Formerly Utilized Sites Remedial
Action Program (FUSRAP)

Maywood Chemical Company Superfund Site

ADMINISTRATIVE RECORD

Document Number

MISS- 136.

US Army Corps
of Engineers®

FINAL
PILOT DEMONSTRATION WORK PLAN

VOLUME 1
OVERVIEW

FUSRAP MAYWOOD SUPERFUND SITE
MAYWOOD, NEW JERSEY

CONTRACT NO. DACW41-99-D-9001
WAD 06 WBS 07

Submitted to:

Department of the Army
U.S. Army Engineer District, Kansas City
Corps of Engineers
700 Federal Building
Kansas City, Missouri 64106

Department of the Army
U.S. Army Engineer District, New York
Corps of Engineers
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26 Federal Plaza
New York, New York 10278

Submitted by:

Stone & Webster Environmental Technology & Services
245 Summer Street
Boston, Massachusetts 02210
June, 2000

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FINAL
PILOT DEMONSTRATION WORK PLAN

VOLUME 1
OVERVIEW

FUSRAP MAYWOOD SUPERFUND SITE
MAYWOOD, NEW JERSEY

SITE-SPECIFIC ENVIRONMENTAL RESTORATION
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TABLE OF CONTENTS

VOLUME 1
OVERVIEW

Tables

Figures

LIST OF ACRONYMS AND ABBREVIATIONS

ASTM	American Society for Testing and Materials
bgs	below ground surface
bkg	background
CDQMP	Chemical Data Quality Management Plan
CERCLA	Comprehensive Environmental, Response, Compensation, and Liability Act
COC	Chain of Custody
cpm	counts per minute
CQCP	Contractor Quality Control Plan
DQCR	Daily Quality Control Report
DQO	Data Quality Objectives
EM	Engineering Manager
FMSS	FUSRAP Maywood Superfund Site
FOL	Field Operations Leader
FUSRAP	Formerly Utilized Sites Remedial Action Program
GPS	Global Positioning System
MHTDP	Materials Handling, Transport and Disposal Plan
MISS	Maywood Interim Storage Site
MS	Matrix Spike
MSD	Matrix Spike Duplicate
NaI	Sodium Iodide
NCP	National Oil and Hazardous Substances Contingency Plan
NCR	Nonconformance Report
NESHAPS	National Emission Standards for Hazardous Air Pollutants
NGVD	National Geodetic Vertical Datum
NJDEP	New Jersey Department of Environmental Protection
PCB	polychlorinated biphenyl
pCi	picocurie
PDWP	Pilot Demonstration Work Plan
PID	Photoionization Detector
QA	Quality Assurance
QC	Quality Control
RCRA	Resource Conservation and Recovery Act

RSO	Radiation Safety Officer
RSS	Radiological Sorting System
SSHO	Site Safety and Health Officer
SSHP	Site Safety and Health Plan
SAP	Sampling and Analysis Plan
SC	Sampling Coordinator
SCC	Soil Cleanup Criteria
SOP	Standard Operating Procedure
SOR	Sum- of-the-Ratios
SSERC	Site-Specific Environmental Restoration Contract
SVOC	Semivolatile Organic Compound
TCLP	Toxicity Characteristic Leaching Procedure
TPWP	Test Pit Work Plan
USACE	U.S. Army Corps of Engineers
USCS	Unified Soil Classification System
USGS	U.S. Geological Survey
USEPA	U.S. Environmental Protection Agency
UTM	Universal Transverse Mercator
VOC	Volatile Organic Compound

1.0 INTRODUCTION

The pilot demonstration described in this work plan is the culmination of efforts to evaluate the benefit of implementing soil volume reduction technologies at the FUSRAP Maywood Superfund Site (FMSS), shown in Figure 1. The results of analyses to date show that volume reduction of radiologically contaminated material is viable. Reduction in radiologically contaminated material may not only result in cost savings during remediation, it may also provide several ancillary benefits, including mitigation of community impacts and material transport and disposal. In order to validate and quantify the potential benefits, a pilot demonstration, as described herein, is planned to be carried out at the Maywood Interim Storage Site (MISS).

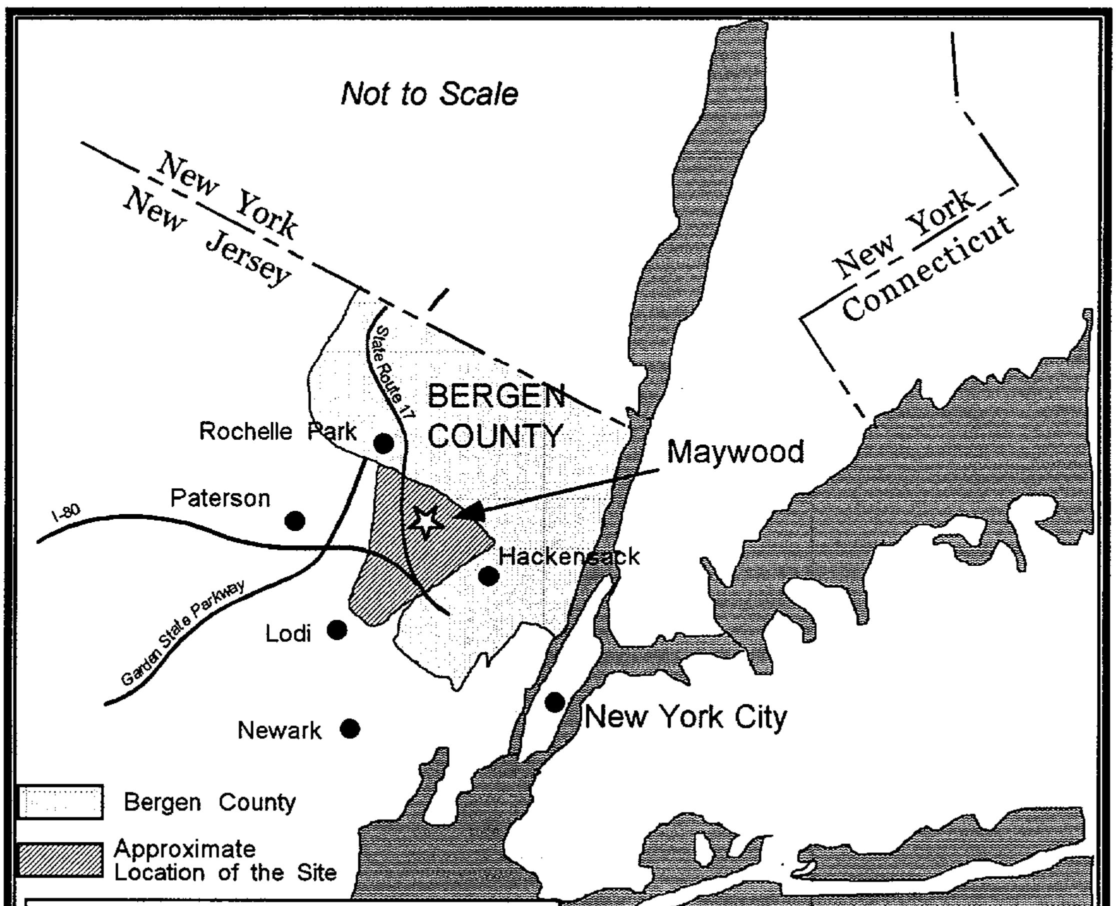


Figure 1: Site Location Map

2.0 DOCUMENT ORGANIZATION

The intent of the Pilot Demonstration Work Plan (PDWP) is to provide the detailed system design, operational procedures, process sampling techniques and procedures, quality control and safety and health plans for the pilot demonstration to support the evaluation of the technologies. The plan has been organized to reflect the logical progression of the pilot demonstration, outlining the various tasks as they are executed.

Figure 2 presents the overall document organization. The Pilot Demonstration Work Plan Overview (i.e., Volume 1) provides general information for the PDWP, as well as a summary of key information from each of the subsequent volumes, which are referred to as required. Volume 1 is presented in sufficient detail to enable the reader to understand the planned pilot demonstration. In addition, Volume 1 describes the elements of the Pilot Demonstration Report, which will present the demonstration's results and address full-scale implementation.

Table 1 contains a brief description of the contents of each of the volumes included in the plan.

Pilot Demonstration Work Plan

Volume 1 - Overview

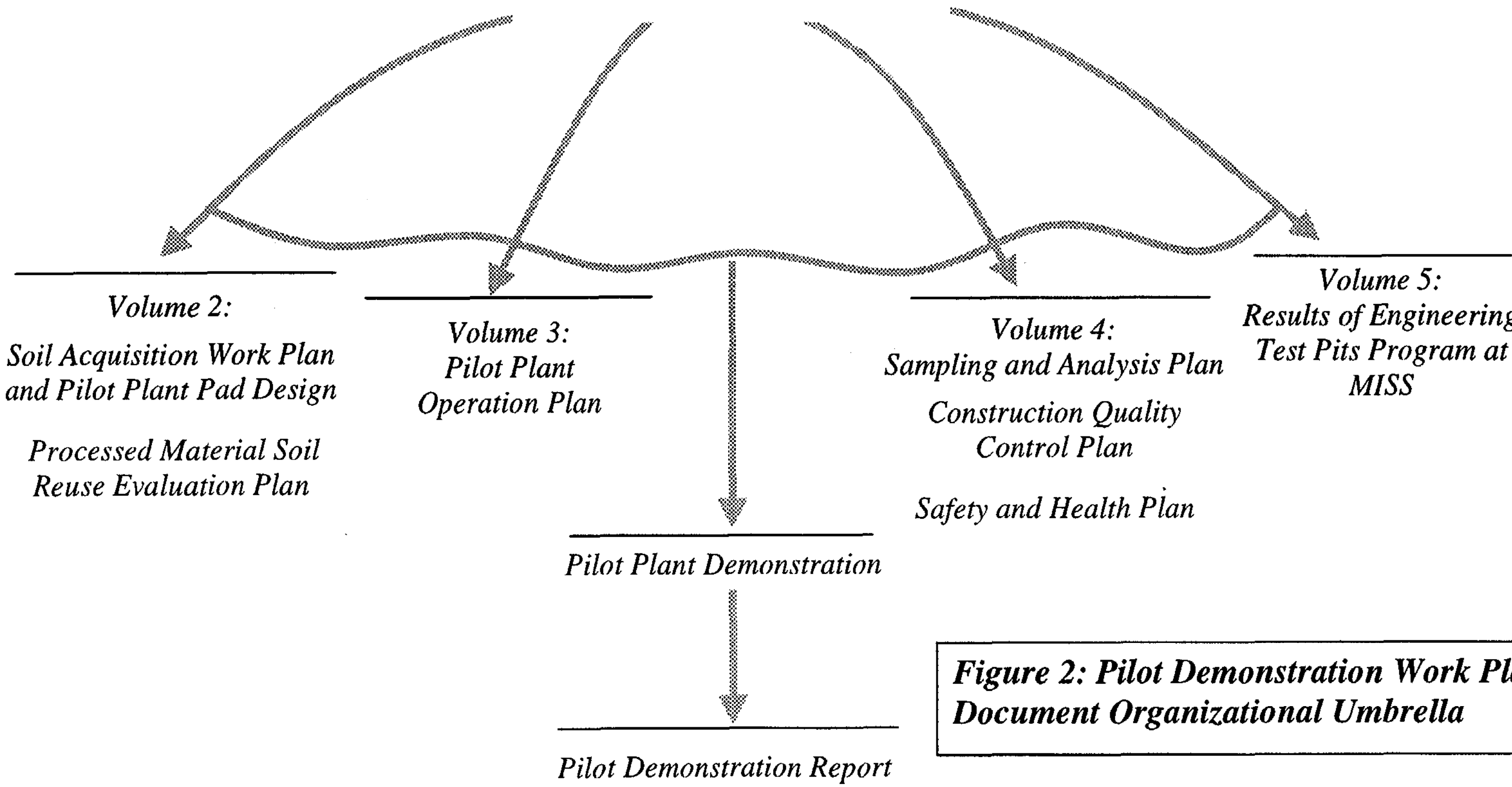


Figure 2: Pilot Demonstration Work Plan Document Organizational Umbrella

Table 1: Pilot Demonstration Work Plan Outline

Volume	Section/Title	Description
1	Overview	Provides description and justification for overall effort. Provides a summary of the work plan and road map to associated volumes. Presents the elements of the Pilot Demonstration Report.
2	Soil Acquisition Work Plan and Pilot Plant Pad Design	Provides design and detailed drawings for the host site pad. Provides description, drawings and staging for the soil acquisition effort, including excavation stabilization plan and procedures.
	Processed Material Soil Reuse Evaluation Plan	Evaluates the potential for reusing soil on the FMSS. Soil reuse is not proposed for the pilot demonstration.
3	Pilot Plant Operation Plan	Contains technical details and operational procedures for the pilot plant.
	Attachment A: Gravel Separation System	This information, supplied by the gravel separation system vendor, provides equipment mobilization, safety and health, system operation and maintenance information.
	Attachment B: Radiological Sorting System	This information, supplied by the radiological sorting system vendor provides equipment mobilization, safety and health, system operation and maintenance information.
4	Sampling and Analysis Plan	The Sampling and Analysis Plan implements the project Chemical Data Quality Management Plan, and provides the details on frequency, parameters, and locations for all sampling under the Pilot Demonstration. This includes the soil acquisition, pilot plant operation, and final survey of the soil acquisition area.
	Construction Quality Control Plan	This plan details how the project Contractor Quality Control Plan will be implemented on this task.
	Safety and Health Plan	This plan implements the project Site Safety and Health Plan and provides the task-specific safety and health considerations.
5	Results of Engineering Test Pits Program at MISS	This volume reports the results of the Engineering Test Pits at MISS program, which was performed as a precursor to the pilot demonstration.

3.0 BACKGROUND

The Comprehensive Environmental, Response, Compensation, and Liability Act (CERCLA) at 2 USC 9621, establishes preferences that remedial actions utilize alternative treatment technologies to the maximum extent practicable in providing permanent and significant reduction of toxicity, mobility and volume of hazardous substances, pollutants or contaminants. Additionally, the National Oil and Hazardous Substances Contingency Plan (NCP) at 40 CFR 300.430, mandates that an assessment be performed of the degree to which the remedy employs recycling, or treatment, that reduces toxicity, mobility, or volume of hazardous substances, pollutants or contaminants. Pursuant to these regulations, the evaluation of waste volume reduction has been a stated objective of the FMSS project since it was initiated.

The United States Army Corps of Engineers (USACE), under Site-Specific Environmental Restoration Contract (SSERC) No. DACW41-99-D-9001, has contracted Stone & Webster Environmental Technology & Services (Stone & Webster) to perform remediation of the FMSS, in Maywood, Lodi, and Rochelle Park, New Jersey. The site location is shown in Figure 1.

In support of the volume reduction initiative, Stone & Webster has evaluated soil processing technology alternatives and prepared this PDWP to facilitate the demonstration of the selected technologies. Through the appropriate management and waste characterization of the processed soils, the volume of radioactively contaminated material may be reduced.

The FMSS is located on the former site of the Maywood Chemical Works in Maywood, New Jersey. The chemical works manufactured a variety of industrial products, which involved the processing of thorium and lithium compounds. It is apparent from historical records of the chemical works that wetlands on the western portion of the property were filled in as the need arose to expand the facility. Additionally, retention ponds were constructed on the western end of the property in order to stabilize and store residual waste slurries and unrecoverable wastes from the manufacturing processes.

Previous remedial investigations and characterizations of the FMSS during the 1980s and early 1990s have shown that the property soils are contaminated with radioactive material, primarily in the form of Thorium-232 (Th-232), Radium-226 (Ra-226), and Uranium-238 (U-238), as well as various other non-radiological contaminants. Remediation will necessitate the identification, removal, transport and disposal of contaminated surface and subsurface soils.

Previous characterizations of the site have shown that the volume of in-situ soil that may be required to be remediated is significant, approximately 200,000 cubic yards. Remediation in the form of excavation and offsite disposal of contaminated soil is being considered at the FMSS. This type of remediation invariably results in the excavation of soil below the radiological cleanup levels. This "over-excavation" of material incurs additional costs in excavation, transport and disposal of soils. Unless the volume of soil requiring such offsite disposal is appropriately managed, remediation will incur a significant cost in the disposal of the material alone.

Given the radioactive materials present at the FMSS, a limited number of options are available for reducing the volume of soil disposed of as radiologically contaminated material. The most suitable options are physical separation techniques. By employing a soil processing technology that can separate soil that is radiologically below criteria from radiologically contaminated soil, remediation costs may be reduced through more efficient soil management. Soil management relates to such aspects as soil excavation, transport, processing, and ultimate disposal. Soil management can result in creating streams each with different handling requirements ranging from offsite disposal, to reuse at the FMSS.

In the latter part of the 1990s, further characterizations and treatability studies were performed on the soils from the FMSS. The intent of these investigations was to identify soil groupings throughout the site and determine if particle-size separation techniques would be effective in separating the excavated volume of material into contaminated and non-contaminated fractions. The primary sources for the data used were from geologic boring data from the characterizations performed during the 1980s and late 1990s, as well as additional data from limited geologic boring and soil sampling programs.

The treatability studies evaluated costs for implementing soil separation technologies at the FMSS. Essentially, the treatability studies were performed in two parts; characterization of the FMSS soils, and development of a conceptual flowsheet, or process simulation, for a production-scale soil treatment plant. The conceptual flowsheet used mathematical modeling of the results of the characterization to assess the feasibility of selected separation technologies in providing volume reduction of the contaminated fractions. Results from the soil treatability studies concluded that: significant cost savings may be realized by combining soil processing and reuse at the FMSS; and, that a further assessment of soil processing technologies was warranted.

A full assessment of any processing options would require an identification of appropriate technologies for the FMSS soil groups and an economic evaluation of each. Any soil processing technologies selected would then undergo a pilot demonstration study. In early 1999, the U.S. Army Corps of Engineers tasked Stone & Webster with preparing a work plan to demonstrate the cost impact of employing soil sorting and/or soil washing during full-scale remediation of the FMSS.

Technology Evaluation

A technology evaluation was performed by Stone & Webster to evaluate the viability of implementing these technologies at the FMSS and to rank the systems. Several categories of soil processing technologies were evaluated: soil sorting, gravel separation and soil washing. Vendors provided system information in response to a questionnaire developed by Stone & Webster. Vendor information was evaluated and each system numerically ranked using a set of evaluation criteria and weighting factors established by Stone & Webster as relevant and appropriate to the assessment and reflective of the following criteria: Efficacy, Safety, Environmental, Schedule, and Cost.

The gravel separation operation is basically a coarse screening system to remove material greater than six (6) inches in nominal diameter, followed by a vibrating screen that removes soil particles larger than 3/8 inch in nominal diameter. The removed material (i.e., gravel) is then rinsed in a closed system. As part of the pilot demonstration, other size screens (e.g. ¼ inch) may be evaluated. Further discussion of the gravel separation system is presented in Section 5.5 of this volume, and in Volume 3.

Radiological sorting is a process that continuously assays a soil stream and directs soil that exceeds a selected threshold activity level to an above criteria stockpile. The remaining soil with radioactivity less than the selected threshold value is directed to a below criteria stockpile. Radiological sorting is most effective when the contamination is not homogeneously distributed in the soil mass. That is, within a given volume of soil there is likely to be a measurable soil volume that is below the selected criteria as well as soil that exceeds the selected criteria. Investigations to date at the FMSS show that the site soils likely meet these criteria.

Soil washing is a water-based process for scrubbing soils ex-situ to remove contaminants. The process removes contaminants from soils, or reduces the volume of contaminated soil, through particle size separation, gravity separation, and attrition scrubbing. The concept of reducing soil contamination through the use of particle size separation is based on the finding that most contaminants tend to bind, either chemically or physically, to clay, silt, and organic soil particles. Washing processes that separate the fine (e.g., small) clay and silt particles from the coarser sand and gravel soil particles effectively separate and concentrate the contaminants into a smaller volume of soil that can be further treated or disposed.

As part of this evaluation, an economic assessment was prepared that compared the total remediation cost for the site utilizing a variety of technologies. Due to the uncertainties in some key variables, including the fraction of material below cleanup criteria and soil grain sizes, a parametric study was performed to examine the potential cost savings for a wide range of values for these parameters. The results of the parametric study indicated that the economics of performing volume reduction on the FMSS soils were viable for a wide range of conditions. Nevertheless, the need to minimize the uncertainties related to soil and radioisotope relationships was defined by Stone & Webster and a limited test pit program (results presented in Volume 5) was performed to address data gaps in the existing site information. Gathering this supplemental information was required to facilitate an evaluation of the applicability of the technology.

Engineering Test Pit Program

In August of 1999, an engineering test pit program was performed at the MISS to gather more detailed information on subsurface soils. Specifically, the objective of the engineering test pit program was to provide an engineering correlation between data from the test pits and previous data, which was generated from soil borings. In order to provide a more accurate evaluation of the performance of the technologies, an assessment of the assumptions made in the technology evaluation was also performed using the results of the test pit program. Following this evaluation, the use of soil processing was still considered viable. The program also provided design basis input to system selection/sequencing and soil acquisition for the pilot demonstration.

The engineering test pit program found that chemical contamination exists at the MISS that has the potential for exceeding certain cleanup criteria. While the chemical contaminants will not affect the pilot plant's process, they may affect possible soil reuse or offsite disposal options.

Therefore, in-situ material will be sampled for chemical contaminants prior to excavation to characterize the material to be processed. Additionally, material processed during the pilot demonstration will be sampled to determine if chemical contaminants may be concentrated in any particular process stream.

More detailed information concerning the Engineering Test Pits Program can be found in Volume 5 of this plan.

Pilot Demonstration

Based on the results of the technology evaluation and the test pit program, a pilot demonstration consisting of the deployment of a dry gravel separation and rinse system and a radiological separation system was recommended. The engineering test pit program found substantial quantities of clean material greater than 3/8 inches in diameter, supporting gravel separation. A dry gravel separation system was selected based on these soil analytical results, as well as the desire to minimize water usage and to simplify the management of the process waste streams. The program also confirmed that in-situ contaminant distribution will support radiological sorting. Also, based on the findings of the engineering test pit program, the deployment of the soil washing system has been eliminated from consideration. The program found a high fines content in the non-retention pond material, with averages up to 40 percent, and radiological contamination in the intermediate sand fractions between #4 and #200 sieve.

The pilot demonstration will focus on determining the effectiveness of the two soil management technologies in separating excavated material into components above and below selected radioactivity criteria, and evaluating the benefits of materials management of the resulting processed soils. The pilot demonstration will also be used to determine the full-scale equipment configurations and operating procedures. The demonstration will be conducted such that all required system operational and soil contaminant data are collected to evaluate the systems' performance and reasonably project and establish full-scale system design/performance economics.

4.0 OBJECTIVE AND APPROACH

The relative success of any soil processing technology resides in the effectiveness of the technology to realize appreciable cost savings in the remediation of the FMSS, as well as to provide community and other benefits relating to waste transport and disposal of the radiologically contaminated material. To this end, a relatively high degree of confidence must be attributed to the performance of the technology in order to reasonably quantify volume reduction and cost savings and predict the ancillary benefits of employing the technology. System performance is directly related to the technologies' ability to process the FMSS soil. Therefore, the primary objective of the pilot demonstration is to evaluate the applicability of the gravel separation and radiological sorting technologies to the FMSS soils.

Ancillary benefits of employing soil processing technologies may include the following statutory, economic and community benefits:

- Utilizing soil processing technologies during the remedial action, pursuant to CERCLA's preference for treatment, and satisfying the mandate of the NCP that technologies be evaluated as remedial options;
- Satisfying the preference of CERCLA and the NCP that selected remedies reduce the volume of contaminants, pollutants or hazardous substances through treatment;
- Reducing number of trucks hauling material on local roads;
- Potential time savings by preventing an overburdening of transportation routes;
- Utilizing technology that allows bulk excavation thereby reduce the amount of time individual property owners are impacted by remediation;
- Cost savings from potentially reducing the volume of material requiring off-site disposal or that must go to more expensive disposal facilities capable of handling higher level radiologically contaminated material;
- Cost savings through reducing the volume of fill material required from off-site sources.

The secondary objective of the pilot demonstration is to quantify or qualify the benefits of employing soil processing technology at the FMSS for the purposes of volume reduction of radiologically contaminated soils.

During the operation of the pilot demonstration program, the process technologies will be evaluated by measuring the radiological contamination, chemical contamination and weight of pre- and post processed materials. The following determinations will be made during the demonstration:

- Characteristics of the soils that will be processed;

- Impacts that excavation and soil handling will have on the contaminant distribution in the processed soil and its impact on soil processing;
- Characteristics of the separated soil to evaluate alternatives for disposal and reuse;
- Evaluation of costs and/or cost benefits for implementing the technologies in a full-scale operation.

5.0 PILOT DEMONSTRATION EXECUTION

5.1 General

The pilot demonstration will collect the required data to evaluate the two technologies and quantify cost and cost savings associated with implementing a full scale processing operation. The following sections contain a brief overview of the schedule and methodology for executing the pilot demonstration. More detailed information concerning specific pilot demonstration procedures, and engineering designs is contained in the referenced plan volumes.

5.2 Schedule

The following table outlines the overall schedule for the remaining work related to the pilot demonstration program. In addition to schedule presented below, a public information session will be held to present the work plan prior to its finalization.

Table 4: Project Schedule

Milestone	Date
Pilot Demonstration Preparation	
Draft Work Plan to Regulators	February 29, 2000
Regulatory Briefing	March 14, 2000
Comments to EPA	June 5, 2000
Discussion of Comment Responses with EPA	June 14, 2000
Finalize Work Plan	June 30, 2000
Construction of Host Location (Complete)	July 24, 2000
Mobilize Process Equipment to Site – Install & Test Run (Complete)	August 9, 2000
Pilot Demonstration Execution	
Start Processing Pilot Demonstration Soil	August 10, 2000
End Pilot Demonstration	October 19, 2000
Analyze Data, Draft Report to USACE	January 5, 2001
Comments received from USACE	January 19, 2001
Draft Report Issued for Regulatory Review	February 2, 2001
Regulatory Review Completed	March 23, 2001
Issue Final Report	April 20, 2001

5.3 Pilot Plant Location and Pad Design

The selection of the operations area for the pilot demonstration primarily considered the efficient and economical performance of supplying feed material, handling process streams and loading-out of material requiring off-site disposal. The proposed location has satisfied the declared considerations and has the additional attributes as listed below:

- The pilot operation area is within the MISS boundary to implement maximum access control;
- The operations area is remotely located on the MISS. Potential impact (visual and noise) to adjacent residential properties have been assessed and will be minimized, as will impacts from future MISS project activities. Section 5.5.2 provides more information on potential community impacts;
- Minimal grading and foundation preparation is required at this location;
- The operations area is located close to the soil acquisition area for efficient hauling of feed material to the operations area;
- The operations area is located close to the load-out area for efficient offsite transportation and disposal minimizing the need for long term stockpiling;
- Access to the Ballod property through the gate on the northwest corner of the MISS, which may be needed to support future remediation activities, is maintained.

The pilot plant will be located as shown on Figure 3. The total area required for the pilot plant will be approximately 250 feet x 250 feet. The pad will consist of a six-inch thick gravel base laid over a geotextile fabric. Steel bearing plates will be used to support the heavy components of the gravel separation system. The bearing plates essentially provide a stable, level support for the vibrating portions of the equipment.

The design of the pilot plant equipment and pad reflects the mobile nature of the systems. The equipment may be readily moved to other portions of the site, as required. Use of the metal bearing plates allows for ease in decontamination of the equipment, and eliminates the need for disposing of potentially contaminated foundation materials, such as concrete, after the plant is relocated.

After the demonstration, the coarse gravel used for the pilot plant pad may be processed through the gravel separation system. The clean gravel may then be stockpiled on-site for future use. More detailed information concerning the pad design may be found in Volume 2.

5.4 Stage I and II: Soil Acquisition

5.4.1 Soil Acquisition Location

The performance of the pilot demonstration will be evaluated with feed soil that has similar characteristics to the majority of the soil that will be processed, if full scale soil processing is implemented on the project. Radiological heterogeneity and particle size distribution are the primary soil characteristics that will contribute to operational performance and is the basis for selecting the soil acquisition area.

The area west of Building 76, shown in Figure 3, has been selected as the soil acquisition location. The review of existing site data, documented in Appendix D of the Soil Acquisition Work Plan and Pilot Plant Pad Design (Volume 2), showed the area west of Building 76 on the MISS property had soil that was radioactively contaminated, and that the contamination was not evenly distributed through the soil mass. The area west of Building 76 also contained fine grained lagoon sediments, and granular "overburden" and "surrounding" soil as defined in the Engineering Test Pit Report. The contaminated soil west of Building 76 is generally shallow and accessible without having to remove large quantities of "clean" overburden.

The area of excavation will be approximately 165 feet x 190 feet x 6 feet deep. The extents of the excavation will begin about 65 feet west of Building 76, and extend about 40 feet into Retention Pond A. In addition, soil from vicinity properties being stored on the MISS may be processed. At least 1,000 cubic yards of currently stockpiled soil is anticipated to be processed. The combination of material from the area west of Building 76 and the existing soil stockpiles will yield an adequate amount of material for the pilot demonstration.

Figure 4 shows the project location in relationship to the rest of the FMSS. Volume 2 presents details on the Soil Acquisition Work Plan and Pilot Plant Pad Design.

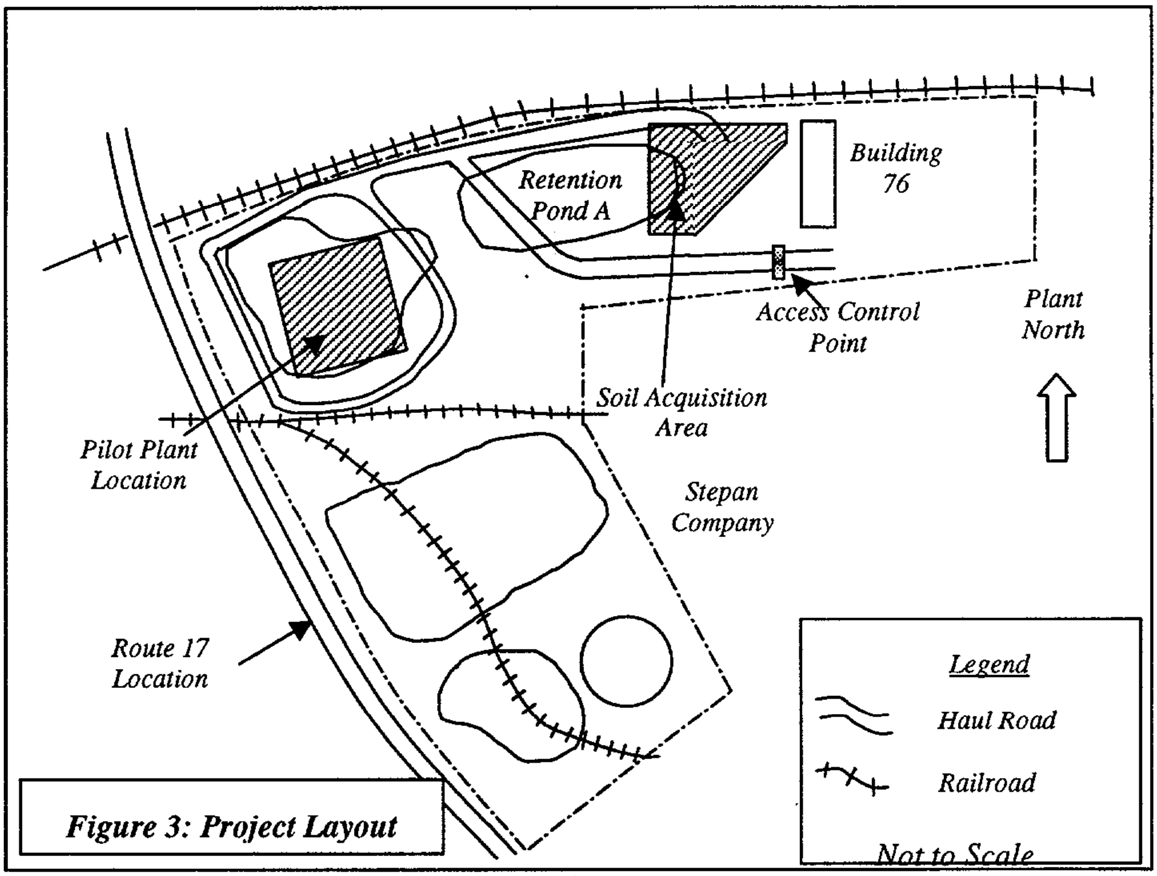


Figure 3: Project Layout

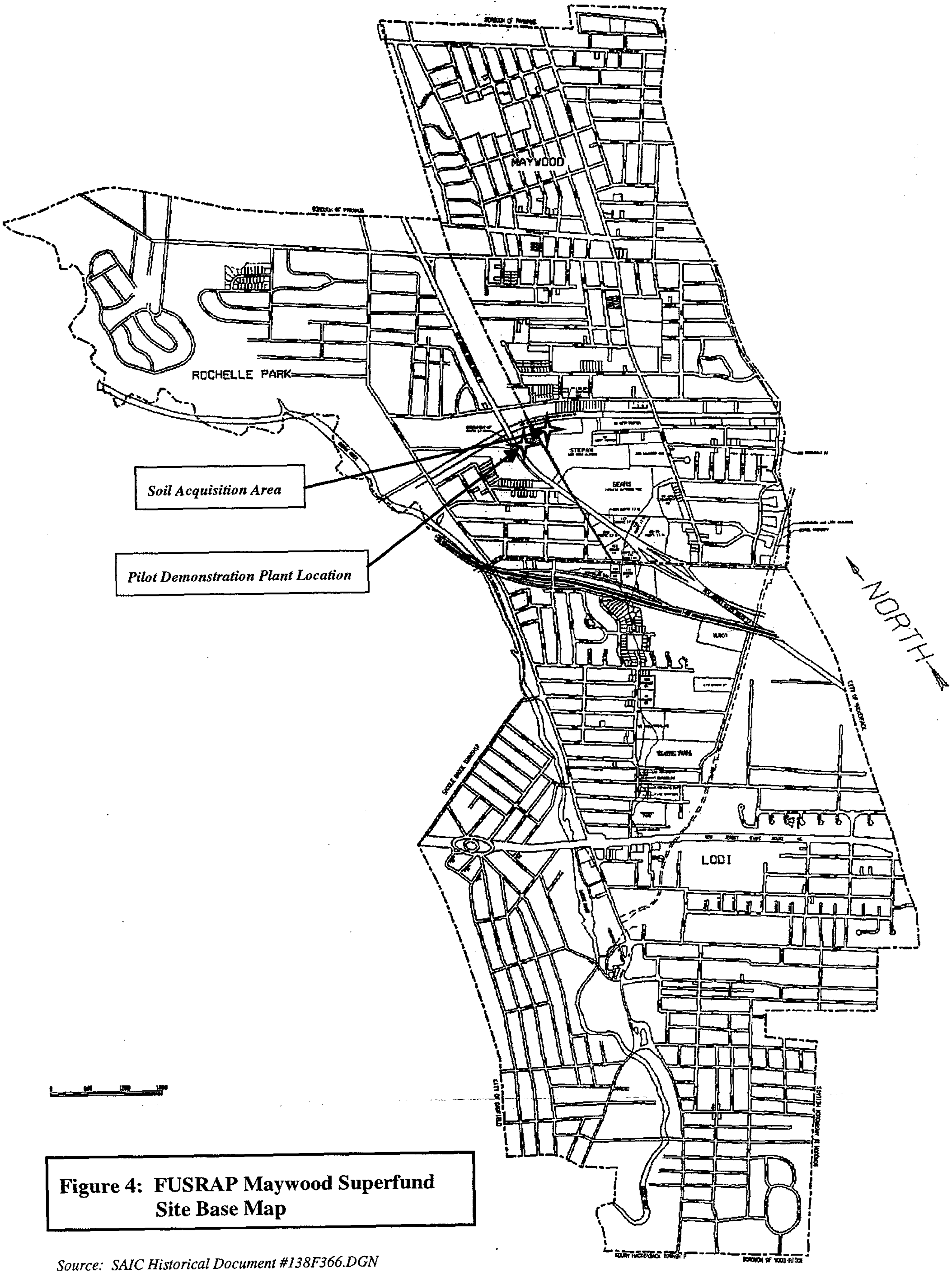


Figure 4: FUSRAP Maywood Superfund Site Base Map

Source: SAIC Historical Document #138F366.DGN

5.4.2 Soil Characterization and Excavation

Effects of normal construction excavation on the heterogeneous distribution of radioactivity in the soil, and the ability of the process system to segregate the processed material into below criteria and above criteria stockpiles are two key factors for measuring the performance of the pilot demonstration. By characterizing the in-situ soils and employing a method of excavation that facilitates the tracking of the excavated material, the performance of the system may be quantified. In addition, the methods of soil characterization and excavation are also related to the operation of the soil processing technologies.

Soil acquisition and pilot plant operations will focus on characterizing, excavating and processing a discrete volume of soil or "batch." Batch processing will afford greater control of the process and will be used to assess the systems under full-production level efforts. Batch sampling will primarily be used to collect appropriate data to evaluate the effectiveness of the processing technologies and the economics of managing the output streams. The batch will be defined prior to excavating a cut of soil, and will fulfill the characteristics of one of the batch types that are to be examined. Batch types are discussed further below and in Volume 3.

Excavation of the material will be performed in two stages. Stage I excavation consists of removing granular material and soils that typically surround the MISS retention ponds. Stage II consists of removing high fines material typical of those found in the retention ponds (i.e., Retention Pond A).

Prior to start of the Stage I excavation, a grid system will be established over the area of soil to be excavated. Each grid will be 5 feet x 5 feet x 1 foot deep (i.e., 25 ft^3 of material). The grid system is being established to aid in the designation and tracking of soils during excavation and processing. The surface of the soil to be excavated will be scanned using a linked NaI-Global Positioning System (GPS) system. Areas of soil will be referenced to the grid to locate and document radiological contamination. The radiological contamination mapped by the linked NaI-GPS system will be used to guide the excavation. The grid system will also be used to select the batch to be processed.

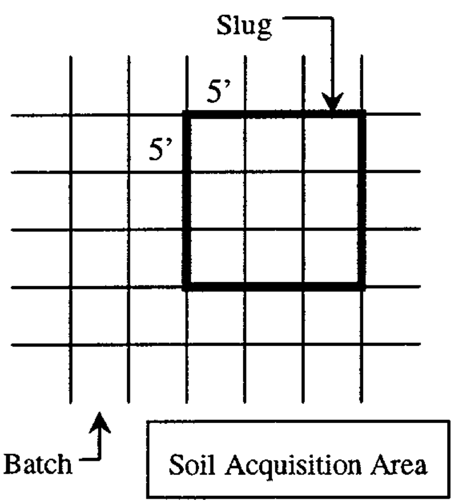
Grids will be selected for each batch to represent one of the following scenarios;

- Granular material to be processed through the gravel separation system only;
- Granular material with radiological activity near the cleanup level;
- Granular material with radiological activity near the offsite disposal facility acceptance criteria;
- Retention pond material with radiological activity near the cleanup level;
- Retention pond material with radiological activity near the offsite disposal facility acceptance criteria;
- Material that is above the cleanup criteria (i.e., hot spot);

- Material that is below the cleanup criteria (i.e., below criteria);

- Material that is a combination of both above and below criteria.

- Retention pond material to be processed through the gravel separation system only;



Once a batch has been designated for processing, a smaller subset of the batch, called a "slug", will be identified. Each slug will consist of approximately 9 grids of material (i.e., 8-10 cubic yards). The intent of the "slug" is to gather the detailed data required to evaluate the mixing/dilution effects caused by soils handling. While only weight is tracked for each batch, the slug will be used to track both weight and activity. Soil samples will be collected for gamma spectroscopy at several points in the process to quantify the radioactivity in the soil. The levels of contamination are generally low at FMSS, so tracking large quantities of soil would increase any margins of error or uncertainties that are inherent in the instruments being used to quantify the activity. By limiting the size of the soil group to be characterized, and increasing the number of samples taken of that volume, a higher degree of confidence may be achieved that the sample data is representative of the excavated material. Following processing, the activity content of the post-processed streams will be compared to the pre-processed streams. Slugs may not be designated for every batch, and will be designated at the discretion of the Task Superintendent. Volume 3 contains more information on slug and batch selection.

Material for the slug will be excavated and stockpiled first, ahead of the remainder of the batch. Removing the slug material first mitigates any concern that operation of heavy equipment in the soil acquisition area will compromise the in-situ characterization of the slug. Excavation of the slug will occur in one (1) foot cuts. The excavation will be performed in one foot cuts to adequately assess the in-situ material. Results of the test pit program, contained in Volume 5, showed that it is problematic to extrapolate contamination between sample locations.

The slug material will be stockpiled near the pilot plant for processing. After the excavation and processing of the slug, excavation and processing of the remaining material for the batch will proceed in a manner similar to the slug.

Soil acquisition and soil feed will be managed in measured units. The unit of measure in the soil acquisition excavation will be the cubic yard (measured in-place). The unit of measure for the feed soil will be total weight in pounds or tons.

The excavation will proceed for each selected batch until the maximum depth of excavation (e.g., 6 feet) is reached. Additional excavation may be performed if isolated areas of contamination remain and additional processing is warranted. This work will be conducted as part of the Stage III activities (see Section 5.6).

Excavated batch material will be staged near the pilot plant in one of four categories:

- Material that is deemed radiologically below criteria by in-situ screening;
- Oversized material and debris that cannot be processed by the pilot plant;
- Granular material that will be processed by the gravel separation system followed by the radiological sorting system;
- Material with high fines content that will be processed only by the radiological sorting system.

After each one foot cut is excavated, the grid system will be re-established and re-surveyed. The next batch to be processed will also be identified.

A more detailed discussion of the soil sampling during soil acquisition is included in Volumes 3 and 4 of this PDWP.

5.5 Stage I and II: Soil Processing

The following section gives a brief overview of the pilot plant process sequencing, operations, soil management, process sampling and weight balance. More detailed information concerning these topics can be found in Volume 3 of this plan. Process sampling is presented in greater detail in Volume 4.

5.5.1 General

Radiological and geotechnical analyses conducted during the engineering test pit program showed that the radiological contamination above the selected criteria resided primarily in material that is less than 3/8 inch in diameter. This result leads to the first underlying premise of the proposed pilot demonstration: the separation of material less than 3/8 inch diameter from the FMSS soils will remove material that is above the selected criteria for radiological contamination. The selected criteria may be based on a reuse criteria or waste profile classification for a particular disposal facility. The second premise is that the heterogeneous distribution of the radiological contamination, which was demonstrated in the test pit program (i.e., Volume 5), will make soil separation a viable process. The following provides a brief discussion of the selected technologies. The technology descriptions are detailed in Volume 3 of this PDWP.

The technology selected for the pilot demonstration consists of a multi-stage process that includes gravel separation of material greater than 3/8 inch nominal diameter and radiological sorting of the soil finer than 3/8 inch nominal diameter.

The gravel separation system is a two-stage system. A soil pre-screening system removes boulders and debris greater than 6 inches. This material is combined with the material deemed not appropriate for processing for waste profiling and subsequent offsite disposal. The second stage removes material that is greater than 3/8 inch in diameter. Material that falls within the range of 3/8 to 6 inches nominal diameter is sent through a water rinse system to remove fine particles that may have adhered to the gravel.

The rinse system is a closed system that recycles water back into the process. Water used in the rinse is collected in a sump and pumped through a three-stage bag and cartridge filter system. Filtered water is collected in a 20,000 gallon fractionation tank and eventually pumped back into the process. Fines removed from the process are captured in the filter membranes. Periodic removal of the filters for cleaning will be required. Less than 5 gpm of makeup to the rinse system will be required to replace water lost to evaporation or with the processed gravel.

The radiological sorting system may be operated in two different configurations during the demonstration. The system may be operated on the back end of the gravel separation system when processing granular material, or it may be fed high fines material directly. Essentially, this system uses an in-line NaI array to detect radiologically contaminated soil and separates the soil into either a below or above criteria stockpile. The system set points can be varied based on project reuse levels or disposal site acceptance criteria.

While processing granular material, the less than 3/8-inch diameter soil stream will be conveyed to the radiological sorting system. When high fines material (i.e., retention pond material) is fed directly to the radiological sorting system, a 1½ inch screen is employed on the front of the system to remove miscellaneous debris. Material larger than 1½ inches that cannot be processed by the system will be temporarily stored and then processed through the gravel separation system.

Figure 5 presents a schematic of the process.

5.5.2 Noise and Dust Monitoring

Background noise surveys have been performed for the FMSS. Anticipated noise levels and mitigation alternatives are included in Appendix B of the Soil Acquisition Work Plan and Pilot Plant Pad Design, Volume 2. During the course of the pilot demonstration noise levels will be monitored. Noise mitigation measures will be implemented if noise levels exceed accepted project levels.

Similarly, dust levels will be monitored in the vicinity of the soil acquisition area and process equipment. A calculation was performed for the pilot demonstration using the CAP88-PC computer code. It concluded that the annual effective population dose to the public within 80 km of the MISS from airborne particulate releases during the pilot demonstration was estimated to be 0.05 person-rem. The annual effective dose to the maximally exposed resident (90 m NE) and worker (90 m NE), primarily from inhalation of airborne particulate releases during the pilot demonstration, is estimated to be 0.04 mrem and 0.02 mrem, respectively. These doses are well below the National Emission Standards for Hazardous Air Pollutants (NESHAPS) standard of 10 mrem/yr. In the event that dust levels are above accepted project levels, appropriate measures will be instituted as described in Volumes 2 and 3 of this work plan.

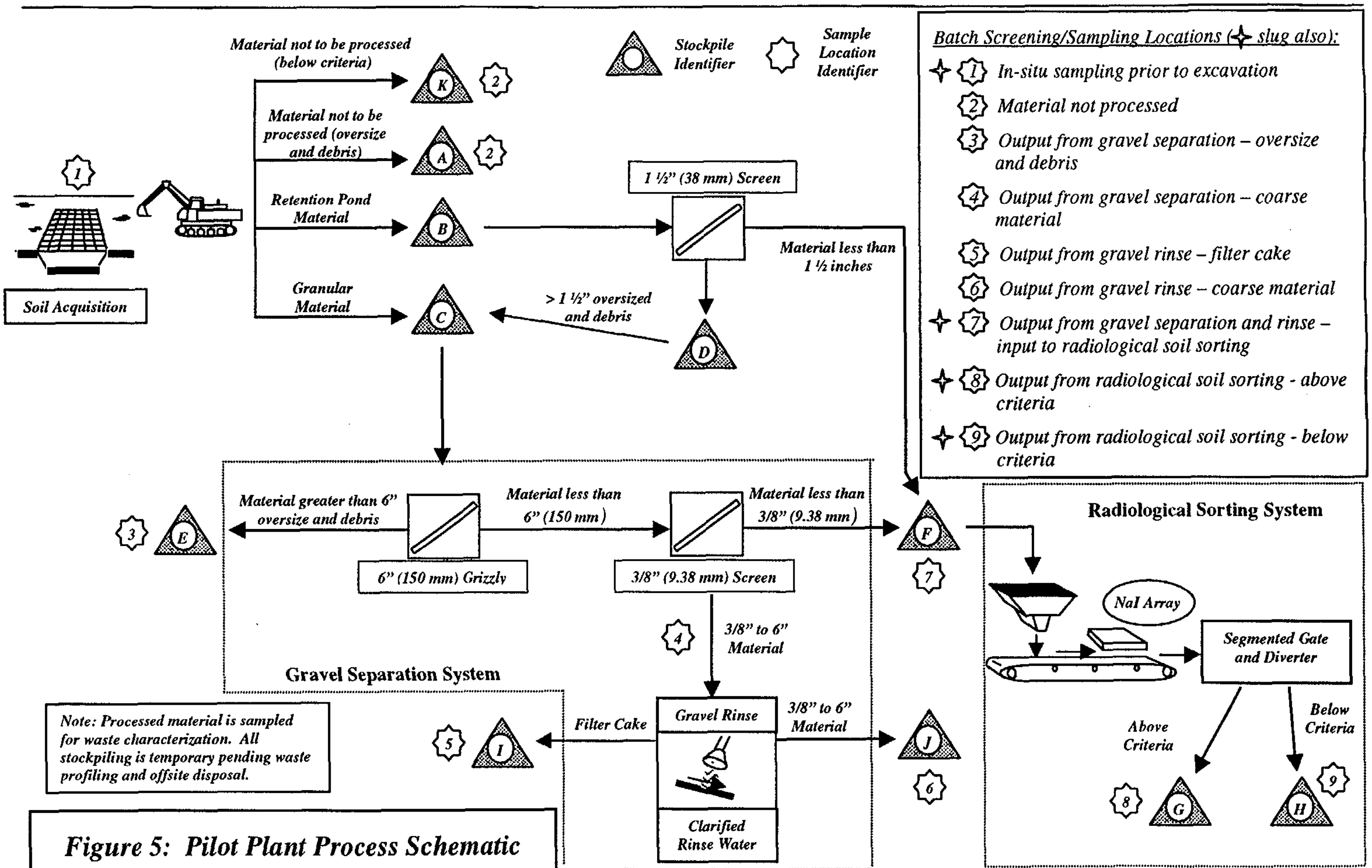


Figure 5: Pilot Plant Process Schematic

5.6 Stage III Activities

When sufficient data has been collected to adequately evaluate the performance of the soil processing systems, the pilot demonstration activities will proceed to Stage III. The anticipated Stage III activities are included in the list below. Planned activities may be added or deleted depending on observations made during Stage I and Stage II of the pilot demonstration.

Stage III activities may include the following:

- Investigation of various excavation and material handling techniques, other than 1 foot cuts, that may be used in full-scale operations and evaluation of their impact on the heterogeneity of the feed soil and operation of the system;
- Testing of various field screening techniques for development of a protocol for identification and removal of residual contamination after initial cuts are completed;
- Testing of throughput limits of the soil management systems;
- Testing of compaction methods for off-site borrow material to refine methods that attain the desired compaction requirements;
- Implementation of the MARSSIM final status survey methodology utilizing and comparing both traditional soil sampling with laboratory analysis and surface ISOCS methodologies;
- Evaluation of techniques for surface water control and management for application during remediation of vicinity properties.

Upon completion of the Stage II soil acquisition, a determination will be made as to whether all contaminated material has been removed to the greatest extent possible. Localized radiological contamination, or hot spots, will be identified and excavated as part of the Stage III activities. A final status survey will be performed using a MARSSIM–like approach. A Final Status Survey Work Plan is in the process of being developed and will be submitted for review at a later date.

The soil acquisition area will be backfilled with material obtained from an approved off-site borrow source. The backfill source will be inspected, sampled, and analyzed to document that the material meets the necessary physical characteristics, and is not chemically or radiologically contaminated. The backfill material will conform to the requirements stated in Volume 2 of this work plan. Backfill material will be placed in loose lifts not exceeding one foot, and will be compacted. Laboratory permeability measurements will be performed on the proposed backfill material compacted to the specified compaction levels to ensure it meets permeability requirements prior to use onsite.

5.7 Material Transport and Disposal

Some temporary stockpiles of processed soil will result from the pilot demonstration, and will require disposal. All material generated by the pilot demonstration will be disposed at an appropriate offsite disposal facility after waste profiling.

It is possible that soils that are below radiological criteria may contain chemical contamination. The presence of chemical contamination above RCRA standards in soil that is below the radiological criteria will require the soil to be disposed of as RCRA waste. In light of possible chemical contamination, soil will be sampled prior to excavation to characterize chemical contaminant concentrations for use in developing disposal options.

6.0 PILOT DEMONSTRATION DOCUMENTATION AND EVALUATION

The results of the pilot demonstration will be compiled, evaluated, and presented in a Pilot Demonstration Report. The report will address the effectiveness of the demonstration in achieving the program's goals. Specifically, did the technologies effectively and efficiently segregate the FMSS soils, and how does this translate in achieving the potential benefits identified previously? Elements of the Pilot Demonstration Report will include the following:

- Soil matrix and radiological contaminant descriptions describing the physical and contaminant characteristics of the soil before and after processing, as well as characteristics of the material that may impact treatment cost or performance during full scale operation;
- Process flow diagram showing the overall schematic of the system as operated during the pilot demonstration. Specific operational parameters that may influence the cost during production will also be included;
- Weight tracking around each soil processing system and radioactivity tracking for material less than 3/8 inch. The tracking will be linked to specific operating conditions, dates of processing and the origin of the contaminant material;
- Processing cost analysis with processing costs for all activities directly attributable to each processing system ($/per ton of soil treated). The cost analysis will include a discussion of the impact of specific site parameters on the cost for additional soil processing;
- Characterization of the processed soils for materials management options.

6.1 Weight and Activity Tracking

Processed materials will be sampled to determine radionuclide concentrations in the soil. Processed residuals will be analyzed for the following suite of radiological contaminants: Ra-226, Th-232 and U-238. Collected data will be used to track the weight and total activity of the radionuclides in the separated process streams generated by the gravel separation and radiological sorting systems. Figure 5 shows how weight and activity will be tracked during the pilot demonstration.

Weight will be measured using weigh scales on the loaders and on process equipment. Specific activity will be measured using gamma spectroscopy on various samples collected in-situ and from the conveyors associated with the systems. Radionuclide activity will be measure in pico-Curies per gram (pCi/g). Specific activity of a stockpile multiplied by the weight of the stockpile results in the total activity (pCi).

Material weight and total activity for slug material less than 3/8 inch will be tracked and evaluated. During the course of batch excavation, selected grids in the soil acquisition area will be designated as part of the slug of material to be tracked through the process. An average gamma count value will be determined for each of the 9 grids included in the slug. A sample for gamma spectroscopy analysis will be taken at each grid included in the slug, and will be analyzed by the onsite laboratory.

Prior to processing the slug of soil, the radial conveyors will be moved away from the main stockpile locations to facilitate the sampling for weight and activity tracking. For weight and activity tracking purposes, each slug will be sampled or weighed at the following locations. Sampling will be performed as specified in the Sampling and Analysis Plan in Volume 4.

- In-situ Material: NaI scan, gamma spectroscopy sample from each grid, weight on loader scale;
- Output from Gravel Separation System/Input to Radiological Sorting: gamma spectroscopy sample from conveyor, weight on conveyor belt scale;
- Output from Radiological Sorting (above criteria): NaI scan of stockpile, gamma spectroscopy sample from conveyor, weight on conveyor belt scale;
- Output from Radiological Sorting (below criteria): NaI scan of stockpile, gamma spectroscopy sample from conveyor, weight on conveyor belt scale.

After the slug processing has been completed, the batch will be processed. The weight of various materials will be tracked at the following locations:

- In-situ Material: weight on loader scale;
- Material Not Processed (oversize construction debris and trash): weight on loader scale;
- Material Not Processed (below criteria): weight on loader scale;
- Output from Gravel Separation (oversize and debris, >6 inch): weight on loader scale;
- Output from Gravel Separation (rinsed coarse material 3/8 to 6 inches): weight on conveyor belt scale;
- Output from Gravel Separation (filter cake following rinsing): weight on field scale;
- Output from Gravel Separation System (input to radiological sorting, <3/8 inch): weight on conveyor belt scale;
- Output from Radiological Sorting (above criteria): weight on conveyor belt scale;
- Output from Radiological Sorting (below criteria): weight on conveyor belt scale;

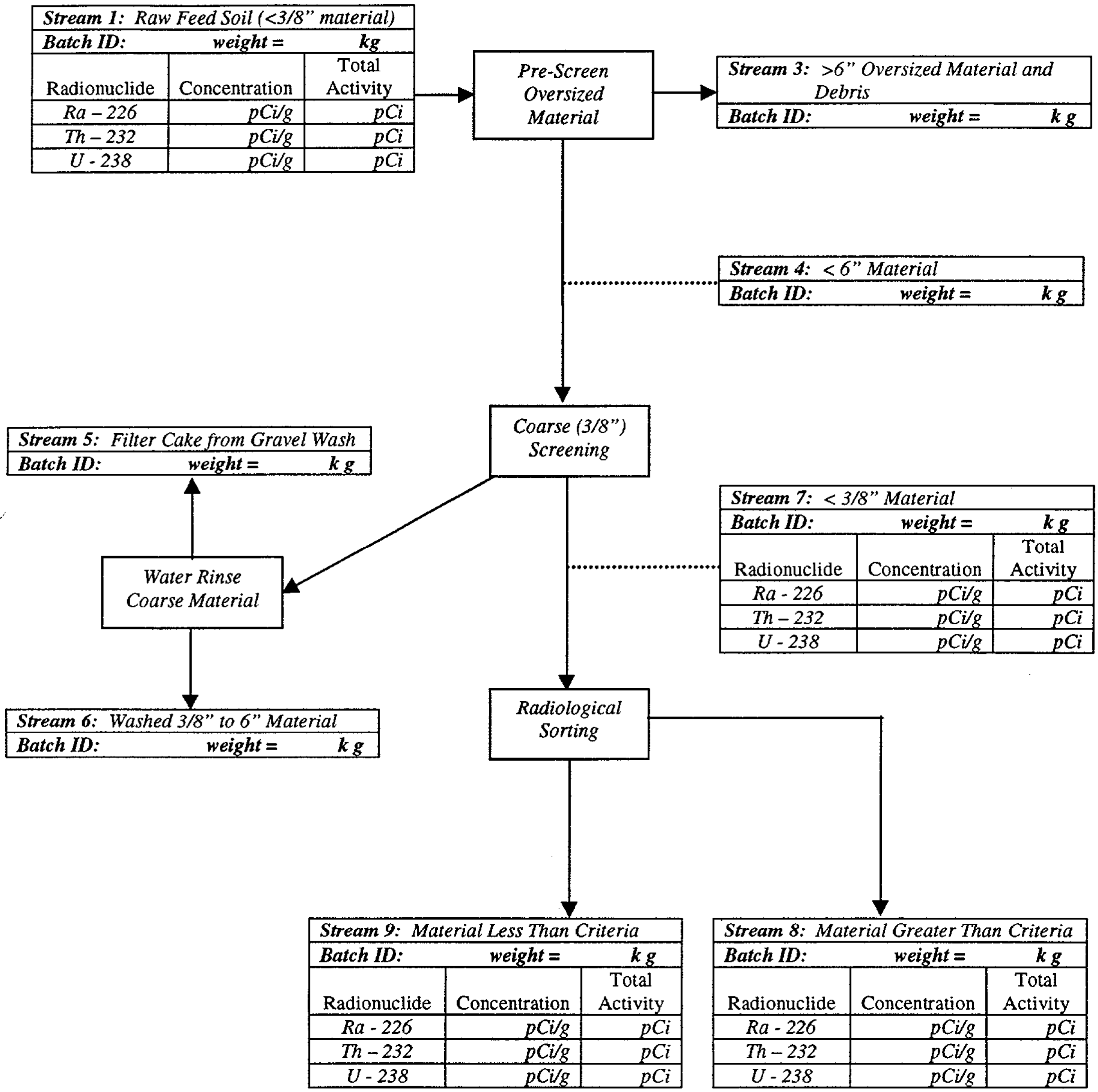
Material will be sampled in-place at the respective stockpiles and in process at intermediate locations. There are several factors that will result in the tracking not being exact:

- The inherent inaccuracy of using samples to represent larger volumes;
- Degree of accuracy of the loader mounted weigh scales (non-certified);
- The addition of water-weight through the gravel rinse process and dust suppression;

- Loss of water through evaporation.

Sampling frequencies and procedures will be performed on the soil residuals as described in the Sampling and Analysis Plan found in Volume 4.

Figure 6: Pilot Demonstration Weight and Activity Tracking



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FINAL
PILOT DEMONSTRATION WORK PLAN

VOLUME 2
SOIL ACQUISITION PLAN AND PILOT PLANT PAD DESIGN AND PROCESSED MATERIAL SOIL REUSE EVALUATION PLAN

FUSRAP MAYWOOD SUPERFUND SITE
MAYWOOD, NEW JERSEY

CONTRACT NO. DACW41-99-D-9001
WAD 06 WBS 07

Submitted to:

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U.S. Army Engineer District, Kansas City
Corps of Engineers
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Department of the Army
U.S. Army Engineer District, New York
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June, 2000

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FINAL
PILOT DEMONSTRATION WORK PLAN

VOLUME 2
SOIL ACQUISITION PLAN AND PILOT PLANT PAD DESIGN

FUSRAP MAYWOOD SUPERFUND SITE
MAYWOOD, NEW JERSEY

SITE-SPECIFIC ENVIRONMENTAL RESTORATION
CONTRACT NO. DACW41-99-D-9001
WAD 06 WBS 07

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Task Manager

TABLE OF CONTENTS

VOLUME 2 - SOIL ACQUISITION WORK PLAN AND PILOT PLANT PAD DESIGN

Tables

Figures

Appendices

LIST OF ACRONYMS AND ABBREVIATIONS

ASTM	American Society for Testing and Materials
bgs	below ground surface
CDQMP	Chemical Data Quality Management Plan
COC	Chain of Custody
CQCP	Contractor Quality Control Plan
DQCR	Daily Quality Control Report
DQO	Data Quality Objectives
EM	Engineering Manager
FMSS	FUSRAP Maywood Superfund Site
GEPP	General Environmental Protection Plan
MS	Matrix Spike
MSD	Matrix Spike Duplicate
MSL	Mean Sea Level
MHTDP	Materials Handling, Transport and Disposal Plan
NAD	North American Datum
NGVD	National Geodetic Vertical Datum
NJDEP	New Jersey Department of Environmental Protection
PCB	polychlorinated biphenyl
pCi	picocurie
PID	Photoionization Detector
QA	Quality Assurance
QC	Quality Control
RSO	Radiation Safety Officer
RMA	Radioactive Materials Area
SSHO	Site Safety and Health Officer
SSHP	Site Safety and Health Plan
SAP	Sampling and Analysis Plan
SOP	Standard Operating Procedure
SVOC	Semivolatile Organic Compound

TCLP	Toxicity Characteristic Leaching Procedure
TS	Task Superintendent
USACE	U.S. Army Corps of Engineers
USCS	Unified Soil Classification System
USGS	U.S. Geological Survey
USEPA	U.S. Environmental Protection Agency
UTM	Universal Transverse Mercator
VOC	Volatile Organic Compound

1.0 INTRODUCTION

The United States Army Corps of Engineers (USACE), under Site-Specific Environmental Restoration Contract (SSERC) No. DACW41-99-D-9001, has contracted Stone & Webster Environmental Technology & Services (Stone & Webster), a division of Stone & Webster Engineering Corporation, to perform remediation of the FUSRAP Maywood Superfund Site (FMSS), in Maywood, Lodi, and Rochelle Park, New Jersey (Figure 1). As discussed in the Overview in Volume 1, gravel separation and radiological sorting technologies offer promise in substantially reducing the volume of soil requiring disposal as radioactive waste. Technologies which result in permanent and significant volume reduction are a statutory preference under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) and the National Oil and Hazardous Substances Contingency Plan (NCP). A pilot study, involving the demonstration of these technologies utilizing two separate processing systems, is planned to be carried out at the Maywood Interim Storage Site (MISS) to further evaluate the viability of full-scale implementation of the technologies at the FMSS.

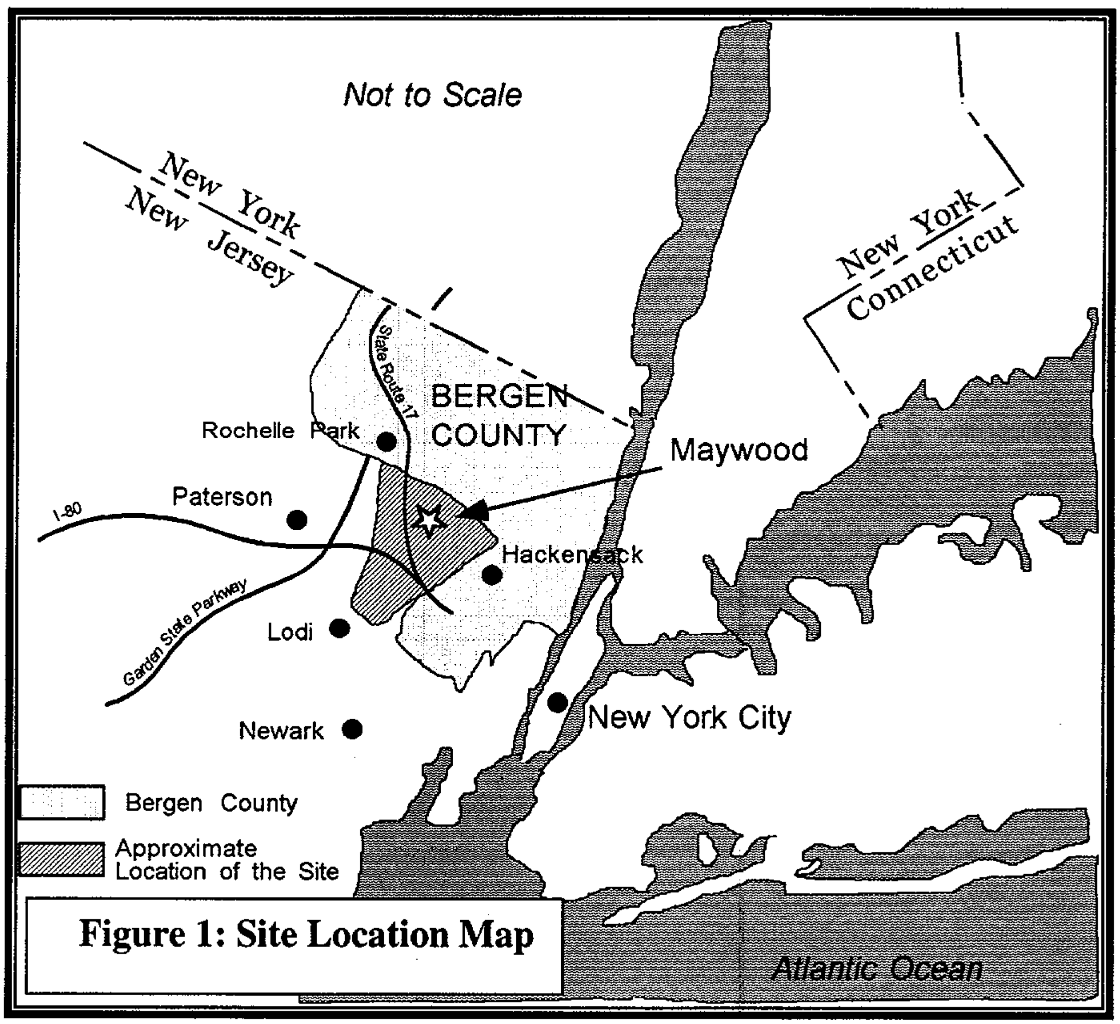

Figure 1: Site Location Map

This pilot demonstration will be used to assess the operational, technical and economic feasibility of applying particle separation and radiological sorting to the soils at the FMSS. The primary objectives of the pilot demonstration are to:

- Determine the applicability of gravel separation of the FMSS site soils for the purpose of achieving volume reduction and remediation cost savings.
- Determine the applicability of radiological sorting of the FMSS site soils for the purpose of achieving volume reduction and remediation cost savings.

The secondary objective of the pilot demonstration is to quantify or qualify the benefits of employing soil processing technology at the FMSS for the purposes of volume reduction of radiologically contaminated soils. The benefits, which are statutory, economic, and community oriented, may include:

- Utilizing soil processing technologies during the remedial action, pursuant to CERCLA's preference for treatment, and satisfying the mandate of the NCP that technologies be evaluated as remedial options;
- Satisfying the preference of CERCLA and the NCP that selected remedies reduce the volume of contaminants, pollutants or hazardous substances through treatment;
- Reducing the number of trucks hauling material on local roads;
- Potential time savings by preventing an overburdening of transportation routes;
- Utilizing technology that allows bulk excavation thereby reducing the amount of time individual property owners are impacted by remediation;
- Cost savings from potentially reducing the volume of material requiring off-site disposal or that must go to more expensive disposal facilities capable of handling higher level radiologically contaminated material;
- Cost savings through reducing the volume of fill material required from off-site sources.

The technologies selected and the configuration of the demonstration are based on the recognition that the bulk of the soils at Maywood are not uniformly contaminated. Rather, the radiologically contaminated soil is likely surrounded by soil that is "clean" (below criteria). It is also recognized that the radiological contamination is concentrated in the finer fractions of the soil mass. These principles were demonstrated in the Engineering Test Pits at MISS Program (see Volume 5). Physical separation of the coarse fraction (greater than 3/8 inch diameter) from the soil mass will result in a soil volume reduction that will be proportional to the percentage of coarse material. A radiological sort of the material which is less than 3/8 inch diameter will then create two streams: above criteria and below criteria. The criteria used in the radiological sort will be based on either reuse or disposal requirements.

This Soil Acquisition Work Plan and Pilot Plant Pad Design provides guidance and specification to ensure the following:

- The feed material for the pilot demonstration is excavated in a controlled excavation procedure and delivered to a designated stockpile as feed material to the plant for processing.

- That soils processed during the pilot study are representative of overall site soils.
- The excavation is stabilized in accordance with applicable regulations.
- That adequate site preparation has been done to facilitate mobilization and plant installation.
- The pilot plant pad design is adequate and installed appropriately.

This Soil Acquisition Work Plan and Pilot Plant Pad Design is intended to be a stand-alone document. Information from other plans is repeated as required. Additional details that support the soil acquisition are contained in Volumes 3 and 4 as summarized in Table 1.

Table 1: Pilot Demonstration Work Plan Outline

Volume	Section/Title	Description
1	Overview	Provides description and justification for overall effort. Provides a summary of the work plan and road map to associated volumes. Presents the elements of the pilot demonstration Report.
2	Soil Acquisition Work Plan and Pilot Plant Pad Design	Provides design and detailed drawings for the host site pad. Provides description, drawings and staging for the soil acquisition effort, including excavation stabilization plan and procedures.
	Processed Material Soil Reuse Evaluation Plan	Evaluates the potential for reusing soil on the FMSS. Soil reuse is not proposed for the pilot demonstration.
3	Pilot Plant Operation Plan	Contains technical details and operational procedures for the pilot plant.
	Attachment A: Gravel Separation System	This information, supplied by the gravel separation system vendor, provides equipment mobilization, safety and health, system operation and maintenance information.
	Attachment B: Radiological Sorting System	This information, supplied by the radiological sorting system vendor provides equipment mobilization, safety and health, system operation and maintenance information.
4	Sampling and Analysis Plan	The Sampling and Analysis Plan implements the project Chemical Data Quality Management Plan, and provides the details on frequency, parameters, and locations for all sampling under the pilot demonstration. This includes the soil acquisition, pilot plant operation, and final survey of the soil acquisition area.
	Construction Quality Control Plan	This plan details how the project Contractor Quality Control Plan will be implemented on this task.
	Safety and Health Plan	This plan implements the project Site Safety and Health Plan and provides the task-specific safety and health considerations.
5	Results of Engineering Test Pits Program at MISS	This volume reports the results of the Engineering Test Pits at MISS program, which was performed as a precursor to the pilot demonstration.

2.0 PROJECT ORGANIZATION AND RESPONSIBILITIES

This portion of the plan addresses the overall organization of the pilot demonstration program. The Project Organizational Chart is shown in Figure 2.

2.1 Task Manager

The Stone & Webster Task Manager is responsible for the effective day-to-day management of all operations. The Task Manager has responsibilities that specifically include the following:

- preparing work plans, including approval of sampling locations, chemical analysis parameters, schedules, and labor allocations;
- managing all funds for labor and materials procurement;
- monitoring and controlling the schedule;
- managing the site team toward unified, productive project accomplishment;
- direct communication and liaison with the USACE Engineering Manager (EM) and Stone & Webster Project Manager; and
- providing oversight to the technical leaders and reviewing all deliverables.

2.2 Task Superintendent

The Task Superintendent (TS) is responsible for the following items:

- the appropriateness, adequacy, and timeliness of the technical or engineering services provided;
- developing the technical approach and level of effort required to address each task/subtask;
- the day-to-day conduct of the work, including the integration of the input of supporting disciplines and subcontractors and ensuring that all field documentation is completed properly (see Volume 4 – Construction Quality Control Plan);
- the technical integrity of all field work.

2.3 Site Safety and Health Officer and Radiation Safety Officer

The responsibilities of the site safety and health personnel are discussed in the Safety and Health Plan - Volume 4.

2.4 Sampling Coordinator

The Sampling Coordinator will be responsible for overseeing all sampling and analysis activities, including preparing sample bottles for collection; managing field sampling records, laboratory chains-of-custody, and other sampling related documentation; coordinating laboratory sample pick-ups; and/or packaging and shipping samples.

2.5 Identified Individuals

The task order staff consists of the following individuals:

Task Manager	Richard Skryness, P.G.
Lead Geotechnical Engineer	L.P. Singh, P.E
Task Superintendent	Babatunde Marquis
Project Superintendent	Tom Farrell
Site Safety and Health Officer	Shawn Andrews
Radiation Safety Officer	Eric Laning
Sampling Coordinator	Mike Ciminera
Contractor Quality Control System Manager	Akram Aziz, P.E
Project Chemist	Brian Tucker, Ph.D.
Project CIH	James Skrabak, CIH
Project CHP	Alan Fellman, CHP, Ph.D

The subcontractors and team members which will be used include the following:

Table 2: Pilot Demonstration Work Plan Contractors

CSI	Certified Health Physicist
Garden State Survey	Civil Surveying
Franklin Environmental Services	Excavation Equipment Gravel Separation System Equipment
Thermo NUtech (TNu)	Radiological Sorting System Equipment
Safety and Ecology Corp. (SEC)	Health and Safety Training
	Radiation Technicians
	Onsite Radiation Laboratory
Severn Trent Laboratories	Chemical Laboratory and related supplies
	Overflow Radiological laboratory
Advanced Terra Testing	Geotechnical Laboratory
Various	Waste Transport and Disposal

All subcontractors and team members are required to comply with the project work plans.

3.0 PROBLEM DEFINITION/BACKGROUND

The FMSS became contaminated as a result of processing operations at the Maywood Chemical Works (MCW) where thorium, a radioactive element, was extracted from monazite sand. The primary radioactive contaminants are Thorium-232 (Th-232) and its decay products. There are also lesser amounts of the Uranium-238 (U-238) decay chain, including Radium-226 (Ra-226). Based on laboratory bench-scale testing, investigations at various FUSRAP sites, and rough order-of-magnitude cost estimates for remediating radioactively contaminated soils, use of volume reduction technologies, such as gravel separation or radiological sorting, may reduce the costs of remediating soils at the Maywood site, as well as provide other statutory and community benefits as listed in Section 1.0.

A pilot demonstration is planned to evaluate the feasibility and applicability of using a gravel separation or radiological sorting process at this site. In order to best evaluate these technologies, the pilot demonstration will be conducted using representative soils from the MISS. Data collected will be used to compare the costs associated with use of the full-scale technology to manage and dispose of Maywood soils to the disposal costs without implementing gravel separation or radiological sorting.

4.0 SOIL ACQUISITION

4.1 Soil Acquisition Consideration

The performance of the pilot demonstration will be evaluated with feed soil that has similar characteristics to the majority of the soil that will be processed, if full scale soil processing is implemented on the project. Radiological heterogeneity and particle size distribution are the primary soil characteristics that will contribute to operational performance and are the basis for selecting the soil acquisition area.

The area west of Building 76, shown in Figure 3, has been selected as the soil acquisition location. The review of existing site data, documented in Appendix D of this Soil Acquisition Work Plan and Pilot Plant Pad Design, showed the area west of Building 76 on the MISS property had soil that was radioactively contaminated, and that the contamination was not evenly distributed through the soil mass. The area west of Building 76 also contained fine grained lagoon sediments, and granular "overburden" and "surrounding" soil as defined in the Results of Engineering Test Pits Program at MISS (Volume 5). The contaminated soil west of Building 76 is generally shallow and accessible without having to remove large quantities of "clean" overburden.

4.2 Soil Acquisition Excavation

The ground surface along the northern half of the excavation varies between El. 60 ft.(MSL) and 64 ft. Along the western edge of the excavation, the ground rises to approximately El. 68 ft.(MSL) due to the existing truck off-loading ramp as shown in Figure 3.

Based on borings drilled at the MISS, the top of competent bedrock contours run in a northeasterly fashion through the location of the soil acquisition excavation. The top of bedrock contours are generally at El. 45 ft.(MSL) along the northwest and southeast corners of the excavation and at El. 35(MSL) in the middle. Weathered rock overlying the bedrock varies in thickness from 4 ft. to 10 ft.

The soil acquisition area is comprised of gravel, sandy-silt and silty-sand. Cross sectional profiles of the northeast portion of the MISS inclusive of the soil acquisition area are shown in Figures 7 and 8. Based on existing record, radiological contamination in this area is found predominantly within the first 4 feet of soil as detailed in Appendix D.

The planned dimension of the excavation is approximately 190 feet by 165 feet at the ground surface, excavated to the bottom of contamination (El. 55.8 ft.(MSL) approx.) or 6 feet in depth on a 1.5(H) to 1(V) slope at all sides. The extent of the excavation will begin about 65 feet west of Building 76, along the northern boundary of the site and projecting about 40 feet into Retention Pond A. Details of the excavation layout are shown in Figure 3. The surface area to be excavated is partitioned into two areas labeled as Stages I and II. The Stage I excavation area is predominantly granular soils and will be excavated first in a 1-foot horizontal cut progression. The Stage II excavation will commence after completing the Stage I excavation. The Stage II excavation area represents the pond sediment and its overburden material. Due to the unstable nature of the retention pond sediment and its inability to support load, the Stage II section will be excavated in a slant cut (approximately 1.5H:1V) with the excavator seated at the base of the Stage I excavation. Details of the excavation layout and construction methods are shown in Figure 4.

The average depth of the contamination is approximately 4 ft. below ground surface (bgs) in the soil acquisition area. A 50 percent margin has been added to the excavation depth to ensure that the majority of the residual contamination below 4 feet is removed. After the excavation of both Stages I and II is complete, starting at the far end of the base of the Stage II area, a radiological survey screening will be performed and areas with residual contamination will be scraped in reverse order of excavation.

The feed material for the pilot demonstration will comprise of the excavated material west of Building 76 and other stockpiles presently at the MISS. The combination of the excavated material west of Building 76 and other on-site stockpiles will yield adequate feed material for the pilot demonstration.

4.3 Excavation Design

The excavation design incorporates the following process:

- Selection of excavation plan that enables the removal of granular material as well as pond sediments and fines. Several variables in excavation and soil handling such as width and depth of cuts, stockpile locations, excavation equipment, etc. will be evaluated and optimized for later remedial excavations.

- Establishing a range and grid marker at the ground surface along the north and south edge of the soil acquisition area at 5-ft. intervals. Marker grids along the east and west edge of the excavation will be established at 20 ft. intervals. The range markers will provide an expedient way to layout the 5-ft. by 5-ft. grid at the completion of each 1-foot cut. The grid layout will be used to maintain a description of the soil types as the excavation progresses. A description of soil type will be maintained as each layer of soil cut is removed. Any changes in the soil type will be noted.

- Performing a radiological survey of the excavation in accordance with the Sampling and Analysis Plan (SAP) before each cut of soil is performed.

- Performing excavation as an open-cut so that sheetpiling or other excavation support systems are not required.

- Varying the cut depth to evaluate various excavation equipment, excavation techniques, and materials handling techniques. The excavation is planned at an average cut depth of 1 ft. but may be varied between 6 in. and 2 ft. depending upon the level, depth, and extent of contamination.

- Minimizing the handling of excavated materials

- After general excavation to remove contaminated soil is performed, areas of localized contamination may be further excavated to remove residual contamination below the planned excavation level. Contamination in weathered bedrock will be removed to the extent that it can be readily excavated by mechanical means.

- Excavating Retention Pond "A" sediments on a slant (approximately 1.5H:1V) face after the granular soil in the Stage I area has been removed to full depth. Retention pond sediments will be removed in 1-ft. cuts along the slope of the excavation. Before each cut, a radiological survey will be performed along the sloped face from top to bottom of the excavation in accordance with the SAP.

- Maintaining the excavation above the water table based on known data and the information that was gathered during the Engineering Test Pits at MISS Program, (Volume 5). However, plans for construction dewatering and water management is presented in Sections 4.8 and 4.9.

- After the excavation base has undergone a final status survey, the slopes of the excavation will be covered with filter fabric (Mirafi.Filterweav 402) as a marker for the slopes of the soil acquisition area and the excavation will be restored.

4.4 Mandatory Notification

The following are the mandatory hold points which require notification of the TS for further engineering evaluation. All work related to the soil acquisition will stop pending such notification and work will resume upon authorization from the TS.

- All work will stop if any buried drums, containers, or a significant amount of buried obstructions or construction debris are uncovered. In case buried drums or containers are encountered, combinations of geophysical surveys, controlled excavation, content evaluation, and disposal options may be undertaken before proceeding further.

- If groundwater is encountered before the bottom of the excavation is reached, excavation in the area of the groundwater will stop, pending evaluation which will include an estimate of pumping quantities, remaining excavation to be performed, and a dewatering system design.

- If the design excavation slopes are found to be unstable, work will stop pending evaluation of various alternatives including change of slope, use of sheetpiling or other support system, and limiting the size and depth of the excavation.

4.5 Survey Controls

1. Permanent monuments, if required, will be established to horizontal and vertical controls of +/- 0.01 ft.

2. Construction staking will be established with horizontal and vertical controls of +/- 0.1 ft.

3. A topographic survey of the site and the soil acquisition area including the excavation slopes, the toe of slope and the bottom of the excavation will be performed:

4. Drawings will be prepared showing the results of the topographic survey, which will meet the following minimum requirements.

    a. The drawing will utilize the state plane coordinate system.
    b. All benchmark elevations will be based on the National Geodetic Vertical Datum (NGVD) 1929.
    c. All horizontal controls will be based on the North American Datum (NAD) 1927.
    d. All elevations will be shown in feet above Mean Sea Level (MSL).
    e. Elevation measurements will be accurate to within 0.1 ft.
    f. Drawings will be submitted on 22"x 34" size paper and use a standard title-block
    g. Site plans will be drawn using a scale of 1 in. = 50 ft. or less.
    h. Cross sections will be scaled as shown on the drawings.

4.6 Environmental Protection

All work will be performed in such a manner that the noise and effect to air, water or land is minimized.

4.6.1 Pre-Construction Survey

Prior to the start of any on-site construction activities, a condition survey will be conducted which will indicate on a layout plan the condition of shrubs and grassed areas immediately adjacent to the site of the work and adjacent to stockpile locations and access route(s) as applicable.

4.6.2 Protection of Water Sources

All work under this plan will be performed in compliance with applicable Federal, State, County and Municipal laws concerning protection of rivers, streams, and other water bodies. A spill prevention plan will be implemented in accordance with the General Environmental Protection Plan (GEPP) to prevent chemicals, fuels, oils, greases, bituminous materials, and washed soil from entering public waters.

Water used in on-site material processing or collected from dewatering of the soil acquisition area will be managed in accordance with Section 3 of the GEPP.

All soil stockpiles will be maintained within the MISS boundaries. Stockpiles that are below criteria will be separated from those that are above criteria as detailed in Section 4.12.

4.6.3 Dust Control

All excavations, embankments, stockpiles, access and haul roads, waste areas, and other work areas will be maintained with no visible dust. Continuous monitoring will be implemented using dust monitors for airborne dust in the pilot demonstration work area. Surfaces and stockpiles that could produce fugitive dust will be watered at intervals as necessary.

4.6.4 Stockpile Maintenance

In order to prevent any contaminated soil from getting airborne, the stockpile will be maintained in a moist condition. At mid-day everyday, the stockpile will be visually checked for dryness. If the stockpile is dry, it will be sprayed with water. Minimal water will be used in spraying to ensure that there is no runoff from the stockpile.

Stockpiles that will be exposed overnight or extended periods of time such as the weekend or holidays will be covered with a plastic material and secured with sandbags. Equivalent protection will be provided in the event of precipitation.

4.6.5 Erosion Control

Surface drainage from disturbed areas within the construction limits, whether or not completed, and from the soil acquisition excavation, demonstration plant, and stockpiles will be retained within the limits of the site. Temporary control measures will be provided and maintained. The area of bare soil exposed at any one time by construction operations will be held to a minimum. All sediment control structures will conform to the State of New Jersey requirements as detailed in Section 4.7.

4.7 Erosion and Sediment Control Plan

Combinations of straw bales and a geosynthetic silt barrier will be installed up-slope from locations where storm water collects and at locations surrounding all stockpiles including stone, aggregate, site excavated materials, processed materials and the excavation area as shown in Figure 5.

Bales will be replaced at times when they become clogged, ineffective or deteriorated. Bales will be set on exposed existing site soil. Stakes or rebar will be driven to secure bales in place. Stakes or rebar will be driven at an inward-facing angle toward the center of the bale. A minimum of two stakes or rebar will be used per bale. Adjacent bales will be butted end to end. Loose straw will be utilized to secure adjacent bales and secure fill gaps between bales. Bales will be inspected once a week and after each significant precipitation event for damage or clogging. Damaged, clogged, or dislocated bales will be removed and replaced. Bales and other surface drainage mechanisms will be provided in accordance with the requirements of the Bureau of Soil and Water Conservation, New Jersey Department of Environmental Protection (NJDEP).

Installation details for filter fabric fencing are shown in Figure 5. Installation, maintenance and restrictions are listed below.

4.7.1 Filter Fabric Fence Installation

- A trench will be plowed or otherwise excavated to the required depth with little, if any, disturbance to the downslope side of the trench. The bottom of the trench and the fence top will be placed at level grade.
- Support stakes will be driven to the 12-inch minimum depth below the existing ground surface, at 8-foot maximum intervals.
- The fabric will be stretched and fastened to the upslope side of the support stakes (in case of a reinforced section, reinforcement mesh will be fastened prior to fastening the fabric.
- The ends of the fabric will be overlapped, folded and stapled to prevent sediment bypass.
- The toe anchor will be backfilled and compacted to a density equal to the surrounding soils.
- If constructing a reinforced section, guy wires will be attached to support stakes. Provisions will be made for easy loosening and removal of guy wires to allow for access to perform maintenance work.

4.7.2 Maintenance

- The fence installation will be inspected once a week and after each significant precipitation event. Any necessary repairs will be made immediately.
- Accumulated sediments will be removed as required to keep the fence functional. In all cases, deposits will be removed where accumulations reach 6 inches aboveground.
- All undercutting or erosion of the toe anchor will be repaired immediately with compacted backfill material.

4.7.3 Restrictions

- The formation of concentrated flows on the drainage slope above a filter fabric fence installation will not be permitted. In the event of concentrated flows, direct slope stabilization measures will be employed to prevent such conditions.
- Filter fabric fences will not be placed in any area of concentrated flows such as ditches, swales, channels, etc.
- Filter fabric material will not be placed across the entrance to pipes or culverts and will not be wrapped around the principal spillway structures of sediment traps or basins.

4.8 Drainage

The work site will be maintained in a sufficiently dry state. Perimeter ditches, swales, and other drainage features and equipment will be provided as required to maintain dry soils. The ground surface will be graded to divert surface runoff away from excavations.

4.9 Dewatering

It is expected that the excavation will be maintained above the water table. Localized or perched groundwater flowing into the excavation will be controlled to prevent sloughing of excavation slopes and walls, piping conditions, uplift and heave in the excavation and to eliminate interference with the orderly progress of soil acquisition development.

The bottom of the excavation will be graded to drain away from the middle towards the sides where a toe-drain will collect and direct drainage or groundwater flow into sumps as shown in Figure 4. Water collected in the sump will be managed in accordance with the GEPP.

A contingency dewatering plan will be developed by Stone & Webster prior to the start of the pilot demonstration and implemented prior to excavating below the groundwater table and if significant groundwater inflow is expected. This will include a sufficient number of well points to be installed outside of the excavation or sumps and trenches to intercept any groundwater and maintain the excavation in a dry condition. The dewatering system will be operated continuously until all work below the natural groundwater table is complete. Pumped groundwater will be collected in a fractionation tank and managed in accordance with the GEPP.

4.10 Protection of Structures

During excavation for the soil acquisition area, the following structures in its vicinity will be protected.

- Electric utility pole southwest of Building 76
- Monitoring wells
- The fence line along the northern boundary of the MISS.

Protection will include but not be limited to the following:

- Excavation will be suspended if additional foundations or buried utility lines not shown on the drawings are found. Hand excavation will then be performed to determine the extent of such buried utility lines or structures.

- A minimum 10-ft. clear distance will be maintained between the fence along the northern MISS boundary and the limits of the excavation.

- A minimum 20-ft. clear distance will be maintained between the electric utility poles and the limits of the excavation.

- A minimum 5-ft. clear distance will be maintained between the monitoring wells and the limits of the excavation at the ground surface.

- Wells in close proximity of the traffic pattern will be flagged with physical barriers installed to protect the wells.

4.11 Material Management

Prior to excavation, a five-foot square grid system will be established over the surface area of soil to be excavated. The surface area to be excavated will be scanned using a linked NaI-GPS system with slaved computer/printer link as detailed in the Soil Sampling Network Design, Section 5.2.1 of the SAP, Volume 4. A batch of soil to be processed will be selected to meet proposed scenarios as detailed in Table 8 of the Pilot Plant Operation Plan (Volume 3). It will be identified in situ, prior to excavation; it will not be formed from stockpiles. A slug of soil corresponding to 8-10 cubic yards within a respective batch will also be identified for processing based on the NaI measurements. It also will be selected prior to excavation. A soil sample will be collected from each grid within the slug and analyzed by gamma spectroscopy to quantify the radioactivity in the soil. Areas of soil will be referenced to the grid to locate and document radiological contamination. The radiological contamination mapped by the linked NaI-GPS system will be used to guide the excavation through the selection of the batches and slugs. The grid system will also be used to identify and track soil excavated during the course of the pilot demonstration.

Two kinds of excavation methods will be implemented. The first is selective excavation whereby a pre-designated section of the batch identified as the slug will be excavated. The weight and activity of the slug will be tracked through the demonstration plant. The second is the general excavation of the remainder of the grids designated to represent a batch. Soil will be excavated in 1-foot cuts for both the slug and the batch. The slug will be excavated ahead of the remainder of the batch. Material excavated will be loaded directly onto a dump truck. Based on the NaI measurements and visual observations, the TS will direct each of the truckloads to one of the four stockpiles shown in Figure 3.

- *Stockpile A*: Oversize or debris material that will not be processed through either of the systems.

- *Stockpile B*: High fines material such as retention pond sediments that will not be processed through the gravel separation system will be fed directly into the radiological sorting system.

- *Stockpile C (Day Pile):* Granular material to be processed through the gravel separation system and/or radiological sorting system.

- *Stockpile K:* Excavated material that is radiologically and chemically below the clean-up criteria. This material will not be processed.

The SAP (Volume 4) contains additional details regarding the selection and sampling of the slugs and batches.

4.12 Stockpile Construction

The base for each stockpile will be prepared in the following steps:

a. Six (6) inches of topsoil will be removed and piled into a berm along the periphery of the stockpile.

b. The excavated surface will be covered with a geotextile Mirafi 500X or equivalent.

c. A 6-inch thick layer of 2 inch crushed stone will be placed on top of the geotextile.

d. 1-inch thick base plates (4-ft by 4-ft) will be placed atop of the 2-inch crushed stones. The base plates will be arranged in a manner that will provide ½ inch to 1-inch gap between abutting plates to allow free-draining from the stockpiles.

The geotextile will maintain a separation between the soil and the crushed stone overlayment and the stockpile. The existing geotextile will enable any runoff from the stockpile to percolate into the underlying soils. The berm along the periphery will contain stockpile runoff.

The crushed stone overlayment will also provide a working surface for construction equipment.

The steel plates will provide a sturdy-working surface for the front-end loader. Only the stockpile location designated for the holding of slug material will require the installation of 1-inch steel plates (Step d).

A minimum of 10 feet will be maintained between the base of stockpiles that differ materially or a physical barrier will be installed to provide partition.

5.0 EXCAVATION BACKFILL

Prior to backfilling the excavation, a final status survey will be performed on the base of the excavation. A topographic survey of the excavation including the limits of excavation at the top, base, and the side slopes will be made and documented for as-built conditions.

The slopes of the excavation will be covered with a permeable geotextile (Mirafi.Filterweav 402). Geotextile will be placed as shown in Figure 9 to prevent migration of soil particles but allow water movement. The installed geotextile is meant to serve as a separation/marker between the clean backfill and abutting potentially contaminated soil.

Backfill will be placed and compacted in horizontal lifts not more than 1-ft compacted to achieve the required density. After backfilling, the corners and other turning points along the surface boundaries of the excavation will be marked.

5.1 Subgrade Preparation

Prior to the installation of a permeable geotextile and backfilling, the subgrade of the soil pit will be proof rolled with a minimum of three passes by using approved compacting equipment.

If soft or unsuitable areas are encountered during the proof rolling, those areas will be undercut and/or stabilized in place

Proof rolling of the subgrade will not be performed during or after periods of inclement weather. Proof rolling after inclement weather will continue only after the subgrade has been inspected and approved.

5.2 Backfill Material

The excavation pit will be backfilled with imported backfill material, free from radiological and chemical contamination, debris, roots, wood, scrap material, vegetation matter, refuse, brick, construction debris or frozen material. The compacted backfill will have a permeability equal to or less than the those of the surrounding soils.

5.3 Backfill Placement

Fill will be placed after the excavation and the subgrade have been inspected and approved.

In general, fill will be placed in approximately 1-ft. lifts in horizontal layers prior to compaction. Materials placed by dumping in piles or windrows will be spread uniformly before being compacted.

Fill placement will be suspended when wet weather prevents operation of compaction equipment or proper compaction of the fill. Fill softened or disturbed by rainfall or flooding will be dried, if necessary, and re-compacted or removed from the fill. When wet, frozen, or otherwise unsuitable fill is removed, the fill surface will be graded, scarified, and re-compacted prior to placement of the next layer.

5.4 Compaction Equipment

Compaction equipment that is capable of achieving the specified density and appropriate to the backfill material will be selected.

5.5 Compaction Requirements

Backfill will be compacted to a density of at least 90 percent of the maximum dry density as determined by ASTM D1557. The backfill material will be aerated or moistened as necessary to obtain the required degree of compaction.

Each layer of fill will be compacted by a minimum of 3 coverages of the compactor or as specified by the approving agent.

Where clearances, the protection of structure, or other space restrictions prevent the use of heavy vibratory compactors, the fill will be compacted with light compactors or hand-operated compactors. When compaction requirements cannot be met, the lift thickness will be reduced in order to obtain the required minimum density.

5.6 Soil Testing

Laboratory compaction procedure to simulate the compactive effort required in the field will be performed as part of the backfill material approval. The approved backfill material will be tested in an off site laboratory prior to delivery to the site. For quality control, a performance based sampling and testing may be performed to determine whether the backfill material being placed can be compacted to the specified density with permeability equal to or less than those of the surrounding soils. These tests will be used to verify and document that the fill meets the material and placement requirements.

Maximum dry densities and moisture contents as determined by the laboratory and used as the compaction criteria will be taken from moisture-density relationships determined by compaction tests in accordance with ASTM D1557, Method C.

5.7 Topsoil and Placement

An approved off-site source of topsoil will be identified. The topsoil will be certified free of chemical or radiological contamination. Sampling may be performed to document this. Finished topsoil surfaces will be graded to within 0.3 ft. of elevation shown on the drawings. Areas will be graded to drain surface runoff away from structures and to provide suitable surfaces for mowing machines. Existing grades that are disturbed during construction operations will be restored.

Topsoil will not be placed on frozen or extremely wet or dry subgrade, or when conditions are detrimental to seeding, planting, or grading. Topsoil will be spread to a uniform depth of 6 in.

Newly graded areas will be protected from traffic, erosion, and settlement. Damaged grades, elevations, or slopes will be repaired or re-established.

5.8 Temporary Vegetative Cover

Temporary vegetative cover will be provided on all disturbed soil areas that will remain exposed for a period over two (2) months.

Any storm sewer inlet in the work area will be protected from sediment transport. The inlet grate will be covered with filter fabric, and ASTM C-33 size 2 or 3 crushed stone will be piled at least 1.5 ft. high over an area with a perimeter length 4 times the perimeter length of the inlet.

6.0 PILOT PLANT PAD LOCATION AND DESIGN

6.1 Pilot Operations Area Selection Considerations

The pilot plant will be located as shown in Figures 3 and 6. The selection of the operations area for the pilot demonstration primarily considered the efficient and economical performance of supplying feed material, handling process streams and loading-out of material requiring off-site disposal. The proposed location has satisfied the declared considerations and has the additional attributes described below.

The pilot operation area is within the MISS boundary to implement maximum access control. The operations area is remotely located on the MISS. Its impact (visual and noise) to adjacent residential properties, and future MISS project activities will be minimized. Minimal grading and foundation preparation is required at this location. The operations area is located close to the soil acquisition area for efficient hauling of feed material to the operations area. The operations area is located close to the load-out area for efficient offsite transportation and disposal. Access to the Ballod property from the MISS, which may be needed to support future remediation activities, is maintained.

6.2 Pilot Plant Pad Design

The demonstration plant will be located at the northwest corner of the MISS bounded by Route 17 to the west and the New York Susquehanna and Western Railways to the north. The plant will occupy an area of approximately 62,500-sq. ft. The plant will be seated atop of the former Retention Pond "B". The ground surface in this area is generally between 60 ft.(MSL) and El. 63 ft., which is several feet higher than the surrounding site. The higher ground is due to a former contaminated material stockpile at this location, which has since been removed, but the base of which is still present.

The subsurface at this location consists of approximately 2 ft. of loose "contaminated soil" from the stockpile and soil from vicinity properties which are underlain by 1 ft. of crushed stone fill. An underlying impervious geomembrane separates the stone fill from the overburden and Retention Pond "B" sediments.

The area will consist of a geotextile liner covered with a 6-inch layer of crushed stone. Additionally, components of the gravel separation system will be located on a series of 1 inch thick portable steel bearing plates arranged in a manner to provide a sturdy base for the various components. The processing systems will be located and constructed so as to allow a continuous feed of material from the gravel separation system to the radiological sorting system.

Adequate measures will be taken during the layout, construction of the host pad and operation of the pilot plant to protect wells in the immediate area. In addition, an access (Person hole) into an existing brook diversion conduit is located in the vicinity of the host plant. The location will be flagged and a physical barrier installed to protect the access.

7.0 PROJECT PLANNING

7.1 Project Coordination

Coordination meetings will be held with appropriate parties as required to promote information dissemination and to facilitate smooth transitions between tasks, minimize overlapping and identify concurrent activities.

7.1.1 Operational Noise Analysis

As part of the Soil Acquisition Work Plan, Ambient Sound Level Survey in the vicinity of the FMSS Maywood, New Jersey was conducted. Details of the Operational Noise Analysis are included in Appendix B.

7.1.2 Coordination with USACE, NJDEP, EPA and Local Authorities

All work under this task will be coordinated with the USACE. No special permits are required from NJDEP, USEPA or local authorities. Evaluation of the MISS during the 1999 test pit investigation concluded that there are no wetlands at the MISS. Details of the wetlands evaluation are included in Appendix H, Volume 5 of the Pilot Demonstration Work Plan.

A set of the "Soil Erosion and Sediment Control Plan" drawings will be filed with Bergen County Soil Conservation District for information.

7.1.3 Property Access and Right-of-Entry

All work under this task will take place at the MISS. No property access or right-of-entry concerns have been identified.

7.1.4 Coordination/Scheduling

The pilot plant (gravel separation and radiological soil sorting systems), soil acquisition and any associated construction activity will be coordinated with the Project Superintendent, health and safety personnel, and others to ensure that appropriate support is available and that the planned activities do not interfere with other ongoing activities.

7.2 Support Activities

7.2.1 Training

Personnel participating in the performance and completion of the scheduled pilot plant demonstration and associated construction activity will have received, in addition to the OSHA 40-hour HAZWOPER course, a General Employee Radworker Training (GERT) and site orientation. Upon completion of the GERT, the field crew will be respirator fit tested in accordance with the SSHP. Medical baseline evaluation/testing will be conducted prior to work commencement. All personnel will be required to read and sign as read the overall Site Safety and Health Plan (SSHP). Records of training will be maintained on site.

7.2.2 Mobilization/Demobilization

To streamline field tasks and minimize project delays at the commencement of field construction activities, the following mobilization tasks will be implemented prior to initiating field activities.

1. Subcontractor equipment and supplies will be staged in a designated location during mobilization. Equipment brought on site will surveyed upon arrival to establish a baseline for demobilization.

2. All appropriate personal protective equipment (PPE) (gloves, tyveks, etc will be available on-site prior to the initiation of fieldwork in accordance with the SSHP.) PPE requirements are detailed in the SSHP.

3. A pre-construction and coordination meeting will be held at the MISS with the project management and team members. The meeting will be held to address the final Stage of mobilization. The coordination meeting will address issues relating to the following:

    - Health and safety requirements
    - Pilot plant installation, operation and integration of the entire system
    - Soil Acquisition Work Plan and Pilot Plant Pad Design, construction methods and work sequence
    - Identification of team roles, key personnel responsibilities, and support requirements
    - Sampling procedures and protocols
    - Schedule, work hours, and identified task overlaps, concurrent activities on site and training requirements for the labor crew.

    A coordination meeting will be held with Stepan Company to address safety, access, traffic and co-usage of the railroad tracks.

4. A site walkover will be conducted with the team members to identify laydown and staging areas, review the proposed site layout and resolve any conflicts or concerns prior to work initiation.

7.2.3 Survey

A site survey to document the existing site conditions and topography will be completed prior to performing any intrusive work, or erecting permanent or temporary structures.

7.2.4 Utility Markouts and Clearance

Prior to initiation of field activities, the location of existing utilities will be established in the proposed location for the pilot plant and soil acquisition areas such as the location of the existing gas pipeline located along Route 17. Utility markouts and clearances will be performed using local utility company markouts, site plans and drawings, and geophysical investigations as necessary.

8.0 SOIL ACQUISITION CONSTRUCTION, SEQUENCE AND PROCEDURE

8.1 Preparation

To facilitate transition between the different tasks and levels of operation, the following preparatory tasks will be performed.

8.2 Hazardous Work Permit

In accordance with the SSHP, the Hazardous Work Permit (HWP) will be completed and updated based on the Activity Hazard Analysis (AHA).

8.3 RMA Posting

To protect the field crew and prohibit unauthorized access, a radiation materials area (RMA) will be established and posted. An access control point will be installed. This new RMA will incorporate existing adjacent RMAs.

8.4 Site Clearing

To prevent clogging of the gravel separation system, vegetation in the soil acquisition area will be cut, raked and removed. Trees and shrubs in the area will be cut down and uprooted. The stockpile of logs, tree stumps, wood-chips, branches etc. in the proposed area for soil acquisition will be removed and disposed or relocated to another area on the MISS. In addition, equipment and construction materials such as pipes, bricks, chain link fence, etc will be relocated.

8.5 Decontamination Pad

The existing decontamination pad is located in the proposed soil acquisition area and therefore will be demolished prior to excavation. A temporary decontamination pad for the pilot demonstration will be located and constructed as shown in Figure 3. The decontamination pad is located such that it is assessable to others.

Locations for a permanent decontamination pad will be evaluated. If a permanent location is identified prior to initiating the pilot demonstration, a permanent decon pad will be constructed.

8.6 Haul Road(s)

A haul road to transport excavated material from the soil acquisition area to the pilot plant feed stockpiles will be constructed. The haul road will begin from the soil acquisition pit, continue through the access ramp to the demonstration plant feed stockpile locations and branch off to circumnavigate the demonstration plant for access to the various end product stockpiles as shown in Figure 3. The haul road will be graded to contain or channel construction area surface runoff. A perimeter drainage, soil erosion and sedimentation control system will be implemented in accordance with the GEPP.

8.7 Access Road

An access road originating at the existing gate in the northwest corner of the MISS will be laid out and constructed for use in transporting material from the Ballod property onto the MISS.

8.8 Pre-Excavation Preparation

The following tasks will be completed prior to beginning excavation. A detailed field construction sequence is included in Appendix A.

- Establish construction access control and post RMA limits
- Locate and stake excavation limits
- Delineate excavation Stages I and II
- Locate stake and layout ramp to excavation area
- Install perimeter fence and hay bales and/or silt fence around the host plant location, excavation location and to partition the Stage II portion of the excavation to restrict traffic and prevent surface disturbance in the Stage II area.

8.8.1 Stage I – Granular Soil Excavation Sequence

- Layout the Stage I excavation area in a 5 foot by 5 foot grid. Permanent range markers will be staked along the perimeter of the Stage I area.
- Establish reference elevation from project benchmarks and monuments
- Perform and record radiological walkover scan and soil sampling in accordance with the SAP, Volume 4.

8.8.2 Stage II – High fines (Retention Pond "A" Sediment)

- Layout the Stage II excavation area in a 5 foot by 5 foot grid. Permanent range markers will be staked along the perimeter of the Stage I area.
- Establish reference elevation from project benchmarks and monuments.
- Perform and record radiological walkover scan and soil sampling in accordance with the SAP, Volume 4.

8.9 Excavation

Excavation cut planes will be constructed at 1.5(H) to 1(V) slopes at all sides. The following general steps will be followed:

- Excavate and process identified slug

- Excavate and process remainder of the batch.

- The excavation will proceed in 1-ft cuts (horizontal) for the Stage I and in 1-ft slant cuts for Stage II.

- The access ramp to the soil acquisition excavation will be developed as the excavation advances. The access ramp developed will serve as the haul road to the excavation scheme for both Stages I and II.

- Upon completion of the excavation, a radiological survey will be performed on the exposed bottom of the excavation.

- The excavated area will be stabilized.

8.10 Post-Construction Activities

Equipment will be decontaminated before leaving the site in accordance with the Safety and Health Plan (SHP), Volume 4. An exit radiological survey of the equipment will be conducted and additional decontamination will be performed if necessary. Equipment that cannot be verified clean will be retained on the site.

The limits of the soil acquisition area including the pilot plant and any structures remaining on site after the pilot demonstration will be surveyed and posted on a drawing of the MISS.

9.0 REFERENCES

1. Stone & Webster. *Chemical Data Quality Management Plan, Revision 0,* October 1999.

2. Stone & Webster. *Contractor Quality Control Plan*, October 1999.

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4. Stone & Webster. *Site Safety and Health Plan*, August 1999.

5. Stone & Webster. *General Environmental Protection Plan*, November 1999.

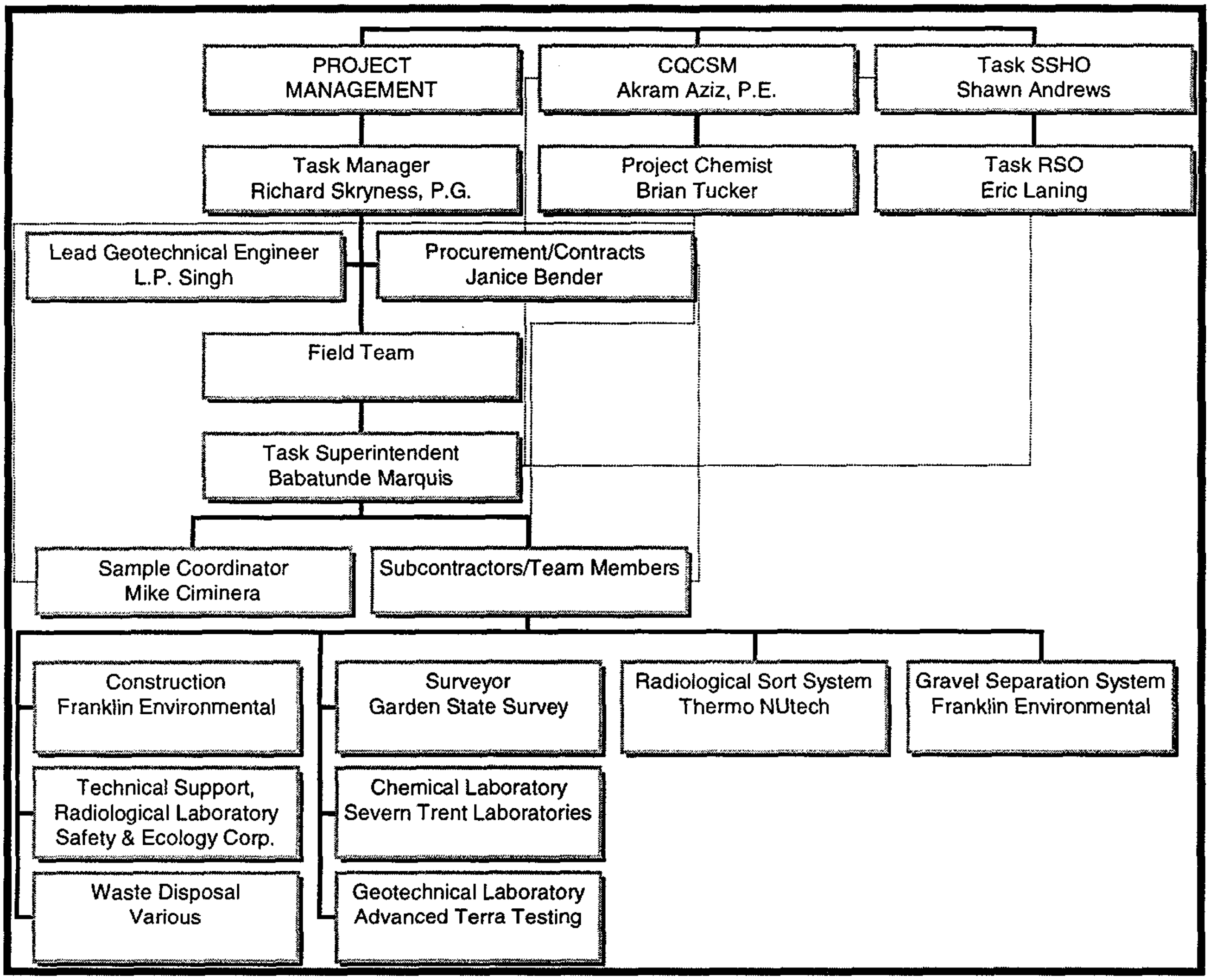
6. USACE New York District Office. *Final Maywood Soils Grouping Report, Volume 1, Maywood, New Jersey, Final,* USACE/OR/DACA62-1032, January, 1998.

7. CH2M Hill. *Final Remedial Investigation Report, Stepan Company Property*, November 1994

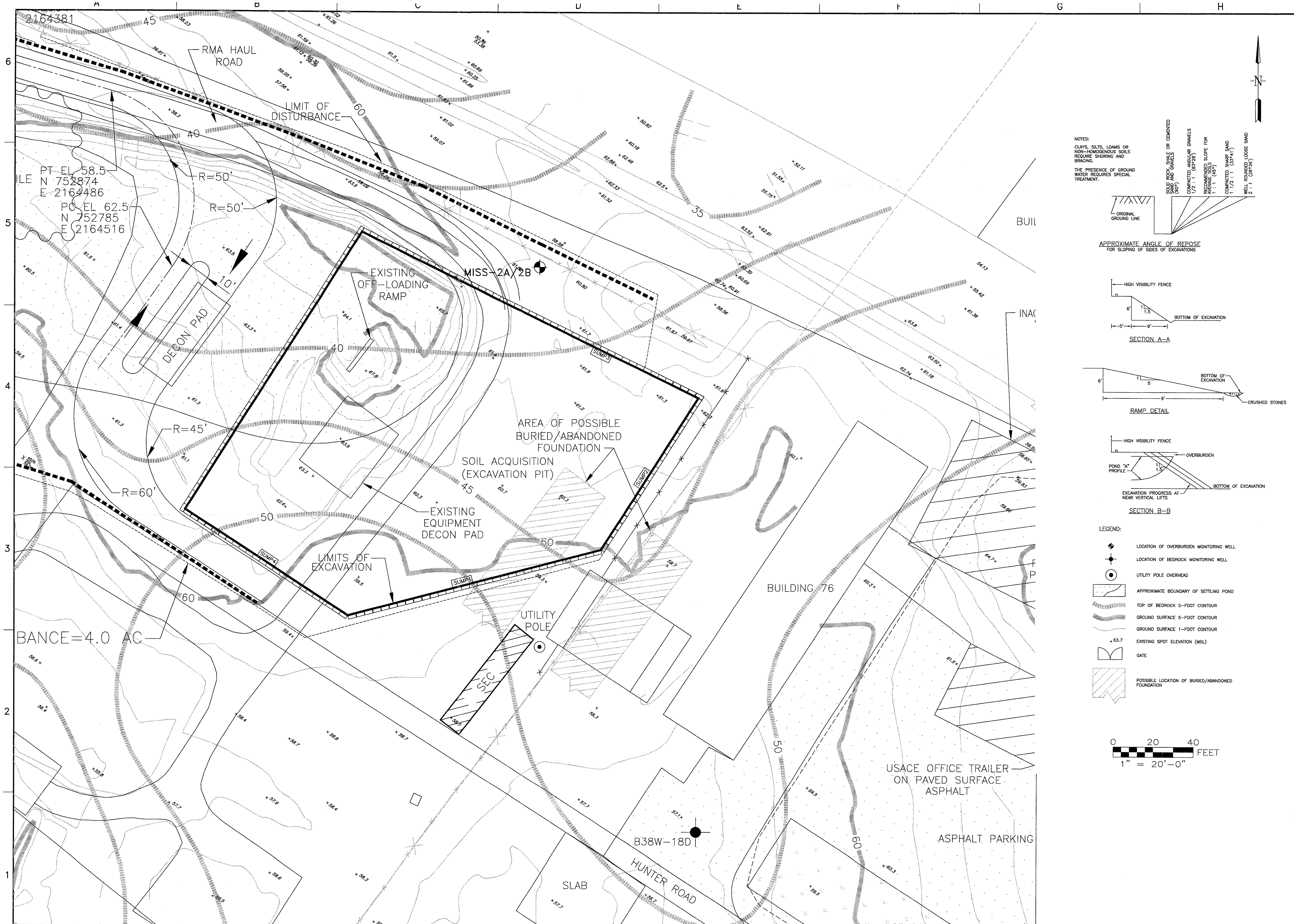
8. Bechtel. *Remedial Investigation Report for the Maywood Site*, December 1992

9. Bechtel. *Characterization Report for the Maywood Interim Storage Site*, June 1987

Figure 2 - Organizational Chart




U.S. Army Corps of Engineers NEW YORK DISTRICT
N
1" BASE PLATE
EXISTING GRADE
BERM
GEOFABRIC MIRAFI 500X TYPE
2" CRUSHED STONES
STOCKPILE CONSTRUCTION DETAIL
PILOT DEMONSTRATION PLANT LAYOUT
CONSISTING OF:
1. THE GRAVEL SEPARATION SYSTEM SUPPLIED AND INSTALLED BY FRANKLIN.
2. THE RADIOLOGICAL SORTING SYSTEM SUPPLIED AND INSTALLED BY THERMONUTECH.
LEGEND:
LOCATION OF OVERBURDEN MONITORING WELL
LOCATION OF BEDROCK MONITORING WELL
UTILITY POLE OVERHEAD
APPROXIMATE BOUNDARY OF SETTLING POND
TOP OF BEDROCK 5-FOOT CONTOUR
GROUND SURFACE 5-FOOT CONTOUR
GROUND SURFACE 1-FOOT CONTOUR
x 63.7 EXISTING SPOT ELEVATION (MSL)
A MATERIAL NOT TO BE PROCESSED – OVERSIZED
B RETENTION POND MATERIAL
C GRANULAR MATERIAL TO GRAVEL SEPARATION SYSTEM
D >1 1/2" OVERSIZED AND DEBRIS
E MATERIAL GREATER THAN 6" OVERSIZE AND DEBRIS
F OVERFLOW STOCKPILE MATERIAL LESS THAN 3/8" (9.38 mm)
G ABOVE CRITERIA
H BELOW CRITERIA
I FILTER CAKE
J 3/8" TO 6" RINSED GRAVEL MATERIAL
K EXCAVATED MATERIAL NOT TO BE PROCESSED
GATE
POSSIBLE LOCATION OF BURIED/ABANDONED FOUNDATION
OFFICE TRAILER
0 50 100 FEET
1" = 50'-0"
MAYWOOD
ROCHELLE PARK
NEW YORK SUSQUEHANNA AND WESTERN RAILROAD
NEW JERSEY STATE HIGHWAY 17
ACCESS ROAD (BALLOD)
GATE
PILOT STOCKPILE AREA
RMA HAUL ROAD
LIMIT OF DISTURBANCE
EXISTING OFF-LOADING RAMP
DECON PAD
AREA OF POSSIBLE BURIED/ABANDONED FOUNDATION
SOIL ACQUISITION (EXCAVATION PIT)
EXISTING EQUIPMENT DECON PAD
LIMITS OF EXCAVATION
AREA OF DISTURBANCE=4.0 AC
SILT FENCE (TYP)
BUILDING 136
BUILDING 76
INACCESSIBLE GEOMEMBRANE INSTALLED WITH RAMPED CRUSHED STONE ON TRAILER LOCATION
FORMER THORIUM PROCESSING AREA
USACE OFFICE TRAILER ON PAVED SURFACE ASPHALT
ASPHALT PARKING
GRASS
UTILITY POLE
SLAB
HUNTER ROAD
RAIL LOADOUT
EXIST UTILITY LINE
STEPAN
GP-1E N 9164.025 E 9729.512
GP-2E N 9125.200 E 9788.610
B38W-19S
B38W-19D
B38W-18D
MISS-1AA/1B
MISS-2A/2B
MISS-5A
MISS-6A
MISS-7A
MISS-7B
Revisions
Symbol
Description
Date
Approved
A
ORIGINAL ISSUE
6/28/00
STONE & WEBSTER ENVIRONMENTAL TECHNOLOGY & SERVICES
Designed by: B MARQUIS Date: 6/27/00
Drawn by: K ANTHONY Date: 6/28/00
Reviewed by: R SKRYNESS Date: 6/28/00
Approved: Richard Skryness Date: 6/28/00
File Name:
U.S. ARMY ENGINEER DIVISION CORPS OF ENGINEERS MAYWOOD, NEW JERSEY
FUSRAP
FUSRAP MAYWOOD SUPERFUND SITE MAYWOOD, NEW JERSEY
SOIL ACQUISITION WORK PLAN
SITE PLAN - TRAFFIC FLOW PLAN
PILOT DEMONSTRATION PLANT LAYOUT
JUNE 2000
FINAL
Contract Number: DACW41-99-D-9001
Delivery Order Number:
Project Number: 08575
Drawing Number: FIGURE 3



U.S. Army Corps of Engineers
NEW YORK DISTRICT

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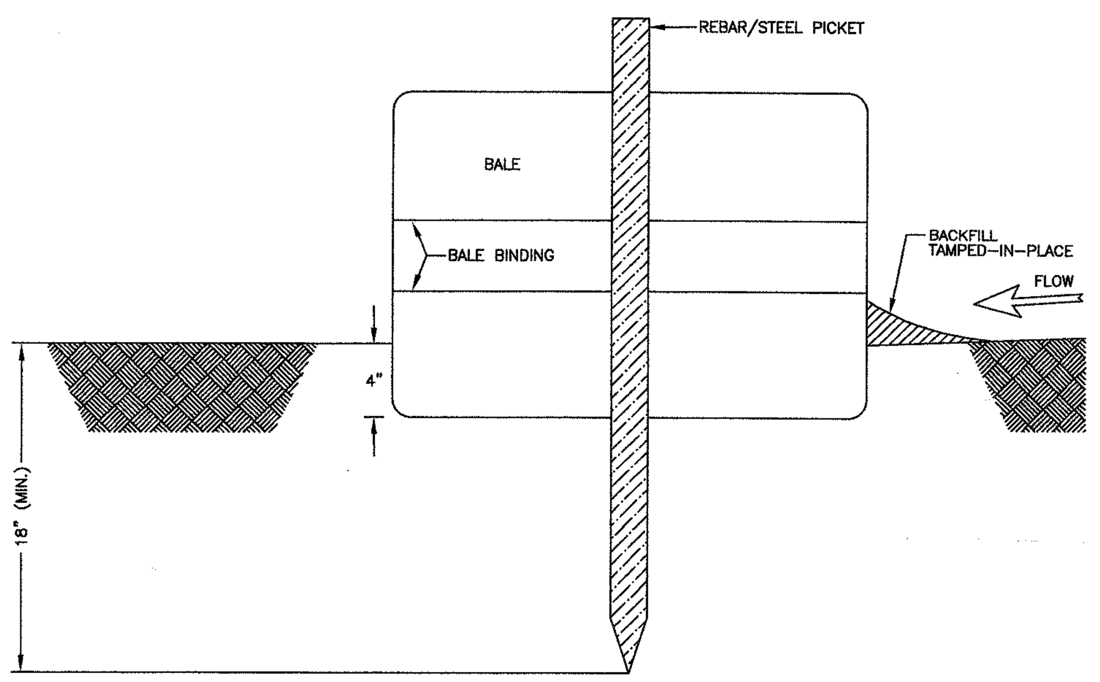
U.S. ARMY ENGINEER DIVISION
CORPS OF ENGINEERS
MAYWOOD, NEW JERSEY

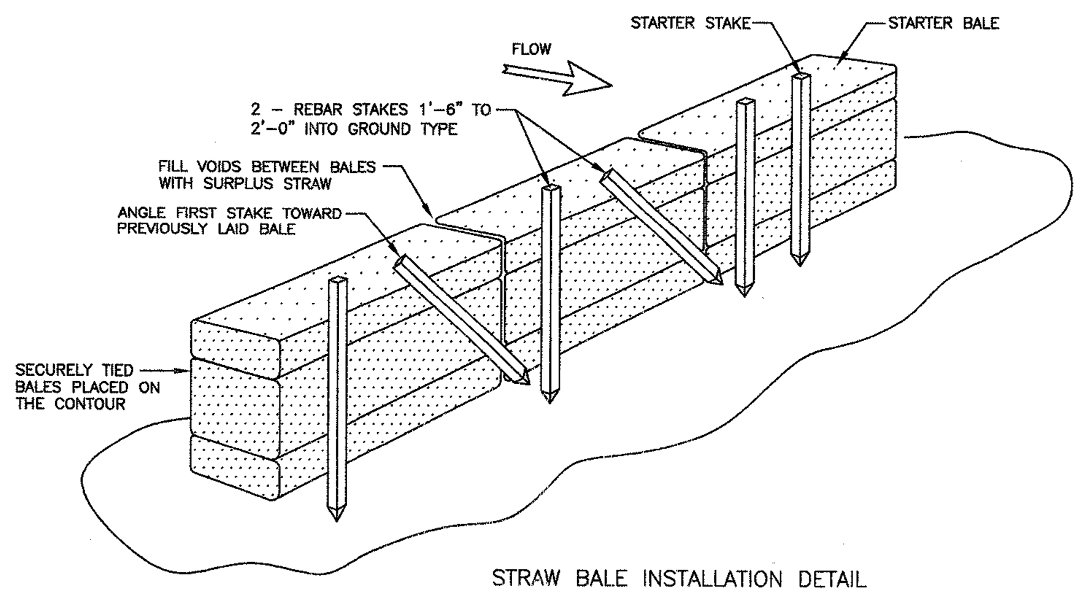
FUSRAP

FUSRAP MAYWOOD SUPERFUND SITE
MAYWOOD, NEW JERSEY

SOIL ACQUISITION WORK PLAN
EXCAVATION PLAN AND DETAIL
JUNE 2000
FINAL

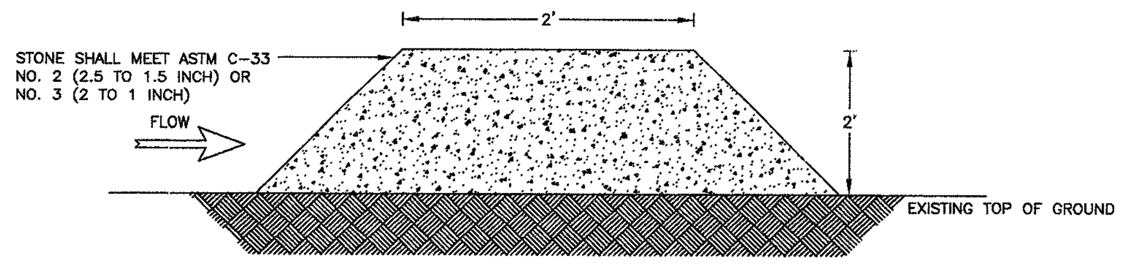
Contract Number: DACW41-99-D-9001
Delivery Order Number:
Project Number: 08575
Drawing Number: FIGURE 4



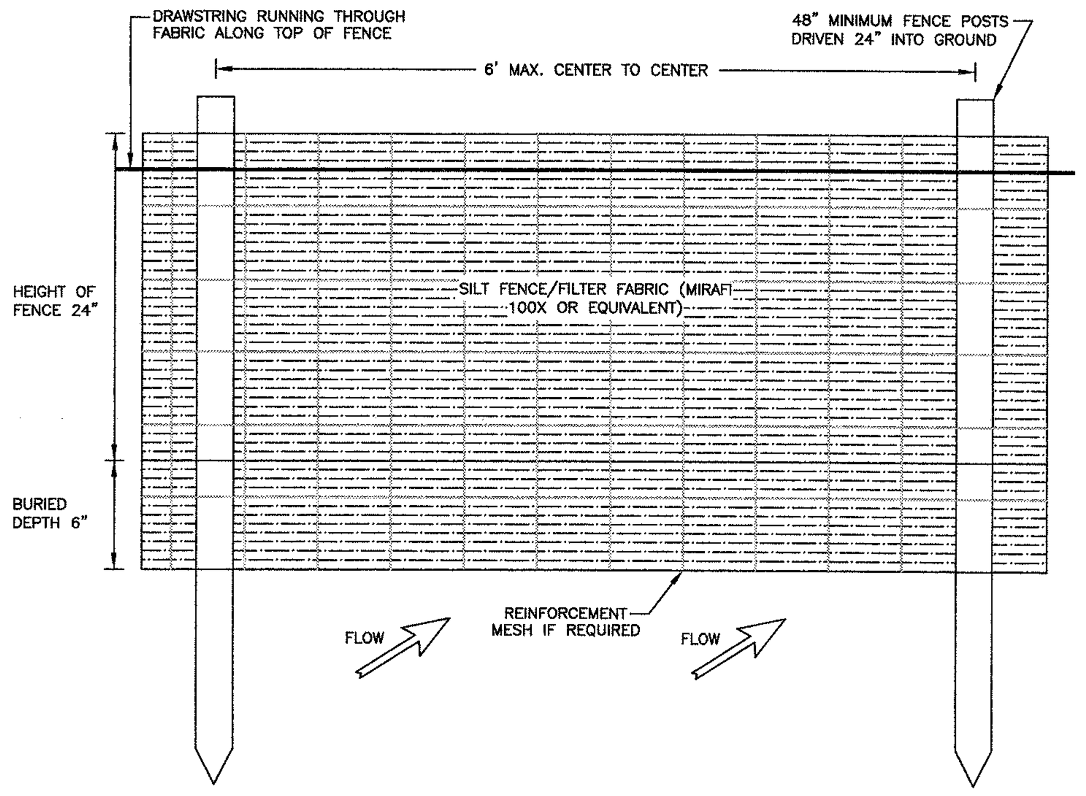


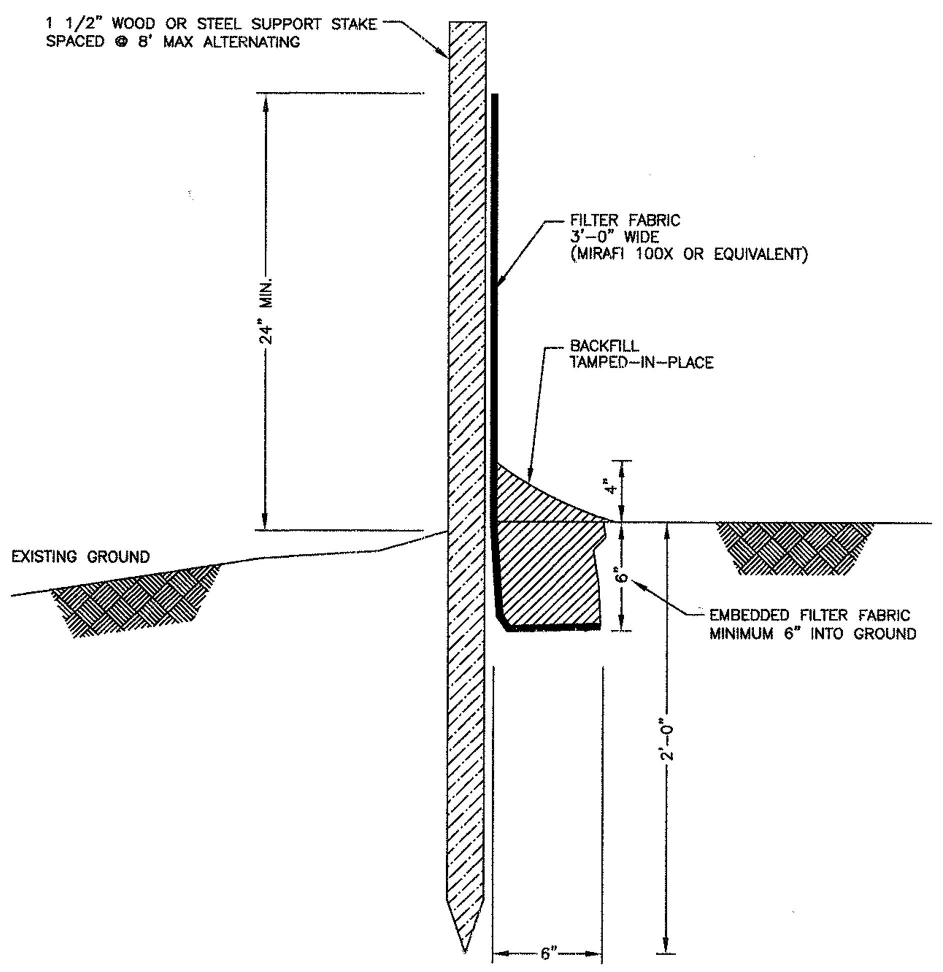
STRAW BALE INSTALLATION DETAIL

STRAW BALE SEDIMENT BARRIERS CONSTRUCTION AND INSTALLATION DETAILS
NOT TO SCALE



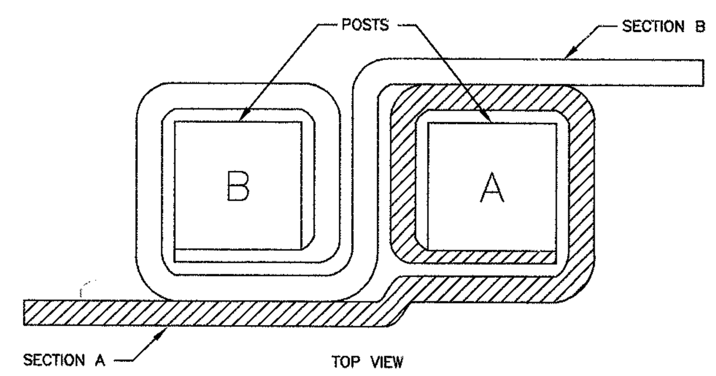
STONE BARRIER
REPAIR OPTION FOR BREACH IN SILT FENCE
NOT TO SCALE





STANDARD SILT FENCE

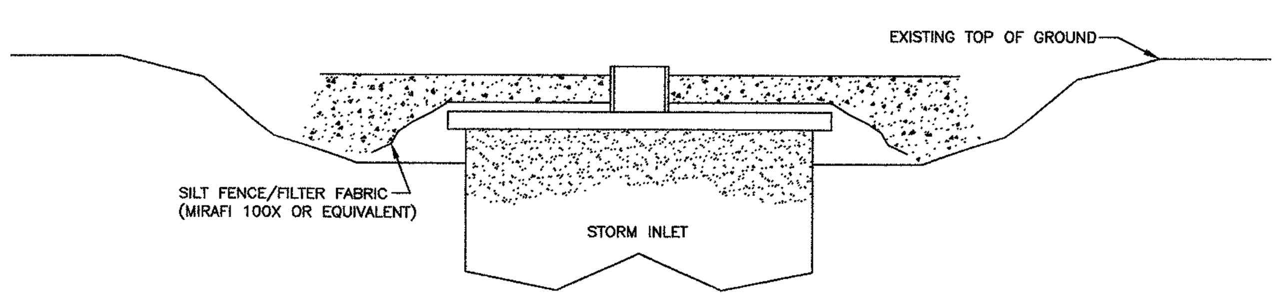
SILT FENCE CONSTRUCTION AND INSTALLATION DETAIL
NOT TO SCALE



POSITION POSTS TO OVERLAP AS SHOWN ABOVE, MAKING CERTAIN THAT FABRIC FOLDS AROUND EACH POST ONE FULL TURN.

DRIVE POSTS TIGHTLY TOGETHER AND SECURE TOPS OF POSTS BY TYING OFF WITH CORD OR WIRE TO PREVENT FLOW-THROUGH OF BUILT-UP SEDIMENT AT JOINT.

JOINING SECTIONS OF SILT FENCES
PREFABRICATED SILT FENCE WITH POSTS



SEWER INLET PROTECTION
(AS NEEDED)
NOT TO SCALE

PROVIDE SOIL EROSION & SEDIMENT CONTROL SYSTEMS IN ACCORDANCE WITH THE REQUIREMENTS AS SHOWN ON PLANS

1. All soil erosion & sediment control measures will be constructed, stabilized, and functional prior to any major soil disturbances and will be maintained until permanent protection is installed.
2. Any disturbed areas that will be left exposed for more than 30 days, and not subject to construction traffic will immediately receive temporary seeding. If the season prevents the establishment of a temporary cover, the disturbed areas will be mulched with straw or equivalent material according to state standards.
3. Permanent vegetation consisting of seeding or sodding will be installed on all exposed areas within 10 days after final grading. Mulch will be used as necessary for cover until seeding is established.
4. All work will be in accordance with the New Jersey Standards for Soil Erosion and Sediment Control.
5. A 50'x20'x1' pad of 1 1/2" to 2" crushed stone will be installed as construction entrance driveway immediately after initial site disturbance. Existing construction driveway used for this purpose will be upgraded to these requirements.
6. In accordance with the Standards for permanent vegetative cover for soil stabilization, soil having a pH of 4 or less or containing sulfides will be covered with a minimum of 12 inches of soil having a pH of 5 or more prior to preparation of seedbed.
7. Filter fabric fence will be installed at level grade. Both ends of each fence section will extend at least 10-ft upslope at 45 degrees to the main barrier alignment.
8. Sediment will be removed when accumulations reach 1/2 the above ground height of the fence.
9. Any silt fence section or straw bale barrier that has been undermined or topped, will be immediately replaced with a rock filter as shown on this drawing.
10. Straw bale barriers will not be used for more than 3 months.
11. Straw bale barrier will be placed at level grade. Both ends of the barrier will be extended at least 10-ft upsweep at 45 degrees to the main barrier alignment.
12. Sediment will be removed when accumulations reach 1/3 the above ground height of the straw bale barrier.
13. All erosion and sediment control measures will be maintained properly until permanent protection is installed. Maintenance will include inspections of all erosion and sediment control after each storm event and on a weekly basis. All preventative and repair maintenance work including cleaning, repair, replacement, regrading, reseeding, and re-netting will be performed immediately.
14. Damages caused by construction traffic to erosion and sedimentation control systems will be repaired immediately.
15. A survey shall be performed to establish existing ground surface elevations prior to any construction activities.
16. All coordinates are based on the New Jersey State Plane Coordinate System. All elevations are based on NGVD MSL.
17. Refer to drawing number ES-1 for construction notes and specifications.

U.S. Army Corps of Engineers
NEW YORK DISTRICT

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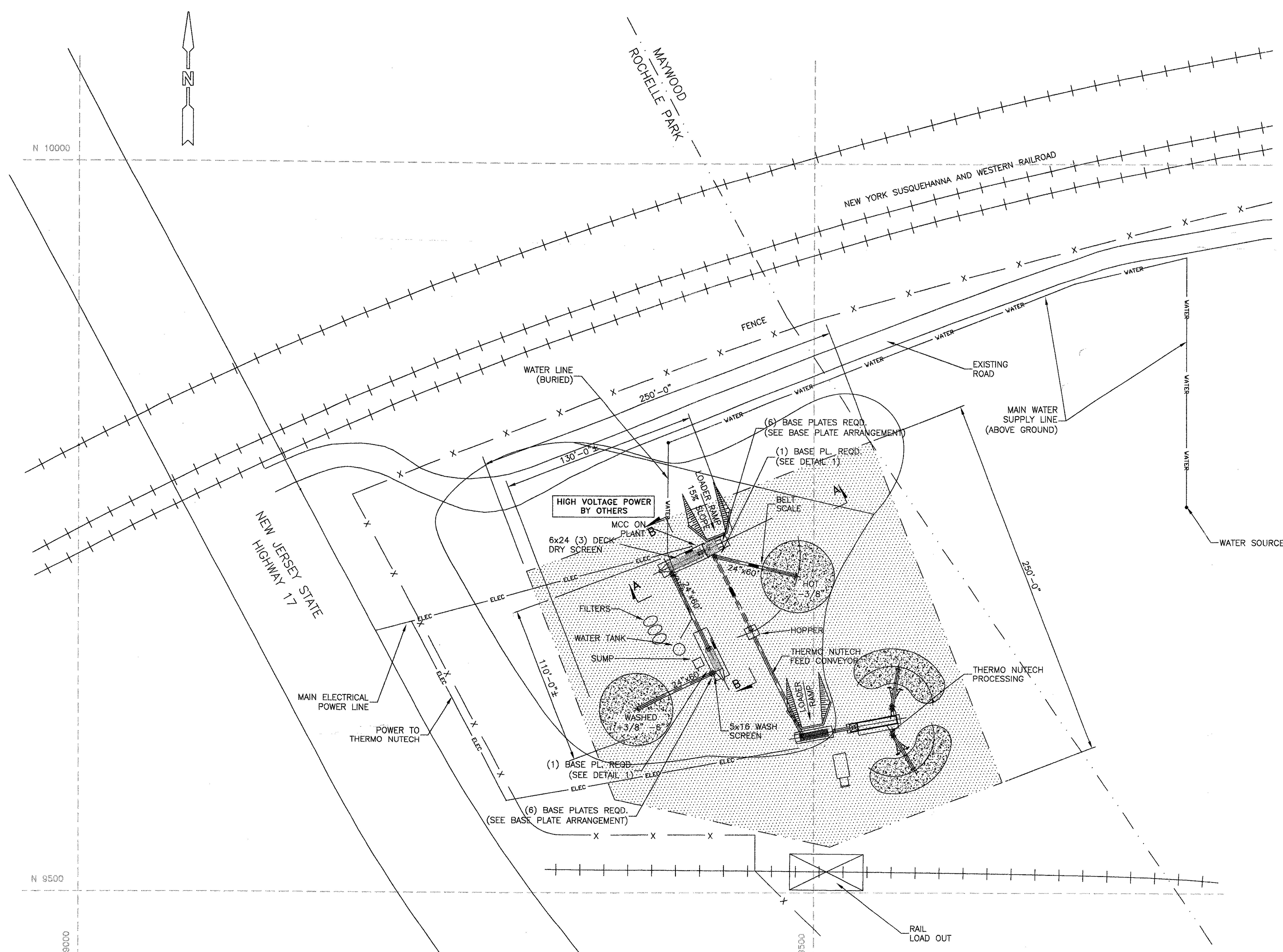
U.S. ARMY ENGINEER DIVISION
CORPS OF ENGINEERS
MAYWOOD, NEW JERSEY

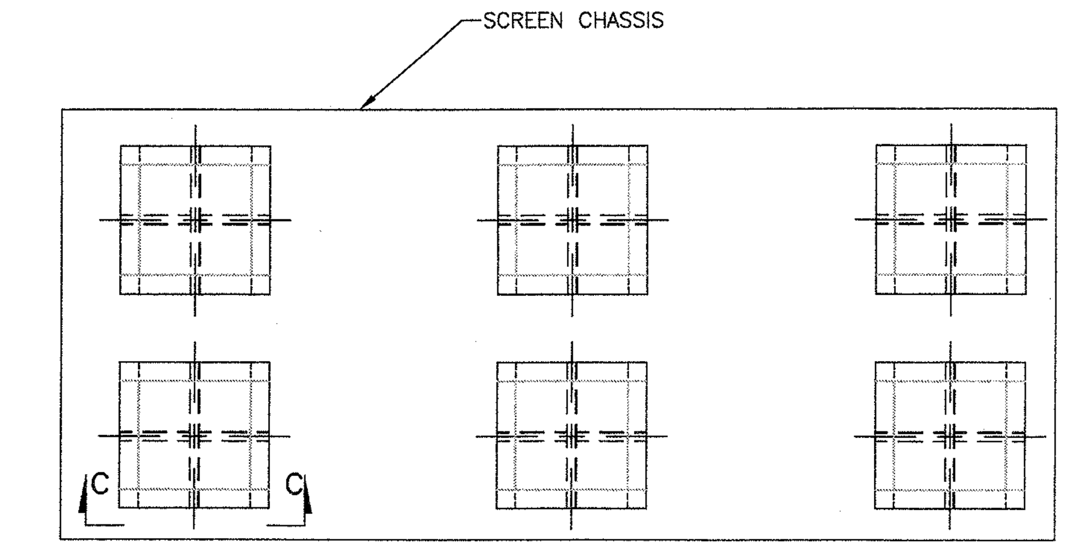
FUSRAP

FUSRAP MAYWOOD SUPERFUND SITE
MAYWOOD, NEW JERSEY

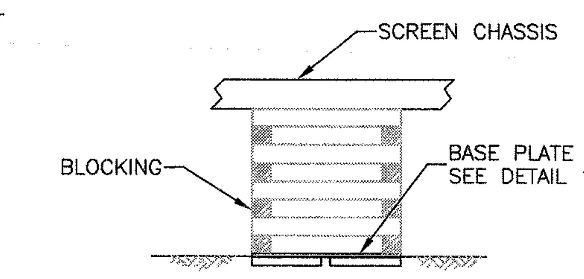
SOIL ACQUISITION WORK PLAN
SOIL EROSION AND SEDIMENT CONTROL
JUNE 2000
FINAL

Contract Number:
Delivery Order Number:
Project Number: 08575
Drawing Number: FIGURE 5



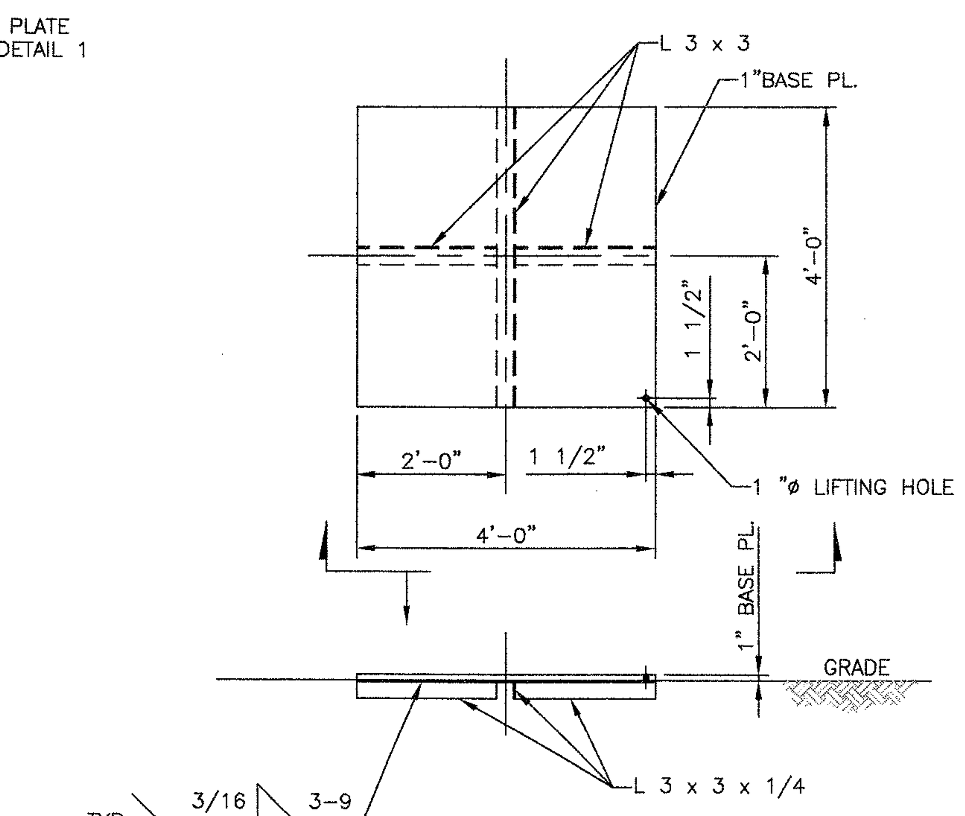


PORTABLE DRY & WASH SCREEN BASE PLATE ARRANGEMENTS



SECTION C–C

(SCALE: 1/4" = 1'-0")



DETAIL 1

(SCALE: 1/2" = 1'-0")

NOTES:

1. IDENTIFY AND LOCATE ABOVE GROUND UTILITIES AND BELOW GROUND UTILITIES, MONITORING WELLS, AND OTHER REMARKABLE SITE FEATURES. RENEW PERMIT WITH NEW JERSEY ONE-CALL.

2. PERSONNEL WORKING ON SITE SHALL BE TRAINED IN ACCORDANCE WITH THE REQUIREMENTS OF 29 CFR 1910.120. ALSO GENERAL EMPLOYEE RADIATION TRAINING (GERT) AND SITE SPECIFIC RADIATION WORKER TRAINING WILL BE REQUIRED AS DETERMINED BY THE SITE SAFETY AND HEALTH OFFICER (SSHO).

3. REMOVE BOULDERS LOCATED AT THE SOUTHWEST CORNER OF THE PROPOSED PAD AREA. EXCAVATED BOULDERS SHALL BE RELOCATED ON THE MISS AT THE DIRECTION OF THE TASK MANAGER UTILIZING AN END DUMP.

4. THE AREA COMPRISING THE 62,500 SQUARE FOOT PROPOSED PAD SHALL BE UNIFORMLY SMOOTH GRADED, MAINTAINING SLIGHT CROWN TO PREVENT SURFACE WATER SETTLING AREAS. THE DEGREE OF FINISH SHALL BE THAT WHICH IS ORDINARILY OBTAINABLE FROM DOZER OPERATION. NO EXCESS SOIL SHALL BE GENERATED FROM SITE GRADING OPERATIONS. THE GRADED SURFACE UNDERLYING THE GEOTEXTILE SHALL BE CHECKED AND MADE FREE OF ROOT OR LARGE STONE PROTRUSIONS OR OTHER DELETERIOUS MATERIALS WHICH COULD DAMAGE THE GEOTEXTILE.

5. COVER THE ENTIRE 62,500 SQUARE FOOT PAD AREA WITH HEAVY DUTY WOVEN GEOTEXTILE FABRIC, SUCH AS GTF 300 MANUFACTURED BY LINQ INDUSTRIAL FABRICS, OR EQUAL. GEOTEXTILE SHALL MEET AASHTO M288-92 REQUIREMENTS FOR HIGH SURVIVABILITY AND HAVE THE FOLLOWING MINIMUM PHYSICAL PROPERTIES:

GRAB TENSILE STRENGTH	ASTM D4632	300 LBS.
ELONGATION	ASTM D4632	15% (MAX.)
TRAPEZOID TEAR	ASTM D 4533	115 LBS.
PUNCTURE RESISTANCE	ASTM D4833	145 LBS.
MULLEN BURST	ASTM D3786	600 PSI

OVERLAP OF GEOTEXTILE SHALL BE A MINIMUM OF TWO (2) FOOT AT SEAMS.

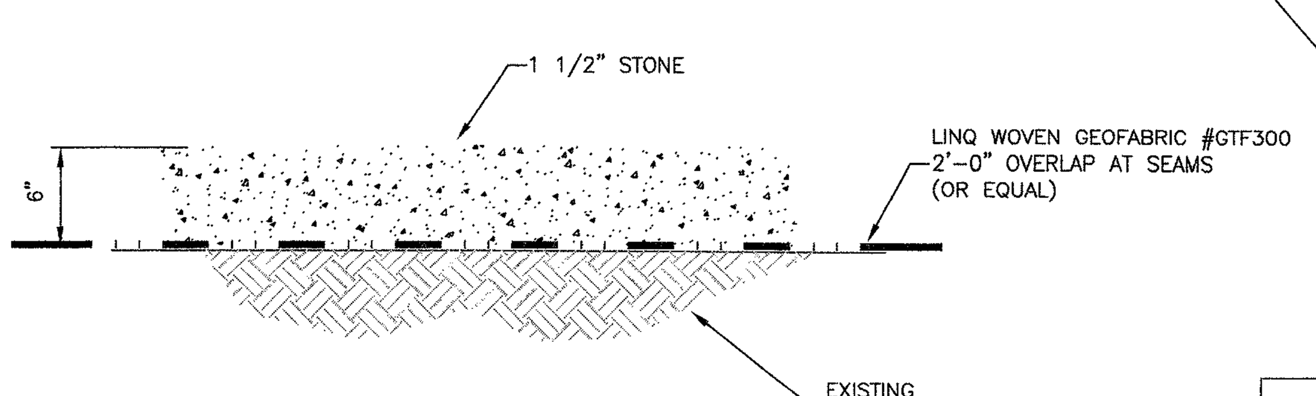
6. UNIFORMLY SPREAD A SIX (6) INCH LAYER OF CLEAN STONE OVER THE ENTIRE PAD AREA. UTILIZE A ONE AND ONE HALF (1 1/2) INCH, 100% 100% CRUSHED STONE PRODUCT. NOT MORE THAN 8% OF THE CRUSHED STONE PRODUCT SHALL PASS A 3/8 INCH SIEVE OPENING.

7. A THREE (3) INCH LAYER OF 3/4" QUARRY PROCESS MATERIAL SHALL BE PLACED OVER THE STONE AT HIGH TRAFFIC AREAS AND OTHER AREAS WHERE A FIRMER BASE THAN THAT PROVIDED BY THE STONE WILL BE REQUIRED. SUCH AREAS MAY INCLUDE THE LOADER RAMP AREA OF THE DRY SCREEN PLANT GRIZZLY HOPPER AND THE TRAVEL PATH OF RADIAL STACKING CONVEYORS. THE PLACEMENT OF THE QUARRY PROCESS MATERIAL SHALL BE AT THE DISCRETION AND AT THE DIRECTION OF THE TASK MANAGER.

8. PLACE ONE (1) INCH THICK STEEL BEARING PLATES ATOP THE STONE BASE FOR SUPPORT OF THE WET AND DRY SCREENING SYSTEMS. PLATES SHALL BE (4) FOOT SQUARE AND SHALL NUMBER SIX (6) PER EACH SCREENING SYSTEM FOR A TOTAL OF 12 PLATES. PLATES SHALL HAVE LIFTING HOLES OR LUGS FOR PORTABILITY. THE UNDERSIDE OF EACH PLATE SHALL HAVE AFFIXED (WELDED) TO EACH EDGE A 3" BY 3" BY 2' ANGLE IRON SECTION TO PROVIDE LATERAL SHEAR RESISTANCE SET WITHIN THE AGGREGATE BASE.

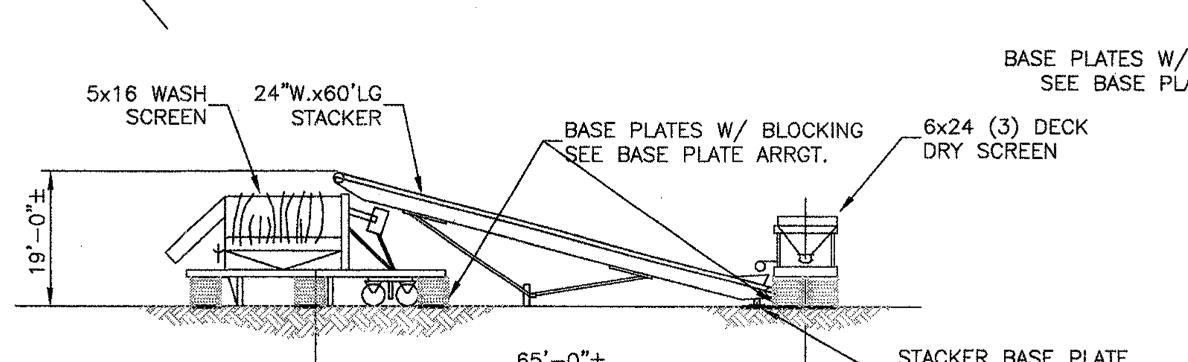
9. WATER SHALL BE BROUGHT TO THE WET SCREEN FROM THE NEAREST WATER SOURCE LOCATION AT THE EXISTING MISS DECONTAMINATION PAD. TWO (2) INCH DIAMETER FIRE HOSE SHALL BE PLACED ALONG THE EXISTING EROSION CONTROL BARRIERS AT NORTHERN BOUNDARY OF THE RMA. AT THE LOCATION OF THE DRY SCREEN GRIZZLY HOPPER, PLACE THE WATER SUPPLY HOSE WITHIN THREE (3) INCH DIAMETER SCHEDULE 40 BLACK IRON PIPE. THE BLACK IRON PIPE SHALL BE LOCATED BENEATH THE SIX (6) INCH CRUSHED STONE LAYER, ABOVE THE GEOTEXTILE FABRIC.

10. ELECTRIC SERVICE SHALL BE DROPPED TO THE PILOT PLANT FROM PSE&G MAIN SERVICES ALONG ROUTE 17. ELECTRIC SERVICE SHALL BE SPLIT AT THE STEP DOWN LOCATOR TO PROVIDE SEPARATE SERVICE TO DISTRIBUTION PANELS LOCATED AT THE DRY SCREEN AND AT THE THERMO NUTECH PROCESSING SYSTEM. A THIRD FEED SHALL BE PROVIDED FOR A SITE TRAILER WORK STATION AT THE PILOT PLANT LOCATION, IF REQUESTED.



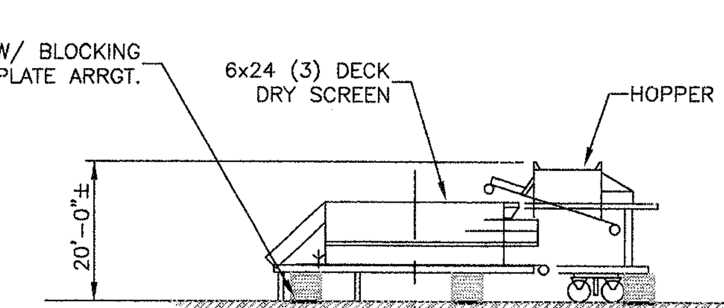
TYPICAL GROUND COVER

(NO SCALE)



VIEW B–B

(SCALE: 1" = 20'-0")



VIEW A–A

(SCALE: 1" = 20'-0")

FINAL

FIGURE 6
STONE & WEBSTER ENGINEERING CORPORATION
BOSTON, MASSACHUSETTS

LB&W
ENGINEERING, INC.
961 MARCON BLVD. • SUITE 401 • ALLENTOWN • PA • 18103

REV. NO.	DESCRIPTION OF REVISION	BY	CHK'D	APPR.	DATE
C	REVISED PER COMMENT	TL			01/18/00
B	REVISED PER COMMENT	TL			01/17/00
A	RELEASED FOR CUSTOMER COMMENT	TL			01/11/00

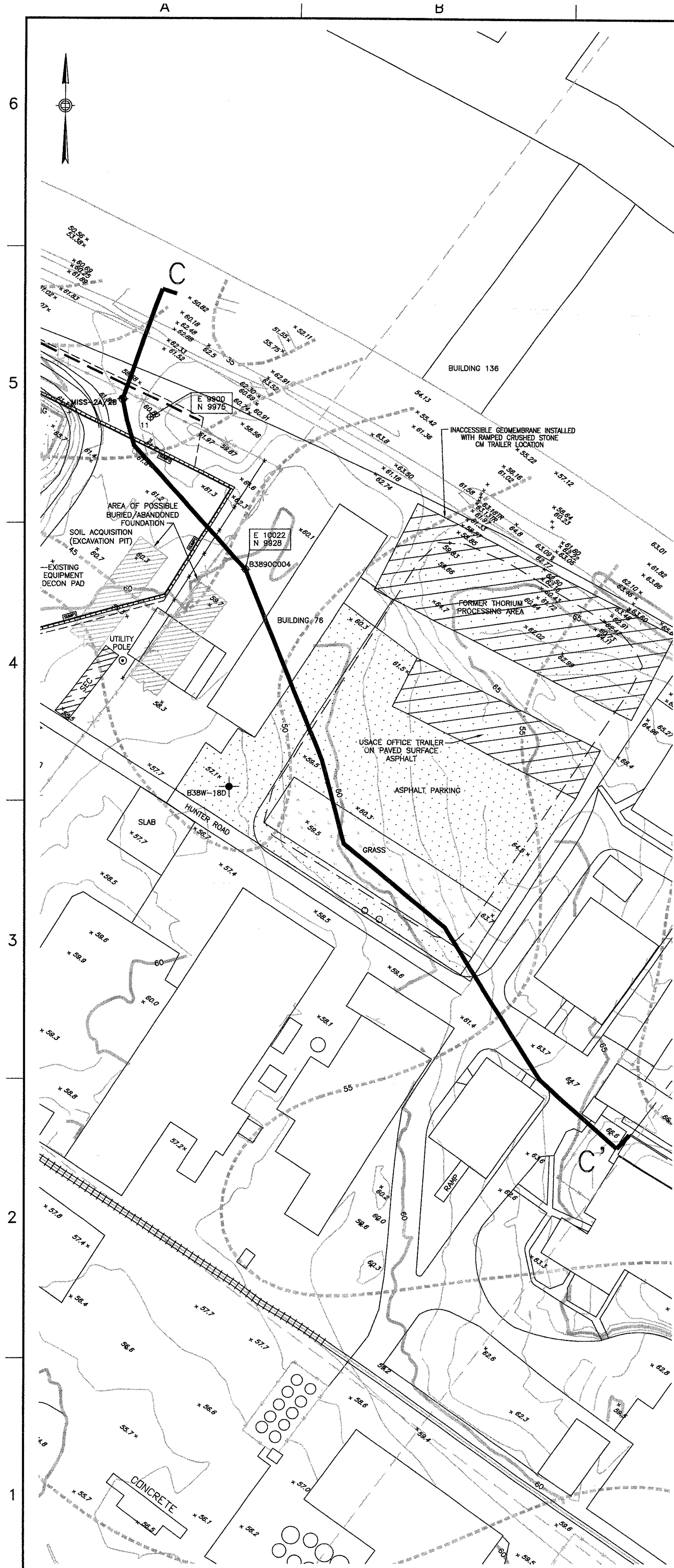
CUST. APP.	PRICING	ORDERING	DETAILING	CONST.	
REV BY DATE	REV BY DATE	REV BY DATE	REV BY DATE	REV BY DATE	REV BY DATE

DRAWING REVIEWED		DISCIPLINE	BY	DATE
PROJ. ENGR.	DATE	MECHANICAL		
PROJ. MANAGER	DATE	STRUCTURAL		
		ELECTRICAL		

WHITNEY & SON
FUSRAP MAYWOOD SUPERFUND SITE
PILOT PLANT DEMONSTRATION LAYOUT
SMALL SCALE GENERAL ARRANGEMENT
SCREENING OPERATION OPTION

DRAWN	CHECKED:	LB&W CONTRACT NO.	
TL	[signature]	99025-129	
DATE: 06/28/00	DATE: 6/28/00	DRAWING NUMBER 101	REVISION C
SCALE: 1" = 40'-0"			

p:\Ibwho1\Maywood\Data0608\drawings\xxx\101pilot.dwg 28-June-2000



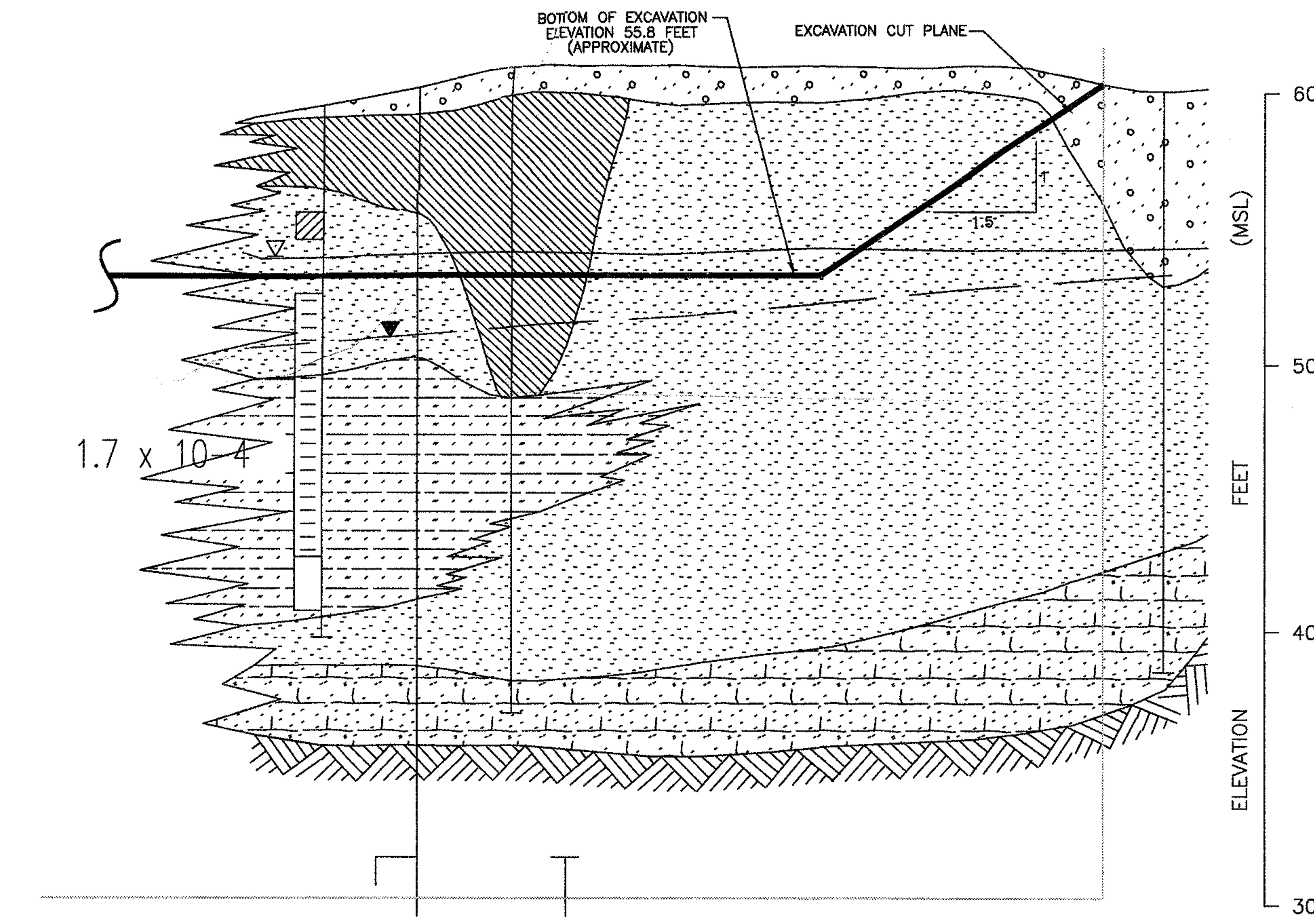
LEGEND:

- LOCATION OF OVERBURDEN MONITORING WELL
- LOCATION OF BEDROCK MONITORING WELL
- APPROXIMATE BOUNDARY OF SETTLING POND
- TOP OF BEDROCK 5-FOOT CONTOUR
- GROUND SURFACE 5-FOOT CONTOUR
- GROUND SURFACE 1-FOOT CONTOUR
- x 63.7 EXISTING SPOT ELEVATION (MSL)
- GATE
- POSSIBLE LOCATION OF BURIED/ABANDONED FOUNDATION
- E 10050 N 9850 BORING LOCATION
- HYDROGEOLOGIC CROSS SECTION LINE

NOTE:

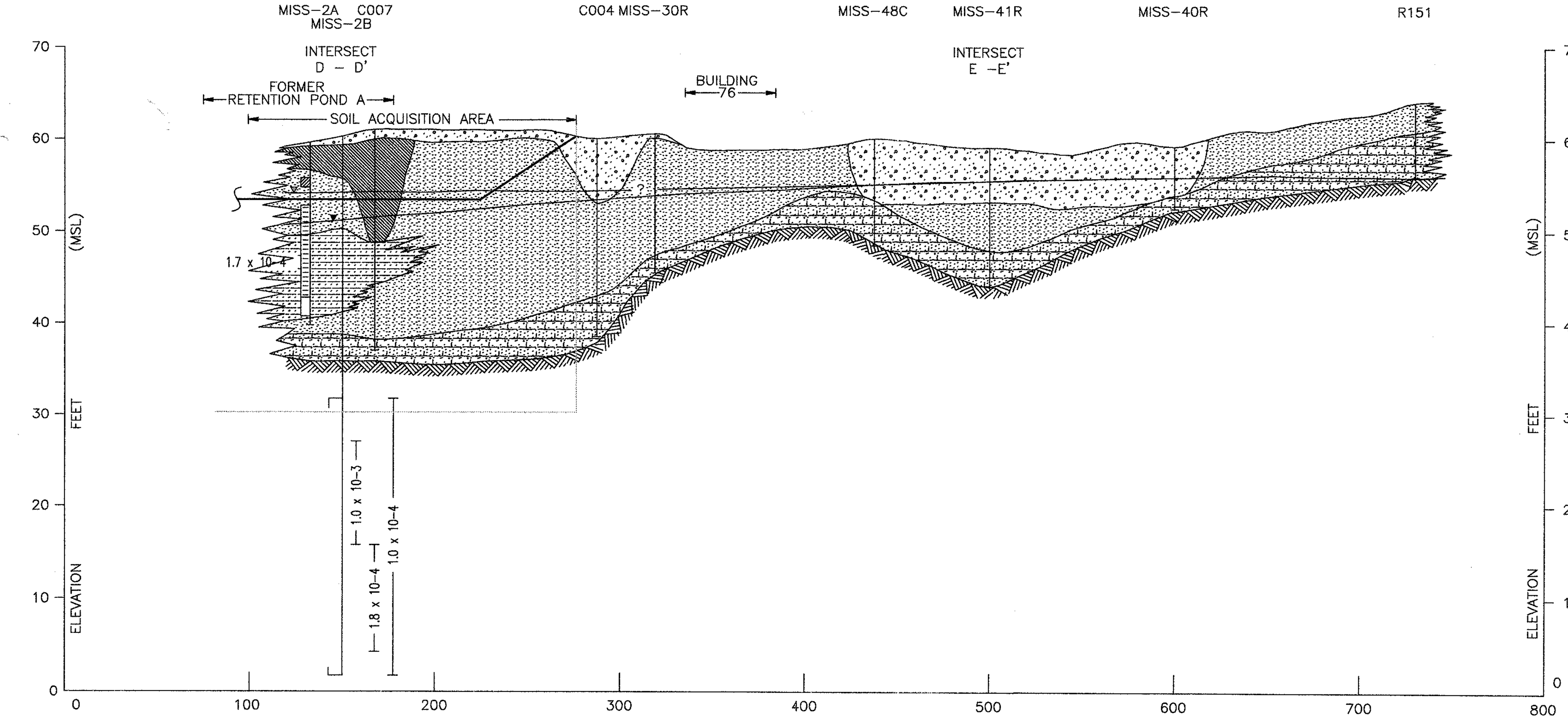
TASK COMPLETED PRIOR TO CONVERSION TO NEW JERSEY PLANE COORDINATE SYSTEM.

0 50 100 FEET
1" = 50'-0"



SOIL ACQUISITION/EXCAVATION PROFILE

HORIZONTAL 0 25 50
VERTICAL 0 5 10
SCALE IN FEET



LEGEND:

- FILL – ASH & SLUDGE
- FILL – UNDIFFERENTIATED
- UNDIFFERENTIATED SAND, SILT, CLAY
- BLACK SAND, SILT, CLAY
- SAND AND GRAVEL
- WEATHERED BEDROCK
- BEDROCK
- WATER TABLE SURFACE (UNCONSOLIDATED SEDIMENTS)
- POTENTIOMETRIC SURFACE IN BEDROCK
- WATER LEVEL (UNCONSOLIDATED SEDIMENTS)
- POTENTIOMETRIC SURFACE (BEDROCK)
- DATE OF MEASUREMENT: 3/30/92

MONITORING WELL: BENTONITE SEAL; SCREENED INTERVAL; SUMP; OPEN HOLE INTERVAL

HYDRAULIC CONDUCTIVITY: 7.9 x 10-4 HYDRAULIC CONDUCTIVITY TEST INTERVAL IN BEDROCK RESULT IN CM/SEC

BOREHOLE

HYDROGEOLOGIC PROFILE – SAIC

HORIZONTAL 0 50 100
VERTICAL 0 10 20
SCALE IN FEET

U.S. Army Corps of Engineers
NEW YORK DISTRICT

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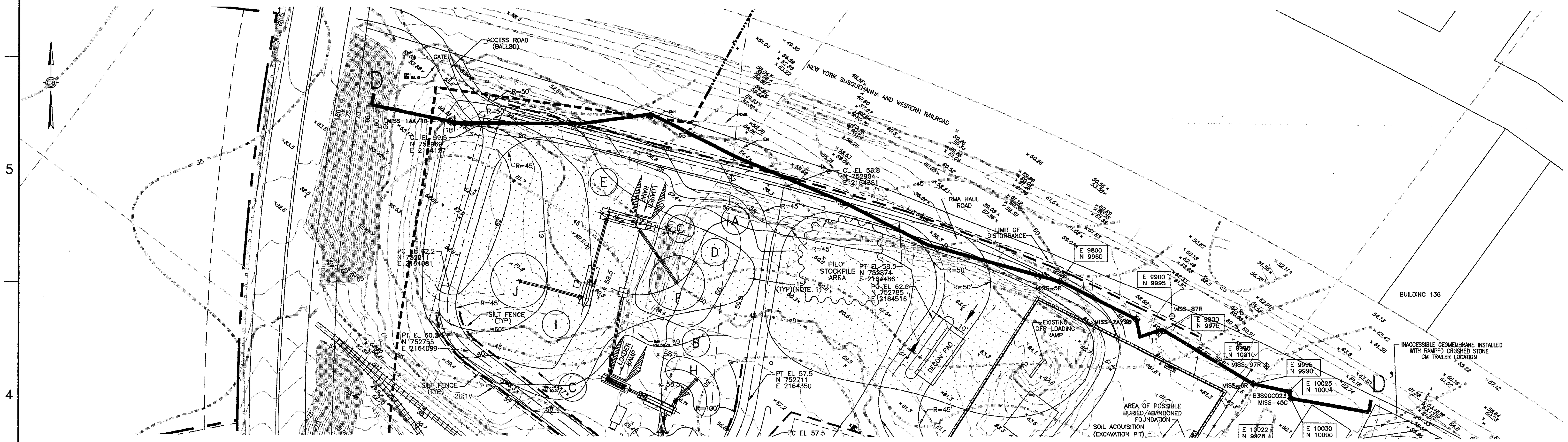
U.S. ARMY ENGINEER DIVISION
CORPS OF ENGINEERS
MAYWOOD, NEW JERSEY

FUSRAP

FUSRAP MAYWOOD SUPERFUND SITE
MAYWOOD, NEW JERSEY
SOIL ACQUISITION WORK PLAN
PROFILE C - C'
ELEVATION OF BEDROCK
JUNE 2000
FINAL

Contract Number: DACW41-99-D-9001
Delivery Order Number:
Project Number: 08575
Drawing Number: FIGURE 7



LEGEND:

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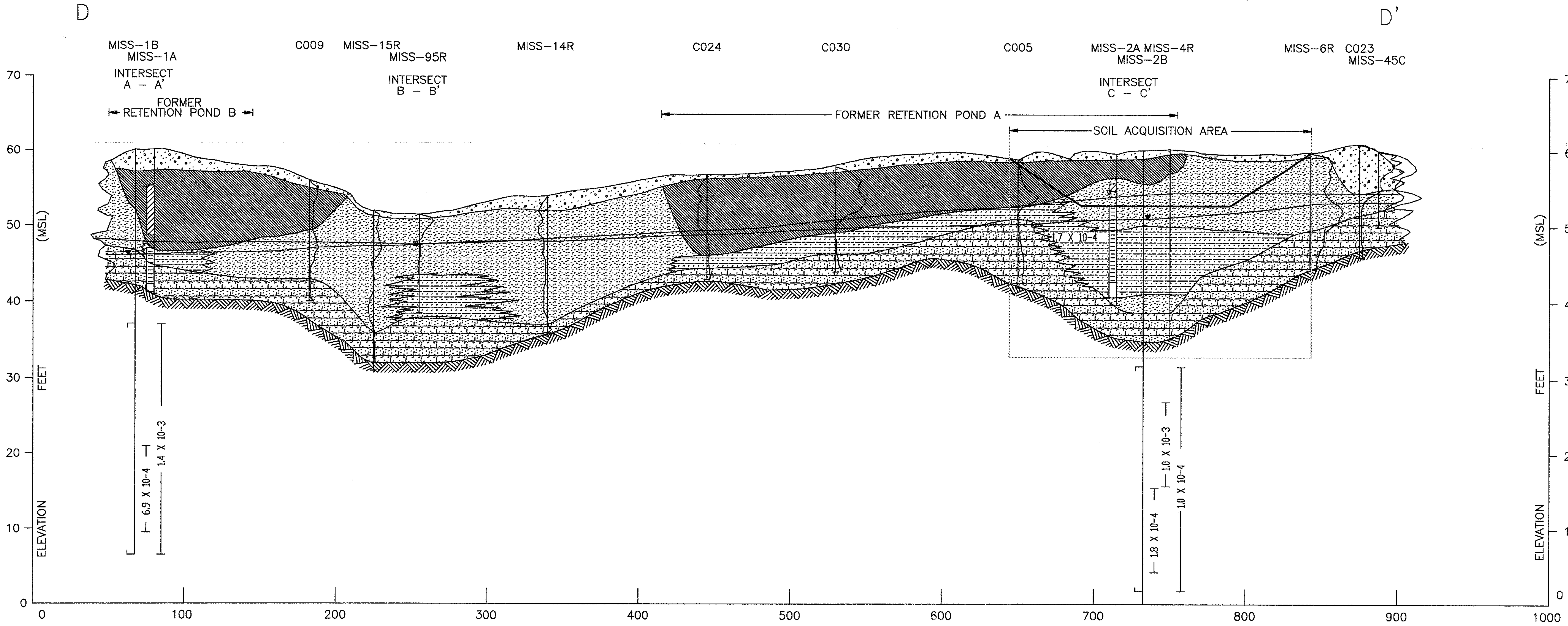
- LOCATION OF BEDROCK MONITORING WELL
- APPROXIMATE BOUNDARY OF SETTLING POND
- TOP OF BEDROCK 5-FOOT CONTOUR
- GROUND SURFACE 5-FOOT CONTOUR
- GROUND SURFACE 1-FOOT CONTOUR
- × 63.7 EXISTING SPOT ELEVATION
- (A) STOCKPILE
- GATE
- POSSIBLE LOCATION OF BURIED/ABANDONED FOUNDATION
- E 10050 N 9850 BORING LOCATION
- HYDROGEOLOGIC CROSS SECTION LINE

NOTE:

TASK COMPLETED PRIOR TO CONVERSION TO NEW JERSEY PLANE COORDINATE SYSTEM.

0 50 100 FEET
1" = 50'-0"



LEGEND:

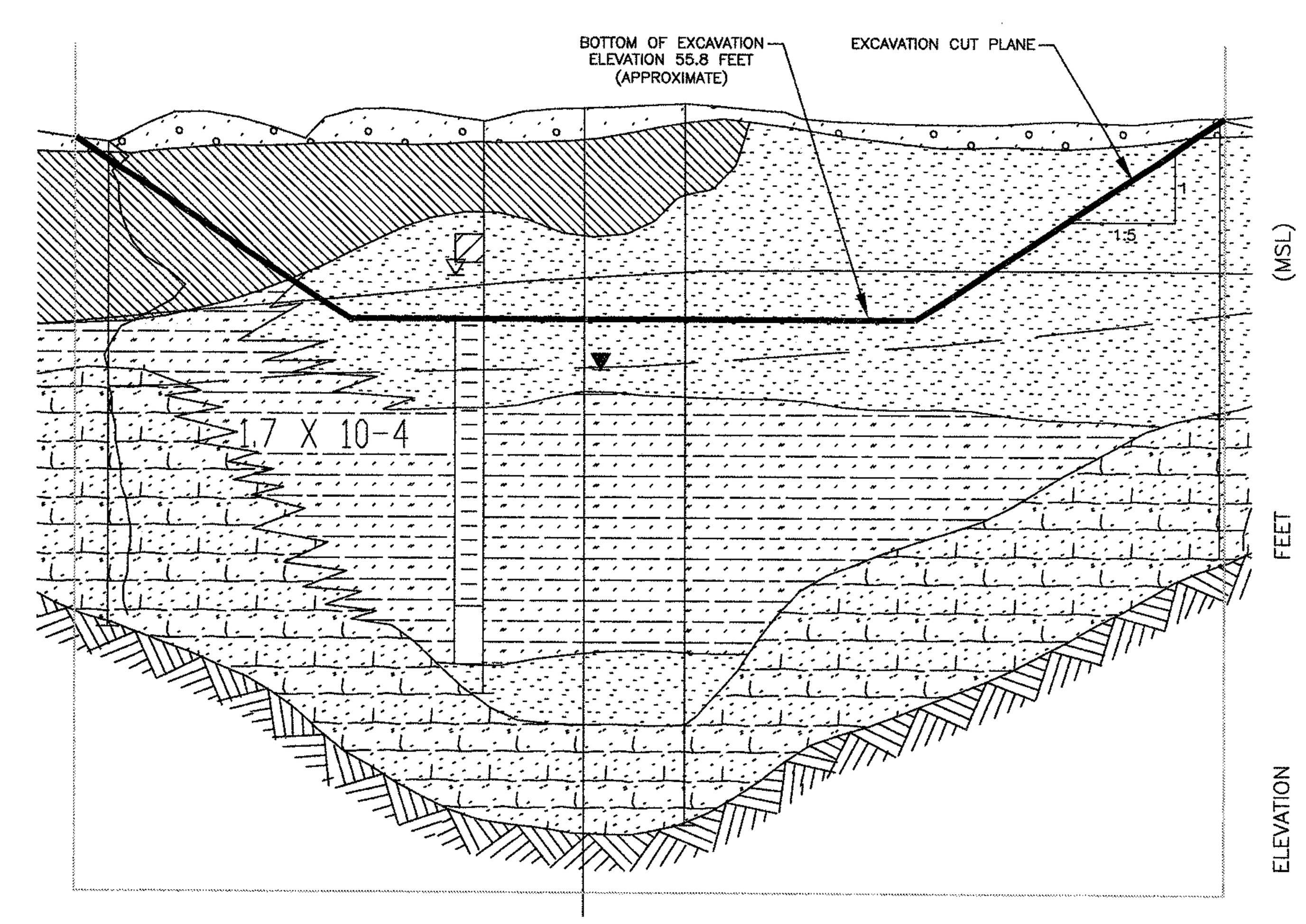
- FILL - ASH & SLUDGE
- FILL - UNDIFFERENTIATED
- UNDIFFERENTIATED SAND, SILT, CLAY
- BLACK SAND, SILT, CLAY
- SAND AND GRAVEL
- WEATHERED BEDROCK
- BEDROCK
- WATER TABLE SURFACE (UNCONSOLIDATED SEDIMENTS)
- POTENTIOMETRIC SURFACE IN BEDROCK
- WATER LEVEL (UNCONSOLIDATED SEDIMENTS)
- POTENTIOMETRIC SURFACE (BEDROCK)
- DATE OF MEASUREMENT: 3/30/92
- HYDROGEOLOGIC PROFILE - SAIC

MONITORING WELL: BENTONITE SEAL; SCREENED INTERVAL; SUMP; OPEN HOLE INTERVAL

HYDRAULIC CONDUCTIVITY: 7.9 x 10-4 HYDRAULIC CONDUCTIVITY TEST INTERVAL IN BEDROCK RESULT IN CM/SEC

BOREHOLE

HORIZONTAL 0 50 100
VERTICAL 0 10 20
SCALE IN FEET



SOIL ACQUISITION/EXCAVATION PROFILE

HORIZONTAL 0 25 50
VERTICAL 0 5 10
SCALE IN FEET

U.S. Army Corps of Engineers
NEW YORK DISTRICT

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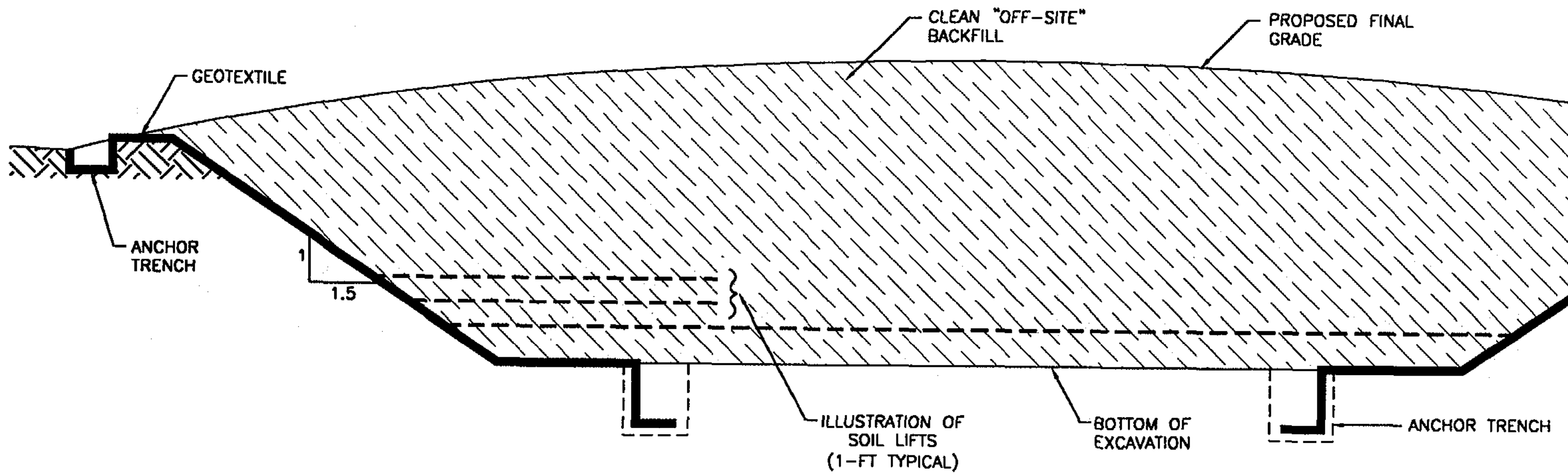
U.S. ARMY ENGINEER DIVISION
CORPS OF ENGINEERS
MAYWOOD, NEW JERSEY

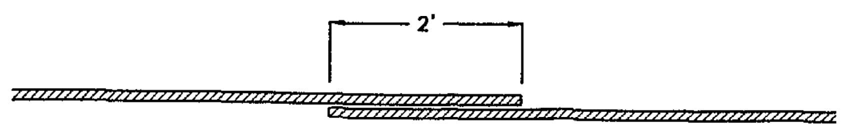
FUSRAP

FUSRAP MAYWOOD SUPERFUND SITE
MAYWOOD, NEW JERSEY

SOIL ACQUISITION WORK PLAN
PROFILE D - D'
ELEVATION OF BEDROCK
JUNE 2000
FINAL

Contract Number: DACW41-99-D-9001
Delivery Order Number:
Project Number: 08575
Drawing Number: FIGURE 8





GEOTEXTILE OVERLAPPING DETAIL

NOT TO SCALE

NOTES:

1. GEOTEXTILE (MIRAFI-FILTER WEAVE 402) SHALL BE PLACED AS SHOWN TO PREVENT MIGRATION OF SOIL PARTICLES. GEOTEXTILE TO BE PERMEABLE TO ALLOW WATER TO PASS WHILE RETAINING SOIL PARTICLES. GEOTEXTILE IS MEANT TO SERVE AS A SEPARATION/MARKER BETWEEN APPROVED BORROW BACKFILL AND CONTAMINATED SOIL.

2. FILL TO ACHIEVE FINAL GRADE SHALL BE PLACED IN HORIZONTAL LIFTS AND COMPACTED BEGINNING FROM TOE OF SLOPE AND PROGRESSING TO TOP OF SLOPE. COMPACTION EQUIPMENT SHALL BE SELECTED SO THAT THE HORIZONTAL LIFT PLACEMENT CAN CONTINUE AS FAR AS POSSIBLE UP THE SLOPE.

3. OVERLAP OF GEOTEXTILE SHALL BE A MINIMUM OF 2-FEET AT THE SEAM.

4. PRIOR TO THE INSTALLATION OF A PERMEABLE GEOTEXTILE AND BACKFILLING, THE SUBGRADE OF THE SOIL ACQUISITION PIT SHALL BE SURVEYED AND PROOF-ROLLED.

U.S. Army Corps of Engineers
NEW YORK DISTRICT

Revisions

STONE & WEBSTER ENVIRONMENTAL TECHNOLOGY & SERVICES

U.S. ARMY ENGINEER DIVISION
CORPS OF ENGINEERS
MAYWOOD, NEW JERSEY

FUSRAP

FUSRAP MAYWOOD SUPERFUND SITE
MAYWOOD, NEW JERSEY
SOIL ACQUISITION WORK PLAN
BACKFILL PLAN
CONTAMINATED SOIL ISOLATION DETAIL
JUNE 2000
FINAL

FIGURE 9

p:[Bosts01\M... \Maywood\Task0607\drawings\esk\B\07\backfill.dwg 28-June-2000

Appendix A

Field Construction Sequence

Appendix A

Field Construction Sequence

Preparation

Ensure that all preparatory work has been performed

1 Site Clearing

- Initiate Hazardous Work Permits (HWP)
- Establish and post RMA with access control point
- Cut, rake and remove vegetation. (uproot all shrubs)
- Remove and relocate the boulders that are located west of Building 76 and the location of the host site pad to another area on the MISS.
- Remove/relocate construction supplies stockpiled west of Building 76
- Remove/dispose of tree stumps and wood chips
- Locate buried utilities and obtain utility clearances
- Perform equipment entry Survey
- Erect wind sock
- Transmit a set of the "Soil Erosion and Sediment Control Plan" drawings to Bergen County Soil Conservation District for Information

2 Site Preparation

- Extend utilities to demonstration plant location (Power, and Water)
- Locate, stake, layout and construct Demonstration plant (Gravel separation and Soil sorting systems) to include – laydown, storage and office trailer.
- Locate layout and construct Decontamination Pad
- Locate and stake excavation limits
- Delineate excavation Stages I and II

  Stage I - Granular/surrounding soils to be excavated in 1-ft. horizontal lift progression.

  Stage II – High fines (Pond "A" material) to be excavated at slant lift progression.

- Locate, stake and layout ramp to excavation
- Locate and layout access and haul road(s)
- Grade access and haul.
- Rough grade location of the host site pad and install woven geofabric material in accordance the details shown on Figure 6
- Demolish the existing decontamination pad and loading ramp. Stockpile ramp material for processing

- Relocate the construction material stockpile (1,000 cubic yard) from Stepan to a different location for processing.

- Install erosion and sedimentation control scheme in accordance with the General Environmental Protection Plan (GEPP) and Figures 3 and 5.

3 Pre-Excavation Preparation

Stage I – Granular/surrounding soil

- Establish 5 ft by 5 ft grid squares
- Establish reference elevation
- Perform radiological walkovers and flag areas exceeding selected criteria
- Survey and record 5' x 5' grid elevations

Stage II high fines (Pond "A" sediment)

- Establish 5 ft by 5 ft grid rectangles
- Establish reference elevation
- Perform radiological walkovers and flag areas exceeding clean-up criteria
- Survey and record 5 ft by 5 ft grid elevations

4 Excavation Sequence

Stage I: Excavation cut planes shall be constructed at 1:1.5 slope at all sides.

a. Excavate and process slug.

b. Excavate and process remainder of the batch.

Repeat steps a and b until the planned depth of excavation is reached

Stage II: Excavation cut planes shall be constructed at 1:1.5 slope at all sides

Excavation shall proceed in 1-ft lifts (slant at 1.5H:1V) for the Stage II excavation

a. Excavate and process slug.

b. Excavate and process remainder of the batch.

Repeat steps a and b until excavation reaches about 40-ft. into pond A

REPEAT STEPS 3 AND 4 FOR EVERY LIFT TO THE DESIGNATED DEPTH OF SIX FEET

5. Develop access ramp as excavation advances.

6. At completion, perform radiological survey of the bottom of the excavation and stabilize the excavation pit.

7. Decontaminate construction equipment in accordance with the SAP

8. Following the completion of Stages I and II, Stage III will commence to address any remaining contamination.

STOP WORK CONDITIONS

Immediately cease excavation if:

Any fluid phase or groundwater seepage is encountered ;

Any drums, or other potential waste containers are encountered;

Distinct changes of material are encountered; or

The inspecting Stone & Webster representative directs the operator to cease digging.

Excavation shall resume upon authorization of the Stone & Webster Task Superintendent

ONLY AUTHORIZERIZED PERSONNEL WILL BE PERMITTED ENTRY INTO THE EXCAVATION PIT

For additional information refer to the following drawings:

Figure 1 – Site Location
Figure 2 – Organizational Chart
Figure 3 – Sit Plan, Traffic Flow Plan and Demonstration Plant Layout
Figure 4 – Soil Acquisition Excavation Plan and Detail
Figure 5 – Soil Erosion and Sediment Control
Figure 6 – Pilot Demonstration Plant Layout and Pad Design
Figure 7 – Soil Acquisition Cross Section Profile C-C
Figure 8 – Soil Acquisition Cross Section Profile D-D

Appendix B

Operational Noise Analysis

APPENDIX B

OPERATIONAL NOISE ANALYSIS

Ambient Sound Level Survey

A sound level survey was conducted on February 1-2, 2000 in the vicinity of the FMFS. The purpose of the survey was to document the existing ambient sound levels for use in identifying potential community noise impacts from the operation of the site excavation and soil processing equipment.

A precision, integrating, octave band sound level meter was used to take sound level measurements at 6 locations. The meter collected 10-minute statistical sound level and octave band sound pressure level samples, and was calibrated before and after each survey. The meter and calibrator have calibrations traceable to the National Institute of Standards and Technology.

The meter measured the 10-minute L_{10}, L_{50}, and L_{90} sound levels, which are the levels exceeded 10, 50, and 90 percent of the time. The L_{eq}, or the energy average sound level, was also measured during each sample. For simplicity only the L_{eq} and L_{90} are reported herein.

The L_{90}, the sound level exceeded 90 percent of the time, quantifies the quiet periods in the absence of intrusive noise such as passing vehicles, airplanes, or calling birds. Any new noise source introduced into the area will be most audible during these quietest periods.

The second unit of measure is the L_{eq}, which is the energy average sound level. The L_{eq} is dominated by passing vehicles, and is dependent on the distance to major and secondary roads, and the frequency of vehicle pass-bys. The L_{eq} measurements taken close to the road may be slightly higher than those experienced by residences set back from the road, but the L_{90} measurements would remain the same. Most of the measurements were taken within 25 ft. of the center of the road to avoid private land.

Measurement Locations

The noise measurement locations, shown in Figure 1, are described below.

Location #1	-Sidewalk at corner of Eccleston Pl. and West Magnolia Ave.
Location #2	Sidewalk on north side of West Central Ave. halfway between Ramapo Ave. and Eccleston Pl.
Location #3	Sidewalk on north side of West Central Ave. halfway between Eccleston Pl. and Hergesell Ave.

Location #4 Sidewalk on north side of West Central Ave. halfway between Hergesell Ave. and NJ State Rt. 17.

Location #5 Sidewalk at corner of Central Ave. and Lincoln Drive.

Location #6 Sidewalk on south side of Grove Ave. approximately 250 feet from intersection of Grove Ave. and NJ State Rt. 17.

Summary of Ambient Levels

The ambient L_{90} and L_{eq} sound level data are summarized in Table 1. The data illustrate a relatively small spacial and temporal variability of the sound levels in the vicinity of the FMFS site. Additional survey information, including all L_{90} and L_{eq} daytime measurements, the times of data collection, and the controlling noise sources are given in Tables 2-7, Attachment 1.

Details of the controlling noise sources are also summarized in Tables 2-7. For each measurement period, the first line of the "Controlling Noise Source" entry in the tables describes what is dominating the L_{eq}s. The second line indicates what is controlling the L_{90}s, or minimum sound levels. As indicated in Tables 2-7, the residual (L_{90}) sound levels are mostly controlled by NJ State Rt. 17 car/truck traffic and the L_{eq}s by local traffic

Variability of Residual L_{90} Levels

Locations 4, 5, and 6 were the loudest with daytime L_{90} levels in the 57-63 dBA range. These locations were close (less than 350 ft) to NJ State Rt. 17 and were controlled by the constant highway traffic.

Locations 1, 2, and 3 were 800-1200 ft. further away from Rt. 17 and thus received lower traffic noise levels ranging from 52-57 dBA. The constant Rt. 17 vehicular noise again controlled the L_{90}s.

The measurement location's L_{90}s varied by only 1-4 dBA throughout the entire day, indicating that the daytime Rt. 17 traffic noise is relatively constant in time. Therefore, it is not likely that there will be periods when the sound levels at any of the locations might drop below the measured levels.

Variability of l_{eq} energy average levels

The L_{eq} sound levels were controlled by the distance from the adjacent road and number of passing cars/trucks. The L_{eq}s at the measurement locations along Central/West Central Ave. (Locations 2-5) ranged from 62-72 dBA. The lower L_{eq}s were measured in the early morning, 6:00-7:00 AM, when the number of passing cars was minimal. Occasional overhead airplane traffic contributed to the L_{eq}s. The highest L_{eq}s were measured in the late afternoon, between 4:00-5:00 PM, when up to 30 cars were passing per minute.

Locations 1 and 6 were on less frequently traveled roads, West Magnolia Ave. and Grove Ave., respectively, and therefore had lower L_{eq}s. Location 1 L_{eq}s ranged from 55-61 dBA, and were dominated by both passing cars/trucks and occasional overhead airplane traffic. Location 6 L_{eq}s ranged from 60-64 dBA. The Location 6 L_{eq}s were controlled by both passing cars/trucks and overhead airplane traffic. The L_{eq}s at Location 6 were higher than those at Location 1 because Location 6 was approximately 1000 ft closer than Location 1 to the Rt. 17 traffic noise.

Table 1: Summary of Daytime L_{90} and L_{eq} Ambient Sound Levels

Location	L_{90} (dBA)		L_{eq} (dBA)		Project
	High	Low	High	Low	Leq
1	54.7	53.1	61.2	55.4	<58
2	56.3	51.7	69.2	62.3	58
3	57.3	56.2	71.3	67.9	63
4	61.2	58.7	68.3	66.1	62
5	63.4	59.6	71.5	69.1	<56
6	60.9	56.6	64.2	60.4	<56

Operational Noise Impact Assessment

The earth moving equipment to be used in the soil processing operation has not specifically been determined, but for the purpose of the noise analysis it is assumed that the soil will be picked up with a front-end loader and transported to processing by truck. Other types of diesel driven equipment have similar sound levels and would yield similar results.

The character of the sound from the diesel engine driven front-end loader would be familiar to many in the community. Front-end loaders are commonly used in the construction of house foundations and the repair of streets. The sound from the vibrating screen has not yet been determined.

The sound from mobile equipment was estimated with a technique outlined in *Power Plant Construction Noise Guide*, May, 1977, Empire State Electric Energy Research Corporation. This methodology takes into consideration the sound level of the equipment and the percent of time it operates at maximum load. The predictions are in terms of the Leq, the energy average sound level.

The equipment sound was then projected into the community taking into consideration atmospheric absorption and hemispherical radiation. No corrections were made for the barrier affect of house, buildings or highway overpasses. The symbol "less than" (<) was used in the Table 1 where a significant reduction from the value shown may be experienced because of barriers.

Conclusions

Table 1 indicates that for the nearest homes along West Central Avenue the Project L_{eq}s will be 3-5 dB below the lowest measured L_{eq}s, indicating they will have an insignificant impact on the existing ambient Leq levels. On the other hand, the Project Leqs along W. Central Ave. will be 3-7 dBA above the lowest L_{90} levels. That means that during the quietest periods along W. Central Ave. at locations with a direct line of site to the equipment, the diesel operated equipment may be audible, and could temporarily increase the existing sound levels.

The highest projected level along W. Central Ave. of 63 dB is within the NJDEP requirement of 65 dBA from 7am to 10 pm. If the amount of similar equipment on site were to double the sound levels in the community would increase by 3 dBA to 66. This indicates that there is a small noise budget left for the screening operation.

In order to assure that the project will have no significant detrimental noise impact on the adjacent community, a sound level survey will be conducted when the soil processing operation begins . If a significant increase in the ambient L90 sound levels is occurring due to the project operation, as projected above, the noise will be mitigated with a barrier or other form of mitigation.

ATTACHMENT 1

Table 2
Location #1
Corner of Eccleston Pl. and West Magnolia Ave.

Date	Time	L_{90} (dBA)	L_{eq} (dBA)	Controlling Noise Sources
1-Feb-2000	14:35	54.2	59.2	L_{eq} Passing Cars/Airplanes L_{90} Rt. 17 Traffic
2-Feb-2000	6:20	53.1	55.4	L_{eq} Passing Cars/Airplanes L_{90} Rt. 17 Traffic
2-Feb-2000	9:55	54.7	58.4	L_{eq} Passing Cars/Airplanes L_{90} Rt. 17 Traffic
2-Feb-2000	13:40	53.8	55.6	L_{eq} Passing Cars/Airplanes L_{90} Rt. 17 Traffic
2-Feb-2000	16:00	54.0	61.2	L_{eq} Passing Cars/Airplanes L_{90} Rt. 17 Traffic

Table 3
Location #2
West Central Ave. – Halfway between Ramapo Ave. and Eccleston Pl.

Date	Time	L_{90} (dBA)	L_{eq} (dBA)	Controlling Noise Sources
1-Feb-2000	15:10	55.5	68.1	L_{eq} Passing Cars L_{90} Rt. 17 Traffic
2-Feb-2000	6:00	51.7	62.3	L_{eq} Passing Cars/Airplanes L_{90} Rt. 17 Traffic
2-Feb-2000	10:10	54.6	66.5	L_{eq} Passing Cars L_{90} Rt. 17 Traffic
2-Feb-2000	14:00	56.3	67.6	L_{eq} Passing Cars L_{90} Rt. 17 Traffic
2-Feb-2000	16:15	54.2	69.2	L_{eq} Passing Cars L_{90} Rt. 17 Traffic

Table 4
Location #3
West Central Ave. – Halfway between Eccleston Pl. and Hergesell Ave.

Date	Time	L_{90} (dBA)	L_{eq} (dBA)	Controlling Noise Sources
1-Feb-2000	15:25	57.3	69.2	L_{eq} Passing Cars L_{90} Rt. 17 Traffic
2-Feb-2000	6:35	56.2	67.9	L_{eq} Passing Cars/Airplanes L_{90} Rt. 17 Traffic
2-Feb-2000	10:23	56.4	68.7	L_{eq} Passing Cars L_{90} Rt. 17 Traffic
2-Feb-2000	14:15	57.3	69.6	L_{eq} Passing Cars L_{90} Rt. 17 Traffic
2-Feb-2000	16:30	56.2	71.3	L_{eq} Passing Cars L_{90} Rt. 17 Traffic

Table 5
Location #4
West Central Ave. – Halfway between Hergesell Ave. and NJ State Rt. 17

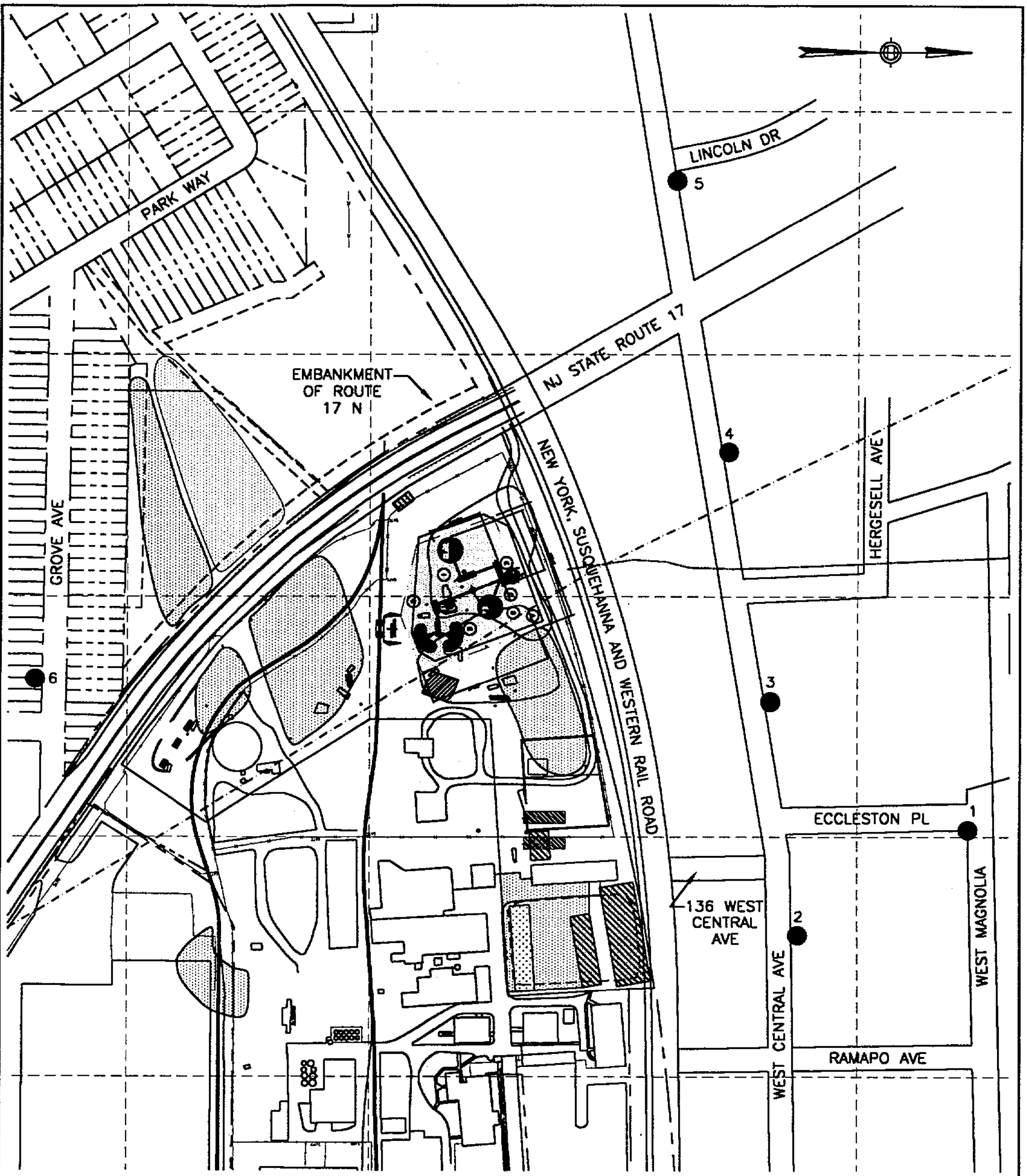
Date	Time	L_{90} (dBA)	L_{eq} (dBA)	Controlling Noise Sources
1-Feb-2000	15:40	60.3	68.3	L_{eq} Passing Cars L_{90} Rt. 17 Traffic
2-Feb-2000	6:55	59.8	66.1	L_{eq} Passing Cars/Airplanes L_{90} Rt. 17 Traffic
2-Feb-2000	10:40	61.1	67.6	L_{eq} Passing Cars L_{90} Rt. 17 Traffic
2-Feb-2000	14:30	61.2	68.1	L_{eq} Passing Cars L_{90} Rt. 17 Traffic
2-Feb-2000	16:50	58.7	68.2	L_{eq} Passing Cars L_{90} Rt. 17 Traffic

Table 6
Location #5
Corner of West Central Ave. and Lincoln Drive

Date	Time	L_{90} (dBA)	L_{eq} (dBA)	Controlling Noise Sources
1-Feb-2000	16:00	63.4	70.3	L_{eq} Passing Cars L_{90} Rt. 17 Traffic
2-Feb-2000	7:05	59.8	69.1	L_{eq} Passing Cars/Airplanes L_{90} Rt. 17 Traffic
2-Feb-2000	11:00	59.9	69.3	L_{eq} Passing Cars L_{90} Rt. 17 Traffic
2-Feb-2000	14:45	59.6	69.3	L_{eq} Passing Cars L_{90} Rt. 17 Traffic
2-Feb-2000	17:05	60.0	71.5	L_{eq} Passing Cars L_{90} Rt. 17 Traffic

Table 7
Location #6
Grove Ave. – Approx. 250 ft from Intersection of Grove Ave. and NJ State Rt. 17

Date	Time	L_{90} (dBA)	L_{eq} (dBA)	Controlling Noise Sources
1-Feb-2000	16:35	60.7	64.2	L_{eq} Passing Cars/Airplanes L_{90} Rt. 17 Traffic
2-Feb-2000	7:30	59.4	62.9	L_{eq} Passing Cars/Airplanes L_{90} Rt. 17 Traffic
2-Feb-2000	11:35	60.5	63.2	L_{eq} Passing Cars/Airplanes L_{90} Rt. 17 Traffic
2-Feb-2000	15:05	60.9	63.1	L_{eq} Passing Cars/Airplanes L_{90} Rt. 17 Traffic
2-Feb-2000	17:30	56.6	60.4	L_{eq} Passing Cars/Airplanes L_{90} Rt. 17 Traffic



LEGEND:

● SET-UP LOCATION

FINAL

0 300 600 FEET

1" = 300'-0"

FUSRAP MAYWOOD SUPERFUND SITE
MAYWOOD, NEW JERSEY

APPENDIX B
FIGURE 1
AMBIENT NOISE SURVEY MEASUREMENT LOCATIONS
JUNE 2000

STONE & WEBSTER ENGINEERING CORPORATION
BOSTON, MASSACHUSETTS

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Appendix C

Stage III Activities

APPENDIX C

STAGE III ACTIVITIES

When sufficient data has been collected to adequately evaluate the performance of the soil processing systems the Pilot Demonstration will move into Stage III. The anticipated Stage III activities include those listed below. Planned activities may be added or deleted depending on observations made during Stage I and Stage II of the Pilot Demonstration. A listing of these intended activities is provided below. A more complete description and results/conclusions will be provided in the Pilot Demonstration Report.

The following activities are being considered:

- Look at various excavation and material handling techniques (other than excavation in 1-foot lifts), that would be used in full-scale operations and see how they impact the heterogeneity of the feed soil and operation of the system.

- Test various field-screening techniques for development of a protocol for identification and removal of residual contamination after initial cut line are completed.

- Test throughput limits of system (the Gravel Separation System in particular)

- Test compaction methods used on off-site borrow material to refine methods that attain the desired compaction requirements.

- Obtain experience in implementation of the MARSSIM final status survey methodology. Use both traditional soil sampling with laboratory analysis and surface ISOCS to see if there are differences in the outcome of the final status survey using the different methodologies.

- Evaluate techniques for surface water control and management for application during remediation of vicinity properties.

Once it can be determined that all contaminated material has been removed, a final status survey will be performed using a MARSSIM-like approach. A work plan is in the process of being prepared for the implementation of the survey. The Final Status Survey Work Plan (FSSWP) will be provided at a later date.

The FSSWP will identify the protocol for conducting a survey to demonstrate compliance with the proposed cleanup goals. The FSSWP will define the roles and responsibilities of project personnel and describe the survey, implementation procedures, data assessment methods, and process for making a technically defensible decision.

The Data Life Cycle will be used as a framework for planning, implementing, and evaluating survey results prior to making a decision as to whether or not a survey unit meets the release criterion. The following table, taken from MARSSIM (Roadmap, Figure 1) shows the application of the application of the Data Life Cycle to a Final Status Survey.

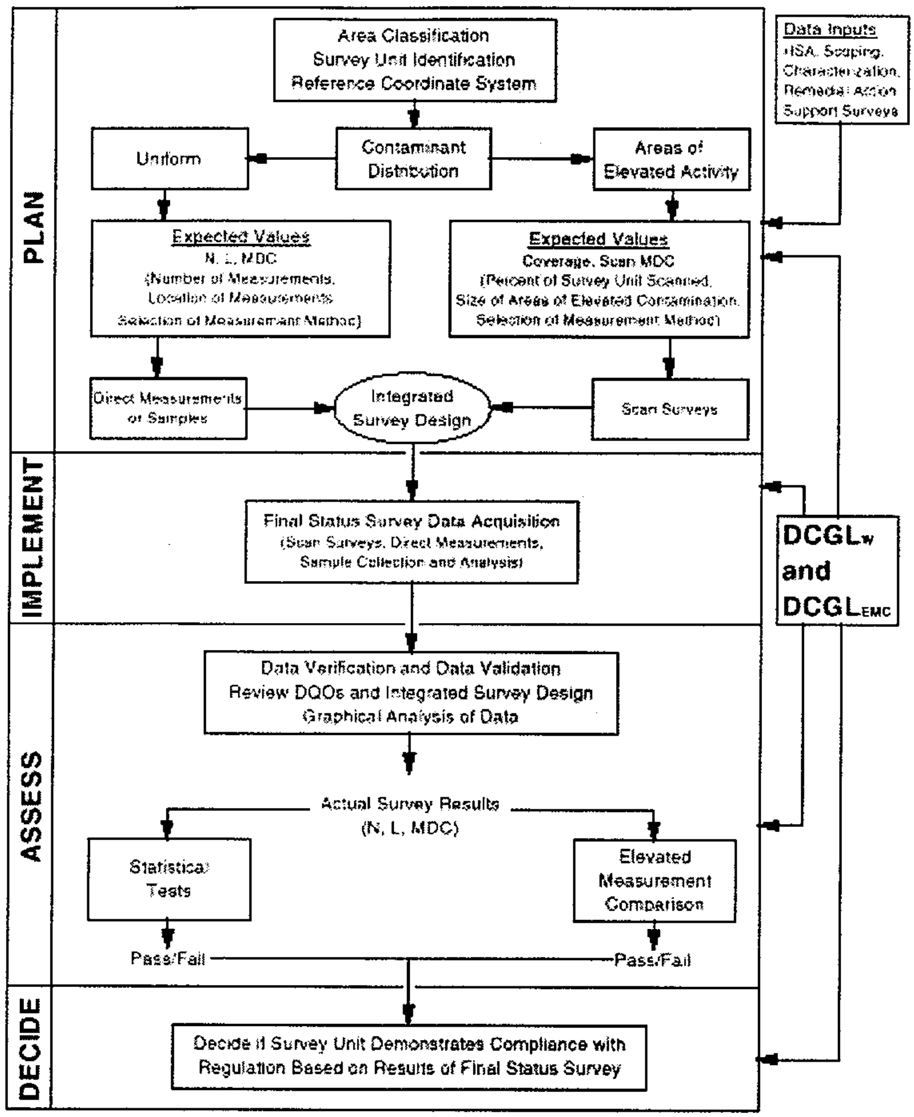

Figure 1: The Data Life Cycle Applied to a Final Status Survey

Appendix D

Remedial Investigation and Pre-Design Investigation Data for Soil Acquisition Area

APPENDIX D

Remedial Investigation and Pre-Design Investigation Data for Soil Acquisition Area

Data Sources

Radiological, chemical and geotechnical characteristics of soils for the MISS were compiled from existing documentation found in the Maywood Administrative Record. Previously collected data is in the form of analytical chemical sampling results, downhole gamma logging counts, and geologic borehole logs. The following documents are the primary sources of information used in the correlation:

- Engineering Test Pit Data from the MISS
- The Final Maywood Soils Grouping Report, SAIC, January 1998
- Final Remedial Investigation Report, Stepan Company Property, CH2M Hill, November 1994
- Remedial Investigation Report for the Maywood Site, Bechtel, December 1992
- Characterization Report for the Maywood Interim Storage Site, Bechtel, June 1987
- PDI Soil Probe Log Sheet

Table 1
Remedial Investigation Data for Soil Acquisition Area
Soil Acquisition Downhole Gamma Logging (cpm)

Boring ID	B3890C005 (RI)	MISS-68C (RI)	MISS-5R (RI)	MISS-3R (RI)		B3890C030-2 (RI)	B3890C021 (RI)	B3890C007 (RI)
Depth	E 9798 N 9953	E 9800 N 9930	E 9800 N 9960	E 9900 N 9900	E 9900 N 9975	E 9865 N 9919	E 9870 N 9815	E 9951 N 9903
0.5	17,000	18,000	13,000	11,000	18,000	54,000	78,000	17,000
1.0	11,000	23,000	19,000	16,000	23,000	80,000	127,000	16,000
1.5	13,000	32,000	22,000	15,000	37,000	119,000	119,000	18,000
2.0	13,000	69,000	23,000	10,000	51,000	111,000	76,000	21,000
2.5	14,000	110,000	36,000	11,000	43,000	96,000	41,000	22,000
3.0	16,000	117,000	92,000	14,000	14,000	84,000	41,000	24,000
3.5	19,000	45,000	81,000	16,000	9,000	54,000	41,000	27,000
4.0	26,000	21,000	53,000	14,000	5,000	55,000	130,000	30,000
4.5	49,000	22,000	44,000	15,000	4,000	46,000	260,000	37,000
5.0	77,000	23,000	27,000	16,000	4,000	24,000	353,000	23,000
5.5	56,000	18,000	24,000	16,000	4,000	13,000	272,000	12,000
6.0	29,000	9,000	13,000	17,000	4,000	9,000	119,000	8,000
6.5	14,000	8,000	10,000	18,000	4,000	7,000	41,000	7,000
7.0	11,000	7,000	9,000	26,000	4,000	8,000	19,000	6,000
7.5	9,000	8,000	8,000	40,000	4,000	8,000	13,000	6,000
8.0	10,000	9,000	10,000	50,000	5,000	9,000	13,000	5,000
8.5	10,000	10,000	9,000	47,000	6,000	9,000	13,000	5,000
9.0	11,000	11,000	10,000	27,000	7,000	10,000	12,000	5,000
9.5	11,000	11,000	11,000	11,000	7,000	9,000	10,000	6,000
10.0	12,000	12,000	11,000	7,000	6,000	10,000	10,000	6,000
10.5	12,000	12,000	11,000	6,000	6,000	10,000	10,000	7,000
11.0	13,000	12,000		6,000	7,000	11,000	12,000	14,000
11.5	14,000	14,000		8,000	7,000	11,000	12,000	16,000
12.0	14,000	14,000		9,000	8,000	12,000	13,000	12,000
12.5	16,000			9,000	8,000	12,000	14,000	10,000
13.0	17,000			8,000	9,000	15,000	15,000	9,000
13.5	18,000			8,000	8,000		16,000	10,000
14.0	18,000				7,000		17,000	9,000
14.5	17,000				9,000			8,000
15.0	17,000				8,000			8,000
15.5	15,000				9,000			11,000
16.0	15,000				8,000			11,000
16.5	17,000				8,000			12,000
17.0					8.000			11,000
17.5					7,000			10,000
18.0					6,000			8,000
18.5					6,000			7,000
19.0					7,000			7,000
19.5					7,000			7,000
20.0					6,000			7,000
20.5					7,000			8,000
21.0					9,000			9,000
21.5					9,000			11,000
22.0					10,000			13,000
22.5					9,000			12,000
23.0					10,000			12,000
23.5					9,000			13,000
24.0								13,000

Table 2
Pre-Design Investigation Data for Soil Acquisition Area
Soil Acquisition Downhole Gamma Logging (cpm)

Boring ID	MPI 12070 (PDI)	MPI 12093 (PDI)	MPI 12113 (PDI)	MPI 12078 (PDI)	MPI 12092 (PDI)	MPI 12112 (PDI)	MPI 12094 (PDI)	
Depth								
0.5	5,574	564	1,188	954	1,506	1,356	3,954	
1.0	6,030	1,254	1,398	1,326	1,872	2,088	1,356	
1.5	5,568	1,578	1,506	1,578	2,586	3,234	19,116	
2.0	3,210	1,068	1,614	1,494	4,020	2,298	21,426	
2.5	28,524	1,548	1,602	1,266	1,878	894	26,076	
3.0	58,116	2,172	3,126	1,470	1,512	312	40,872	
3.5	73,854	7,020	13.476	1,572	1,524	354	13,842	
4.0	47,022	2,788	3,840	1,524	1,740	7,396	5,754	
4.5	29,538	1,734	1,782	1,698	3,798	1,362	10,122	
5.0	10,038	1,596	1,920	2,124	16,386	1,248	53,040	
5.5	1,530	1,470	1,806	3,750	22,716	474	121,758	
6.0	1,272	1,380	1,872	10,182	5,454	312	316,176	
6.5	96	1,536	2,250	7,230	1,662	306	453,966	
7.0	204	1,776	2,490	3,786	756	252	383,598	
7.5	132	3,360	4,440	1,914	462	180	112,686	
8.0	216	1,596	15,162	972	348	204	22,182	
8.5	516	756	3,402	612	408	438	6,042	
9.0	1,158	408	1,548	510	798	552	2,292	
9.5	1,158	222	654	660	1,122	972	1,332	
10.0	930	222	444	636	1,092	996	1,134	
10.5	942	396	384	354	1,104	888	1,236	
11.0	978	822	570	480	1,026	858	1,446	
11.5		786	1,326	696	834	1,068	1,374	
12.0		1,056	924	786	978	1,182	1,542	
12.5		834	942	1,020	900	1,140	1,398	
13.0		840	1,116	1,038	786	1,116	1,500	
13.5		960	1,182	864	654	1,146	1,578	
14.0		1,320	1,206	846	738	1,482	1,680	
14.5		1,298	1,092	1,122	606	1,350	1,710	
15.0		1,278	906	912	540		1,770	
15.5		876	642	1,086	966			
16.0			576	966	1,494			
16.5			630	708	1,626			
17.0			834	534	1,560			
17.5			1,476	714	1,632			
18.0				762	1,548			
18.5				1,140	1,734			
19.0				918	1,794			
19.5				990				
20.0				1,008				
20.5								
21.0								
21.5								
22.0								

FINAL
PILOT DEMONSTRATION WORK PLAN

VOLUME 2
PROCESSED MATERIAL SOIL REUSE EVALUATION PLAN

FUSRAP MAYWOOD SUPERFUND SITE
MAYWOOD, NEW JERSEY

SITE-SPECIFIC ENVIRONMENTAL RESTORATION
CONTRACT NO. DACW41-99-D-9001
WAD 06 WBS 07

Submitted to:

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TABLE OF CONTENTS

VOLUME 2
PROCESSED MATERIAL SOIL REUSE EVALUATION PLAN

Tables

Figures

Appendices

LIST OF ACRONYMS AND ABBREVIATIONS

ASTM	American Society for Testing and Materials
bgs	below ground surface
bkg	background
CDQMP	Chemical Data Quality Management Plan
CERCLA	Comprehensive Environmental, Response, Compensation, and Liability Act
COC	Chain of Custody
cpm	counts per minute
CQCP	Contractor Quality Control Plan
DQCR	Daily Quality Control Report
DQO	Data Quality Objectives
EM	Engineering Manager
FMSS	FUSRAP Maywood Superfund Site
FOL	Field Operations Leader
FUSRAP	Formerly Utilized Sites Remedial Action Program
GPS	Global Positioning System
MHTDP	Materials Handling, Transport and Disposal Plan
MISS	Maywood Interim Storage Site
MS	Matrix Spike
MSD	Matrix Spike Duplicate
NaI	Sodium Iodide
NCP	National Contingency Plan
NCR	Nonconformance Report
NGVD	National Geodetic Vertical Datum
NJDEP	New Jersey Department of Environmental Protection
PCB	polychlorinated biphenyl
pCi	picocurie
PDWP	Pilot Demonstration Work Plan
PID	Photoionization Detector
QA	Quality Assurance
QC	Quality Control
RCRA	Resource Conservation and Recovery Act
RSO	Radiation Safety Officer

RSS	Radiological Sorting System
SSHO	Site Safety and Health Officer
SSHP	Site Safety and Health Plan
SAP	Sampling and Analysis Plan
SC	Sampling Coordinator
SCC	Soil Cleanup Criteria
SOP	Standard Operating Procedure
SOR	Sum- of-the-Ratios
SSERC	Site-Specific Environmental Restoration Contract
SVOC	Semivolatile Organic Compound
TCLP	Toxicity Characteristic Leaching Procedure
TPWP	Test Pit Work Plan
USACE	U.S. Army Corps of Engineers
USCS	Unified Soil Classification System
USGS	U.S. Geological Survey
USEPA	U.S. Environmental Protection Agency
UTM	Universal Transverse Mercator
VOC	Volatile Organic Compound

1.0 INTRODUCTION

> ***Note: This Plan presents the protocols under which processed soil would be reused at the FMSS. Acceptance of this plan is required to evaluate the viability of implementing a full-scale system, however no reuse of processed soil is proposed for the pilot demonstration.***

The United States Army Corps of Engineers (USACE), under Site-Specific Environmental Restoration Contract (SSERC) No. DACW41-99-D-9001, has contracted Stone & Webster Environmental Technology & Services (Stone & Webster), a division of Stone & Webster Engineering Corporation, to perform remediation of the FUSRAP Maywood Superfund Site (FMSS), in Maywood, Lodi, and Rochelle Park, New Jersey (Figure 1). Remediation of the site may include the use of soil processing to reduce the volume of radiologically contaminated material requiring offsite disposal. At this time, the soil processing technologies being evaluated for use at the FMSS consist of gravel separation and radiological soil sorting technologies. A pilot study, involving the demonstration of these technologies utilizing two separate processing systems, is planned to be carried out at the Maywood Interim Storage Site (MISS). This pilot demonstration will further evaluate the viability of full-scale implementation of the technologies at the FMSS (see other plans within the Pilot Demonstration Work Plan for additional details).

It is recognized that the potential use of soil processing technologies will yield streams of below criteria material as well as streams of contaminated material. The contaminated material will be disposed of at appropriate, approved offsite facilities. The below criteria material may be suitable for reuse if it meets the relevant reuse criteria, as specified below:

- Radiological Criteria – Dictated by the Record of Decision (ROD)
- Chemical Criteria – Dictated by NJ Soil Cleanup Criteria (Industrial)
- Permeability Criteria – Dictated by N.J.A.C 7:26E.

The objective of this Processed Material Soil Reuse Evaluation Plan is to:

- Identify the potential for reuse of the processed below criteria streams at the MISS, Stepan or Sears properties; and
- Identify the activities that will be conducted as part of the pilot demonstration to quantitatively evaluate the potential to reuse processed material during full-scale production.

During remediation (including soil processing) of the FMSS, separate material streams described as follows are anticipated:

Stream Number	Description	Potential Final Disposition
1 (Vol. 1 - Overview Fig. 5 Stream # 6)	Below criteria material greater than 3/8" and less than 6" diameter (separated and rinsed gravel)	Reuse as backfill
2a (Vol. 1 - Overview Fig. 5 Stream # 9)	Below criteria less than 3/8" material (output of radiological sorting system)	Reuse as backfill
2b (Vol. 1 - Overview Fig. 5 Stream # 9)	Below criteria retention pond material (output of radiological sorting system)	Reuse as backfill
3 (Vol. 1 - Overview Fig. 5 Stream # 3)	Oversize (>6" material)	Sample for potential reuse as backfill
4 (Vol. 1 - Overview Fig. 5 Stream # 8)	Above criteria (contaminated) material	Dispose of at an approved off-site disposal facility

The proposed final disposition stated above assumes that levels of chemical constituents are below site-specific standards. It is also assumed that the physical properties of the below criteria streams of material processed for volume reduction will be acceptable as processed, or able to be rendered acceptable through blending, and therefore approved for backfill (see Section 4.3).

A test pit investigation indicated that there may also be a considerable amount of building debris such as bricks, foundations, and concrete block. Based upon the "*1998 Revised Guidance Document for Remediation of Contaminated Soils,*" soils that contain contaminants below regulatory concern and are not petroleum contaminated may be mixed with source separated concrete, brick, and block generated on-site and may be recycled on-site as clean fill. In addition, such operations are exempted from the requirement to obtain approval from the New Jersey Department of Environmental Protection (NJDEP) in accordance with the Recycling Regulations at N.J.A.C. 7:26a-1.4(a)2. It is assumed that this will apply to the building debris encountered in the required excavations at the FMSS. As required, fill material used to restore a site after the remediation has been completed shall be similar in physical properties to the material removed unless otherwise approved in advance by the NJDEP.

The following sections address specific requirements in the New Jersey Regulations (N.J.A.C. Chapter 26E) regarding the contents of a soil reuse proposal. The citations for these requirements are provided in brackets below the title of the section.

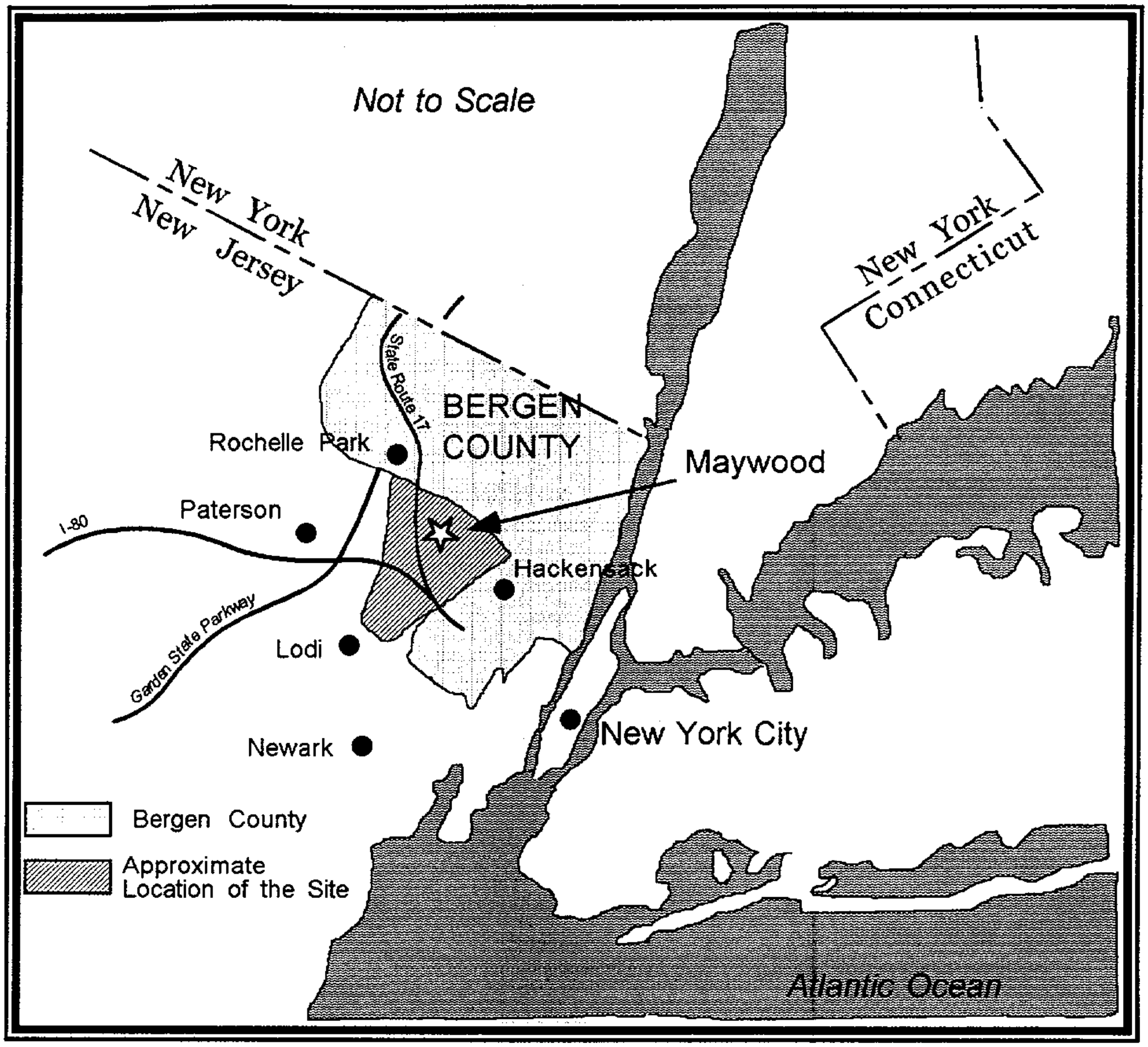

Figure 1: Site Location Map

2.0 DESCRIPTION OF SITE
[N.J.A.C. 7:26E-6.2(b)1]

A number of studies and investigations have been performed to date at the FMSS. Appendix A contains the Executive Summary for the Remedial Investigation Report prepared in 1992. This report presented the results of the remedial investigation activities conducted during 1989, 1990, and 1991 at the FMSS. In general the attached report summary provides information which characterizes the nature and extent of contamination at the FMSS. Table 1 lists the properties at which processed soil may be reused.

TABLE 1 – FMSS PROPERTIES FOR POSSIBLE REUSE OF PROCESSED SOIL

Property	Shallowest Depth To Groundwater (Ft bgs)	Current Use	Reasonably Anticipated Future Land Use	Proposed[1] Category of Reuse Criteria
Sears (149-151 Maywood Ave)	0.5[2]	Lt. Industrial	Lt. Industrial	Commercial/ Non-Residential[3]
Stepan (100 West Hunter)	0.2[2]	Lt. Industrial	Lt. Industrial	Commercial/ Non-Residential
Maywood Interim Storage Site (100 West Hunter)	5	Lt. Industrial	Lt. Industrial	Commercial/ Non-Residential

1 Currently only proposed. There is no approved ROD for the Site.
2 These depths are associated with wetlands areas on the sites. The wetlands areas would not be backfilled with processed material. They would be restored in accordance with applicable requirements.
3 Commercial radiological cleanup levels and NJ Soil Cleanup Criteria - Non-Residential

3.0 SOIL CLASSIFICATION
[N.J.A.C. 7:26E-6.2(b)2]

Should soil reuse be demonstrated and supported as viable, then all soil proposed to be reused will be below the applicable reuse criteria, both chemical and radiological, for the receiving site (i.e. reuse location) as identified in the Record of Decision (ROD). Determination that the soil is below the applicable criteria will be in accordance with N.J.A.C. 7:26-6.4(d). In brief, for radiological contamination, soil will be screened using a sodium iodide (NaI) detector every 20 cubic yards and one sample for onsite laboratory analysis (gamma spectroscopy) will be taken for each 100 cubic yards. For organic chemical contamination, soil will be screened for headspace (volatiles) every 20 cubic yards and one sample for offsite laboratory analysis will be taken for each 100 cubic yards. For inorganic chemical contamination, one sample will be taken each 20 cubic yards for the first 100 cubic yards and one sample each 100 cubic yards thereafter. Offsite chemical analysis will consist of certain volatile organic compounds, semivolatile organic compounds, pesticides, and polychlorinated biphenyls for organics, and metals for inorganics, based on historical information and previous analytical data collected. Pre-remedial investigation data may be used to satisfy a portion of the sampling requirements.

During the pilot demonstration, below criteria streams will be sampled at a more intense rate to develop the data necessary to test the reuse hypothesis from the radiological, chemical and geotechnical standpoints. Refer to the Sampling and Analysis Plan (Volume 4 of the Pilot Demonstration Work Plan) for details on the sampling program.

4.0 POTENTIAL REUSE PLAN
[N.J.A.C. 7:26E-6.2(b)3]

Processed soil which is demonstrated to be non-contaminated may be suitable for reuse at the MISS, Stepan and Sears properties. The anticipated below criteria streams are:

- Stream 1 - Below criteria material between 3/8" and 6" diameter – separated during gravel separation process (Vol. 1 –Overview, Figure 5 - Stream # 6).
- Stream 2a - Below criteria material after >3/8" fraction is removed – sorted by radiological soil sorting equipment (Vol. 1 -Overview, Figure 5 - Stream # 9).
- Stream 2b - Below criteria retention pond material – sorted by radiological soil sorting equipment (Vol. 1 -Overview, Figure 5 - Stream # 9).
- Stream 3 – Oversize debris (> 6 inches) – removed by grizzly (Vol. 1 -Overview, Figure 5 - Stream # 3).

A detailed description of the soil processing systems is provided in Volume 3 of the Pilot Demonstration Work Plan.

The proposed sampling to evaluate contaminant levels and appropriateness of the full-scale material produced for reuse is as follows:

Stream 1 - Since this material will be what is retained by the 3/8" gravel separation screen, it will not be subjected to the 100 percent radiological assay from the radiological soil sorting system. Although results from the test pit investigation indicate this material will be well below the reuse criteria, periodic sampling will be required to verify this assumption. The proposed sampling frequency is:

- 1 screening sample per 20 cubic yards for the first 100 cubic yards (NaI and headspace)

- 1 grab sample for each additional 100 cubic yards

- N.J.A.C. 7:26E-6.4(d)1.iii. allows for consideration of a lower sampling frequency for quantities greater than 1,000 cubic yards. Since the FMSS will have significantly more than 1,000 cubic yards of material, and it is likely that the coarser fraction of the physical separation will be below the reuse criteria, it is envisaged that the sampling frequency would be reduced to 1 grab sample for every 200 cubic yards, if the initial 1,000 cubic yards of material, sampled at the prescribed frequency is all below the reuse criteria.

Streams 2a, 2b - These will be the below criteria streams from the radiological soil sorting operation. Granular material and retention pond material will be processed separately. This material will undergo a 100 percent radiological screening level assay as it goes through the radiological sorting equipment. It is assumed that some sampling and laboratory analysis will be required to verify the continued effectiveness of the radiological sorting system, particularly at startup. However, 100 percent radiological screening of the material is assumed to be justification for reducing the amount of sampling required. It is envisaged at full-scale that the sampling frequency would be reduced shortly after initial startup if sampling verifies the effectiveness of the radiological sorting operation. The proposed sampling frequency is:

- 1 screening sample per 20 cubic yards for the first 100 cubic yards (NaI and headspace)
- 1 grab sample for each additional 100 cubic yards
- N.J.A.C. 7:26E-6.4(d)1.iii. allows for consideration for a lower sampling frequency for quantities greater than 1,000 cubic yards. Since the FMSS will have significantly more than 1,000 cubic yards of material, and since material will be subjected to a 100 percent radiological screening, it is envisaged that the sampling frequency would be reduced to 1 grab sample every 200 cubic yards, if the initial 1,000 cubic yards of material, sampled at the prescribed frequency is all below the reuse criteria.

Stream 3 – This oversize material will be removed by the grizzly at the front end of the gravel separation system. After the oversize trash and organics are manually removed from the stockpile, the remaining boulders and debris will be sampled as follows:

- 1 screening sample per 20 cubic yards (NaI scan)
- 1 surface wipe sample per 100 cubic yards. The surface activity will be correlated to an overall specific activity (pCi/g) using a surface area/mass ratio.

Note that the sampling frequencies specified above are what would be required to support reuse of the processed material during full-scale operation. During the pilot demonstration, samples will be collected every 50 cubic yards to evaluate reuse potential, rather than the above specified 20 or 100 cubic yards.

All material above the reuse criteria generated during the remedial effort will be sampled for off-site disposal characterization.

4.1 Site Location
[N.J.A.C. 7:26E-6.2(b)3i]

The portion of the FMSS proposed for the reuse of processed soil is comprised of the MISS, Stepan and Sears properties, located within the city limits of Maywood, and Rochelle Park, New Jersey. Table 1 provides a listing of these properties by address.

4.2 Reuse Volume
[N.J.A.C. 7:26E-6.2(b)3ii]

The volume of soil to be reused is currently not known with precision. It will depend on the amount of below criteria soil that must be excavated to remove above criteria soil and the amount of below criteria soil generated during volume reduction processing. It is anticipated that volumes will range from 75,000 to 150,000 cubic yards.

4.3 Reuse Location
[N.J.A.C. 7:26E-6.2(b)3iii]

The exact locations of potential reuse are not currently established. At this time, it is perceived that processed soil will only be reused on the MISS, Stepan and Sears properties and only if it is below the reuse criteria for both radiological and chemical contamination for that site, and meets geotechnical requirements. Per project policy, it is also intended to place 2-feet of imported borrow material above all material reused as backfill.

In addition to radiological and chemical requirements, soil proposed for reuse must meet the following permeability criteria, as required by the State of New Jersey in N.J.A.C. 726E-6.4(b)2:

1) If the excavated material is native soil, the fill shall be of equal or less permeability than the soil removed.

2) If the excavated material is not native soil, the fill material shall be of equal or less permeability than the native soil in or adjacent to the area of concern or at a minimum, have a permeability equal to or less than that of loam.

Since most if not all of the material excavated will be fill, it appears that Item 2 above is most applicable to the FMSS. According to the Natural Resources Conservation Service (formerly the Soil Conservation Service), the native soil materials of the top layer (within 2-ft from the surface grade) in Bergen County, New Jersey vary from a relatively impervious silt clay loam to pervious gravelly loam. The range of its permeability is from 1.4×10^{-4} cm/sec to 1.4×10^{-2} cm/sec. Typical permeability values in the vicinity of the Maywood area range from 4.2×10^{-4} cm/sec to 1.4×10^{-3} cm/sec. The use of loam or silt loam which has its permeability of approximately 3.7×10^{-4} cm/sec to 1.9×10^{-4} cm/sec would satisfy this requirement.

As part of the pilot demonstration, samples of material for reuse will be collected and tested for permeability. It is recognized that some blending of the output streams may be desirable. The following materials will be investigated:

Material	Compaction Testing	Permeability Testing
1. >3/8" material (rinsed gravel)	---	---
2. Below Criteria Retention Pond Material	✓	✓
3. Below Criteria <3/8" material	✓	✓
4. Blended Below Criteria <3/8" material and >3/8" material (rinsed gravel)	✓	✓
5. Blend of 4., above, and offsite material.	✓	✓
6. Blend of 1, 2, 3 above.	✓	✓

The relative percentage of materials in each of the blends will be varied and documented in the field. The material will be sampled at a frequency of every 1,000 cubic yards.

The permeability of each of the materials and blends listed above will be compared to the permeability of the site as determined during ground water investigations at the MISS. If the permeability is not determined to meet the N.J.A.C. 726E-6.4(b)2 criteria, then material from an offsite source will be blended with the onsite material and tested. As an alternative, with the assumption that the permeability requirement is to reduce surface water infiltration, and given the fact that two feet of clean fill is proposed in all areas backfilled, an exemption to the permeability requirement will be requested from NJDEP.

During the course of the pilot work, NJDEP input will be sought and, as appropriate, proposals in preparation and testing of "blends" (as described in paragraph 2, above) will be performed.

4.4 Groundwater
[N.J.A.C. 7:26E-6.2(b)3iv]

Since each of the MISS, Stepan or Sears could potentially be a receiving site for processed material, Table 1 identifies the groundwater depth for each of the properties. Note, depth to groundwater varies across each of the properties. The depth provided is the shallowest known depth on each of the properties, as determined by monitoring well measurements.

4.5 Receiving Site
[N.J.A.C. 7:26E-6.2(b)3v]

The receiving properties for processed soil are all designated as light industrial. For each property, Table 1 identifies the current use, reasonably anticipated future use, and category of cleanup criteria proposed. Note, since there is no approved ROD for the FMSS, the criteria identified may not be final reuse criteria approved for each of the properties.

4.6 Reuse Performance
[N.J.A.C. 7:26E-6.2(b)3vi]

With the exception of the permeability issue raised in Section 4.3, the soil that would potentially be reused will perform similarly or better than the soil removed. There are no foreseen negative impacts to human health or the environment, since all soil reused will be below the reuse criteria for the property.

4.7 Remedial Action Work Plan
[N.J.A.C. 7:26E-6.2(b)3vii]

Remedial Action Work Plans will be prepared for each property prior to remediation at that property. All items listed in the regulations (N.J.A.C.7:26E-6.2 (a)1 through (a)18, as applicable) will be provided as part of the Remedial Action Work Plan.

5.0 REFERENCES

1 New Jersey Department of Environmental Protection, 1998. *Guidance Document for the Remediation of Contaminated Soils*, January 1998.

2 State of New Jersey, 1999. *Chapter 26E, Technical Requirements for Site Remediation*, July 2, 1999.

APPENDIX A

Executive Summary from Remedial Investigation Report

EXECUTIVE SUMMARY

This executive summary briefly describes the activities and results of a remedial investigation (RI) conducted during 1989, 1990, and 1991 at the Maywood Site in Maywood, New Jersey. The RI was performed by the U.S. Department of Energy (DOE) in cooperation with the Environmental Protection Agency (EPA) Region II. The New Jersey Department of Environmental Protection and Energy was provided an opportunity to participate in developing the scoping and planning documents and to provide oversight to sampling activities.

The following sections provide basic background about the site (ES.1), explain the purpose of the RI and outline its goals (ES.2), and discuss the environmental requirements and agency responsibilities at the site (ES.3). Section ES.4 lists the activities performed at the site, and Section ES.5 summarizes the RI results in terms of the nature and extent of contamination. The potential fate and transport of contaminants are discussed in Section ES.6, and Section ES.7 presents basic conclusions and outlines future requirements for work at the site.

ES.1 BACKGROUND

The Maywood Site is located in Bergen County, New Jersey, approximately 20 km (12 mi) north-northwest of New York City and 21 km (13 mi) northeast of Newark, New Jersey. At Maywood, operations at the former Maywood Chemical Works (MCW) resulted in contamination of numerous properties in the boroughs of Maywood and Lodi and the township of Rochelle Park.

In 1916, MCW began extracting radioactive thorium and rare earths from monazite sand for use in manufacturing industrial products such as mantles for gas lanterns. The slurry that contained waste from the thorium processing operations was pumped to two earthen diked areas west of the plant. Some process wastes, along with tea and coca leaves from other MCW operations, were removed from the MCW property and used as mulch and fill on nearby properties, thereby contaminating those properties. Additional waste apparently migrated off the property through natural drainage associated with the former Lodi Brook. MCW stopped extracting thorium in 1956, but thorium processing from stockpiled material continued until 1959. The property was sold to the Stepan Company in 1959; Stepan Company has never processed radioactive material.

In 1961, Stepan was issued an Atomic Energy Commission (AEC) radioactive materials license. On the basis of AEC inspections and information related to the property west of New Jersey State Route 17, Stepan agreed to take certain corrective actions and began to clean up residual thorium wastes in 1963, partially stabilizing residues and tailings. From 1966 through 1968, contaminated material was removed from the property west of Route 17 and buried in three burial pits on the Stepan property.

In 1968, AEC surveyed the area west of Route 17 and certified it for use without radiological restrictions. At the time of the survey, AEC was apparently not aware of contaminated waste materials still present in the northeast corner of the property. In 1968, this portion of the Stepan property was sold to a private citizen, who sold it in the 1970s to Ballod Associates; that area is now called the Ballod property.

The presence of radioactive materials in the northeast corner of the Ballod property was discovered in 1980. A survey of the area (Route 17, Ballod property, and Stepan property) identified the contaminants as thorium-232 and radium-226. Additional surveys confirmed high concentrations of thorium-232 in soil samples, and subsequent surveys indicated contamination not only on the Stepan and Ballod properties but also in areas to the north and south.

Subsequent investigations by Oak Ridge National Laboratory indicated that several residential properties were contaminated and required remedial action. DOE was authorized to undertake a decontamination research and development project at the Maywood Site by the Energy and Water Development Appropriations Act of 1984, and the Maywood Site was assigned to DOE's Formerly Utilized Sites Remedial Action Program (FUSRAP). In 1985, to expedite cleanup of the contaminated properties, DOE negotiated access to a 4.7-ha (11.7-acre) portion of the Stepan property for use as an interim storage facility for contaminated materials; this area was designated as the Maywood Interim Storage Site (MISS). Subsequently, DOE began a program of removal actions (i.e., cleanup) at the vicinity properties and environmental monitoring at MISS. In September 1985, ownership of MISS was transferred to DOE.

The properties contaminated as a result of the original MCW activities include the property previously owned by MCW (now owned by the Stepan Company); MISS; and numerous residential, commercial, and governmental vicinity properties. These properties comprise the Maywood Site.

Many of these properties have been previously investigated, and some have been remediated. At the time of this RI, 25 of the 55 residential properties designated by DOE for remediation had been fully decontaminated, and one has since been partially decontaminated. Thirty have been characterized but remain to be remediated. Eight residential properties were investigated during the RI. Twenty-three commercial/governmental properties had been previously characterized, and a partial removal action had been conducted on the Ballod property. Five commercial/governmental properties were investigated during the RI.

ES.2 PURPOSE AND GOALS OF THE REMEDIAL INVESTIGATION

For the purposes of the Maywood Site RI, DOE grouped the properties into four operable units to obtain the greatest efficiency and effectiveness in performing and managing RI activities:

- Stepan Company property (also referred to as Stepan property)
- MISS
- Residential vicinity properties
- Commercial/governmental vicinity properties

The properties may be grouped differently for evaluating remedial action alternatives or when final remedial actions are implemented.

The purpose of the RI was to define the nature and extent of contamination at the Maywood Site, determine the fate and transport of contaminants, and identify remedial action objectives. This information will then be used in a feasibility study (FS) to identify potential remedial action alternatives and potential applicable or relevant and appropriate requirements.

Historical data and data collected during the RI have been used to achieve the goals of this RI. The RI gathered data not collected during previous investigations and investigated properties that had been designated for inclusion in FUSRAP but had not been fully characterized.

The RI objectives for each operable unit were as follows:

Stepan property

- Determine the extent of surface radioactive contamination
- Determine horizontal and vertical boundaries of subsurface radioactive contamination
- Identify the chemical contaminants resulting from thorium processing operations
- Determine whether hazardous waste [as defined by the Resource Conservation and Recovery Act (RCRA)] is mixed with radioactive waste
- Determine whether wastes buried at Stepan have migrated from those burial areas
- Confirm the validity of previous surveys' radiological measurements of fixed and removable contamination within buildings
- Confirm the validity of previous surveys' measurements of gamma exposure rates within buildings and over outdoor surfaces

MISS

- Determine whether waste in the storage pile contains RCRA-hazardous waste or polychlorinated biphenyls (PCBs)
- Determine the average concentrations of radioactive waste in the pile
- Determine whether chemical contaminants are present in onsite soil and identify the contaminants
- Determine whether chemical contaminants are migrating from MISS through surface water, sediment, or groundwater
- Quantify the radon and thoron exposure pathways at MISS
- Quantify residual radioactive contamination on structural surfaces in Building 76
- Resolve data gaps to provide further understanding of the MISS groundwater system

Residential vicinity properties

- Determine the extent of surface radioactive contamination on residential vicinity properties not previously characterized
- Determine the horizontal and vertical boundaries of subsurface radioactive contamination on these properties
- Investigate the potential presence of chemical contaminants associated with thorium processing operations
- Determine the mechanisms of contaminant transport
- Measure the gamma exposure rates on each property

Commercial/governmental vicinity properties

- Determine the extent of surface radioactive contamination on commercial/governmental properties investigated as part of this RI
- Determine horizontal and vertical boundaries of subsurface radioactive contamination on these properties
- Investigate the potential presence of chemical contaminants

associated with thorium processing operations

- Determine the mechanisms of contaminant transport
- Measure the gamma exposure rates on each property.

ES.3 CLEANUP RESPONSIBILITIES AND REQUIREMENTS

Responsibility for cleanup of the radioactive and chemical contamination at the Maywood Site is shared by DOE and EPA. DOE's responsibilities are based on its role as manager of FUSRAP and its ownership of MISS; EPA Region II oversees DOE's work because the Maywood Site is listed on the National Priorities List. The shared responsibilities of the two agencies have been detailed in a negotiated federal facilities agreement (FFA) that became effective April 22, 1991.

Under the FFA, DOE is responsible for cleanup of "FUSRAP waste," which, as defined in the FFA, is specifically limited to

- All radioactive and chemical contamination, whether commingled or not, occurring on the DOE-owned MISS

- All radioactive contamination exceeding DOE action levels and related to thorium processing at MCW, occurring on any vicinity property

Chemical or nonradioactive contamination on vicinity properties is DOE's responsibility if the contamination satisfies either of the following conditions:

- If the contamination is mixed or commingled with radioactive contamination that exceeds DOE action levels

- If the contamination originated at DOE-owned MISS or if it is associated with specific thorium manufacturing or processing activities at MCW that resulted in the radioactive contamination.

Remedial and removal actions at the Maywood Site are being conducted under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as amended by the Superfund Amendments and Reauthorization Act. In addition, all DOE activities must be conducted in compliance with the National Environmental Policy Act, which requires that the environmental consequences of a proposed action be considered as part of the decision-making process for that action.

The FFA requires that EPA review all previous characterization and remediation activities conducted by DOE to determine functional equivalency with technical and substantive requirements of CERCLA, the National Contingency Plan, and the remedial investigation/ feasibility study (RI/FS) process.

The Maywood Site is also being addressed through a separate RI/FS, which is being conducted by Stepan Company under EPA direction and oversight. DOE is addressing radioactive contamination as well as the contaminants that meet the definition of FUSRAP waste set forth by the FFA. Stepan Company is primarily responsible for nonradioactive or chemical contamination under an administrative order of consent signed with EPA in 1987 and an administrative order signed by EPA in 1991. Although DOE and Stepan RI/FS activities are being conducted independently, EPA oversight of both actions will ensure that sufficient coordination occurs between the parties to fully address the Maywood Site without duplication of effort.

ES.4 RI ACTIVITIES

Activities performed to meet the goals of the RI centered on collecting data and compiling information regarding surface features, contaminant sources, surface water and sediments, hydrogeology, meteorology, demography, and ecology. Surface feature investigations concentrated on aerial photographs, topographic maps, owner drawings (where available), and eyewitness accounts. Additional investigations performed included a ground-penetrating radar survey of burial pits 1 and 2 at Stepan and portions of two commercial properties.

Contaminant source investigations were performed to evaluate potential waste source(s) and to further characterize radiological, chemical, and physical characteristics of materials within various media at the Maywood Site. These included radiological

investigations of the four operable units using near-surface gamma radiation surveys, surface and subsurface soil sampling, downhole gamma logging, and gamma exposure rate measurements.

Chemical investigations were performed on various properties to determine whether waste would be characterized as RCRA-hazardous upon removal and whether chemical contamination existed that met the FFA definition of FUSRAP waste.

Surface water/sediment investigations were performed to determine whether radioactive or chemical contaminants originating at MISS are migrating into (and being transported offsite by) the current surface water flow system and to determine any impact of waters from MISS on the surface waters in the vicinity.

The hydrogeologic investigation was conducted to further define the groundwater system at MISS and to provide additional data to supplement previous investigations. Sampling and analysis of groundwater were conducted to investigate the nature, extent, and concentrations of contaminants present in the groundwater and their potential for migration from MISS.

Meteorological, demographic, and ecological data were compiled by reviewing previous characterizations and historical information.

ES.5 NATURE AND EXTENT OF CONTAMINATION

ES.5.1 Stepan Property

The RI confirmed that the primary sources of radioactive contamination on the Stepan property are burial pits 1, 2, and 3. In the burial pits, the maximum concentration of thorium-232, which was the primary contaminant at the Maywood Site, was 1,592 pCi/g (burial pit 1). In addition, surface and subsurface soils throughout the Stepan property were found to be radioactively contaminated; the maximum concentration of thorium-232 in surface soils was 380 pCi/g, and the maximum depth of subsurface contamination outside the burial pits was 4.6 m (15 ft).

Radioactive contamination on the Stepan property also occurs in areas where thorium processing operations were conducted and where process residues were used as fill material in low-lying areas. However, the areas of contamination are covered by grass or asphalt, so there is little potential for migration via surface water runoff.

DOE conducted limited chemical assessment of the Stepan property because of the separate RI/FS being conducted by the Stepan Company. In this limited chemical assessment, three rare earth elements (cerium, lanthanum, and neodymium) were detected with greater frequency and at higher concentrations than others, primarily in areas of radioactive contamination. These results are not unexpected because several rare earth elements (cerium, lanthanum, and dysprosium) are constituents of monazite sands, the feed material used in the thorium processing operations conducted by MCW. Sampling and analysis were also conducted for metals, volatile organic compounds (VOCs), and semivolatile or base/neutral and acid extractable (BNAE) compounds. Several metals known to be elemental components of monazite sands were detected at the highest concentrations and with the greatest frequency in areas where radioactive contamination also was found. Metals detected in association with radioactively contaminated soils included lithium, lead, arsenic, chromium, and selenium. In areas that are not radioactively contaminated, these metals were detected infrequently and at low concentrations. In these areas, any connection between the metals and thorium processing wastes would be difficult to establish because these metals occur naturally at trace concentrations in the earth's crust. The general occurrence of these metals in industrialized areas such as the Stepan Company property is also highly probable.

Most organic compounds detected at concentrations above representative mean background were polyaromatic hydrocarbons. These may be attributed to the natural decay of organic materials or coal-derivative products (e.g., asphalt). These compounds are also commonly found in industrialized areas. BNAEs and petroleum hydrocarbons were occasionally found in association with radioactive waste.

ES.5.2 Maywood Interim Storage Site (MISS)

A complete radiological characterization of MISS onsite soils was conducted in 1986, and the data have been presented in a separate report (BNI 1987a). Therefore, radioactive contaminants in onsite soils at MISS were not addressed as part of this RI, other than to determine the average concentrations of uranium-238, radium-226, and thorium-232 in the interim storage pile.

Results of surface water and sediment sampling conducted at one upgradient and three downgradient locations under the routine environmental monitoring program (presented in Section 4.0) indicate no evidence that radioactive contaminants are migrating from MISS via either of these pathways.

Radiological characterization of the groundwater, based on DOE's routine environmental monitoring program, indicates that total uranium, radium-226, and thorium-232 concentrations are comparable at upgradient, offsite, and downgradient wells. The only exception is well B38W12A, which is located on an offsite property downgradient of Stepan and another offsite property, both of which are known to be radioactively contaminated. Though below guideline levels, consistently elevated concentrations of uranium have been detected in this well.

The chemical investigation of the interim storage pile and onsite soils at MISS produced no results that would identify the soil as RCRA-hazardous waste. No PCBs or pesticides were detected in any sample analyzed.

DOE is responsible for all chemical contamination on MISS. Of the 22 metals detected above representative mean background in MISS onsite soils, 8 (arsenic, cobalt, copper, lead, lithium, nickel, selenium, and vanadium) were identified as constituents of thorium ores, uranium analyte metals, or lithium wastes processed or disposed of onsite. These metals and four others (antimony, barium, chromium, and cadmium) were detected at above-background concentrations. The latter four metals were also detected with varying frequency in areas of radioactive contamination; however, no definite associations were identified that would tie specific metals to radioactive contamination. Lithium, lead, chromium, and arsenic were most commonly found in association with radioactive contamination in the area of former retention ponds that served the entire chemical facility. This common association therefore does not necessarily indicate process waste. Chemical evaluation of soils at MISS identified three rare earth elements (cerium, lanthanum, and neodymium) in significant concentrations and frequency in both fill and native material. As was observed at the Stepan property, rare earth elements exist most frequently in areas of radioactive contamination, primarily in or near areas where historical information indicates that thorium processing took place.

Chemical analysis for VOCs and BNAEs indicated the occurrence of organic compounds at trace levels throughout the site. These compounds were detected at concentrations above mean representative baseline in only two areas: the Building 76 area and areas west of the interim storage pile near the locations of former retention ponds. There was no conclusive evidence of the coexistence of these compounds in radioactively contaminated areas. Historical information indicates that no organic constituents were used in the thorium processing operations at MCW, and the compounds detected are characteristic contaminants of industrialized, multiuse, and urban areas. However, DOE must address all chemical contaminants on MISS.

In groundwater, VOCs (predominantly tetrachloroethene, trichloroethene, dichloroethene, and vinyl chloride) were detected in localized areas at concentrations above existing Safe Drinking Water Act (SDWA) Maximum Contaminant Levels (MCLs). Arsenic, chromium, and sulfate were detected at concentrations above existing and/or proposed SDWA MCLs and Maximum Contaminant Level Goals. Boron and lithium were also detected consistently at concentrations above background. The wells in which these elements were detected are located in areas where the same metals were detected in soil samples. Because of uncertainties related to the source, nature, and extent of groundwater contamination at MISS, groundwater is addressed as a separate operable unit. A further evaluation of existing data is being conducted. Additional monitoring points have been proposed and are included in a September 1992 addendum to the Maywood field sampling plan. An addendum to the RI report will be provided after this reevaluation and future work are completed.

Analysis of surface water samples for indicator parameters, metals, rare earth elements, mobile ions, and volatile and semivolatile organic compounds detected the metal lithium and three organic compounds at downstream sampling locations. Lithium, because of its high solubility, is probably migrating from MISS and has been carried by Westerly Brook to the Saddle River. The volatiles originate somewhere within the MISS/Stepan watershed or from groundwater seepage into the underground culvert that conveys Westerly Brook under MISS, but the source cannot be conclusively defined because of the industrialized history of the area. There is no evidence that organics were used in the MCW thorium processing operations.

Analyses of sediment samples provided no evidence that metal contaminants are migrating offsite.

ES.5.3 Residential Vicinity Properties

Radioactive contamination is present in both surface and subsurface soils on the residential properties investigated during the RI. Table ES-1 summarizes radionuclide concentrations and depths of contamination for each residential property. Because contaminated surface soils are covered by lawns or asphalt driveways, the potential for contaminant migration through air, surface water runoff, or groundwater infiltration is reduced.

Subsurface contamination appears to have resulted from sediment deposition in the former channel of Lodi Brook or its floodplain except at 90 Avenue C and 79 Avenue B, where contamination is the result of contaminated building materials and fill material, respectively, transported to the properties.

Limited chemical sampling was performed on the residential properties to determine the presence of chemical contamination tied to thorium processing. No evidence of RCRA-hazardous waste, PCBs, or pesticides was found. Metals and rare earth elements detected at MISS and the Stepan property were also detected on these residential properties, but at lower concentrations and with less frequency. In general, metals and rare earth elements were found in areas of radioactive contamination. Their occurrence can probably be attributed to the deposition of thorium process wastes (either by fill material emplacement or by transport via the former channel of Lodi Brook), or, at low concentrations, they may naturally occur in native soils.

ES.5.4 Commercial/Governmental Vicinity Properties

Radioactive contamination is present in surface and subsurface soils on these properties. Table ES-2 summarizes radionuclide concentrations and depths of contamination for each property. Because the contaminated surface soils (like the residential vicinity properties) are covered by lawns or asphalt driveways, the potential for contaminant migration via air, surface water runoff, or groundwater infiltration is reduced.

Limited chemical sampling was performed on these properties. Metals and rare earth elements detected are probably attributable to transport by the former channel of Lodi Brook. Their presence is primarily confined to areas of radioactive contamination. Organic constituents in soils were detected at low frequencies and at generally low concentrations. Tests for RCRA characteristics indicated that no hazardous waste is present, and no PCBs or pesticides were detected.

ES.6 CONTAMINANT FATE AND TRANSPORT

Contaminants identified as FUSRAP waste at the Maywood Site include radionuclides (primarily thorium-232), metals, and rare earth elements. The primary sources of contamination identified were burial pits at Stepan, former retention ponds on MISS, and the interim storage pile at MISS. The principal migration pathways are groundwater, surface water, and air. Because most of the contaminants are confined to the unsaturated zone, their migration in groundwater is limited. Migration of metals and radionuclides may increase in the groundwater if the contaminants in the unsaturated soil zone reach the water table.

Most of the properties investigated during this RI are covered by grass, other thick vegetation, or asphalt. Therefore, surface water transport and air resuspension are relatively insignificant pathways for migration unless activities occur that disturb the coverings.

ES.7 CONCLUSIONS/FUTURE WORK

Except for groundwater data, this RI has successfully provided the additional data called for in the work plan. No new data gaps were identified that would require further investigation. Therefore, the RI phase of the CERCLA process is considered complete.

Characterization of the nature and extent of groundwater contamination is incomplete. The existing analytical data for groundwater are being reevaluated and integrated with other available data (e.g., the analytical data for soils and the hydrogeologic conceptual model). To aid in the delineation of the nature and extent of contamination entering and exiting MISS, additional monitoring points have been proposed and are included in a September 1992 addendum to the Maywood field sampling plan. An addendum to the RI report will be completed after this reevaluation and other future work are completed.

Additional work to complete the RI/FS-environmental impact study process includes preparation of a baseline risk assessment and an FS to provide information necessary for the selection of an appropriate remedial action alternative. Results of a wetland delineation conducted by Stepan as part of their RI will be factored into the baseline risk assessment and FS for the Maywood Site. Treatability studies will be conducted to evaluate the feasibility of certain treatment technologies; this information will aid the evaluation of remedial action alternatives.

Future work will include identification of historic/prehistoric resources and endangered species. DOE's routine environmental monitoring of groundwater, surface water, sediment, and air will continue. During remedial action, more detailed radiological surveys of the Stepan buildings will be required to better delineate the extent of contamination. The nature of contamination in burial pit 3 may also require further investigation; access limitations prevented sampling during this RI. For the purposes of future environmental documentation and review and analysis, contaminants found in burial pits 1 and 2 will be assumed to also be present in burial pit 3.

TABLES FOR EXECUTIVE SUMMARY

Table ES-1

Summary of Radiological Data for Residential Vicinity Properties

Property name	Radionuclide Concentrations in Surface Soil (pCi/g)			Radionuclide Concentrations in Subsurface Soil (pCi/g)			Depth of Subsurface Contamination (ft)	Interior Gamma Exposure Rates (μR/h)	Exterior Gamma Exposure Rates[a] (μR/h)
	U-238	Ra-226	Th-232	U-238	Ra-226	Th-232			
70 W. Hunter Ave.	<3.5 - <7.1	0.4 - 1.2	<0.5 - 3.2	<1.8 - <9.2	0.5 - 1.6	0.7 - 4.4	None	N/A	9 - 12
79 Avenue B	<4.2 - <9.8	0.4 - 4.6	0.7 - 68	<0.2 - <7.1	0.3 - 1.6	0.5 - 17.9	0.5 - 1.5	N/A	6 - 8
90 Avenue C	<2.5 - <10	<0.5 - 1.9	1.5 - 17	<1.4 - <35.3	0.4 - 4.2	0.4 - 72.5	0.5 - 2.5	36 - 38	9 - 20
108 Avenue E	<4 - <27	<0.7 - <9	1.1 - 19	<1.8 - <7.8	<0.3 - 2.8	<0.3 - 13	0.5 - 1.0	N/A	6 - 10
112 Avenue E	<2.6 - <17	0.5 - 3.7	0.6 - 34	<1 - <16	<0.2 - 4.4	0.4 - 17	0.5 - 4.0	N/A	9 - 21
113 Avenue E	<2.3 - 37	<0.5 - 3.7	<0.8 - 28	<1.1 - 13	<0.3 - 1.9	<0.4 - 13	0.5 - 1.0	N/A	8 - 14
62 Trudy Dr.	<2 - <9.5	0.6 - 3.7	1.3 - 12.7	<1.4 - 18.2	<0.4 - 10.8	<0.5 - 24.9	0.5 - 9.5	N/A	11 - 19
136 W. Central Ave.	<3.4 - <22.3	<0.6 - 2.3	<0.9 - 111.6	<2.3 - <25	<0.4 - 3.8	<0.6 - 63.9	0.5 - 8.0	12 - 20	8 - 15

[a]Measurements included background. Background for the Maywood area is 9 μR/h.

N/A = no interior measurements obtained because near-surface gamma measurements (coneshield) were within background levels, and there was no indication that contamination extended beneath the residence.

Table ES-2
Summary of Radiological Data for Commercial/Governmental Vicinity Properties

Property name	Radionuclide Concentrations in Surface Soil (pCi/g)			Radionuclide Concentrations in Subsurface Soil (pCi/g)			Depth of Contamination (ft)	Exterior Gamma Exposure Rates[a] (μR/h)
	U-238	Ra-226	Th-232	U-238	Ra-226	Th-232		
200 Route 17, Maywood (Sears Repair Center)	<1.8 - <1.9	0.3 - 5.6	<0.4 - 18.7	<1.3 - <12	0.3 - 4.3	0.3 - 59.4	0.5 - 4.0	6 - 23
Essex Street and Route 17, Maywood (Joseph Muscarelle & Associates)	<1.6 - 15	0.3 - 4.5	0.4 - 22	<1.2 - <10	0.3 - 1.8	<0.6 - 6.1	0.5 - 1.0	6 - 17
113 Essex St., Maywood (National Community Bank)	<2.8 - <5.1	<0.6 - 1.5	<0.8 - 5.6	9.0 - <14	0.3 - 10	0.2 - 18	0.5 - 9.0	5 - 17
Interstate 80, Lodi (Westbound Right-of-Way)	<2.5 - <4.6	<0.6 - <0.8	<0.8 - 3.3	<1.4 - <10.6	<0.3 - 7.3	0.4 - 5.2	1.0 - 5.5	6 - 12
205 Maywood Ave., Maywood (Myron Manufacturing)	<3 - <9.3	<0.6 - 4.1	0.6 - 9.8	<1.4 - <9.7	<0.1 - 2.5	0.4 - 31	0.5 - 2.0	5 - 13

[a]Measurements include background. Background for the Maywood area is 9 μR/h.

FINAL
PILOT DEMONSTRATION WORK PLAN

VOLUME 3
PILOT PLANT OPERATION PLAN

FUSRAP MAYWOOD SUPERFUND SITE
MAYWOOD, NEW JERSEY

CONTRACT NO. DACW41-99-D-9001
WAD 06 WBS 07

Submitted to:

Department of the Army
U.S. Army Engineer District, Kansas City
Corps of Engineers
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Department of the Army
U.S. Army Engineer District, New York
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New York, New York 10278

Submitted by:

Stone & Webster Environmental Technology & Services
245 Summer Street
Boston, Massachusetts 02210
June, 2000

Issued to: ____________________ **Date:** ____________________

Copy #: __________ ☐ **Controlled** ☐ **Uncontrolled**

FINAL
PILOT DEMONSTRATION WORK PLAN

VOLUME 3
PILOT PLANT OPERATION PLAN

FUSRAP MAYWOOD SUPERFUND SITE
MAYWOOD, NEW JERSEY

SITE-SPECIFIC ENVIRONMENTAL RESTORATION
CONTRACT NO. DACW41-99-D-9001
WAD 06 WBS 07

Submitted to:

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Corps of Engineers
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Task Manager

TABLE OF CONTENTS

VOLUME 3
PILOT PLANT OPERATION PLAN

Tables

Figures

Attachments

LIST OF ACRONYMS AND ABBREVIATIONS

ASTM	American Society for Testing and Materials
bgs	below ground surface
bkg	background
CDQMP	Chemical Data Quality Management Plan
COC	Chain of Custody
cpm	counts per minute
CQCP	Contractor Quality Control Plan
CQCSM	Contractor Quality Control Systems Manager
DQCR	Daily Quality Control Report
DQO	Data Quality Objectives
EM	Engineering Manager
FMSS	FUSRAP Maywood Superfund Site
FUSRAP	Formerly Utilized Sites Remedial Action Program
GEPP	General Environmental Protection Plan
GSS	Gravel Separation System
MHTDP	Materials Handling, Transport and Disposal Plan
MISS	Maywood Interim Storage Site
MS	Matrix Spike
MSD	Matrix Spike Duplicate
NaI	Sodium Iodide
NCP	National Oil and Hazardous Substance Contingency Plan
NCR	Nonconformance Report
NGVD	National Geodetic Vertical Datum
NJDEP	New Jersey Department of Environmental Protection
PCB	polychlorinated biphenyl
pCi	picocurie
PDWP	Pilot Demonstration Work Plan
PID	Photoionization Detector
QA	Quality Assurance
QC	Quality Control
RCRA	Resource Conservation and Recovery Act
RMA	Radioactive Materials Area

RSO	Radiation Safety Officer
RSS	Radiological Sorting System
SA	Specific Activity
SAP	Sampling and Analysis Plan
SC	Sampling Coordinator
SCC	Soil Cleanup Criteria
SOP	Standard Operating Procedure
SOR	Sum- of-the-Ratios
SSERC	Site-Specific Environmental Restoration Contract
SSHO	Site Safety and Health Officer
SSHP	Site Safety and Health Plan
SVOC	Semivolatile Organic Compound
TCLP	Toxicity Characteristic Leaching Procedure
TPWP	Test Pit Work Plan
TS	Task Superintendent
USACE	U.S. Army Corps of Engineers
USCS	Unified Soil Classification System
USGS	U.S. Geological Survey
USEPA	U.S. Environmental Protection Agency
UTM	Universal Transverse Mercator
VOC	Volatile Organic Compound
W	Weight

1.0 INTRODUCTION

The United States Army Corps of Engineers (USACE), under Site-Specific Environmental Restoration Contract (SSERC) No. DACW41-99-D-9001, has contracted Stone & Webster Environmental Technology & Services (Stone & Webster), a division of Stone & Webster Engineering Corporation, to perform remediation of the FUSRAP Maywood Superfund Site (FMSS), in Maywood, Lodi, and Rochelle Park, New Jersey (Figure 1). As discussed in the Overview in Volume 1, gravel separation and radiological sorting technologies offer promise in substantially reducing the volume of soil requiring disposal as radioactive waste. Technologies which result in permanent and significant volume reduction are a statutory preference under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) and the National Oil and Hazardous Substances Contingency Plan (NCP). A pilot study, involving the demonstration of these technologies utilizing two separate processing systems, is planned to be carried out at the Maywood Interim Storage Site (MISS) to further evaluate the viability of full-scale implementation of the technologies at the FMSS.

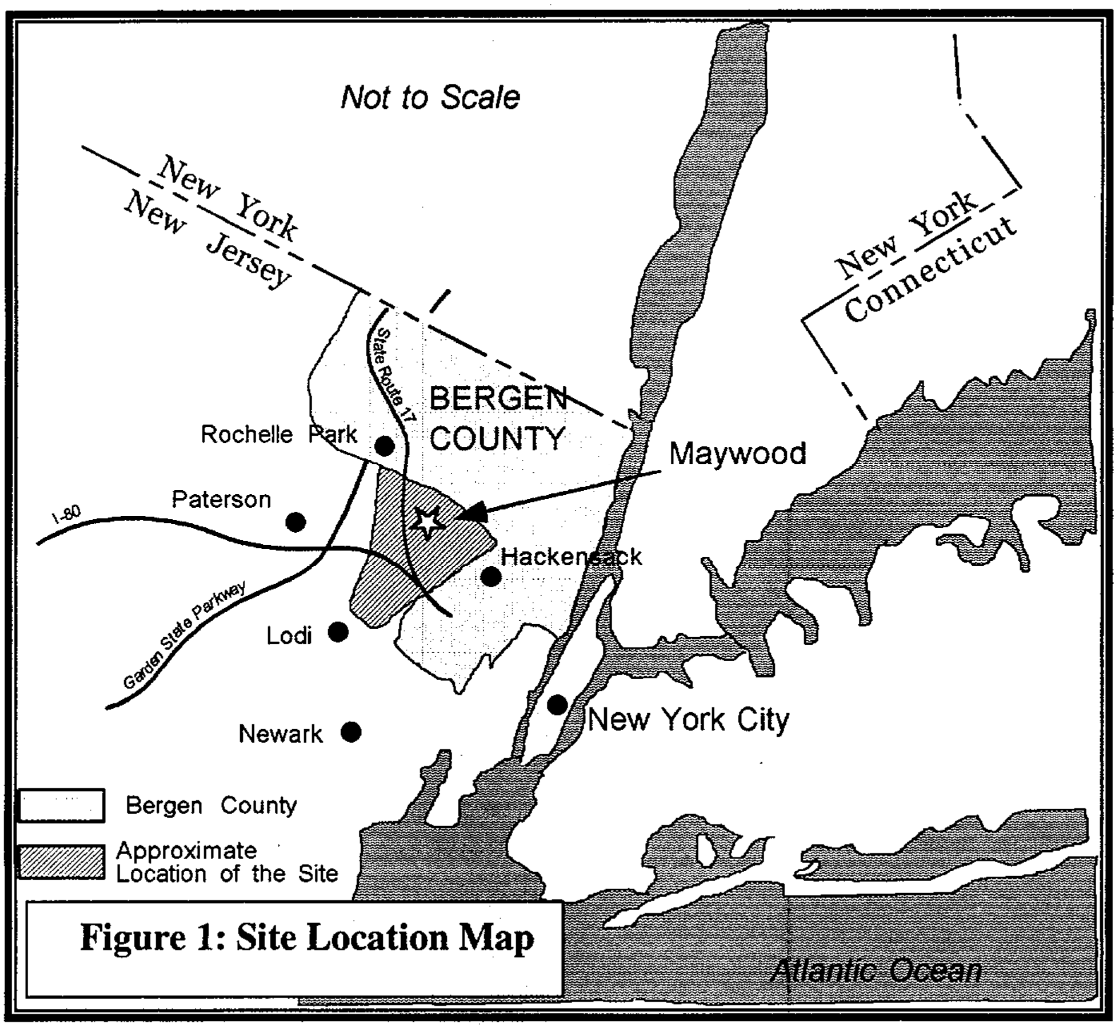


Figure 1: Site Location Map

This pilot demonstration will be used to assess the operational, technical and economic feasibility of applying particle separation and radiological sorting to the soils at the FMSS. The primary objectives of the pilot demonstration are to:

- Determine the applicability of gravel separation of the FMSS site soils for the purpose of achieving volume reduction and remediation cost savings.
- Determine the applicability of radiological sorting of the FMSS site soils for the purpose of achieving volume reduction and remediation cost savings.

The secondary objective of the pilot demonstration is to quantify or qualify the benefits of employing soil processing technology at the FMSS for the purposes of volume reduction of radiologically contaminated soils. The benefits, which are statutory, economic, and community oriented, may include:

- Utilizing soil processing technologies during the remedial action, pursuant to CERCLA's preference for treatment, and satisfying the mandate of the NCP that technologies be evaluated as remedial options;
- Satisfying the preference of CERCLA and the NCP that selected remedies reduce the volume of contaminants, pollutants or hazardous substances through treatment;
- Reducing the number of trucks hauling material on local roads;
- Potential time savings by preventing an overburdening of transportation routes;
- Utilizing technology that allows bulk excavation, thereby reducing the amount of time individual property owners are impacted by remediation;
- Cost savings from potentially reducing the volume of material requiring off-site disposal or that must go to more expensive disposal facilities capable of handling higher level radiologically contaminated material;
- Cost savings through reducing the volume of fill material required from off-site sources.

The technologies selected and the configuration of the demonstration are based on the recognition that the bulk of the soils at Maywood are not uniformly contaminated. Rather, the radiologically contaminated soil is likely surrounded by soil that is "clean" (below criteria). It is also recognized that the radiological contamination is concentrated in the finer fractions of the soil mass. These principles were demonstrated in the Engineering Test Pits at MISS Program (see Volume 5). Physical separation of the coarse fraction (greater than 3/8 inch diameter) from the soil mass will result in a soil volume reduction that will be proportional to the percentage of coarse material. A radiological sort of the material which is less than 3/8 inch diameter will then create two streams: above criteria and below criteria. The criteria used in the radiological sort will be based on either reuse or disposal requirements.

This volume of the Work Plan - the Pilot Plant Operation Plan - provides guidance to ensure the following:

- The demonstration equipment is delivered and erected in accordance with the vendors' operations plans.
- The process systems are aligned and tested to verify operational readiness.

- The appropriate feed material is supplied to the systems.
- The systems are operated in accordance with the vendors' procedures.
- The pilot plant is operated in compliance with the General Environmental Protection Plan (GEPP).
- Sufficient data is collected to achieve the objectives of the study. Data required includes radiological concentrations, chemical concentrations, weights, and cost/processing information.
- Output streams are managed appropriately and transported to a stockpile location for transport and disposal.
- Safety and Health procedures are followed.
- Proper QA/QC is maintained.

This Pilot Plant Operation Plan is intended to be a stand-alone document. Information from other plans is repeated as required. Additional details, which support the operation of the pilot plant, are found in Volumes 2 and 4. The contents of the volumes that constitute the pilot demonstration work plan are described in Table 1.

Table 1: Pilot Demonstration Work Plan Outline

Volume	Section/Title	Description
1	Overview	Provides description and justification for overall effort. Provides a summary of the work plan and road map to associated volumes. Presents the elements of the Pilot Demonstration Report.
2	Soil Acquisition Work Plan and Pilot Plant Pad Design	Provides design and detailed drawings for the host site pad. Provides description, drawings and staging for the soil acquisition effort, including excavation stabilization plan and procedures.
	Processed Material Soil Reuse Evaluation Plan	Evaluates the potential for reusing soil on the FMSS. Soil reuse is not proposed for the pilot demonstration.
3	Pilot Plant Operation Plan	Contains technical details and operational procedures for the pilot plant.
	Attachment A: Gravel Separation System	This information, supplied by the gravel separation system vendor, provides equipment mobilization, safety and health, system operation and maintenance information.
	Attachment B: Radiological Sorting System	This information, supplied by the radiological sorting system vendor provides equipment mobilization, safety and health, system operation and maintenance information.
4	Sampling and Analysis Plan	The Sampling and Analysis Plan implements the project Chemical Data Quality Management Plan, and provides the details on frequency, parameters, and locations for all sampling under the Pilot Demonstration. This includes the soil acquisition, pilot plant operation, and final survey of the soil acquisition area.
	Construction Quality Control Plan	This plan details how the project Contractor Quality Control Plan will be implemented on this task.
	Safety and Health Plan	This plan implements the project Site Safety and Health Plan and provides the task-specific safety and health considerations.
5	Results of Engineering Test Pits Program at MISS	This volume reports the results of the Engineering Test Pits at MISS program, which was performed as a precursor to the pilot demonstration.

2.0 PROJECT ORGANIZATION AND RESPONSIBILITIES

This portion of the Work Plan addresses the overall organization of the pilot demonstration program. The pilot demonstration organizational chart is shown in Figure 2.

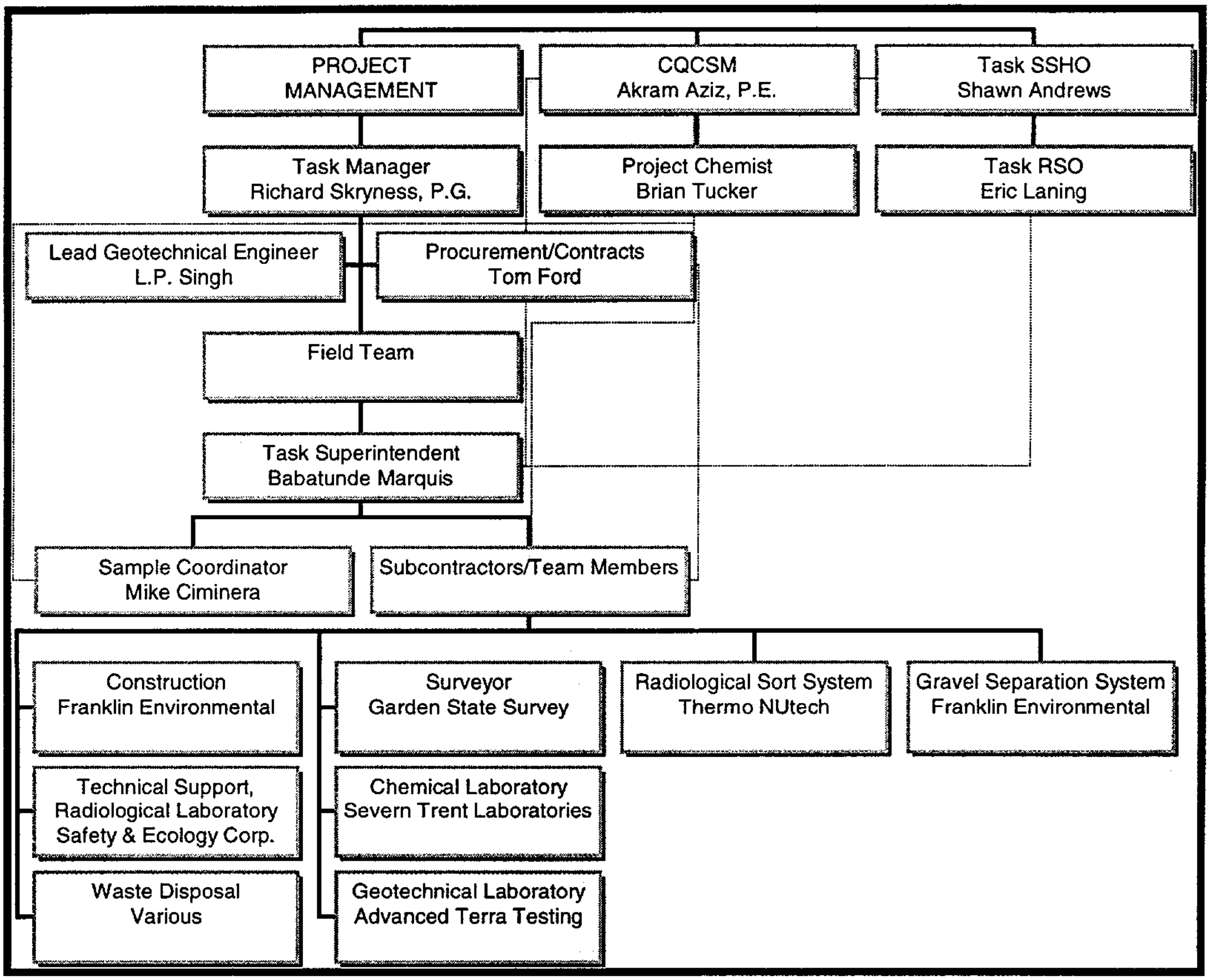


Figure 2 – Pilot Demonstration Organization Chart

The key positions described above are described in the following sections:

2.1 Task Manager

The Stone & Webster Task Manager is responsible for effective day-to-day management of all operations. The Task Manager has responsibilities which specifically include the following:

- preparing work plans, including approval of sampling locations, chemical analysis parameters, schedules, and labor allocations;
- managing all funds for labor and materials procurement;
- monitoring and controlling the schedule;
- managing the site team toward unified, productive project accomplishment;
- direct communication and liaison with the USACE Engineering Manager (EM) and Stone & Webster Project Manager; and
- providing oversight to the technical leaders and reviewing all deliverables.

2.2 Task Superintendent

The Task Superintendent (TS) is responsible for the following items:

- the appropriateness, adequacy, and timeliness of the technical or engineering services provided;
- developing the technical approach and level of effort required to address each task/subtask;
- the day-to-day conduct of the work, including the integration of the input of supporting disciplines and subcontractors and ensuring all field documentation is completed properly (see Volume 4 – Quality Control Plan);
- ongoing QA/QC during performance of the work; and
- the technical integrity of all field work.

2.3 Site Safety and Health Officer and Radiation Safety Officer

The responsibilities of the site safety and health personnel are discussed in the Safety and Health Plan in Volume 4.

2.4 Contractor Quality Control Systems Manager

The responsibility of the Contractor Quality Control Systems Manager (CQCSM) and support personnel is discussed in the Quality Control Plan in Volume 4.

2.5 Sampling Coordinator

The Sampling Coordinator will be responsible for overseeing all sampling and analysis activities, including preparing sample bottles for collection; managing field sampling records, laboratory chains-of-custody, and other sampling related documentation; coordinating laboratory sample pick-ups; and/or packaging and shipping samples. The responsibility of the Sampling Coordinator is discussed in the Sampling and Analysis Plan in Volume 4.

2.6 Identified Individuals

The task order staff consists of the following individuals:

Task Manager	Richard Skryness, P.G.
Lead Geotechnical Engineer	L. P. Singh, P.E
Task Superintendent	Babatunde Marquis
Project Superintendent	Tom Farrell
Site Safety & Health Officer	Shawn Andrews
Radiation Safety Officer	Eric Laning
Sampling Coordinator	Mike Ciminera
Contractor Quality Control System Manager	Akram Aziz, P.E.
Project Chemist	Brian Tucker, Ph.D.
Project Certified Industrial Hygienist	James Skrabak, CIH
Project Certified Health Physicist	Alan Fellman, Ph.D., CHP

The Subcontractors and Team Members which will be used include the following:

Table 2: Pilot Demonstration Work Plan Contractors

CSI	Certified Health Physicist
Garden State Survey	Civil Surveying
Franklin Environmental Services	Excavation Equipment, Gravel Separation System Equipment
Thermo NUtech (TNu)	Radiological Soil Sorting System Equipment
Safety and Ecology Corp. (SEC)	Health and Safety Training
	Radiation Technicians
	Onsite Radiation Laboratory
Severn Trent Laboratories	Chemical Laboratory and related supplies
	Radiological laboratory – water samples
Advanced Terra Testing, Inc.	Geotechnical Laboratory
Various	Waste Transport & Disposal

All subcontractors and Team Members are required to comply with all components of the project work plans.

3.0 PILOT PLANT OPERATIONS

This section provides the description for the major elements that make up the pilot operations. It includes the following sections:

- System Description;
- Mobilization;
- Erection and Initial Configuration;
- Startup;
- Soil Acquisition;
- Production;
- Schedule;
- Safety and Health;
- Shutdown and Demobilization.

Mobilization, setup, startup, operation and maintenance, shutdown, and demobilization of the equipment are the responsibility of the supplying vendors. Refer to Attachments A and B for vendor-specific information.

Attachment A – Gravel Separation System (GSS)
Attachment B – Radiological Sorting System (RSS)

Pilot plant pad design and soil acquisition details are presented in Volume 2 and are only briefly mentioned here for continuity. Volume 4 contains the sampling and analytical protocols, the Safety and Health Plan for the pilot demonstration, and the Quality Control Plan.

3.1 System Description

3.1.1 Gravel Separation System

The Gravel Separation System consists of two main groups of components: the gravel separation system and the gravel rinse system. The gravel separation operation is a coarse screening system to remove material greater than six (6) inches in nominal diameter, followed by a vibrating screen that removes soil particles larger than 3/8 inch in nominal diameter. The removed material (i.e., gravel) is then rinsed to remove adhered fines. The rinse water is filtered to remove the fines and recycled back through the system. This should not be confused with soil washing. In soil washing, the soil is put into a slurry and separated into size fractions by various means. This system rinses adhered fines from an already separated stream. The less than 3/8-inch stream is directed via a conveyor to a feed hopper for the radiological sorting system. If the radiological sorting system is unavailable, this material may be deposited in a stockpile. Refer to Attachment A for operational details on this system.

As part of the demonstration, alternate alignments may be investigated, including the possible use of an internal combustion power supply for the vibrating screen.

3.1.2 Radiological Sorting System

The Radiological Sorting System continuously assays a soil stream and directs soil that is below a selected threshold activity level to a "below criteria" stockpile. The remaining soil with radioactivity above the selected threshold value is directed to an "above criteria" stockpile. The radiological sorting system utilizes two banks of NaI detectors, calibrated to specific energy windows which represent the contaminants of concern (Th-232 + Ra-226, U-238). The detectors then signal a segmented gate which opens or closes to divert the section of soil (typically about 2 pounds) to the above or below criteria stockpile. Methods for checking for increased background radiation are in place. These include scans on empty conveyors; daily checks/calibrations; and confirmatory sampling on output piles. Refer to Attachment B for operational details on this system.

3.2 Mobilization

Components that make up the processing units for the pilot demonstration will be shipped to the site by truck. All components will be radiologically surveyed prior to off loading. A 40-ton crane will be used to offload all equipment. Vendor personnel will be responsible for the rigging and off loading of the equipment. Off loading will occur at the site prepared for the pilot demonstration.

The pilot plant will be located on the pad depicted in Figure 3. The pad will be constructed as described in the Soil Acquisition Work Plan and Pilot Plant Pad Design document located in Volume 2. It will consist of a six-inch thick gravel base laid over a geotextile fabric. Steel bearing plates will be used to support the heavy components of the gravel separation system. Electrical power will be brought in from existing service along Rte. 17. Water for the GSS will be piped to the pilot plant via 2 ½" surface hose connected to an on-site hydrant.

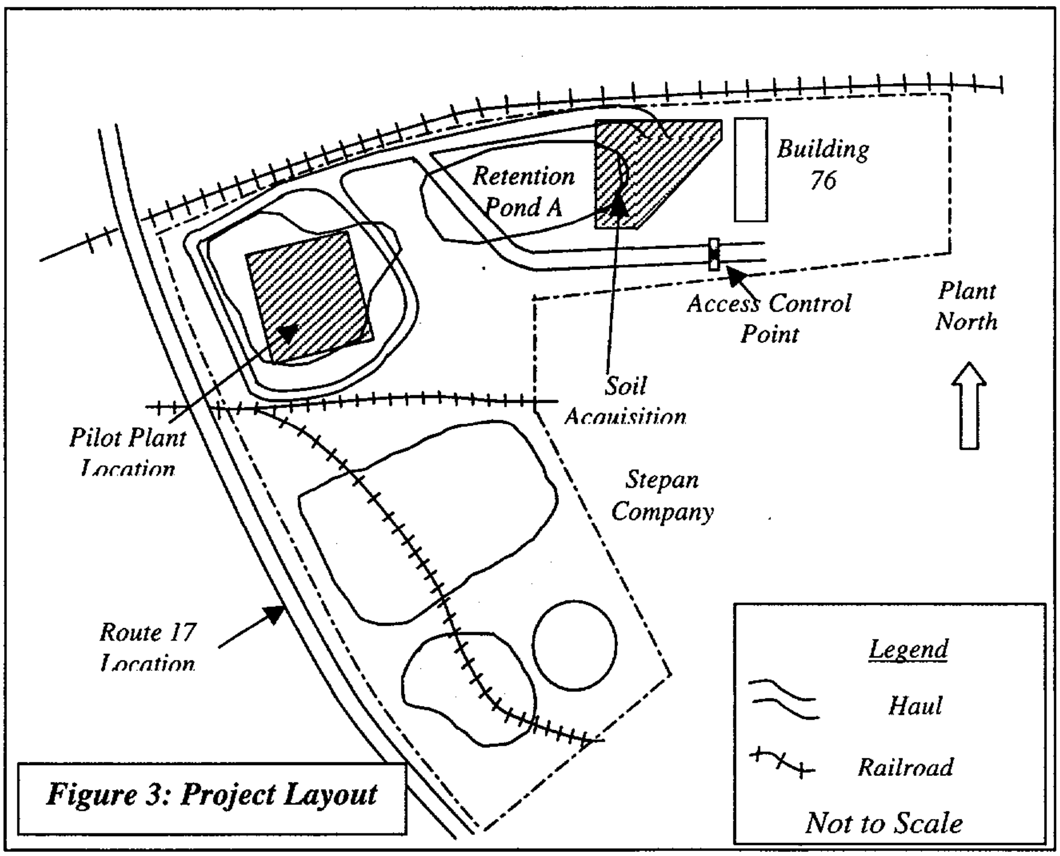


Figure 3: Project Layout

3.3 Erection and Initial Configuration

After the components are off loaded, they will be arranged on the pilot plant pad to process soil as depicted on the process flow diagram shown in Figure 4. A general arrangement of the process equipment is shown in Figure 5 (attached full size). Full-scale drawings are provided in Volume 2.

The processing units will be fed soil from the following general sources;

1. granular soil from stockpile(s) located on the MISS;
2. granular soils representing overburden and the soil outside Retention Pond A (Soil Acquisition Stage I); and
3. fine grained soils representing the retention pond sediments (Soil Acquisition Stage II).

Gravel separation and rinse followed by radiological sorting will be applied to the granular soils. During this mode of operation the less than 3/8" output from the gravel separation will feed directly, via conveyor, to the radiological sorting system (RSS). Generally, all granular material will be processed first (Soil Acquisition Stage I).

The fine-grained retention pond sediments are planned to be processed by the RSS only. During this processing the RSS will be de-coupled from the gravel separation system to permit direct feeding of the fine-grained retention pond sediments. Generally, the fine grained retention pond sediments will be processed after all the granular soils (Soil Acquisition Stage II). Retention pond sediments will be screened with a 1.5" screen prior to processing the material through the RSS. This is required to remove any debris, which may jam the conveyor through the detector array, which has a 2-inch clearance over the conveyor belt. During this stage, material which is retained on the 1.5" screen, and overburden and transition zone material will be processed through the GSS.

When sufficient data has been collected to satisfy the objectives of the demonstration, the Pilot Demonstration will move into Stage III activities. The anticipated Stage III activities include those listed below. Planned activities may be added or deleted depending on observations made during Stage I and Stage II of the Pilot Demonstration. A listing of these intended activities is provided below. A more complete description and results/conclusions will be provided in the Pilot Demonstration Report.

The following activities are being considered:

- Look at various excavation and material handling techniques (other than excavation in 1-foot lifts), that would be used in full-scale operations and see how they impact the heterogeneity of the feed soil and operation of the system.
- Test various field-screening techniques for development of a protocol for identification and removal of residual contamination after initial cut lines are completed.
- Test throughput limits of system (GSS)

- Test compaction methods used on off-site borrow material to refine methods that attain the desired compaction requirements.
- Obtain experience in implementation of the MARSSIM final status survey methodology. Use both traditional soil sampling with laboratory analysis and surface ISOCS to see if there are differences in the outcome of the final status survey using the different methodologies. Surface ISOCS comparison study will be completed prior to this time during PDI activities.
- Evaluate techniques for surface water control and management for application during remediation of Phase II properties.

During the pilot demonstration, additional processes may be requested and the system configuration may need to be altered. For example, different size screens may be used on the gravel separation system. Initially, a set of screens having a minimum screen size of 3/8" will be used. Additional screen sets with minimum sizes of 3/4" and ¼" (#4 sieve) may be installed to determine the relative effectiveness of these screens. The decision to test these screen sizes will be made based on the fraction of material in that range, and the radiological content of the material.

For the radiological sort system, different radiological setpoints will be investigated. For example, setpoints can be based on site radiological cleanup criteria or on various disposal location acceptance criteria. They are currently based on an SOR < 1, with criteria of 15 pCi/g Th-232 and Ra-226; 50 pCi/g U-238 or 5 pCi/g Th-232 and Ra-226; 50 pCi/g U-238. These criteria are for evaluation purposes only. A Record-Of-Decision has not yet been issued for this site.

3.4 Startup

Prior to initiating the pilot demonstration, a test run will be performed. The test will consist of processing approximately 10 cubic yards of soil obtained from an off-site source. Prior to running the off-site material through the processing system, the soil will be sampled for radiological and chemical contaminants. Sampling will be scheduled ahead of the test run to be sure that the laboratory results are available and that the material is documented as "acceptable" for use in the test run.

The test run will demonstrate the following:

- All components are functioning;
- Throughputs of each system can be controlled to maintain continuous operations;
- The interface between the gravel separation and the RSS is functional;
- The gravel rinse is functioning and there are no leaks;
- Dust suppression systems are properly positioned;
- The RSS diversion activates at the proper activity level (determined by a calibration check source);
- Sampling points are accessible;
- The proposed stockpiling and materials handling plan is appropriate for pilot operations.

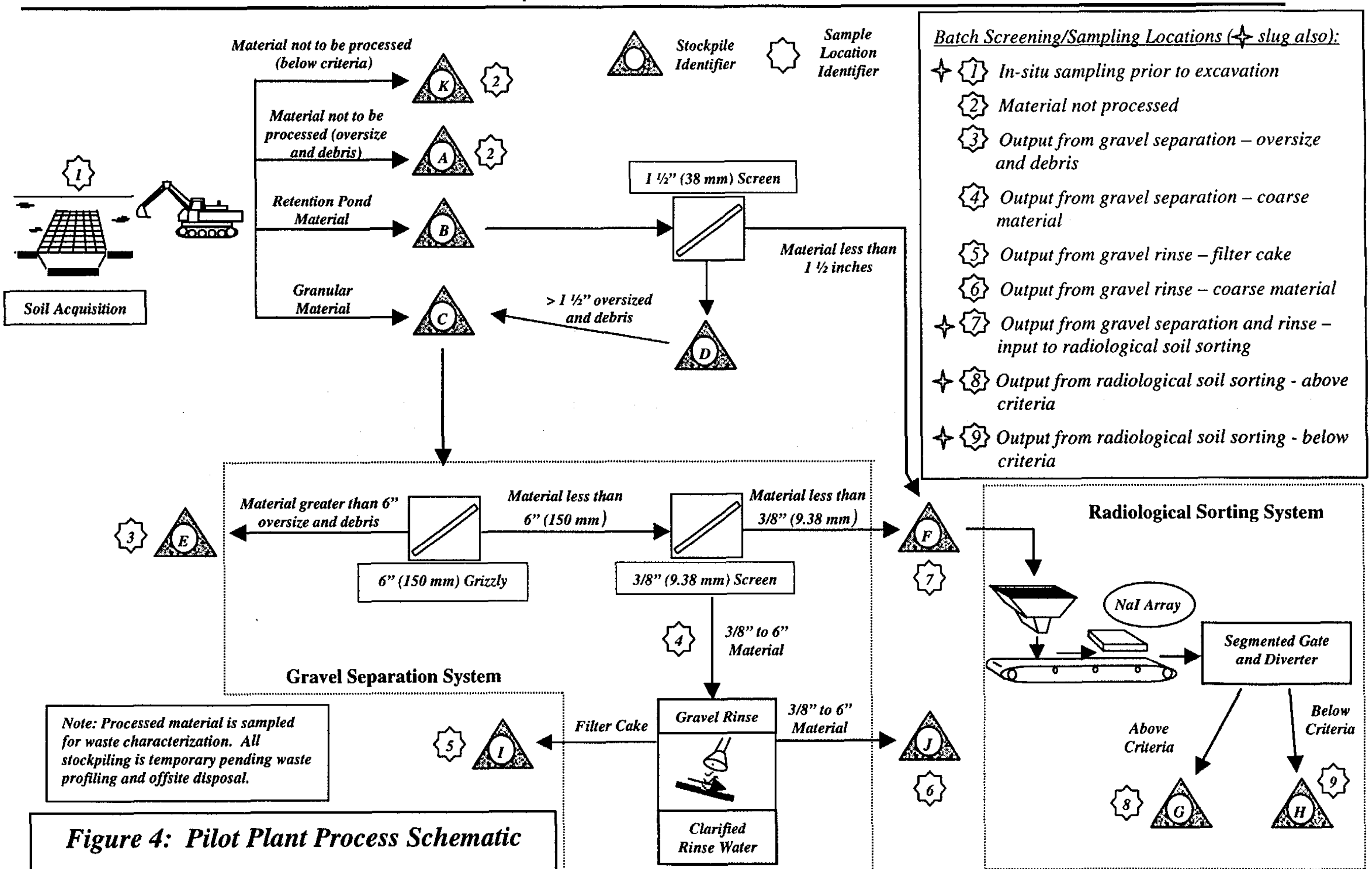


Figure 4: Pilot Plant Process Schematic

After the test run, the system will be shut down and the components checked. Following verification that the systems are operating properly, the processing of potentially contaminated soil will commence.

3.5 Soil Acquisition

Consideration has been given in selecting feed material for the pilot demonstration such that the soil used in the pilot demonstration is representative of the diverse range of soil groupings found at the FMSS. Soil characteristics developed from the results from the engineering test pit program and previously collected soil boring data, as well as operational aspects such as the acquisition area's proximity to the location of the Pilot Plant, were also considered in this selection. This selection is documented in the Soil Acquisition Work Plan and Pilot Plant Pad Design, located in Volume 2.

The area west of Building 76, shown in Figures 3 and 5, has been selected as the soil acquisition location. This area has been determined to be representative, both radiologically and geotechnically, of the bulk of soil that will be remediated at the FMSS. The soil acquisition area is comprised of gravel, sandy silt and silty sand. Similar to other areas of the site, radiological contamination in the soil acquisition area is variable, providing a suitable range of contaminated feedstock to evaluate the systems' performance. Radiological contamination is moderate in this area, and is found predominantly within the first 6 feet of soil. Contamination at depths greater than 6 feet will be addressed during Stage III of the soil acquisition. A total of approximately 10,000 cubic yards of soil will be processed as part of the pilot demonstration. This total volume includes the processing of existing on-site soil stockpiles.

The planned dimension of the excavation is approximately 190 feet by 165 feet at the ground surface, excavated to the bottom of contamination (El. 55.8 ft.(MSL) approx.) or 6 feet in depth on a 1.5(H) to 1(V) slope at all sides. The extent of the excavation will begin about 65 feet west of Building 76, along the northern boundary of the site and projecting about 40 feet into Retention Pond A. The surface area to be excavated is partitioned into two areas labeled as Stages I and II. The Stage I excavation area is predominantly granular soils and will be excavated in a 1-foot horizontal lift progression. The Stage II excavation area represents the pond sediment and its overburden material. Due to the unstable nature of the retention pond sediment and its inability to support load, the Stage II section will be excavated in a slant cut (approximately 1.5H:1V) with the excavator seated at the base of the Stage I excavation. Details of the excavation layout and construction methods are located in the Soil Acquisition Work Plan in Volume 2. The Stage III soil acquisition is also discussed in Volume 2.

3.6 Production

The pilot demonstration will operate ten-hours per day, 5 days per week. Eight hours will be dedicated to soil processing and two hours per day will be reserved for equipment maintenance. The overall pilot demonstration operation schedule is ten weeks. During this time, the pilot demonstration will process the material described in Section 3.5.

Granular material will be processed first. The flow of material from the source areas (soil acquisition excavation or existing stockpile) to the pilot operation will be approximately 200 bulked cubic yards per day. The throughput is based on the capacity of the radiological sorting system.

High fines content (retention pond) material will generally be processed after the granular material. High fines content material will be processed directly through the radiological sorting system. Results of the Engineering Test Pit Program (Volume 5) indicate that there is not a sufficient coarse fraction in the retention pond material to warrant processing by the gravel separation system. During this time, the GSS will be used to process overburden from the retention pond area and transition zone material. If a significant coarse fraction is observed in the retention pond material, some retention pond material may be processed through the GSS.

A brief description of the system process and resulting process streams is described below in Table 3, and illustrated in Figure 4. Stream numbers listed below are identified on Figure 4. A system layout is shown in Figure 5 (oversize).

Sampling requirements for each of the process streams are described in Section 4. Sampling and analyses will be done in accordance with the Sampling and Analysis Plan presented in Volume 4. Data quality objectives and a sampling summary are presented in Section 4.0.

When the analytical results from the process stream sampling are obtained, the stockpiled materials may be consolidated for final disposition in accordance with the project Material Handling, Transportation and Disposal Plan (MHTDP). General protocol for waste transport and disposal is presented in Section 5.

Table 3
Process System Summary

#	SYSTEM	PROCESS STREAM
1	Soil Acquisition	Feed material: ➢ Stockpiled Material ➢ Granular (Soil Acquisition Stage I) ➢ Fines (Retention Pond Material) (Soil Acquisition Stage II) ➢ Additional Material (Soil Acquisition Stage III)
2	Soil Acquisition	Material not processed (OUTPUT) This material may be oversize, debris, organics, below criteria overburden, or highly contaminated material.
3	Gravel Separation	Material scalped out of the feed by the 6 inch grizzly (>6 inch) (OUTPUT) Remainder of feed goes to shaker screen
4	Gravel Separation	Material greater than 3/8 inches and less than 6 inches. Passing from the gravel separation screen to the gravel rinse system.
5	Gravel Separation	Fines from the gravel rinse (OUTPUT) Fines are recovered from the filters and the sump. They will be placed in an interim container and stockpiled with the other streams.
6	Gravel Separation	Rinsed gravel (>3/8 inch to <6 inch) (OUTPUT) Material that has had adhered fines rinsed off.
7	Gravel Separation	<3/8 inch material directly conveyed to radiological sort This is the material that passes through the screen.
N/A	Radiological Sort	Material scalped out of the feed by the 1.5 inch screen (>1.5 inch) – for direct feed of retention pond material only. – Sent to GSS
8	Radiological Sort	Soil exceeding the RSS setpoint (OUTPUT) Soil from the gravel separation or the radiological sort screen is processed through the radiological sort system. This is the "above criteria" stream.
9	Radiological Sort	Soil below the RSS setpoint (OUTPUT) Soil from the gravel separation or the radiological sort screen is processed through the radiological sort system. This is the "below criteria" stream.

There are five primary groups of output streams:

A. (Stream 6) - Rinsed gravel (>3/8 inch to –6 inch)
B. (Stream 9) - Soil below the RSS setpoint (below criteria)
C. (Stream 8) - Soil exceeding the RSS setpoint (above criteria)
D. (Stream 5) - Fines recovered from the gravel rinse

E. (Streams 2, 3) - Oversize - Material scalped out of the feed by the 6 inch grizzly (>6 inch), material removed by the 1 ½ inch screen on the radiological sort system (for direct feed of retention pond material) and debris removed from the excavation.

Groups A and B are likely below criteria. Groups C and D are likely above criteria. Group E (oversize) will be characterized to identify appropriate potential disposition (i.e., could the material meet reuse criteria). For the pilot demonstration, all streams will be combined for transport and disposal. A scaled loader will be used to consolidate and mix the stockpiles. Refer to Section 5 for disposal plans. To expedite offsite transport, in-situ chemical characterization of the feed soils will be performed. This will shorten the turnaround time for stockpile characterization.

Coarse gravel used for pad preparation and haul road construction may be processed through the pilot plant. The rinsed gravel can be stockpiled on-site for future use.

3.7 Shutdown and Demobilization

The process systems will be shutdown after all material is processed. When the last of the material is processed, the equipment will be cleaned and disassembled in accordance with the vendor's requirement. The components of the processing system will be radiologically surveyed and decontaminated prior to release from the site.

A final status survey will be performed in the excavation per the Sampling and Analysis Plan, Volume 4. The sides and bottom of the excavation will be surveyed.

The soil acquisition area will be back filled with material obtained from an approved off site borrow area. The backfill source will be inspected and sampled to document its physical, chemical and radiological characteristics. The material will conform to the requirements stated in the soil reuse plan. Backfill material will be placed in loose lifts not exceeding 1 foot. A compactor will be selected that is appropriate for the back fill material. The compactor will make sufficient passes (minimum of 3) over the entire lift in order to achieve a density of at least 90 percent of the maximum dry density as determined by ASTM D 1557. In place density tests will be performed as the backfill is placed to document that the desired compaction has been achieved.

3.8 Safety and Health

The Site Safety and Health Plan addresses general site safety and health policies. Additionally, the Safety and Health Plan (SHP) included in Volume 4 addresses specific concerns relating to the Pilot Demonstration Work Plan. Activity Hazard Analyses have been completed for all activities associated with the pilot demonstration and are incorporated into the SHP in Volume 4. All site personnel, including vendors, are required to comply with the SSHP and the SHP. Additional safety and health information specific to each vendor is provided in Attachments A and B of this document.

3.9 Schedule

The proposed schedule for the pilot demonstration is as follows:

Table 4: Project Schedule

Milestone	Date
Pilot Demonstration Preparation	
Draft Work Plan to Regulators	February 29, 2000
Regulatory Briefing	March 14, 2000
Comments to EPA	June 5, 2000
Discussion of Comment Responses with EPA	June 14, 2000
Finalize Work Plan	June 30, 2000
Construction of Host Location (Complete)	July 24, 2000
Mobilize Process Equipment to Site – Install & Test Run (Complete)	August 9, 2000
Pilot Demonstration Execution	
Start Processing Pilot Demonstration Soil	August 10, 2000
End Pilot Demonstration	October 19, 2000
Analyze Data, Draft Report to USACE	January 5, 2001
Comments received from USACE	January 19, 2001
Draft Report Issued for Regulatory Review	February 2, 2001
Regulatory Review Completed	March 23, 2001
Issue Final Report	April 20, 2001

4.0 DATA QUALITY OBJECTIVES, ACQUISITION AND DATA MANAGEMENT

4.1 Data Quality Objectives

Data quality objectives (DQOs) were developed for the pilot demonstration following guidance provided in the project Chemical Data Quality Management Plan (CDQMP). The project CDQMP DQO process utilizes EPA 540-R-93-071 - "Data Quality Objectives Process for Superfund." The DQO Process consists of seven steps, as outlined below (Figure 6). The output from each step influences the choices that will be made later in the process.

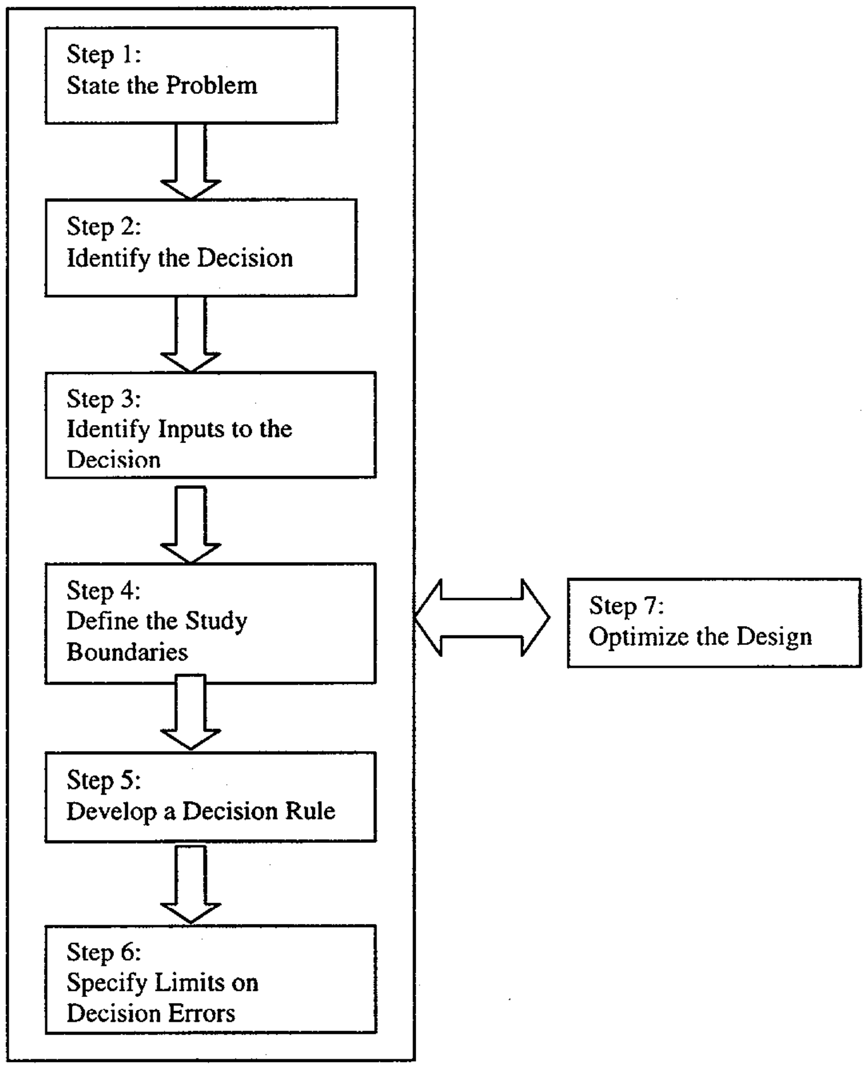


Figure 6: The Data Quality Objectives Process

The application of the DQO process to the pilot demonstration is illustrated below, in Table 5:

Table 5: Pilot Demonstration DQO Development	
DQO Process Step	**DQO**
1. State the Problem	How do we reduce the volume of contaminated soil using soil processing technologies?
2. Identify the decision	1. Do the technologies work – are they applicable to the site? 2. Is implementing the technologies economically viable?
3. Identify inputs to the decision	1. Specific activity (pCi/g) of selected process streams 2. Volume/weight of each process stream 3. Chemical concentrations of each output process stream 4. Cost Information – Operations, Handling, and Disposal 5. Other Samples – System Optimization
4. Define the study boundaries	The study will be performed on discrete batches of soil from the MISS and vicinity properties. The soil will be processed during the pilot demonstration.
5. Develop a decision rule	If the processing reduces the volume of contaminated soils by 25%, then it is considered applicable. If the resultant cost savings is 10%, then it is considered economically viable. If the technology is economically viable, recommend full-scale deployment. If volume reduction is applicable, but cost is prohibitive, no further action will be recommended.
6. Specify limits on decision errors	Allowable decision errors vary by the possible disposition of the material (i.e., material which may be designated below criteria has more stringent error limits than material which will be disposed of offsite). Null Hypothesis (H_0) – The specific activity in a soil pile exceeds criteria. Type I error (False Positive - α) = 0.05 – Incorrectly reject null hypothesis (above criteria material goes to the below criteria pile) Type II error (False Negative - β) = 0.05 – Incorrectly accept null hypothesis (below criteria material goes to the above criteria pile)
7. Optimize the design	The optimization of the DQO process has been integrated into steps 1-6. Additionally, the DQOs may be revisited during pilot operations.

4.2 Data Acquisition

Data acquisition and management will be fundamental to determining the success of the Field Demonstration. Sampling data will be acquired in accordance with the CDQMP and the Sampling and Analysis Plan for the Pilot Demonstration.

As identified by the DQO process, the following data are required to be collected:

1. Specific activity of selected process streams
2. Volume/weight of each process stream
3. Chemical concentrations of each output process stream
4. Cost Information – Operations, Handling, and Disposal
5. Other Samples – System Optimization

This data will be collected as follows:

1. Specific activity of selected process streams

   Specific Activities (pCi/g) for the contaminants of concern (Th-232, Ra-226 and U-238) will be determined as specified in the Sampling and Analysis Plan (Volume 4). The following streams will be sampled:

   1. Activity of Feed Soil (sampled in-situ – less than 3/8" material only)
   7. Output from Gravel Separation System/input to Radiological Sorting System
   8. Activity of Above Criteria <3/8" Soil
   9. Activity of Below Criteria <3/8" Soil

   (Refer to Table 6 and Figure 4 for location of samples)

   Activity will be tracked on a "slug" basis. A "slug" is defined as a subset of the batch, equal to approximately 8-10 cubic yards. A batch will be defined prior to excavating a cut and will fulfill the characteristics of one of the batch types that are to be examined (e.g., by soil type, primarily above criteria, etc.) The purpose of the slug is not to characterize the batch. The slugs and batches have distinct purposes, as outlined below:

   > Slug – to track weight and activity of a small volume of material. This will be used to evaluate mixing/dilution and how well the radioactive material can be accounted for.
   >
   > Batch – Full production level type effort. Only weight will be tracked. Will be used to evaluate effectiveness and economics of the systems.

   Figure 7 shows a sample tracking sheet for weight and activity, which would be used for each "slug". Detailed samples are collected at the "slug" level to reduce the error propagation inherent in using a single sample to represent a large quantity of soil. By reducing the volume of soil being tracked, and increasing the sampling frequency, a single sample represents a much smaller volume of soil. Additionally, the specific activity of each of the output piles will be determined at the end of each batch, or every 50 cubic yards, whichever is less, as specified in the Sampling and Analysis Plan (Volume 4).

2. Volume/weight of each process stream

   The volume of the feed soil to be processed as part of a batch will be measured in place by cross-section survey. The volume of the slugs (8-10 cubic yards) and batches will likewise be determined.

   Weigh scales on the loader bucket will measure the weights of the slug and batch. By weighing the slug just prior to placing it in the system, over- and under-excavation can be accounted for. In addition, process streams will be weighed either through the use of weigh scales on loader buckets or belt scales on process equipment. The following weights will be tracked:

   1. Weight of Feed Soil (weigh scales on loader buckets)
   2. Material not processed (weigh scales on loader buckets)
   3. Weight of >6" Soil – (weigh scales on loader buckets)
   5. Weight of Fines – (filtrate field scale)
   6. Weight of 3/8"-6" Soil – (conveyor belt scale)
   7. Weight of <3/8" Soil – (conveyor belt scale)
   8. Weight of above criteria, <3/8" soil – (conveyor belt scale)
   9. Weight of below criteria, <3/8" soil – (conveyor belt scale)

   Weight will be tracked for both slugs (8-10 cubic yards) and batches. Figure 7 shows a sample tracking sheet for weight and activity, which would be used for each "slug".

3. Chemical concentrations of each output process stream

   The chemical concentrations for the output streams will be determined. The soils will be characterized for waste disposal and/or potential reuse parameters, although reuse is not proposed for the pilot demonstration. Chemical sampling will be performed in accordance with the SAP (Volume 4). Chemical concentrations will be determined for the following streams:

   3. Oversize, >6" Soil
   5. Fines
   6. Rinsed Gravel, 3/8"-6" Soil
   8. Above criteria, <3/8" Soil
   9. Below criteria, <3/8" Soil

Chemical data will be collected for the slugs as specified in Table 6, and for the batches as specified in Table 7. Chemical samples are collected for both slugs (8-10 cubic yards) and batches for specified streams.

4. Cost Information – Operations, Handling, and Disposal

   Cost information will be collected and compiled throughout the project. Factors to be accounted for in the cost include system availability; operating cost (unit processing cost, utility usage); material handling cost (excavation equipment and manpower cost); material transport and disposal costs; etc. Contractors will report data such as availability, equipment repair logs, timesheets, etc. directly to the TS. Final invoices will be used to track overall costs to avoid double-tracking.

5. Other Samples – System Optimization

   Other samples are required to support secondary objectives of the pilot demonstration (system optimization). Samples will be collected as described in the SAP (Volume 4). Samples which will be collected, and the justification, are as follows:

   - *Stream: Less than 6" material from gravel separation to gravel rinse.* Justification: This will be collected to evaluate the effectiveness of the gravel rinse. This sample will allow us to determine if the gravel is above or below criteria at the exit of the gravel separation stage, prior to the rinse stage
   - *Stream: Less than 3/8" material from gravel separation to radiological sort.* Justification: This will be collected to evaluate different screen sizes. Grain size analysis will be performed and gamma spectroscopy will be performed on the fractions. Also, gamma spectroscopy will be performed on samples to evaluate alternative radiation detection equipment, such as the need for a third bank of detectors on the RSS. This is a proposed enhancement to the existing RSS configuration. A limited number of samples will be collected to determine any benefits.

   Other samples may be collected as the need is determined. A full listing of samples to be collected is provided in the Sampling and Analysis Plan (Volume 4).

4.3 Sampling Summary

This section provides a summary of the required sampling.

The following describes the methodology for characterizing the daily feed from the soil acquisition excavation. Feed material will be acquired from each of the following:

1. On-site Soil Stockpile(s)
2. Granular material (overburden and surrounding soils) from Soil Acquisition Area
3. High fines material (retention pond soils) from Soil Acquisition Area

1. On-site Soil Stockpile(s)

There is currently approximately 1000 cubic yards of vicinity property soil stockpiled on-site. In addition, more soil may be stockpiled on the MISS by the time the pilot demonstration is mobilized. It is expected that at least 1000 cubic yards of on-site stockpiled soil will be processed. No detailed in-situ characterization will be performed of the on-site soil stockpile(s). Since they are stockpiles, this material cannot be excavated on 1-foot cuts. The pile will be surface scanned using a NaI survey instrument linked to GPS and mapping software. "Slug" equivalents will be identified during processing. Samples will be collected from 8-10 excavator buckets, and material will be tracked as described in Section 4.2.

2. Granular Material

The soil acquisition area will be gridded into 5 foot x 5 foot squares. For each one-foot lift, the surface within the soil acquisition excavation will be surface scanned using a NaI survey instrument linked to GPS and mapping software. A "slug" will be defined as nine of these 5 foot by 5 foot by 1 foot cells.

For each identified "slug", soil samples will be collected from within the portion of the excavation designated for the day's excavation. On-site gamma spectroscopic analysis will be performed on the bulk soil samples. The NaI survey and soil spectroscopy will provide a radiological profile of the excavated soil.

3. High Fines Material (Retention Pond Sediments)

High fines material will be excavated in full-face excavation, maintaining a 1.5:1 slope on the walls. The method for characterizing the feed material will be the same as for granular material.

The soil will be loaded into the process system using a front end loader with a weigh scale and digital readout mounted on the bucket. The output streams will be sampled and analyzed to determine their radiological and chemical characteristics. Sampling protocols and analytical methods are described in the Sampling and Analysis Plan (Volume 4).

An outline of the sampling program is presented in Tables 6 and 7, below. For weight balance purposes, the weight of the oversize stream will be subtracted from both the feed material and the output. The weight of each output stream will be measured by in process scales or scales mounted on the soil handling equipment. The following identifies the process streams and general sampling requirements.

Table 6: General Process Survey and Sampling Requirements – Slug Samples

Process Stream	"Slug"* Samples
1. Feed Material	R - Detailed NaI walkover of area, gamma spectroscopy sample from each 5' x 5' cell (<3/8" material only**) C – None W – weigh scales on loader
3. Material scalped out the feed by the six inch grizzly	R – None C – None W – weigh scales on loader
4. Material less than 6"	R – None C – None W – weigh scales on loader
5. Fines recovered from the gravel rinse	R – None C – None W – None
6. Rinsed gravel (between 3/8" and 6")	R – None C – None W – weigh scales on loader
7. <3/8" material from gravel separation to radiological sort	R – Gamma spectroscopy C – None W – Conveyor belt scale
8. Soil exceeding the RSS setpoint (above criteria)	R – NaI, gamma spectroscopy C – Per SAP W – Conveyor belt scale
9. Soil below the RSS setpoint (below criteria)	R – NaI, gamma spectroscopy C – Per SAP W – Conveyor belt scale

Legend:
R = Radiological; C = Chemical; W = Weight
* Slugs – A slug is 8-10 cubic yards of soil which will be tracked in detail, both by weight and radiologically.
** The greater than 3/8" material will not be tracked for radiological content. It will be removed from any samples collected.
See Figures 4 and 7 for sample locations.

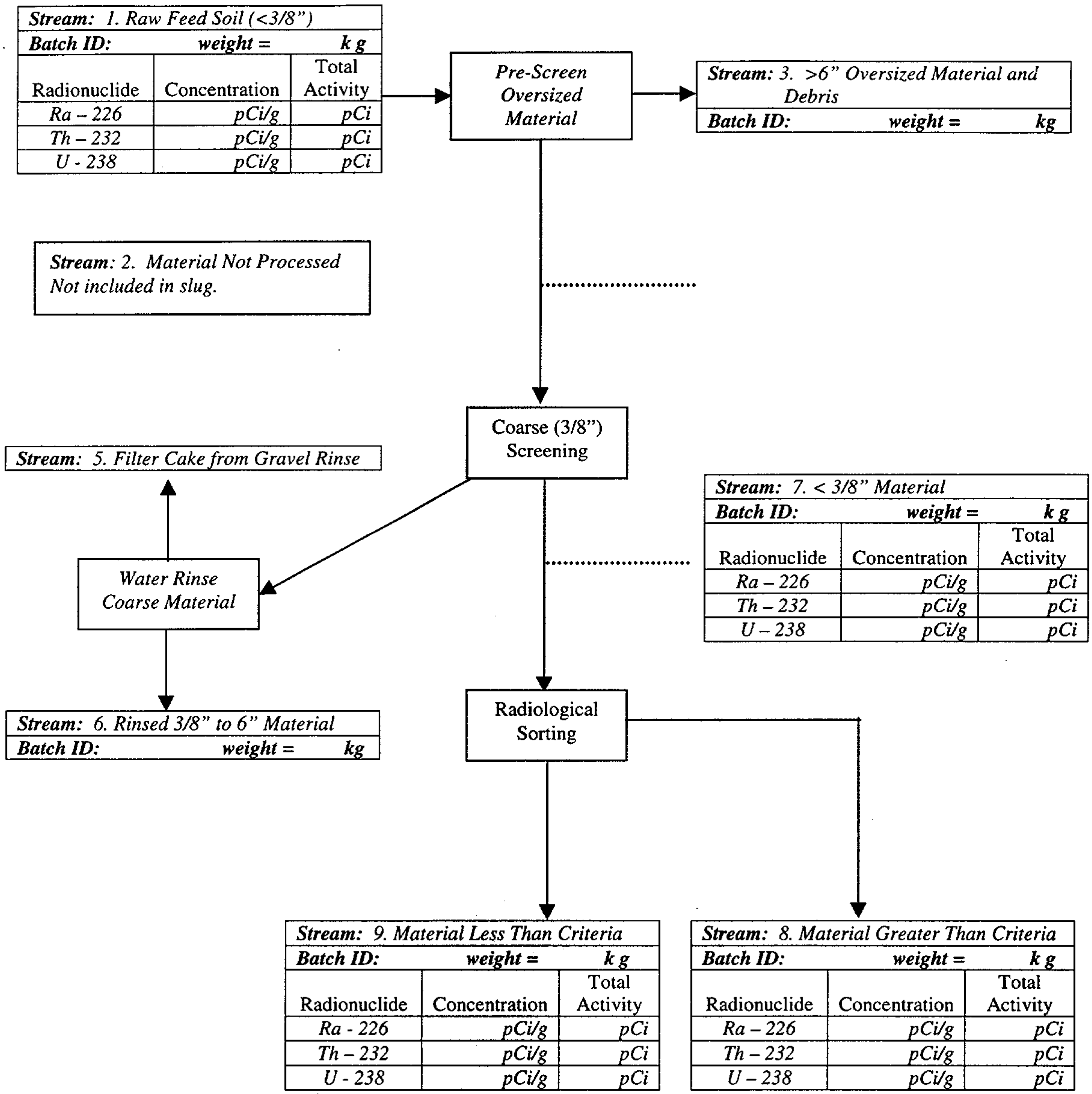
The soil stockpiles will be loaded into the processing system with a front-end loader equipped with a bucket scale and digital readout. The weight of the feed will provide a basis for weight and activity tracking. The soil will be scanned with a NaI survey instrument prior to loading. Output streams will be sampled and analyzed as discussed above to determine the radiological and chemical characteristics of the process streams.

Table 7
General Process Survey and Sampling Requirements – Batch and Other Samples

Process Stream	Batch Samples	Other Samples
1. Feed Material	R - Detailed NaI walkover of area C – In-situ characterization for disposal parameters W – weigh scales on loader	N/A
2. Material Not Processed	Oversize – see 3 Soil – see 8 for suspected above criteria, 9 for suspected below criteria	N/A
3. Material scalped out of the feed by the 6 inch grizzly (>6 inch)	R – NaI Scan, Surface wipe/gamma spec w/ surface area/mass ratio C – Surface wipe w/ surface area/mass ratio W – weigh scales on loader	N/A
4. Material less than 6"	N/A	Gamma Spec
5. Fines recovered from the gravel rinse	R – gamma spec, frequency dictated by disposal criteria C – Per SAP, frequency dictated by disposal criteria W – filtrate field scale	N/A
6. Rinsed gravel (between 3/8 inch and 6 inch)	R – NaI, gamma spec, frequency dictated by disposal/reuse criteria C – Per SAP, frequency dictated by disposal criteria W – Conveyor belt scale	N/A
7. <3/8" material from gravel separation to radiological sort	N/A	Gamma Spec, Perform grain size analysis – gamma spec on fractions.
8. Soil exceeding the RSS setpoint (above criteria)	R – NaI, gamma spec, frequency dictated by disposal criteria C – Per SAP, frequency dictated by disposal criteria W – Conveyor belt scale	N/A
9. Soil below the RSS setpoint (below criteria)	R – NaI, gamma spec, frequency dictated by disposal/reuse criteria C – Per SAP, frequency dictated by disposal criteria W – Conveyor belt scale	N/A

Legend:
R = Radiological; C = Chemical; W = Weight
See Figures 4 and 7 for sample locations.

Figure 7: Pilot Demonstration Weight & Activity Tracking - Slug



The retention pond sediments will be processed after the granular soils. Since the retention pond sediments are composed of uniform fine-grained soil, the sediments will be fed directly into the RSS system. The gravel separation system will be bypassed. The technique for in-situ characterization of the retention pond sediments will be similar to the technique used for the in-situ characterization of the granular soils (NaI scan followed by soil samples for on-site gamma spectroscopy). The retention pond sediments will be fed to the RSS using the front-end loader with a scaled bucket as described earlier for the granular soils. Since the gravel separation system will not be used when processing pond sediments, the only streams that will be quantified (weight, radiological and chemical) will be the materials sorted by the RSS. That is, material sorted above the radiological setpoint and the material sorted below the radiological setpoint.

4.4 Data Management

All data collected during the pilot demonstration will be entered into the project database. The data will be used to answer the questions posed by the objectives:

- Do the pilot systems produce process streams that meet criteria for disposal/reuse?
- Will the projected full-scale system reduce required offsite disposal?
- Will the project realize savings in money, time, and impact to the area through the use of these systems?

4.4.1 Weight Tracking

To determine applicability, the "efficiency", or removal percentage of each system must be established. For the gravel separation system, the efficiency is determined as follows:

> ***Note:***
> *In these equations, W designates the weight, and the subscript identifies the stream number (as defined in Table 3) and the stream description. Therefore $W_{(1.\ FEED)}$ denotes the weight of Stream 1, feed material.*

$$W_{(1.\ FEED)} = W_{(6.\ 3/8"\text{-}6")} + W_{(7.\ <3/8")} + W_{(3.\ >6")} + W_{(5.\ FINES)}$$

The weight of the >6" material and any other oversize will be subtracted from both sides of the equation.

$$\text{Gravel Removal Fraction (Efficiency)} = (W_{(6.\ 3/8"\text{-}6")} - W_{(3.\ >6")}) / (W_{(1.\ FEED)} - W_{(3.\ >6")}),$$

Where W is the weight and the subscript identifies the stream.

For the radiological sorting system, the efficiency is determined as follows:

$$W_{(7.\ FEED\text{-}RSS)} = W_{(9.\ sort<criteria)} + W_{(8.\ sort>criteria)}$$

Sort Removal Fraction (Efficiency) = $W_{(9.\ sort<criteria)} / W_{(7.\ FEED\text{-}RSS)}$

The efficiencies calculated using these equations will be grouped by feed stream activity level (ranked as high/medium/low), so that the context of the efficiency will be apparent.

4.4.2 Total Activity Tracking

Total activity (defined as weight multiplied by the specific activity) will be tracked for the slug of soil. The primary purpose of this is to show conservation of activity – i.e., we can show that we are not just diluting streams, but can demonstrate the activity is being concentrated in specific process streams.

To calculate total activity, the specific activity (pCi/g) is multiplied by the weight (g).

SA = Specific Activity (pCi/g)

Gravel Separation

The "balance" around the gravel separation system can be expressed as follows:

$$\sum SA_{(1.\ FEED)i} * (W_{(1.\ FEED)i} - W_{(2.,\ 3.,\ 4.\ >3/8")}) =$$

$$\text{Average } (SA_{(1.\ FEED)i}) * \left(\sum W_{(1.\ FEED)i} - W_{(2.,\ 3.,\ 4.\ >3/8")}\right) = SA_{(7.\ <3/8")} * W_{(7.\ <3/8")}$$

Where $SA_{(1.\ FEED)i} * W_{(1.\ FEED)i}$ = The specific activity * the weight for each cell (i) of the "slug" of soil being considered

The weight of the >3/8" material and any other oversize will be subtracted from both sides of the equation.

Radiological Sorting

The "balance" around the radiological sorting system can be expressed as follows:

<u>Feed from Gravel Separation System</u>

$$\underbrace{SA_{(7.\ <3/8")} * W_{(7.\ <3/8")}}_{\text{(Input from gravel separation System)}} = \underbrace{SA_{(9.\ sort<criteria)} * W_{(9.\ sort<criteria)} + SA_{(8.\ sort>criteria)} * W_{(8.\ sort>criteria)}}_{\text{(Output streams from radiological sort)}}$$

Feed from Soil Acquisition Area (High Fines Material)

$$\text{Average } (SA_{(1.\ FEED)i}) * \left(\sum W_{(1.\ FEED)i} - W_{(2.,3.,4.\ >3/8")}\right) =$$

$$SA_{(9.\ sort<criteria)} * W_{(9.\ sort<criteria)} + SA_{(8.\ sort>criteria)} * W_{(8.\ sort>criteria)}$$

Where $SA_{(1.\ FEED)i} * W_{(1.\ FEED)i}$ = The specific activity * the weight for each cell of the "slug" of soil being considered (for direct feed from soil acquisition area)

Additionally, it will be confirmed that the SA for the "below criteria" stream is indeed below criteria, and that the equations above are reasonably balanced. The activity on both sides of the equation will be quantified.

The total activity tracking will enable the project to evaluate the effects of excavation and soil handling on soil processing.

4.4.3 Data Uses

Factors such as efficiency (as calculated above), daily production, availability (fraction of time available compared to the planned 8-hours of daily operation), additional material handling cost, etc. will be factored into the unit processing costs. The total potential reduction in volume will be determined. An economic evaluation on the viability of full-scale soil processing will then be made using efficiencies and cost data developed as part of the pilot demonstration. A recommendation on whether to proceed with the full-scale soil processing system will be made based on this economic evaluation.

4.4.4 Pilot Demonstration Scenarios

The following cases may be investigated during the course of the Pilot Demonstration. Note that soil batches will not be formed from stockpiles. They will be identified prior to excavation. The *General Soil Acquisition Sampling Sequence for Pilot Demonstration* (Appendix A of the SAP – Volume 4).

Table 8: Pilot Demonstration Scenarios

Description	Justification
1. Process granular material through gravel separation system utilizing shallow cuts.	Determine efficacy of gravel separation system in removing coarse material – achieve more precise input for activity balance.
2. Process <3/8" material from gravel separation through radiological sorting system – Setpoint based on cleanup criteria.	Determine efficacy of radiological sorting system in segregating material near the cleanup level.
3. Process <3/8" material from gravel separation through radiological sorting system – Setpoint based on disposal site acceptance criteria.	Determine efficacy of radiological sorting system in segregating material near the disposal site acceptance level.
4. Repeat 3. for pond material	Determine efficacy of radiological sorting system in segregating material near the cleanup level.
5. Repeat 4. for pond material	Determine efficacy of radiological sorting system in segregating material near the disposal site acceptance level.
6. Process material known to be above criteria	Determine if field screening can supplement sorting system. Determine removal efficiency for "hot" material – e.g., can the sorter separate "pockets" of below criteria material?
7. Process material known to be below criteria	Determine if field screening can supplement sorting system.
8. Process mixed above and below criteria material	Determine efficacy of radiological sorting system in segregating mixed material.
9. Process retention pond material through gravel separation system.	Determine efficacy of gravel separation system in removing coarse material from retention pond material. This will be performed if it appears that there is a significant coarse fraction in the retention pond material.

5.0 INVESTIGATION DERIVED WASTE

Soil, groundwater, decontamination water, and PPE are anticipated to be generated during these field activities. All residuals will be handled in accordance with the MHTDP. The general requirements of the MHTDP pertaining to soils, groundwater, and PPE are presented in the following subsections.

All soils will be transported from the in-plant stockpile areas and consolidated into a stockpile for transport and disposal. To allay long delays awaiting chemical characterization results, pre-characterization of the soil acquisition area, at a frequency equivalent to once per 1000 cubic yards, will be conducted as part of the pre-design investigation of the MISS. This frequency will be confirmed with the disposal facility once it has been identified.

The stockpile location will be convenient to the rail loading point and will be designated prior to mobilization. Management of this stockpile area will be by site (as opposed to pilot plant) personnel.

All material generated as part of the pilot plant will be disposed of at a USACE approved facility. As part of the pilot demonstration, however, it will be determined if an alternate location would be able to accept the generated waste, based on disposal facility's waste acceptance profiles.

For the pilot demonstration, waste will be disposed of as outlined below:

5.1 Soil Exceeding the Radiological Release Criteria

Soil exceeding the radiological release criteria will be disposed of at an approved facility. If the material is also chemically contaminated (i.e. mixed waste), a RCRA waste disposal facility may also be appropriate. Information on the soil acquisition area gathered to date does not indicate the presence of RCRA-hazardous levels of any chemical contaminants. Shipments offsite will follow 40 CFR 300.440 offsite requirements and procedures identified in the MHTDP.

5.2 Chemically Contaminated Soil Below Release Criteria

Chemically contaminated soil which is below the radiological release criteria will be disposed of at an approved hazardous waste treatment facility or landfill in accordance with the MHTDP.

5.3 Soil/Rinsed Gravel Below Release Criteria

Soil below the release criteria will be disposed of offsite at the lowest-cost approved disposal site. Separated gravel that is below both radiological and chemical release criteria will also be disposed of offsite at the lowest-cost approved disposal site.

During the full-scale operation, these streams may be maintained onsite for beneficial reuse, as described in the Processed Material Soil Reuse Evaluation Plan in Volume 2.

5.4 Water

Groundwater may be generated during the excavations, if the excavations extend below the water table. As part of the Engineering Test Pit Program, groundwater samples were analyzed to determine water treatment requirements. A small amount of water will also be generated as a result of sampling equipment decontamination operations. The decontamination water will be collected in the decontamination pad sump and containerized for offsite disposal. All water samples will be analyzed per the SAP (Volume 4). Storm, excavation and heavy equipment decontamination water may be collected and used for dust control within the RMA, if appropriate.

Water will also be generated as a result of the gravel rinse operation. The rinse operation will be closed systems. The water in the system will be recycled and replaced periodically. The volume of water to be used during processing for the pilot demonstration is estimated to be 20,000 gallons. All process water samples will be analyzed per the SAP (Volume 4) and characterized to determine appropriate disposal. The disposal cost for the water will be factored into the economic evaluation of the full-scale plant.

Data will be collected to accurately design for water treatment and disposal during the full-scale remediation.

5.5 Other Waste Streams

The field program is expected to generate small quantities of other waste streams, such as PPE and waste sampling supplies. This material will be surveyed, drummed, and disposed of at an approved offsite location. Alternately, this material may be mixed into the soil waste streams for disposal in accordance with the receiving facilities' permits.

6.0 POST-DEMONSTRATION ACTIVITIES

Equipment will be decontaminated in accordance with the SHP located in Volume 4 before leaving the site. An exit radiological survey of the equipment will be conducted to ensure that surface contamination levels are below those specified in Table 6-1 of the SHP. Additional decontamination will be performed if necessary. Equipment which cannot be verified clean will be retained on the site, or released under a radioactive materials license.

Locations of all excavations will be surveyed and posted on a MISS site drawing.

7.0 QUALITY CONTROL

QC activities will be performed in accordance with the CQCP and the CDQMP. This work is considered a Definable Feature of Work. As such, the three phase control system will be executed as described in the Quality Control Plan to meet the needs of the activity in an efficient and effective manner. In all cases, QC methods commensurate with the anticipated future use of the data being collected will be employed.

Refer to the Construction Quality Control Plan (Volume 4) for further details.

8.0 REFERENCES

1. Stone & Webster. *Chemical Data Quality Management Plan, Revision 1*, February 2000.

2. Stone & Webster. *Contractor Quality Control Plan*, October 1999.

3. Stone & Webster. *Materials Handling/Transport and Disposal Plan*, July 1999.

4. Stone & Webster. *Site Safety and Health Plan*, August 1999.

5. Stone & Webster. *General Environmental Protection Plan*, November 1999.

6. USACE. *Chemical Data Management for Hazardous Waste Remedial Activities*, ER 1110-1-263, 30 April 1998.

7. USACE New York District Office. *Final Maywood Soils Grouping Report, Volume 1, Maywood, New Jersey, Final,* USACE/OR/DACA62-1032, January, 1998.

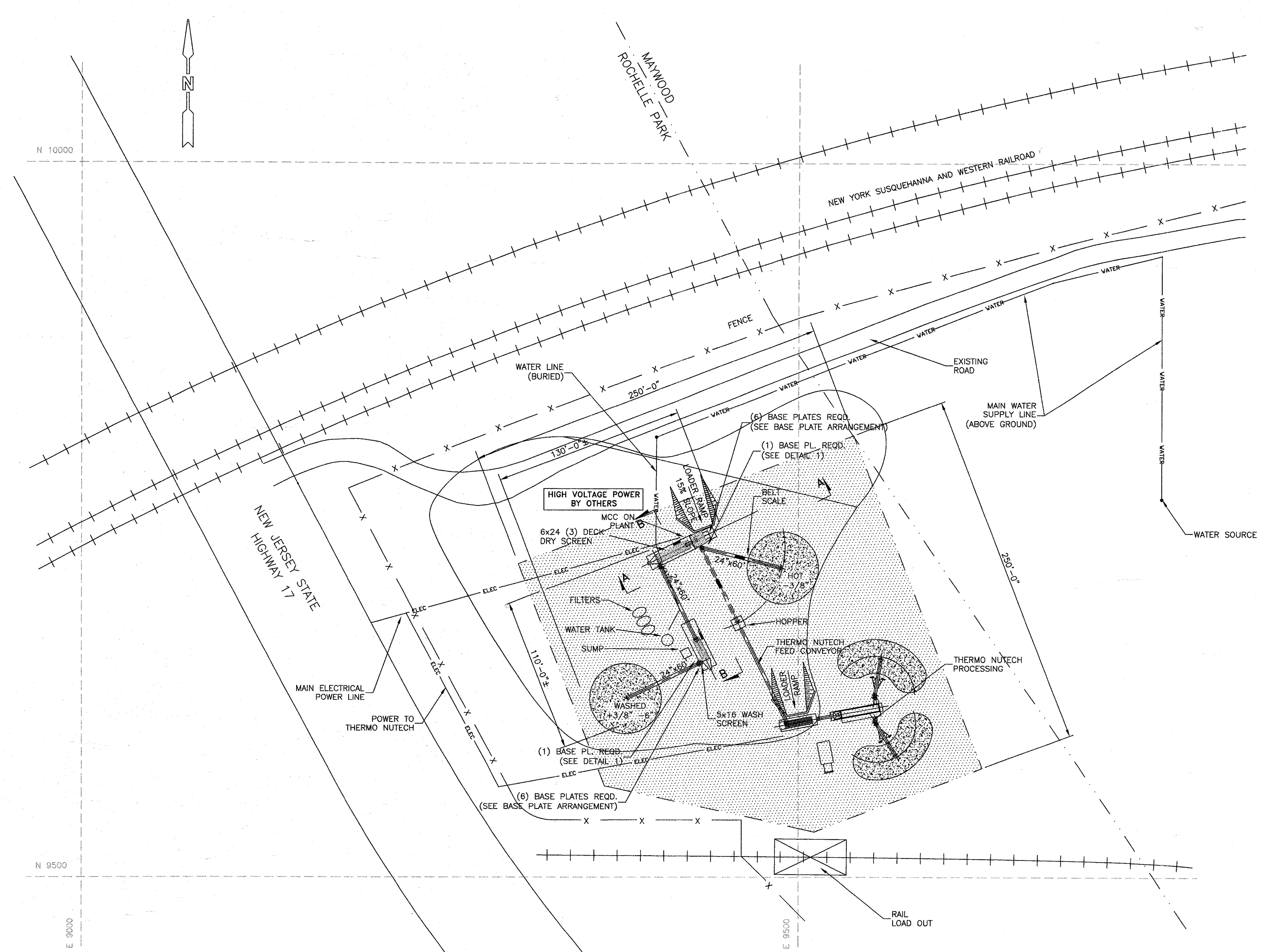
8. USEPA. *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, SW-846, Third Edition, Revision 1, Updates 1, 2, and 3.*

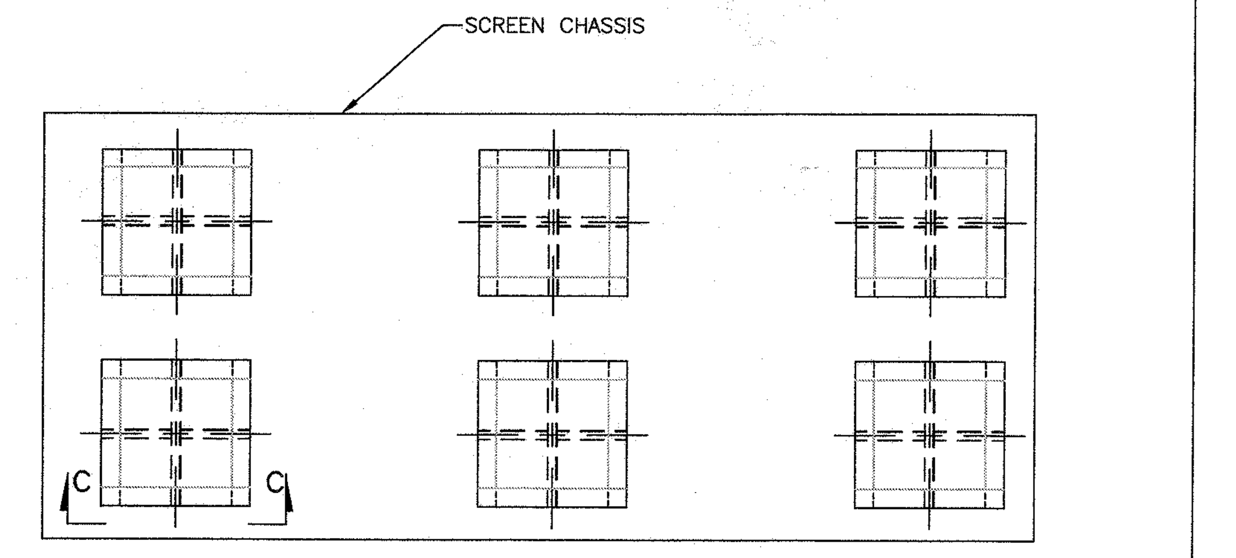
9. CH2M Hill. *Final Remedial Investigation Report, Stepan Company Property*, November 1994

10. Bechtel. *Remedial Investigation Report for the Maywood Site*, December 1992

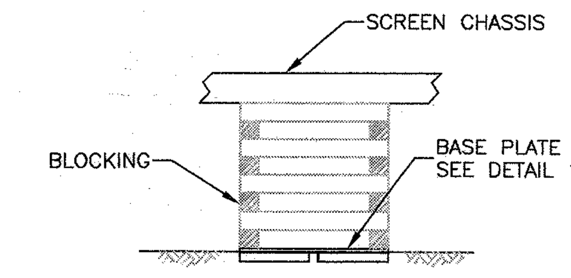
11. Bechtel. *Characterization Report for the Maywood Interim Storage Site*, June 1987

FIGURES



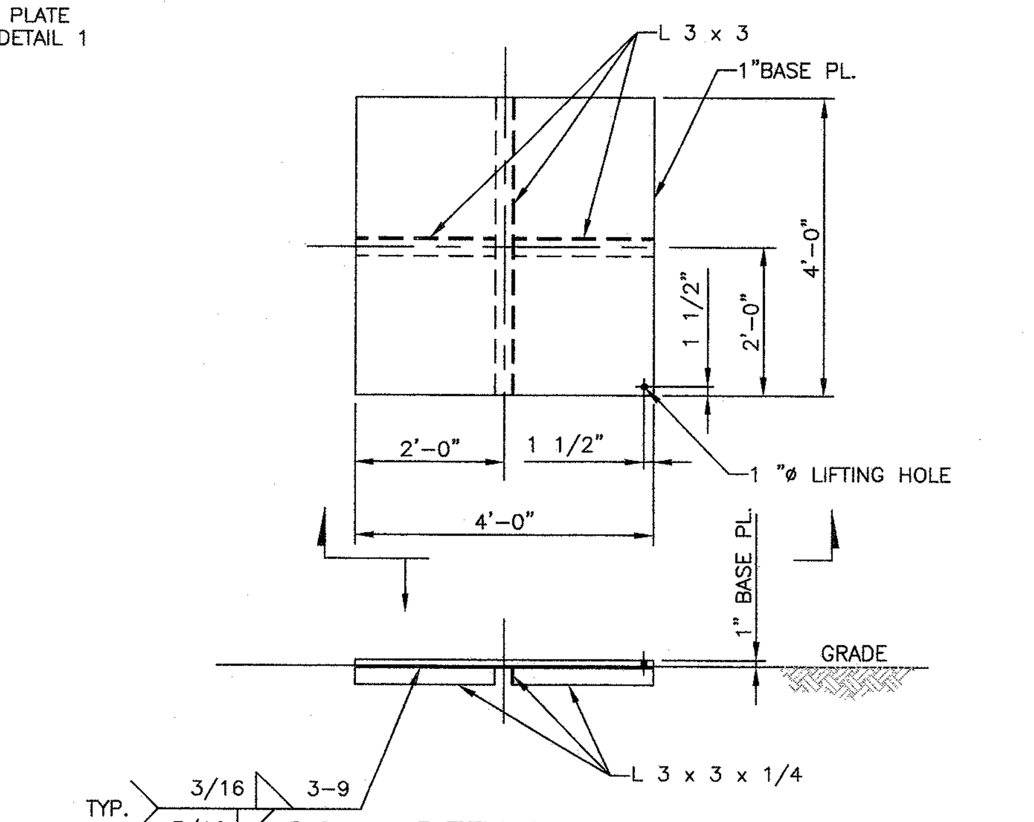


PORTABLE DRY & WASH SCREEN BASE PLATE ARRANGEMENTS



SECTION C–C

(SCALE: 1/4" = 1'-0")



DETAIL 1

(SCALE: 1/2" = 1'-0")

NOTES:

1. IDENTIFY AND LOCATE ABOVE GROUND UTILITIES AND BELOW GROUND UTILITIES, MONITORING WELLS, AND OTHER REMARKABLE SITE FEATURES. RENEW PERMIT WITH NEW JERSEY ONE-CALL.

2. PERSONNEL WORKING ON SITE SHALL BE TRAINED IN ACCORDANCE WITH THE REQUIREMENTS OF 29 CFR 1910.120. ALSO GENERAL EMPLOYEE RADIATION TRAINING (GERT) AND SITE SPECIFIC RADIATION WORKER TRAINING WILL BE REQUIRED AS DETERMINED BY THE SITE SAFETY AND HEALTH OFFICER (SSHO).

3. REMOVE BOULDERS LOCATED AT THE SOUTHWEST CORNER OF THE PROPOSED PAD AREA. EXCAVATED BOULDERS SHALL BE RELOCATED ON THE MISS AT THE DIRECTION OF THE TASK MANAGER UTILIZING AN END DUMP.

4. THE AREA COMPRISING THE 62,500 SQUARE FOOT PROPOSED PAD SHALL BE UNIFORMLY SMOOTH GRADED, MAINTAINING SLIGHT CROWN TO PREVENT SURFACE WATER SETTLING AREAS. THE DEGREE OF FINISH SHALL BE THAT WHICH IS ORDINARILY OBTAINABLE FROM DOZER OPERATION. NO EXCESS SOIL SHALL BE GENERATED FROM SITE GRADING OPERATIONS. THE GRADED SURFACE UNDERLYING THE GEOTEXTILE SHALL BE CHECKED AND MADE FREE OF ROOT OR LARGE STONE PROTRUSIONS OR OTHER DELETERIOUS MATERIALS WHICH COULD DAMAGE THE GEOTEXTILE.

5. COVER THE ENTIRE 62,500 SQUARE FOOT PAD AREA WITH HEAVY DUTY WOVEN GEOTEXTILE FABRIC, SUCH AS GTF 300 MANUFACTURED BY LINQ INDUSTRIAL FABRICS, OR EQUAL. GEOTEXTILE SHALL MEET AASHTO M288-92 REQUIREMENTS FOR HIGH SURVIVABILITY AND HAVE THE FOLLOWING MINIMUM PHYSICAL PROPERTIES:

GRAB TENSILE STRENGTH	ASTM D4632	300 LBS.
ELONGATION	ASTM D4632	15% (MAX.)
TRAPEZOID TEAR	ASTM D 4533	115 LBS.
PUNCTURE RESISTANCE	ASTM D4833	145 LBS.
MULLEN BURST	ASTM D3786	600 PSI

OVERLAP OF GEOTEXTILE SHALL BE A MINIMUM OF TWO (2) FOOT AT SEAMS.

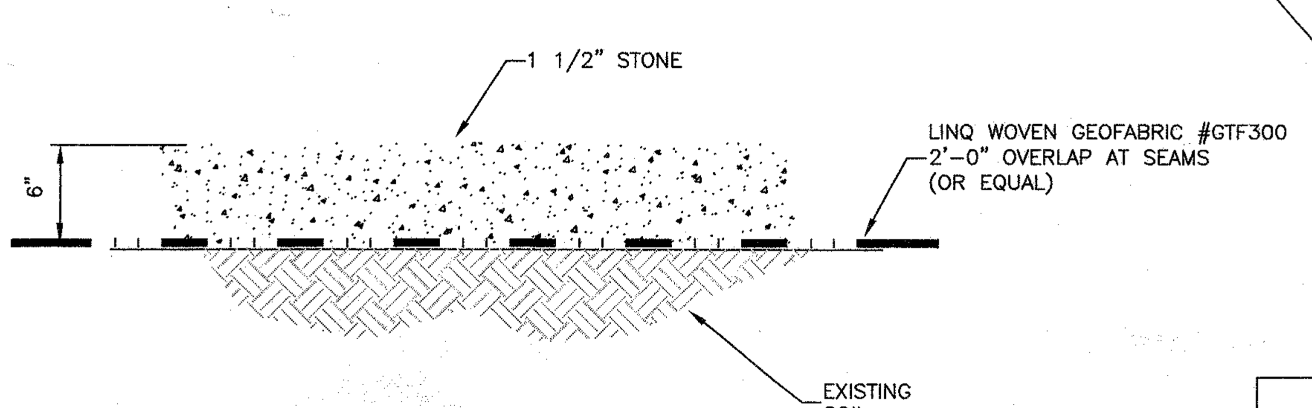
6. UNIFORMLY SPREAD A SIX (6) INCH LAYER OF CLEAN STONE OVER THE ENTIRE PAD AREA. UTILIZE A ONE AND ONE HALF (1 1/2) INCH, 100% 100% CRUSHED STONE PRODUCT. NOT MORE THAN 8% OF THE CRUSHED STONE PRODUCT SHALL PASS A 3/8 INCH SIEVE OPENING.

7. A THREE (3) INCH LAYER OF 3/4" QUARRY PROCESS MATERIAL SHALL BE PLACED OVER THE STONE AT HIGH TRAFFIC AREAS AND OTHER AREAS WHERE A FIRMER BASE THAN THAT PROVIDED BY THE STONE WILL BE REQUIRED. SUCH AREAS MAY INCLUDE THE LOADER RAMP AREA OF THE DRY SCREEN PLANT GRIZZLY HOPPER AND THE TRAVEL PATH OF RADIAL STACKING CONVEYORS. THE PLACEMENT OF THE QUARRY PROCESS MATERIAL SHALL BE AT THE DISCRETION AND AT THE DIRECTION OF THE TASK MANAGER.

8. PLACE ONE (1) INCH THICK STEEL BEARING PLATES ATOP THE STONE BASE FOR SUPPORT OF THE WET AND DRY SCREENING SYSTEMS. PLATES SHALL BE (4) FOOT SQUARE AND SHALL NUMBER SIX (6) PER EACH SCREENING SYSTEM FOR A TOTAL OF 12 PLATES. PLATES SHALL HAVE LIFTING HOLES OR LUGS FOR PORTABILITY. THE UNDERSIDE OF EACH PLATE SHALL HAVE AFFIXED (WELDED) TO EACH EDGE A 3" BY 3" BY 2' ANGLE IRON SECTION TO PROVIDE LATERAL SHEAR RESISTANCE SET WITHIN THE AGGREGATE BASE.

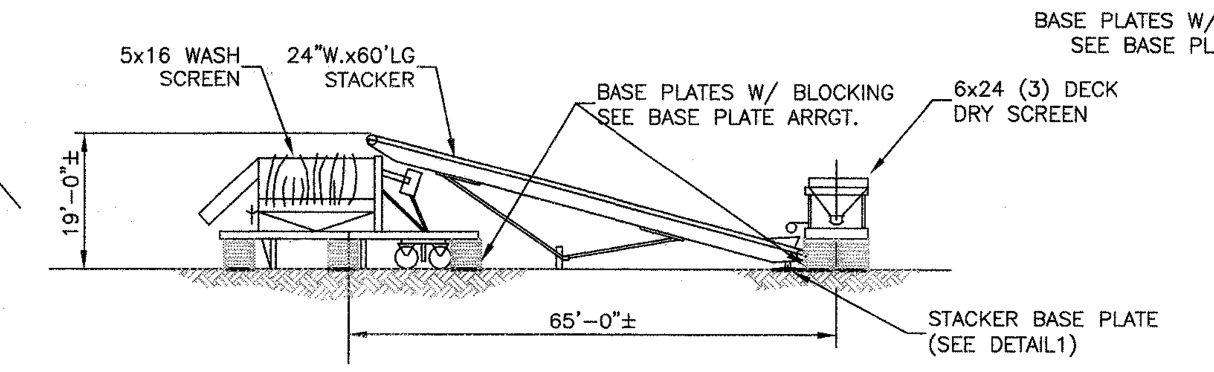
9. WATER SHALL BE BROUGHT TO THE WET SCREEN FROM THE NEAREST WATER SOURCE LOCATION AT THE EXISTING MISS DECONTAMINATION PAD. TWO (2) INCH DIAMETER FIRE HOSE SHALL BE PLACED ALONG THE EXISTING EROSION CONTROL BARRIERS AT NORTHERN BOUNDARY OF THE RMA. AT THE LOCATION OF THE DRY SCREEN GRIZZLY HOPPER, PLACE THE WATER SUPPLY HOSE WITHIN THREE (3) INCH DIAMETER SCHEDULE 40 BLACK IRON PIPE. THE BLACK IRON PIPE SHALL BE LOCATED BENEATH THE SIX (6) INCH CRUSHED STONE LAYER, ABOVE THE GEOTEXTILE FABRIC.

10. ELECTRIC SERVICE SHALL BE DROPPED TO THE PILOT PLANT FROM PSE&G MAIN SERVICES ALONG ROUTE 17. ELECTRIC SERVICE SHALL BE SPLIT AT THE STEP DOWN LOCATOR TO PROVIDE SEPARATE SERVICE TO DISTRIBUTION PANELS LOCATED AT THE DRY SCREEN AND AT THE THERMO NUTECH PROCESSING SYSTEM. A THIRD FEED SHALL BE PROVIDED FOR A SITE TRAILER WORK STATION AT THE PILOT PLANT LOCATION, IF REQUESTED.



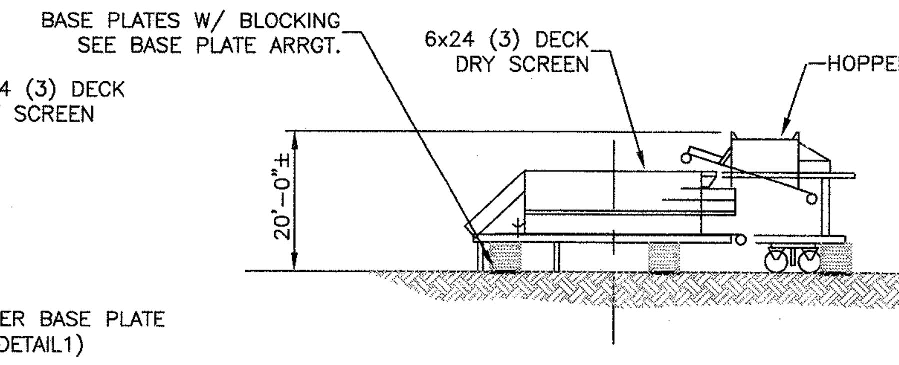
TYPICAL GROUND COVER

(NO SCALE)



VIEW B–B

(SCALE: 1" = 20'-0")



VIEW A–A

(SCALE: 1" = 20'-0")

FINAL

REV. NO.	DESCRIPTION OF REVISION	BY	CHK'D	APPR.	DATE
C	REVISED PER COMMENT	TL			01/18/00
B	REVISED PER COMMENT	TL			01/17/00
A	RELEASED FOR CUSTOMER COMMENT	TL			01/11/00

CUST. APP.			PRICING			ORDERING			DETAILING			CONST.					
REV	BY	DATE	REV	BY	DATE	REV	BY	DATE	REV	BY	DATE	REV	BY	DATE	REV	BY	DATE

DRAWING REVIEWED		DISCIPLINE	BY	DATE
PROJ. ENGR.	DATE	MECHANICAL		
PROJ. MANAGER	DATE	STRUCTURAL		
		ELECTRICAL		

WHITNEY & SON
FUSRAP MAYWOOD SUPERFUND SITE
PILOT PLANT DEMONSTRATION LAYOUT
SMALL SCALE GENERAL ARRANGEMENT
SCREENING OPERATION OPTION

FIGURE 5

STONE & WEBSTER ENGINEERING CORPORATION
BOSTON, MASSACHUSETTS

LB&W
ENGINEERING, INC.
961 MARCON BLVD. • SUITE 401 • ALLENTOWN • PA • 18103

DRAWN: TL	CHECKED: [signature]	LB&W CONTRACT NO. 99025-129	
DATE: 06/28/00	DATE: 6/28/00	DRAWING NUMBER 101	REVISION C
SCALE: 1" = 40'-0"			

ATTACHMENT A

GRAVEL SEPARATION SYSTEM

FRANKLIN ENVIRONMENTAL SERVICES INFORMATION

Franklin
Environmental
Services, Inc.

185 Industrial Road
P.O. Box 617
Wrentham, MA 02093
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Licensed and Permitted in the
United States and Canada
FED. EPA ID #MAD084814136

ENVIRONMENTAL SERVICE PROFESSIONALS

TABLE OF CONTENTS

SOIL SORTING/GRAVEL RINSING OPERATION

Summary and Technical Data

1.1 Summary:

The system proposed by Franklin Environmental Services, Inc. is a "Complete System". The process as designed is a known entity, specifically manufactured to sort soils and to rinse stone. The plant will receive soils, screen, rinse stone, recover rinse water, clean water for reuse, and convey segregated materials to appropriate stockpiles or directly to the Thermo Nutech System. In discussion with manufacturing engineers, Franklin has selected the screen type and wet screen application to best sort and rinse a varied particle size distribution. The proposed feed is characterized as silt, sand, clays with mixed stone.

The custom application of the system design is for environmental control. A dust suppression system is located at the grissly feed hopper. Conveyors are covered, feed conveyor has a digital weight scale with memory, and the wet screen is fitted with a water recovery system returned to a sump fitted with particle separation media.

Franklin has also fitted the equipment with storage tanks and a water filtration system to remove soil fines. Soil rinse water is recycled back to the wet screen. The water filtration system has been successfully operated at D.O.E. and N.R.C. regulated projects Franklin has completed.

The soil sorting/rinsing plant has been designed to allow for additions of in-line components to meet the demand of literally any soil type. The material handling components have been oversized to allow for an increase in volume processed should the soil type be more conducive to the process. The maintenance requirements and service needs are minimal and are locally supplied. Due to the nature of the system, maintenance concerns are outlined in an operations manual and down time can be anticipated for general maintenance. Components and parts are an overnight express delivery away.

2. Process Efficacy:

2.1 Process Description:

Material to be processed is fed into a portable 7 cubic yard feeder hopper via a wheel loader or excavator. This hopper is fitted with a 6" spaced, remotely actuated, hydraulically operated tilt mechanism, which should scalp off the material in excess of 6"+. Attached to the bottom of the hopper is a variable speed (30-175 ft/min) belt feeder which feeds the minus 6" material onto a 30" x 60' screen feed conveyor. This conveyor feeds onto a portable 6' x 19' double deck dry screen fitted with a 3/4" sq. opening screen cloth on the top deck and 3/8" sq. opening on the bottom deck. Material passing through the bottom deck is collected in the hopper beneath the screen and led onto a collecting conveyor which is part of the portable screening plant. This collecting conveyor moves the minus 3/8" material to a discharge point where it is fed onto a 24" x 60' long covered portable radial stacking conveyor where it feeds the Thermo Nutech System.

The material retained (3/8" x 6") on the double deck screen (both decks) rejoins together and deposits onto another 24" x 60' long covered portable conveyor where it is fed onto a portable 5' x 16' triple deck rinsing screen. This rinse screen is fitted with a 2" square opening top, 5/8" sq. opening mid and 6m sq. opening bottom deck which stratifies the material while spray bars, 4 per deck minimum 12 total, continually spray clean water across the 1/2 deck surface to help rinse the fine particles free. Virtually all particles smaller then the bottom deck opening are collected together with the free running water in a vessel fitted to the bottom of the screen structure. This mixture passes along a trough into a two compartment sump where the velocity of the water begins to slow allowing the heavier particles time to settle out for periodic removal via initial filtration. The rising ~~raising~~ water flowing over the weir begins to charge the sump which feeds into the lined pump (rubber, nyhard or polyurethane) which would now control the flow of this water onto the final stages of filtration for either reuse (closed circuited) or for discharge if desired. The ability to verify the speed of the screen along with the amplitude of the stroke and selection of which spray bars are on duty together with the nozzle orifice selection, and spray angle, allows for fine tuning the system for site specifics or varying feed conditions within the limitations of the screen size.

The material retained on all three decks of the rinse screen rejoins together via blending gates at the discharge end of the screen, where it is fed onto a covered portable 24" x 60' long radial stockpiling conveyor and deposited into a pile.

It is anticipated at this time that the first 8' of all three decks of the rinse screen would be used for stratification and rinsing purposes, while the remaining 8' toward the discharge end would be used for de-watering and air pressure drying of the retained material before joining together and discharging onto the stockpiling conveyor where only surface moisture with nearly no free running water should be present. However the bottom side of the stockpiling conveyor will be fitted with a continuous free draining collecting tray discharging to a common point near the tail end of the conveyor for collection purposes should the need arise.

The entire process is to be electrically interlocked to provide a reasonable degree of failsafe into the system for process control. Alarms (audible) will be fitted to the critical elements of the process (water pressure and feed rate thresholds) adjustable to within the anticipated limits. Within the dry segments of the process, all transfer points are to be shrouded, and a dust suppression system (water mist) has been added to help control visible emissions should the need arise.

2.1.1 Process Flow Diagram - See Attached

Flow diagram shows major components. Manufacturers literature is provided for each component.

2.1.2 Operating Conditions:

Operates in any reasonable condition.

2.1.3 System Integration:

Subsystem (ie. water storage and treatment) have been oversized and allow ample storage of water to provide the ability to batch filter water and to store filtered water prior to re-use or discharge. The water treatment system is capable of handling up to 200 gallons per minute and the proposed water usage is 30 gpm. Make-up water of less than 5 gallons per minute is anticipated as a result of evaporation and surface water adhered to gravel or fines.

2.1.4 Size Requirements:

Area 180' x 25' in line, system can be configured off-set by articulating conveyors .

Electrical Service - 460V 3/phase
Water Usage - 30 gpm, with make-up of less than 5 gpm.
Height of plant - 15' - 17'
Stockpile height - 20'
Plant is portable
Stacking conveyors are radial

2.2 Maturity of Technology:

Screen plants have operated for 50 Years.

2.2.1 Application Status:

System was not developed for radioactive material. The technology is an adaption from soil processing plants and washed stone plants. The modifications are only in material containment within the system and the filtration of wash water.

2.2.2 Commercial Scale Operation:

The proposed plant is sized at 200 tons per hour. This plant is full scale.

2.2.2.1 Commercial Throughput/Scale:

See 2.2.2 - 100-200 tons per hour.

2.2.2.2 Availability/Reliability:

The plant and water treatment system can be available on-site in June. The general maintenance of the plant is 1/2 day per month.

2.2.2.3 Commercial Efficiency:

The dry screening in conjunction with wet screening is near 100% effective in removing the fines from the 3/8" plus soil.

2.2.3 Pilot Scale Operation:

Plant size shall be full size

2.2.3.1 Plant Throughput/Scale:

100 - 200 tons of feed soils per hour - Full Scale

2.2.3.2 Pilot Efficiency:

Near 100%

2.2.4 Commercial Availability:
The process plant is readily available . Delivery time to M.I.S.S. is three months. The fabricated components shall be built on-site. The water filtration units and water storage systems are in stock at Franklin's main office.

2.3 Process Monitoring and Control:

2.3.1 Key Process Parameters:
The key to the soil processing plants efficient operation and control is soil type.

2.3.2 Process Alarms:
The plant shall automatically shut down should a back-up occur. Water feed shall shut down if the screen plant stops operating or if there is a no-flow condition at the feeder.

2.3.3 Instrumentation:
The water storage sump and storage tanks shall have high water alarms. The filter unit shall have an in-line flow meter to monitor the volume of water filtered and discharged.

2.3.4 Process Control Design:
See 2.1

2.3.5 Monitoring and Control:
A main control panel and computer integrated system control the conveyor speed relative to feed rate. The screens themselves screen what they are fed mechanically. The 3/8" plus stockpile of stones shall be periodically surveyed for radio nuclides by other team members. The plant, once set-up and fine tuned, is usually operated by the front end loader suppling feed material. Due to the environment system add-on's, an additional foeman/laborer shall be needed to observe environmental conditions, water levels and change filter media as needed.

2.4 Process Robustness:

2.4.1 Feed Flow Rates:
100 tons per hour to 200 tons per hour depending on organic/clay fraction.

2.4.2 Scale-Up:
The system as designed is Full Scale

2.4.3 Feed Concentration Ranges:
The plant, once calibrated for feed rate based on soil type, will monitor its own feed rate by conveyor belt speed from the Grissly to screen plants. The equipment does not discriminate contaminant concentration. The plant is designed to separate the soil fines from the 3/8" stone.

2.5 Applicability:

2.5.1 Soil Applicability:

The equipment as designed will handle a wide variety of soil types. Organics and clay content will determine the amount of soil processed and the amount of water required to separate fines on the wet deck. The equipment proposed is a productive match for the anticipated soil type based on our experience in the region of M.I.S.S. site.

2.5.2 Radioactivity Applicability:

See 2.4.3

2.5.3 Mixed Waste Applicability:

See 2.4.3

2.6 Mobility/Movability:

The entire process is portable. The plant is designed to be moved from one remote site to another over the public way. Decon, breakdown and set-up from scratch is a 10 day process.

3. Process Safety:

3.1 Engineered Safety Features:

The system is designed with remote controls both at the Grissly dump and the operation of the plant itself. Automatic shut down occurs if the system is over-burdened at any stage of the process. All of the conveyors are fitted with emergency shut off switches. All moving parts are guarded at the pinch points of the machinery.

3.2 Worker Safety:

The equipment does not classically require an operator therefore worker interaction with the plant during operation will be solely from the front end loader operator. Equipment maintenance will be done during a shut down. Equipment shall be locked and tagged out of service.

*3.3 Public Safety - Public Nuisance:

The plant will be located within the Hot Zone of the M.I.S.S. Site. Therefore, public interaction is not possible directly. Dust emissions from the equipment are controlled/eliminated by the dust suppression station. Noise levels are well within acceptable levels, all motors are electric. The screens and conveyors are shrouded.

3.4 Environmental Safety:

The plant poses no threat to the environment of the M.I.S.S. The soil screening operation will be erected within the Hot Zone. The equipment has environmental controls to contain migrant dust, water and process soils.

4. Environmental Impact:

See 3.4

4.1 Waste Generation:

Only rinse waters from the wet deck screen shall be generated and these are recirculated after undergoing filtration. Rinse waters shall be monitored analytically for radionucleides and chemical contaminations. Rinse waters unsuitable for recirculation shall be discharged on site or off site pending analytical data and the Environmental Protection Plan.

4.1.1 Effluent Treatment Requirements:

Rinsewaters from the wet screen operation shall be contained within the flume and sump. Rinse water will be filtered through a series of parallel in-line filter units removing potentially contaminated fines before discharge. Should soils contain organic chemical contamination, filtered water could easily be treated through adding carbon filters prior to discharge.

4.1.2 Effluent Constituents/Flows:

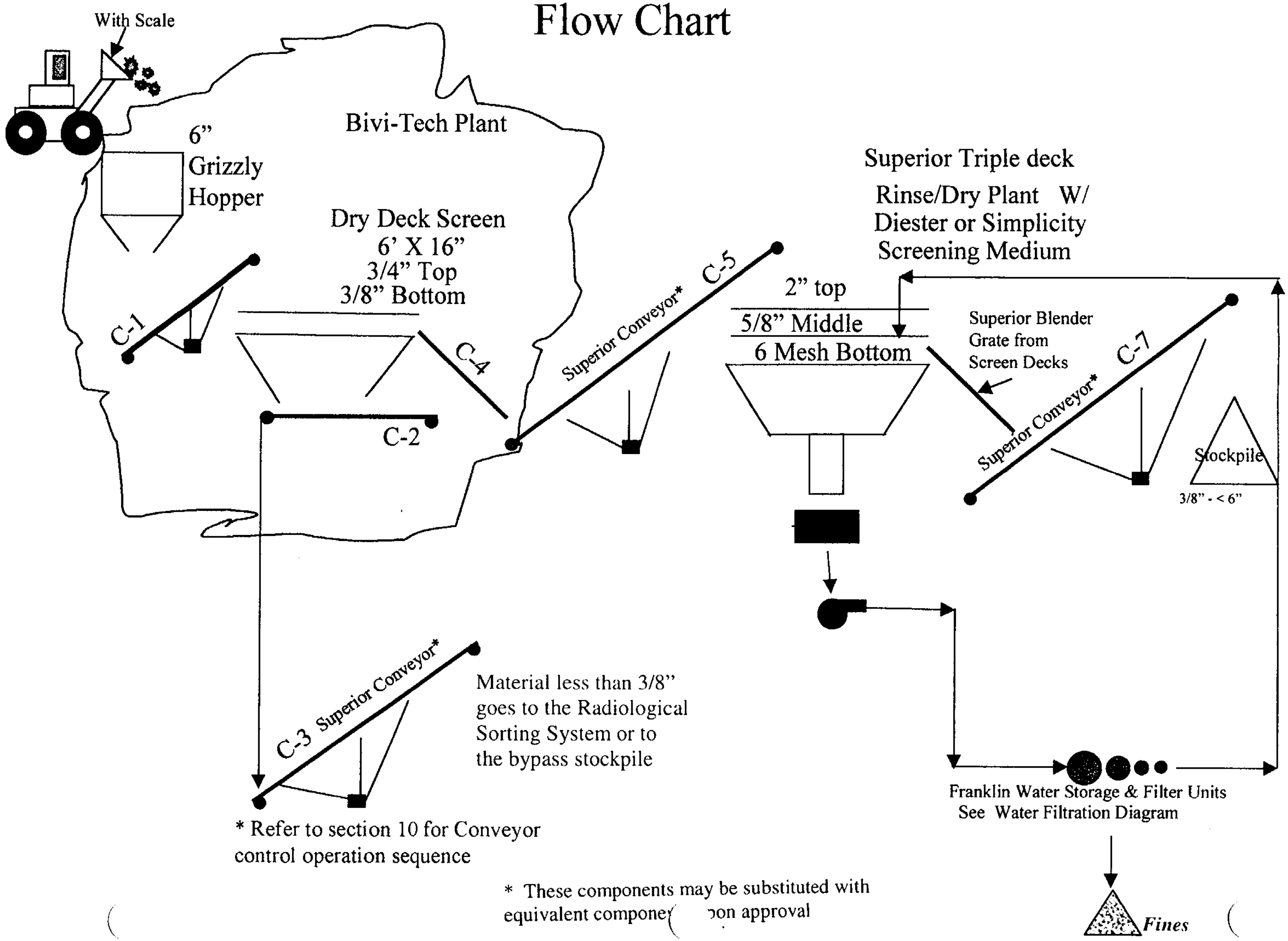
The soil rinsing process requires 30 gpm. A percentage of this water (estimated 10% or less) will be lost to evaporation and as moisture in the sump fines or on washed gravel.

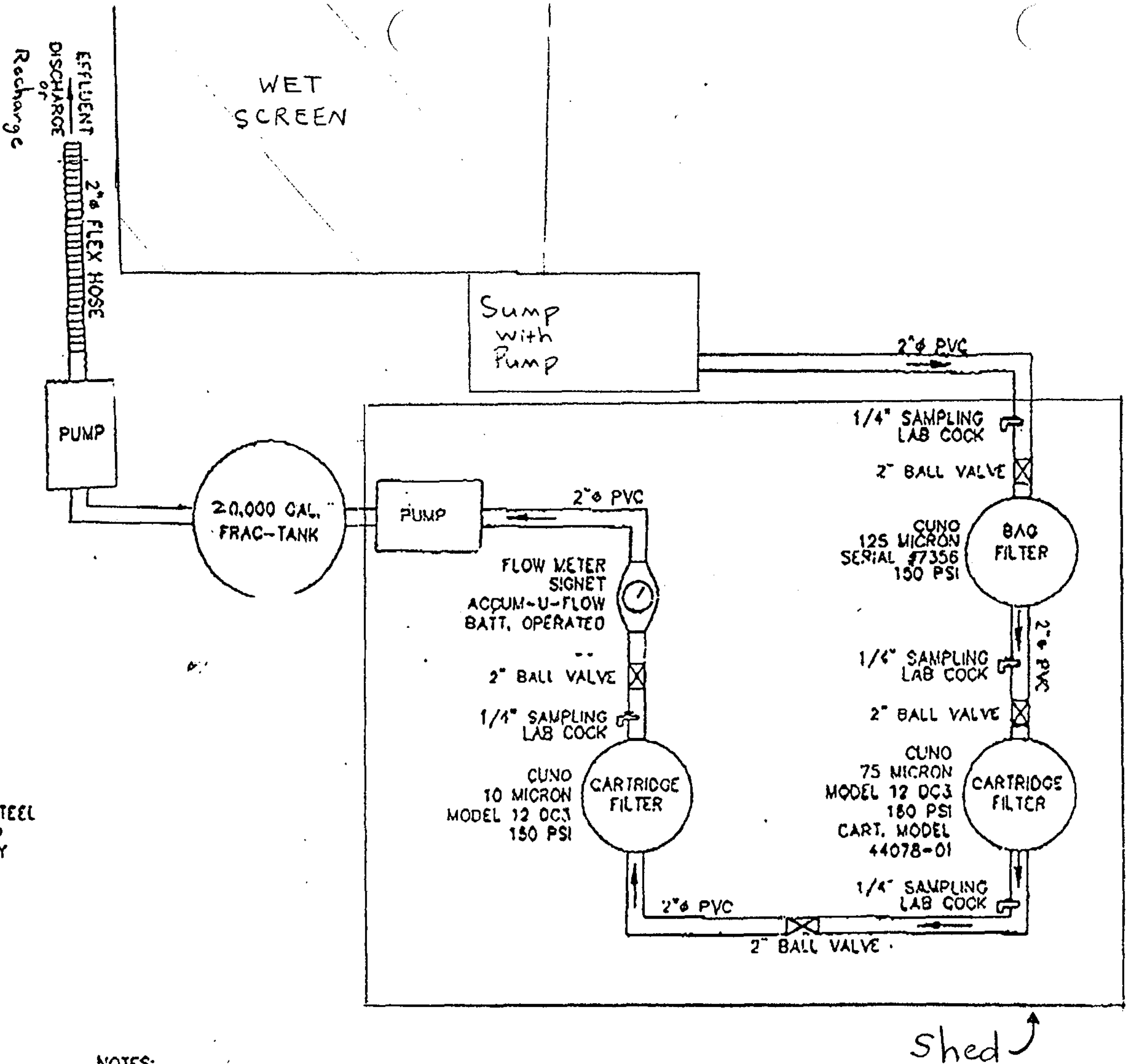
4.2 Permitting History:

Portable units are not subject to permitting requirements of a fixed plant. Electrical codes are exempt. An electrical permit may be required for the electrical drop from the pole.

GRAVEL SEPARATION SYSTEM

Flow Chart





NOTE: PUMPS SHALL BE STAINLESS STEEL CENTRIFUGAL PUMPS BY GOULD PUMPS, CO., SENECA FALLS, NY MODEL SST, MODEL 4STK1

NOTES:
1. ALL PIPE SHALL BE 2"ø SCHEDULE 40 PVC, UNLESS OTHERWISE NOTED.
2. ALL FITTINGS SHALL BE PVC, UNLESS OTHERWISE NOTED.
3. DRAWING SHOWN IS NOT TO SCALE AND IS FOR SCHEMATIC PURPOSES ONLY.
4. ALL FITTINGS, COUPLINGS AND UNIONS SHALL BE SOLVENT WELDED.

Franklin Environmental Services
Gravel Separation System

TAB 1

OPERATIONAL SAFETY

Safety and Health

All vendors will operate under the project SSHP and the task Safety and Health Plan (SHP - refer to Volume 4). The following section describes *additional* safety and health considerations, which are specific to the vendor's system. Any work that is not specifically covered by the SSHP or the SHP will be coordinated with the Maywood HSO/RSO and will be conducted under an HWP.

SAFETY FIRST!

Accidents can be prevented by recognizing the causes or hazards before an accident occurs, and doing something about them. Regardless of the care used in the design and construction of this equipment, there are some areas that cannot be safeguarded without interfering with accessibility and efficient operation.

> ⚠ *This message alert symbol identifies important safety messages on the equipment and in the owner's manual. When you see this symbol, be alert to the possibility of personal injury and carefully read the message that follows.*

> *This message alert symbol identifies information that must be heeded for proper operation of the equipment and to prevent damage or deterioration of the equipment.*

In the owner's manual and on decals used on the equipment the words **DANGER, WARNING, CAUTION, IMPORTANT** and **NOTE** are used to indicate the following:

DANGER: This word warns of immediate hazards which, if not avoided, will result in severe personal injury or death.

WARNING: This word refers to a potentially hazardous situation which, if not avoided, could result in severe personal injury or death.

CAUTION: This word refers to a potential hazard or unsafe practice which may result in minor personal injury.

IMPORTANT: Highlights information that must be heeded.

NOTE: A reminder of other related information that needs to be considered.

BE CERTAIN ALL EQUIPMENT OPERATORS ARE AWARE OF THE DANGERS INDICATED BY SAFETY DECALS APPLIED TO THE EQUIPMENT, AND BE CERTAIN THEY FOLLOW ALL SAFETY DECAL INSTRUCTIONS. CONTACT SUPERIOR EQUIPMENT FOR SAFETY DECAL REPLACEMENT.

SAFETY DECALS

Not all may apply to your equipment - see safety decal placement illustration.

19-00001

DANGER

MOVING PARTS HAZARD

Can crush or dismember hands and fingers.

- Keep hands away when belt is moving.
- Lock out power before cleaning or servicing.

ISO-0005

19-00005

DANGER

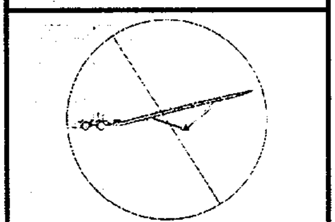
PINCH POINT HAZARD

Keep away from moving parts.

ISO-0020

19-00009

WARNING



During pit transport conveyor may tip over if not lowered to its lowest position.

ISO-0024

19-00002

DANGER

MOVING PARTS HAZARD

- Keep hands, clothing, and hair away from moving belts and parts.
- Replace guard before operating.

ISO 0007

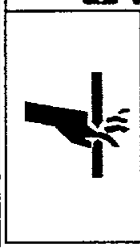
19-00015

DANGER

- Jack one wheel at a time.
- Block the other wheel, and anchor conveyer tail section before jacking.
- Telescoping & swiveling wheels are the only operations to be performed while jacked-up

19-00003

WARNING



PINCH POINT HAZARD

Can crush or dismember hands and fingers.

- Keep hands clear when undercarriage is moving.
- Replace or remove hitch pins only after undercarriage has stopped moving.

ISO 0006

19-00023

CAUTION

Crib machine before operation to prevent fatigue damage.

ISO-0022

19-00004

WARNING

MOVING PARTS HAZARD

Can crush or dismember hands and fingers.

Do not operate with guard removed.

ISO 0001

19-00024

CAUTION

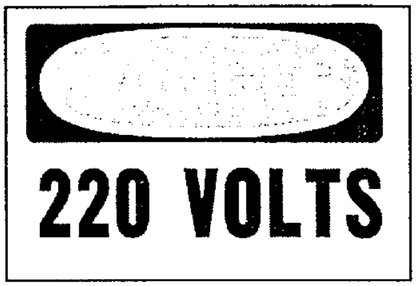
- Maximum travel speed 40 MPH on paved roads, SLOWER speed on other roads.
- Travel restricted to daylight hours and when clear visibility exceeds 500 feet.

ISO-0021

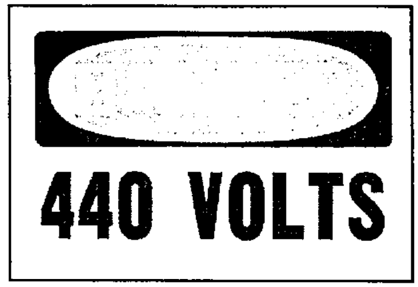
SAFETY DECALS

Not all may apply to your equipment - see safety decal placement illustration.

19-00006



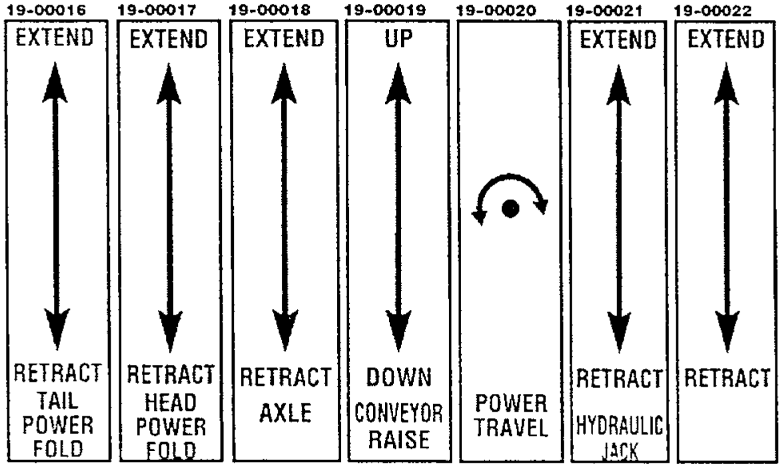
19-00007



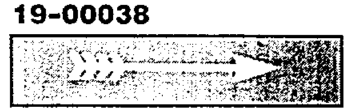
CONTROL & IDENTIFICATION DECALS

Not all may apply to your equipment. Order replacements by part number.

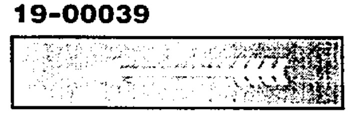
19-00016 19-00017 19-00018 19-00019 19-00020 19-00021 19-00022



19-00038



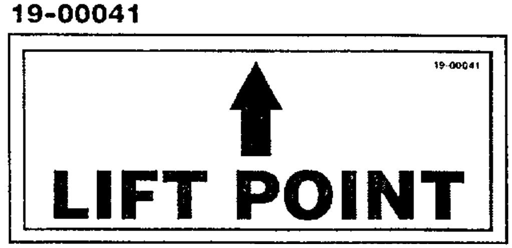
19-00039



19-00008

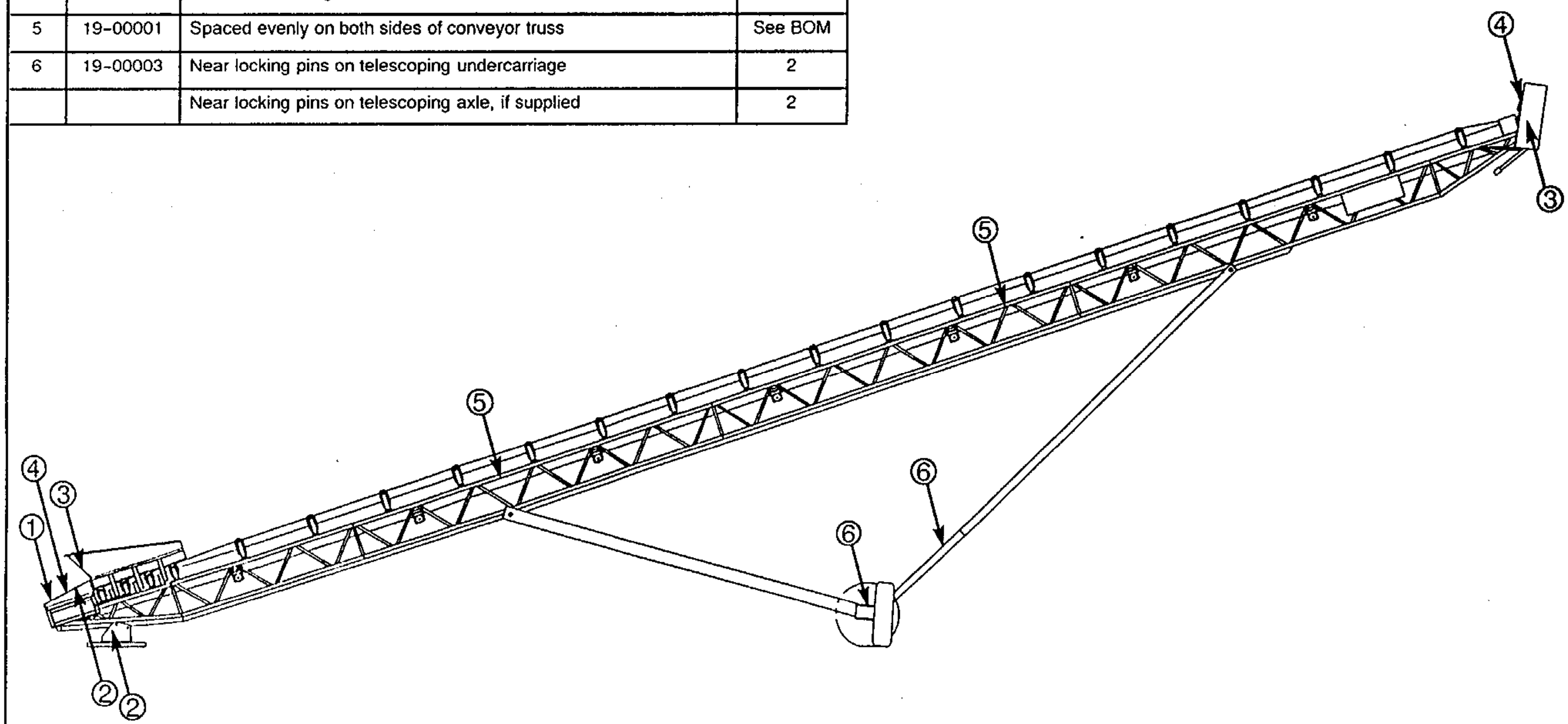
HYDRAULIC OIL RESERVOIR

19-00041



SAFETY DECAL PLACEMENT

Ref.	Part No.	Placement	Qty.
1	19-00009	(1) on top of ring tow hitch OR	1
		(1) on top of tail pulley guard	1
2	19-00024	(1) on glad hand box OR	See BOM
		(1) on each side of 5th wheel hitch AND (1) next to 19-00009 OR	See BOM
		(1) next to 19-00009	See BOM
3	19-00002	On back side of receiving hopper, if supplied	1
		Inside drive guard on back plate	1
4	19-00004	On top of tail pulley guard	1
		On side of drive guard cover	1
5	19-00001	Spaced evenly on both sides of conveyor truss	See BOM
6	19-00003	Near locking pins on telescoping undercarriage	2
		Near locking pins on telescoping axle, if supplied	2



SAFETY INSTRUCTIONS FOR OPERATION AND MAINTENANCE

These are general safety considerations—additional precautions may be necessary to operate your equipment in a safe manner. Be certain you are operating your equipment in accordance with all safety codes, OSHA rules and regulations, insurance requirements; and local, state and federal laws.

1. Do not allow anyone to operate the conveyor until he or she has read the owner's manual and is completely familiar with all safety precautions.

2. Do not allow the following people to operate or maintain the conveyor:
   - Children
   - Persons unfamiliar with the equipment, or unfamiliar with safe operating and maintenance procedures for the equipment.
   - Persons under the influence of alcohol, medications or other drugs that can impair judgement or cause drowsiness.

3. Make sure everyone is clear of the conveyor before starting the belt during operation or maintenance. Never allow anyone to ride on the conveyor!

4. **Do not** wear loose hanging clothes, neckties, or jewelry. Long hair is to be placed under a cap or hat. These precautions will help prevent you from becoming caught in the moving parts of the conveyor.

5. **Do** wear safety glasses, ear protection, respirators, gloves, hard hats, safety shoes and other protective clothing when required. Requirements for personal protective equipment will vary depending upon conveyor placement and material to be conveyed. It is the responsibility of conveyor operators to be certain they make use of all necessary personal protective equipment.

6. Buildup of materials on pulleys or idlers will lead to belt misalignment or damage. When removing such materials, the conveyor must be stopped and power controls must be locked-out or tagged-out.

7. The conveyor should not be used to handle materials other than those which were specified as part of its design and manufacture. It is the operator's responsibility to be aware of the conveyor system capacities and operate the conveyor accordingly.

8. Make sure the operator's area is clear of any distracting objects. Keep work areas clean, and free of grease and oil to avoid slipping or falling.

9. Periodically check all shields and structural members. Replace or repair anything that could cause a potential hazard.

10. When the belt is moving, the material travels at a speed sufficient to cause injury. Do not start the conveyor until you are certain no one is exposed to the moving parts or to the material being discharged from the end of the conveyor.

11. When doing maintenance work on structural parts or repairing any moving parts:
    - Disconnect and lock-out or tag-out all power sources. Know OSHA requirements.
    - When welding is required, disconnect all power sources and connect ground to point closest to welding area.
    - Block all wheels to prevent the conveyor from moving, and block any extended hydraulic cylinders to prevent them from moving or retracting.

12. If any safety devices are not functioning properly, do not use the conveyor. Remove it from service until it has been properly repaired.

13. Do not replace components or parts with other than factory-recommended service parts. To do so may decrease the effectiveness of the unit.

14. Do not lubricate parts while the conveyor is running.

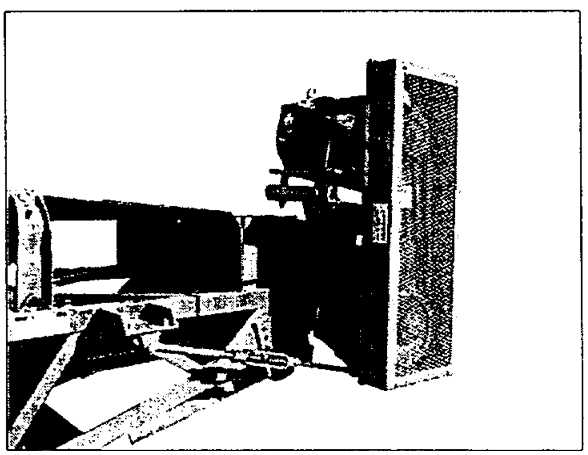
15. Before starting engines within enclosed areas be certain ventilation is sufficient to avoid buildup of exhaust fumes.

16. Relieve any and all pressure before opening, repairing, or removing any air pressure lines, hydraulic lines, valves, fittings or seals. In the event of an hydraulic line rupture, **stay clear** of the area until pressure has been relieved. Clean up any spilled fluid before performing repairs in the area.

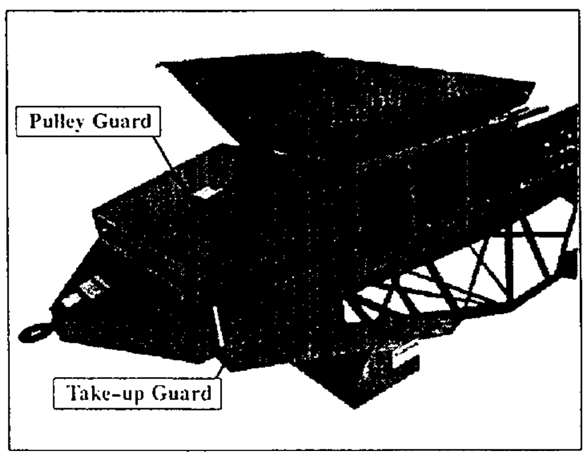
17. It is the operator's responsibility to be aware of equipment operation and work area hazards at all times.

18. Operators are responsible to know the location and function of all controls and indicators, including electrical power panels, hydraulic controls, motor controls, incline indicators, fuel and oil level indicators, belt scale controls, etc.

19. Operators are responsible to know the location and function of all guards and shields including but not limited to drive guards, pulley guards, and nip guards; and are responsible to make certain that all guards are in place when operating the conveyor (See below).

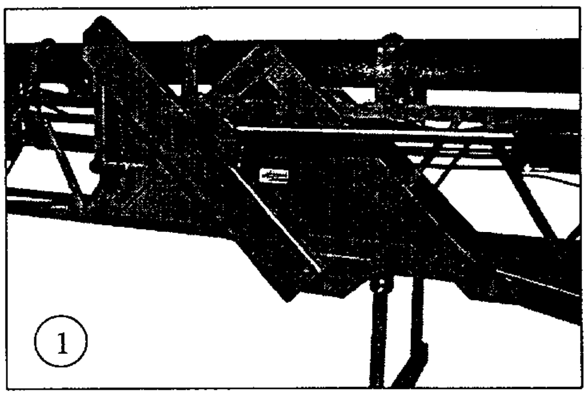


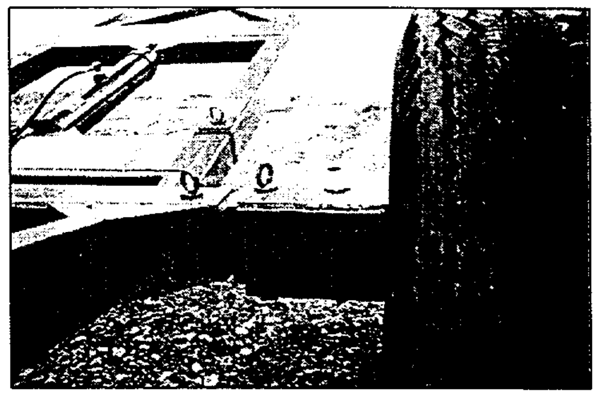
Typical head end drive guard

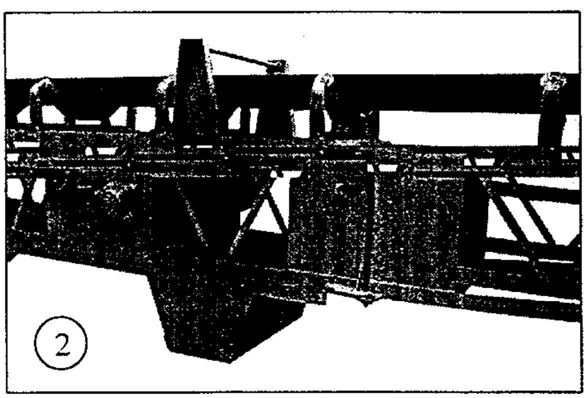


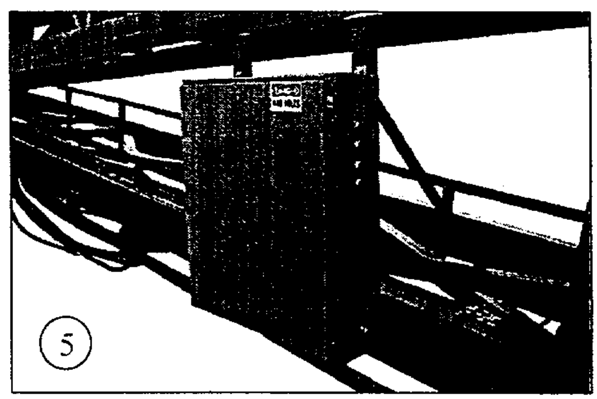
Typical tail end guards

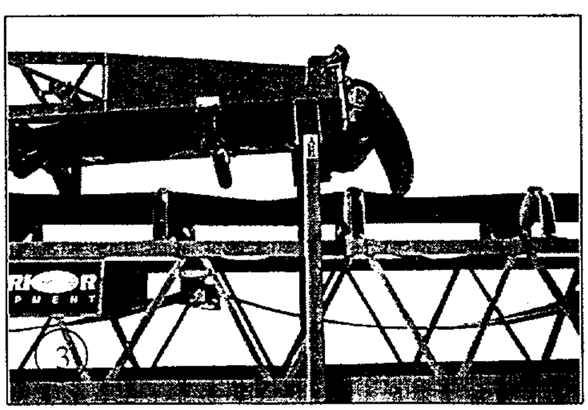
20. Operators are responsible to be aware of safety hazard areas and follow instructions on warning, caution or danger decals applied to the conveyor. Safety hazard areas may include but are not limited to:
    - Pinch points at fold hinge areas (#1, #2)
    - Pinch points at fold support areas (#3)
    - Pinch points where locking pins are used (#4)
    - Electrical control panels (#5)
    - Moving parts hazards on drives
    - Moving parts hazards where contact with belts and idlers is possible











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WARNING: This word refers to a potentially hazardous situation which, if not avoided, could result in severe personal injury or death.

CAUTION: This word refers to a potential hazard or unsafe practice which may result in minor or moderate personal injury.

IMPORTANT: Highlights information that must be heeded.

NOTE: A reminder of other related information that needs to be considered.

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SAFETY DECALS

Not all may apply to your equipment - see safety decal placement illustration.

19-00001

DANGER

MOVING PARTS HAZARD

Can crush or dismember hands and fingers.

- Keep hands away when belt is moving.
- Lock out power before cleaning or servicing.

ISO-0005

19-00005

DANGER

PINCH POINT HAZARD

Keep away from moving parts.

ISO-0028

19-00002

DANGER

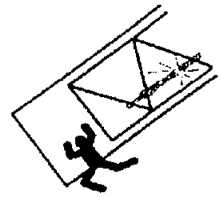
MOVING PARTS HAZARD

- Keep hands, clothing, and hair away from moving belts and parts.
- Replace guard before operating.

ISO-0007

19-00053

DANGER



19-00053

Wire rope WILL FAIL if worn-out, overloaded, misused, damaged, improperly maintained or abused. Wire rope failure may cause serious injury or death! Protect yourself and others:

- [illegible] wire rope for WEAR, DAMAGE, or ABUSE BEFORE USE
- [illegible] wire rope that is WORN-CUT DAMAGED or ABUSED.
- [illegible] Owner's Manual for INSPECTION REQUIREMENTS.
- [illegible] any body parts inside the truss frame unless stinger has been SECURED with chain.

19-00003

WARNING

PINCH POINT HAZARD

Can crush or dismember hands and fingers.

- Keep hands clear when undercarriage is moving.
- Replace or remove hitch pins only after undercarriage has stopped moving.

ISO-0000

19-00024

CAUTION

- Maximum travel speed 40 MPH on paved roads, SLOWER speed on other roads.
- Travel restricted to daylight hours and when clear visibility exceeds 500 feet.

ISO-0021

19-00004

WARNING

MOVING PARTS HAZARD

Can crush or dismember hands and fingers.

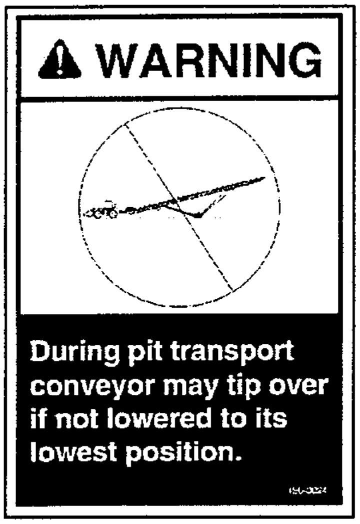
Do not operate with guard removed.

ISO-0009

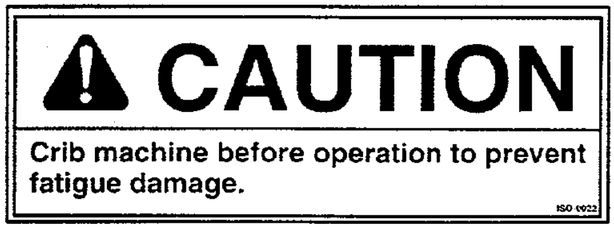
SAFETY DECALS

Not all may apply to your equipment - see safety decal placement illustration.

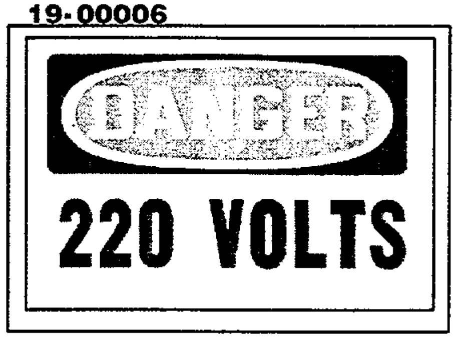
19-00009



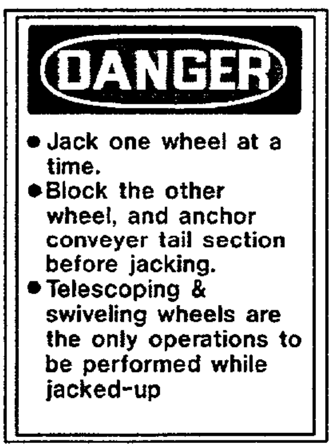
19-00023



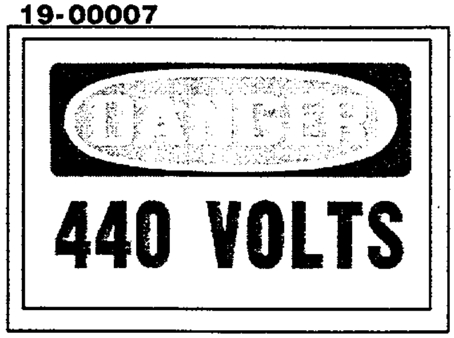
19-00006



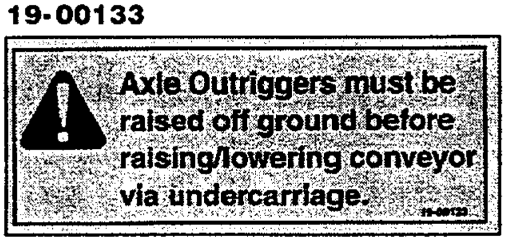
19-00015



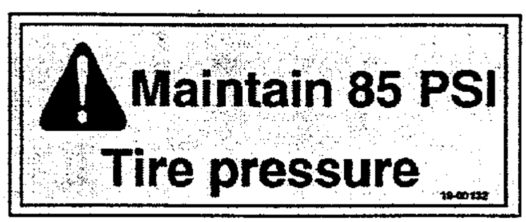
19-00007



19-00133



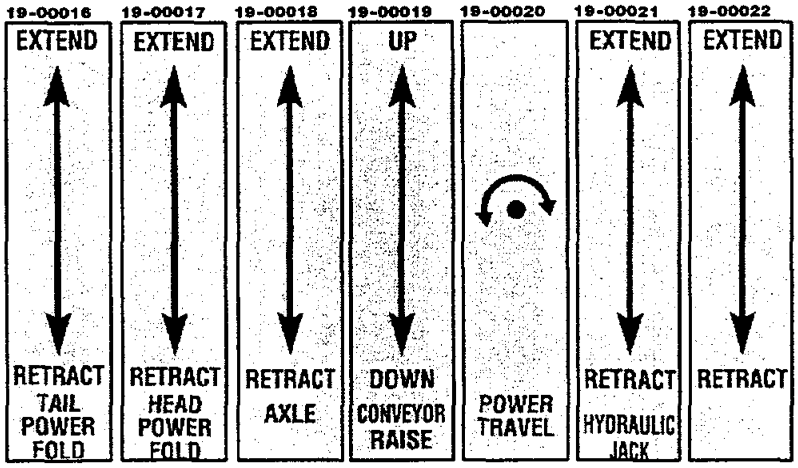
19-00132



CONTROL AND IDENTIFICATION DECALS

Not all may apply to your equipment. Order replacements by part number.

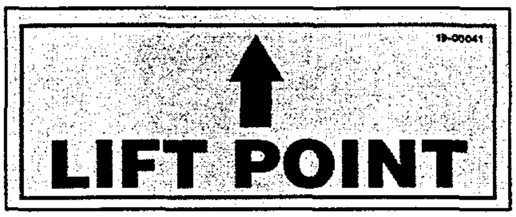
19-00016 19-00017 19-00018 19-00019 19-00020 19-00021 19-00022



19-00008

HYDRAULIC OIL RESERVOIR

19-00041



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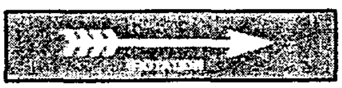
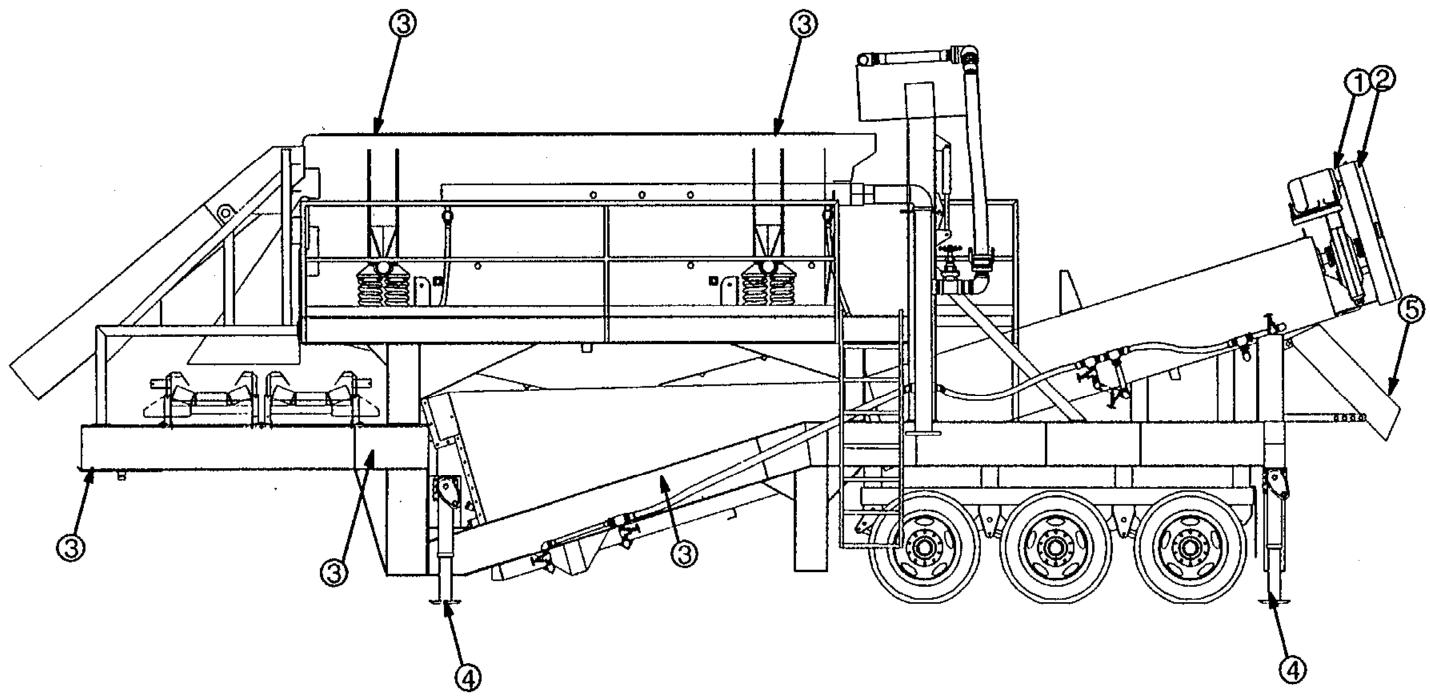


19-00039

SAFETY DECAL PLACEMENT

SUPERIOR INDUSTRIES

Ref.	Part No.	Placement	Qty.
1	19-00002	On back side of hopper above tail pulley guard	2
		Inside drive guard on back plate	4
2	19-00004	On top of tail pulley guard	2
		On side of drive guard cover	4
3	19-00001	On both sides of conveyor	12
4	19-00023	(1) on the outside of each support leg	6
5	19-00024	On front center of transport frame	1



SAFETY INSTRUCTIONS FOR OPERATION AND MAINTENANCE

These are general safety considerations—additional precautions may be necessary to operate your equipment in a safe manner. Be certain you are operating your equipment in accordance with all safety codes, OSHA rules and regulations, insurance requirements; and local, state and federal laws.

1. **Do not allow anyone to operate the wash plant until he or she has read the owner's manual and is completely familiar with all safety precautions.**

2. Do not allow the following people to operate or maintain the wash plant:
   - Children
   - Persons unfamiliar with the equipment, or unfamiliar with safe operating and maintenance procedures for the equipment.
   - Persons under the influence of alcohol, medications, or other drugs that can impair judgement or cause drowsiness.

3. Make sure everyone is clear of the wash plant before starting the unit during operation or maintenance. Never allow anyone to ride on the wash plant!

4. **Do not** wear loose hanging clothes, neckties, or jewelry. Long hair is to be placed under a cap or hat. These precautions will help prevent you from becoming caught in the moving parts of the wash plant.

5. **Do** wear safety glasses, ear protection, respirators, gloves, hard hats, safety shoes, and other protective clothing when required. Requirements for personal protective equipment will vary depending upon wash plant placement and material to be handled. It is the responsibility of wash plant operators to be certain they make use of all necessary personal protective equipment.

6. Buildup of materials on conveyor pulleys or idlers will lead to belt misalignment or damage. When removing such materials, the wash plant and conveyors must be stopped and power controls must be locked-out or tagged-out.

7. The wash plant should not be used to handle materials other than those which were specified as part of its design and manufacture. It is the operator's responsibility to be aware of the wash plant system capacities and operate the wash plant accordingly.

8. Make sure the operator's area is clear of any distracting objects. Keep work areas clean and free of grease and oil to avoid slipping or falling.

9. Periodically check all shields and structural members. Replace or repair anything that could cause a potential hazard.

10. When the conveyors are moving, the material travels at a speed sufficient to cause injury. Do not start conveyors until you are certain no one is exposed to the moving parts or to the material being discharged from the end of conveyors.

11. When doing maintenance work on structural parts or repairing any moving parts:
    - Disconnect and lock-out or tag-out all power sources. Know OSHA requirements.
    - When welding is required, disconnect all power sources and connect ground to point closest to welding area.
    - Block all wheels to prevent the wash plant from moving, and block any extended hydraulic cylinders to prevent them from moving or retracting.

12. If any safety devices are not functioning properly, do not use the wash plant. Remove it from service until it has been properly repaired.

13. Do not replace components or parts with other than factory-recommended service parts. To do so may decrease the effectiveness of the unit.

14. Do not lubricate parts while the wash plant is running.

15. Before starting engines within enclosed areas, be certain ventilation is sufficient to avoid buildup of exhaust fumes.

16. Relieve any and all pressure before opening, repairing, or removing any air pressure lines, hydraulic lines, valves, fittings, or seals. In the event of an hydraulic line rupture, **stay clear** of the area until pressure has been relieved. Clean up any spilled fluid before performing repairs in the area.

17. It is the operator's responsibility to be aware of equipment operation and work area hazards at all times.

18. Operators are responsible to know the location and function of all controls and indicators, including electrical power panels, hydraulic controls, motor controls, incline indicators, fuel and oil level indicators, etc.

19. Operators are responsible to know the location and function of all guards and shields including but not limited to drive guards, pulley guards, and nip guards; and are responsible to make certain that all guards are in place when operating the wash plant.

20. Operators are responsible to be aware of safety hazard areas and follow instructions on warning, caution, or danger decals applied to the wash plant. Safety hazard areas may include but are not limited to:
    - Pinch points at fold hinge areas
    - Pinch points at fold support areas
    - Pinch points where locking pins are used
    - Electrical control panels
    - Moving parts hazards on drives
    - Moving parts hazards where contact with conveyor belts and idlers is possible

21. Carefully read through and follow all safety instructions in the vibrating screen information contained in section 4 of this wash plant owner's manual.

2 - Basic Instructions

2.1 - Safety Instructions

All personnel involved with electrical installations, either handling, lifting, operation and maintenance, should be well-informed and up-to-dated concerning the safety standard and principles that govern the work and carefully follow them.
Before work commences, it is the responsibility of the person in charge to ascertain that these have been duly complied with and to alert his personnel of the inherent hazards of the job in hand.
It is recommended that these tasks be undertaken only by qualified personnel and they should be instructed to:
- avoid contact with energized circuits or rotating parts,
- avoid by-passing or rendering inoperative any safeguards or protective devices,
- avoid extended exposure in close proximity to machinery with high noise levels,
- use proper care and procedures in handling, lifting, installing, operating and maintaining the equipment, and
- follow consistently any instructions and product documentation supplied when they do such work.

Before initiating maintenance procedures, be sure that all power sources are disconnected from the motor and accessories to avoid electric shock.
Fire fighting equipment and notices concerning first aid should not be lacking at the job site; these should be visible and accessible at all times.

2.2 - Delivery

Prior to shipment, motors are factory-tested and balanced. They are packed in boxes or bolted to a wooden base.
Upon receipt, we recommend careful handling and a physical examination for damage which may have occured during transportation.
In the event of damage and in order to guaranty insurance coverage, both the nearest WEG sales office and the carrier should be notified without delay.

2.3 - Storage

Motors should be raised by their eyebolts and never by their shafts. It is important that high rating three-phase motors be raised by their eyebolts. Raising and lowering must be steady and joltless, otherwise bearings may be harmed.
When motors are not immediately installed, they should be stored in their normal upright position in a dry even temperature place, free of dust, gases and corrosive atmosphere.
Other objects should not be placed on or against them.
Motors stored over long periods are subject to loss of insulation resistance and oxidations of bearings.

Bearings and the lubricant deserve special attention during prolonged periods of storage. Depending on the length and conditions of storage it may be necessary to regrease or change rusted bearings. The weight of the rotor in an inactive motor tends to expel grease from between the bearing surfaces thereby removing the protective film that impedes metal-to-metal contact. As a preventive measure against the formation of corrosion by contact, motors should not be stored near machines which cause vibrations, and avery 3 month their shafts should be rotated manually.

Insulation resistance fluctuates widely with temperature and humidity variations and the cleanliness of components. When a motor is not immediately put into service it should be protected against moist, high temperatures and impurities, thus avoiding damage to insulation resistance.
If the motor has been in storage more than six month or has been subjected to adverse moisture conditions, it is best to check the insulation resistance of the stator winding with a megohmeter.
If the resistance is lower than ten megohms the windings should be dried in one of the two following ways:
1) Bake in oven at temperatures not exceeding 194 degree F until insulation resistance becomes constant.
2) With rotor locked, apply low voltage and gradually increase current through windings until temperature measured with thermometer reaches 194 degree F. Do not exceed this temperature.
If the motor is stored for an extensive period, the rotor must be periodically rotated.
Should the ambient conditions be very humid, a periodical inspection is recommended during storage. It is difficult to prescribe rules for the true insulation resistance value of a machine as the resistance vary according to the type, size and rated voltage and the state of the insulation material used, method of construction and the machine's insulation antecedents. A lot of experience is necessary in order to decide when a machine is ready or not to be put into service. Periodical records are useful in making this decision.

The following guidelines show the approximate values that can be expected of a clean and dry motor, at 40°C test voltage in applied during one minute.

Insulation resistance Rm is obtained by the formula:

$$\boxed{Rm = Vn + 1}$$

where: Rm - minimum recommended insulation resistance in M Ω with winding at 40°C
Vn - rated machine voltage in kV

In case that the test is carried out at a temperature other than 40°C, the value must be corrected to 40°C using a approximated curve of insulation resistance v.s temperature of the winding with the aid of Figure 2.1; it's possible verify that resistance practically doubles every 10°C that insulating temperature is lowered.

Example:

Ambient temperature = 50°C
Motor winding resistence at 50°C = 1,02 M Ω
Correction to 40°C

$$R_{40°C} = R_{50°C} \cdot K_{50°C}$$
$$R_{40°C} = 1{,}02 \cdot 1{,}3$$
$$R_{40°C} = 1{,}326\ M\Omega$$

The minimum resistence Rm will be:

$$Rm = Vn + 1$$
$$Rm = 0{,}440 + 1$$
$$Rm = 1{,}440\ M\Omega$$

SAFETY

INSTALLATION

The foundation must be solid, level, and must be adequate to support the load.

Assemble the equipment and connect to foundation according to instructions on Page 3 in the Parts Book.

When lifting equipment for installation, fasten adequate lifting slings to structural members only. While the equipment is raised in the air, be certain no one is underneath, or close enough to get hurt if the equipment should drop. Always make certain no electric wires are in the area that the lifting boom or equipment may contact.

OPERATION

Read instructions of the Parts Book thoroughly.

Wear required safety equipment as specified by U.S. Department of Labor, Occupational Safety and Health Administration, Washington, D.C. 20210; and the U.S. Department of Labor Mine Safety and Health Administration, 4015 Wilson Blvd., Arlington, Virginia 22203; and any other applicable governmental agencies.

Before attempting to start equipment, be certain all bolts are tight, all guards are in place, and all tools, scraps and trash are removed from the operating area. Be certain ladders, stairways, walkways, and handrails are in proper position and clear of any obstructions for safe movement of operating personnel.

Do not attempt to lubricate, adjust, or repair equipment while in operation. The equipment should be completely stopped and a lock out device should be installed on the power unit before personnel attempt any type of maintenance work.

Inspect the equipment daily for loose connections or defective parts, and replace parts that are worn or broken before operating the equipment.

After maintenance work has been completed, replace all guards before operating. Guards are installed for your protection. Do not reach around, over, through or crawl in under them while the equipment is running.

PROCEDURE FOR ASSEMBLY AND OPERATION

1. Read safety instructions.
2. All bolted connections must be complete and properly tightened. (See Page 9)
3. Head and tail pulleys must be in line and securely fastened in place. Troughing idlers must be mounted with the arrow pointing in the direction of material flow. For reversing conveyors, alternate the idler mounting direction.
4. Belt should be properly tensioned. (See Page 17)
5. Head and tail shafts must be square with the belt line.
6. Remove any tools, bolts, nuts, etc. that may have been left on the belt. Be certain to check return side also, as objects may travel over terminal pulleys and damage the belt. Remove any grease or oil which may be on the belt, as it will deteriorate the belt, unless the belt is of the "oil proof" variety.
7. Be certain all accessories are in place and properly adjusted, i.e.: guards, emergency pull cords and switches, zero speed switches, belt scrapers, rubber skirting, counterweights on gravity take-up units, flog gates, etc.
8. All reducers, chain cases, and hydraulic systems must be filled to proper fluid level.
9. Review electrical connections and fusing. Be certain motor line has minimum capacity of 125% of motor amperage stamped on name plate. Be certain the proper overload relays (3 pole) are installed to prevent damage to the motor if an overload occurs.
10. Jog motor to check for proper rotation. IMPORTANT - V-belts or drive connection must be removed before motor is tested if there is a backstop on the conveyor. Re-install V-belts or drive. Tension V-belts. (See Page 17).
11. Be certain the conveyor belt is not rubbing or scraping anywhere; then, run conveyor several complete revolutions while carefully observing the operation of all components.

Normal Operation

Under normal operation the bivi-TEC should have sufficient time to achieve full operating speed before material is fed to the screen. Conversely, during shutdown the feed should be stopped and sufficient time allowed for the bivi-TEC to clear of all material on the surface(s). If an automated sequential start/stop system is employed, check the timing through several start/stop cycles to assure the system meets the above requirements.

The most consistent screening results will be achieved by maintaining a uniform feed rate. If practical, a surge system should be employed ahead of the screen to smooth out fluctuations in the process. The bivi-TEC should then be fed at a uniform rate from the surge system.

4. Maintenance

Routine maintenance of the bivi-TEC is normally limited to lubrication of the bearings of the vibrator shaft and drive shaft, and visual inspection of the screen panels and the rubber springs.

See the detailed instructions for lubrication and inspection frequency.

5. Safety

The following practices are required for the safe operation of the bivi-TEC screen:

- All protective covers and guards must be in place and correctly mounted.
- Electrical cable must be properly protected and must not make contact with any vibrated surface of the screen.
- Maintenance and lubrication instructions must be followed carefully.

Franklin Environmental Services
Gravel Separation System

TAB 2

BIVI-TEC SYSTEM
SCREEN UNIT MANUAL

BIVI TEC

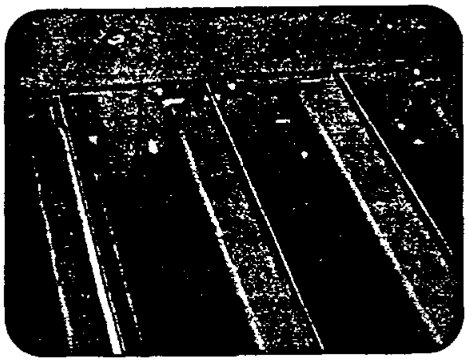
THE NON BLINDING SCREEN

AEI

bivi TEC = **bi**nder **vi**brations **TEC**nology

THE MODERN ART OF SCREENING

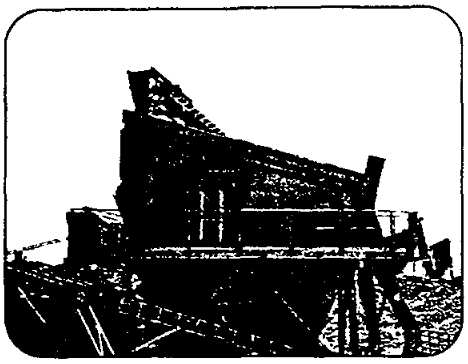
" The Screen That Starts Where the Others Fail "



The bivi-TEC principle :

A creative combination of proven elements in machine design.

Flexible screen mats are dynamically tensioned and relaxed by one drive unit. While the screen box is accelerated by 3.5 g., the bulk receives up to 50 g. So the bivi-TEC screen continues to perform where others fail due to feed material that blinds or pegs. With the bivi-TEC principle you can forget all these problems. The bivi-TEC paves the way for new applications in screening which have previously been considered impossible.



The drive unit :

Two types of drives are offered for the bivi-TEC range of screens. The selection being determined by size of screen required. Single deck machines up to 20 ft. and double deck up to 24 ft. are fitted with the KR type of drive which is activated by unbalanced flyweights on a shaft (circular motion screen). Larger screens are fitted with the LI type drive with two rotating unbalanced weights, synchronized by rigid gearboxes.

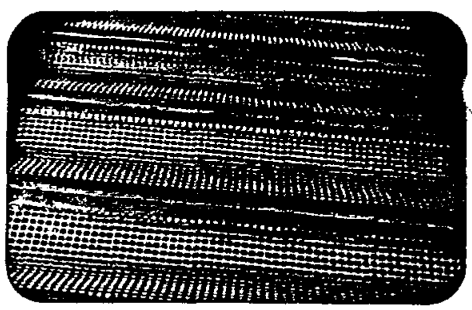
The vibration is adjusted in both types by the weight setting and the drive speed.

The floating frame :

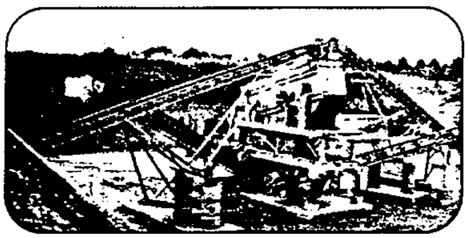
Steel members on the outside of the screen box are connected by cross members. Oscillation of the frame, which is similar to a ladder in construction, is caused by connection to rubber blocks at screen deck level which, in turn, are activated by the vibration of the screen box. The rubber blocks act as the spring elements for the oscillation system of the bivi-TEC screen. The screen operates very quietly and little vibration is transmitted to the support structure.

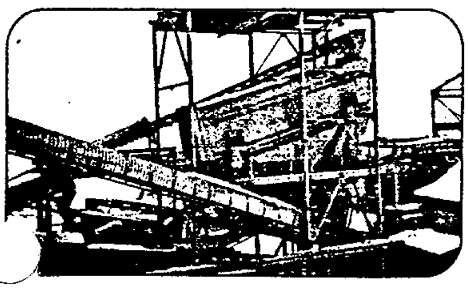
The screen mats :

The flexible screen mats cover the full width of the screen box and are attached to a fixed cross member and to a floating frame cross member. The relative movement of both oscillation systems, which operate with different amplitudes and the same frequency, produces dynamic tensioning, typical of bivi-TEC screens.



GOOD SYSTEMS ARE SIMPLE



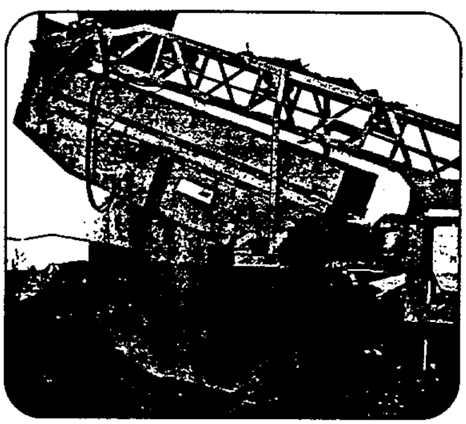


INSTALLATION AND OPERATION
OF bivi-TEC MACHINES IS SIMPLE :

To minimize excessive movement during start-up and rundown periods, the bivi-TEC screens use shock absorbing hollow rubber blocks for support of the screen box.

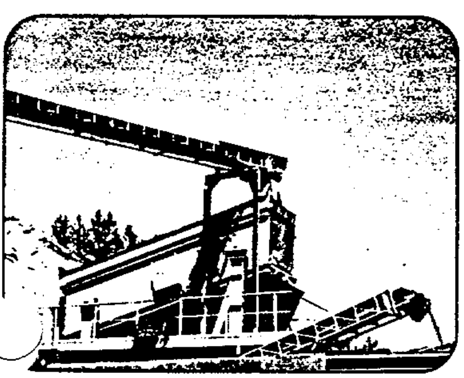
Only high quality polyurethane is used to provide the flexiblility and long wearing properties of the bivi-TEC screening mats. Replacing the mats without the use of bolts is carried out in minutes.

Capacities of the bivi-TEC screen are the same as conventional screens. Open panel area determines output.



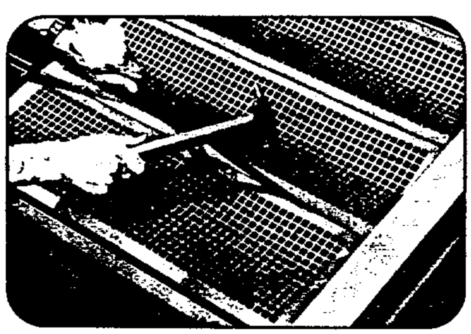
SCREEN APPLICATION AND TESTS :

The proper bivi-TEC application and sizing must take into consideration the type of material, feed gradations, product specifications and moisture content of the material. Aggregates Equipment Inc. has testing facilities to assure proper application.



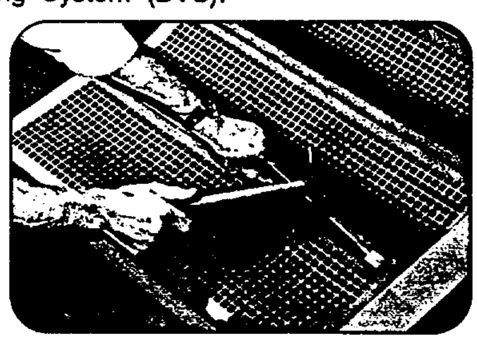
BINDER VARIO SCREENING (BVS) SYSTEM :

This well proven method of screening panel attachment without the use of bolts means that screen panels on the bivi-TEC can be changed quickly. This system is known as the Binder Vario Screening System (BVS).



Method of fixing screen mats

The screening elements are placed into the cross memebers and wedged by hammering in the fastener strip.



Removal of screen mats

By driving the fastener strip deeper into the cross members, the screening elements are released.

bivi ® TEC

GOOD SYSTEMS ARE SIMPLE

For additional information and a video of the bivi-TEC, contact :

AGGREGATES EQUIPMENT, INC. *
9 Horseshoe Road, P.O.Box 39
Leola, PA 17540-0039
Tel: 717/656-2131
Fax: 717/656-6686

* Licensee of BINDER & CO.

U.S. PATENTED

bivi-TEC®: FOR PROBLEMATIC SCREENING

In processing technology, it is becoming very important to classify raw materials, recyclable materials, and other products which create great problems for conventional screens like circular motion screens and linear motion screens, etc.

<u>Problematic Materials Responsible For This</u>:

a) Fibrous and Moist Materials:

e.g. Compost

Black Peat

Fibrous, matted materials entangle the screen mats.

Shredded Metal

Wood Chips

<u>Result</u>:

Screening can no longer take place in any of these cases because the screen surface is blocked.

b) High Moisture Materials:

e.g. Clayey Sand

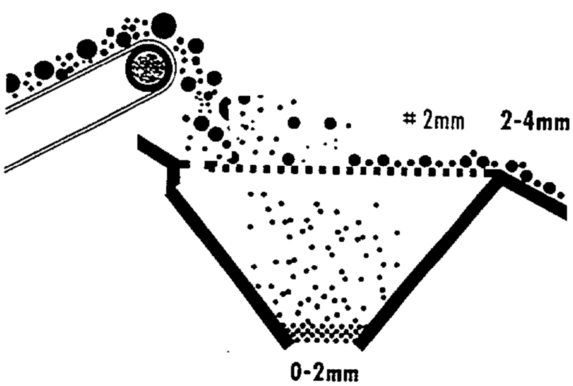
Raw Coal

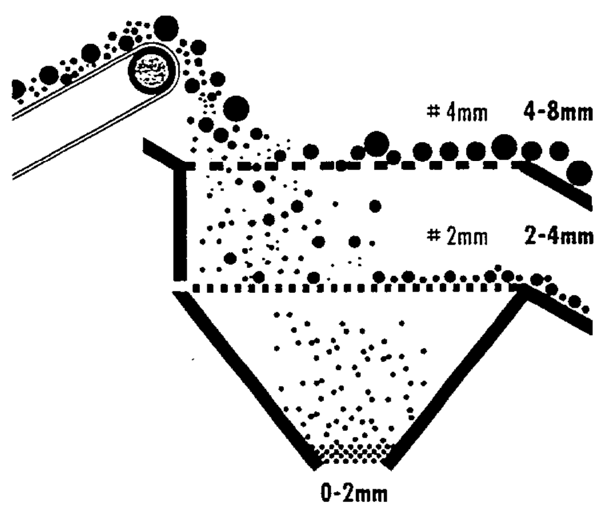
High-moisture material combined with mud, clay, or other impurities causes a build-up on the screen surface.

bivi-TEC®: BASIC SCREENING SOLUTION

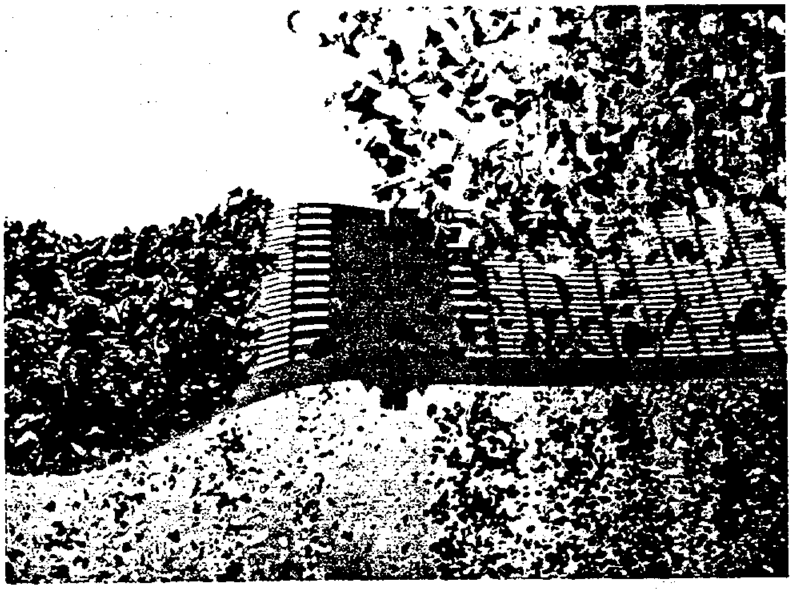
To ensure good screening, forces higher than normal must be transferred to the material to be screened. To fulfil this role in the best possible way, Binder & Co. of Austria has developed a solution which is as simple as it is efficient: bivi-TEC screens with a dual vibration principle from a single drive. The conventional circular vibratory screen was the basis for developing the bivi-TEC screens. Even today, this circular vibratory screen is the basic oscillating mechanism. The special feature of bivi-TEC screens, compared with others on the market, is the dual vibration principle.

With the aid of resonance, one drive provides two vibration movements. High forces are achieved by expanding and contracting the dynamic screen mats. To achieve greater service lives, high-value polyurethane screen mats are driven at an expansion adapted to the material to be screened.



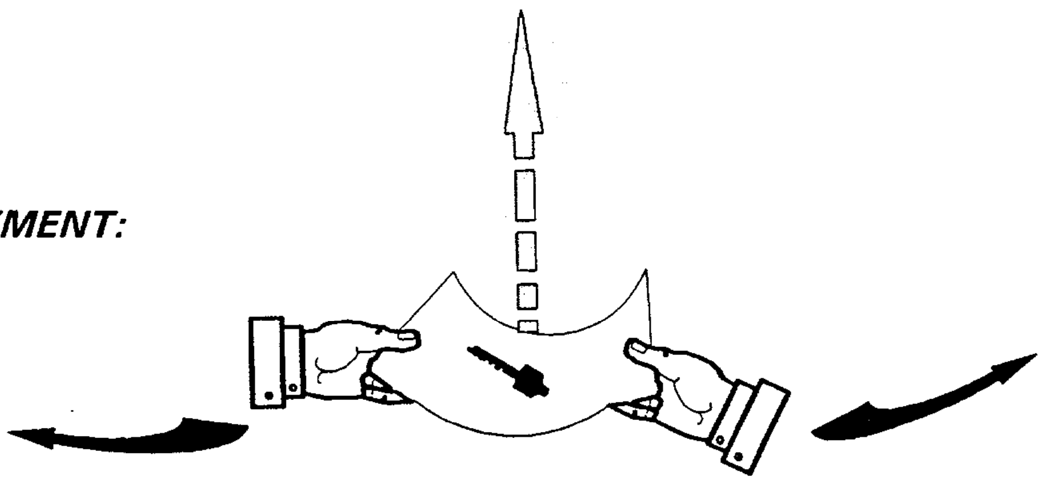


bivi-TEC®



Heavy-screenable Bulk Material with the best separation

MOVEMENT:

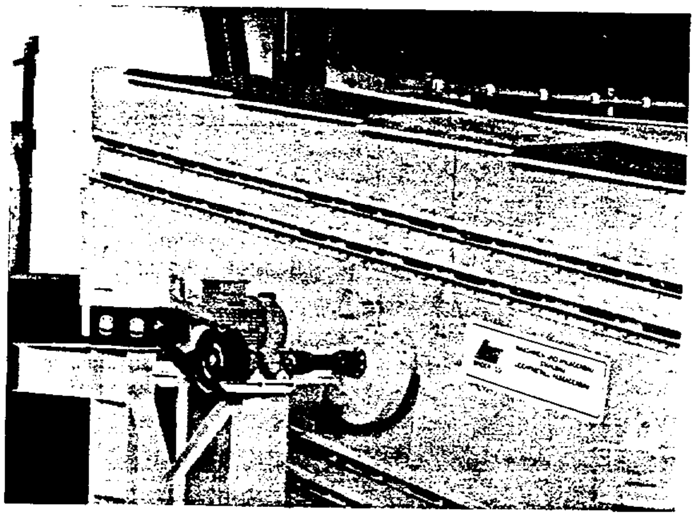


Take a sheet of paper with two hands, let the paper hang loosely between them and put an object on the paper. Then move your hands apart from each other. In relation to the speed of your motion, the object will eventually hit the ceiling of the room.

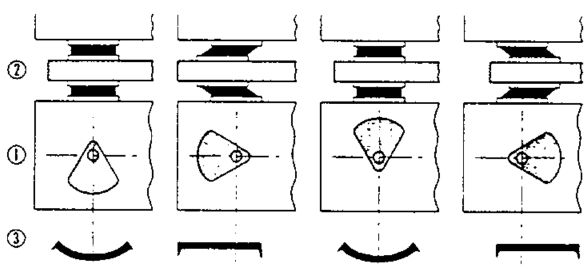
AGGREGATES EQUIPMENT, INC.
PHONE: 717/ 656-2131
FAX: 717/ 656-6686

bivi-TEC®: PRINCIPLE OF OPERATION

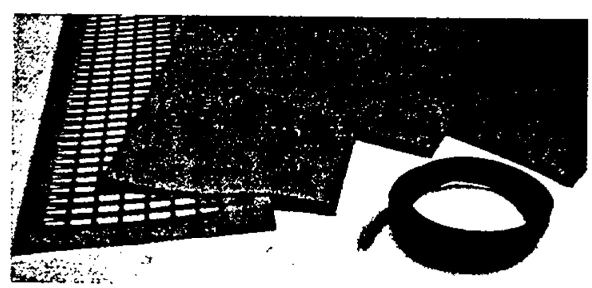
The bivi-TEC screen provides a functional solution that is simple, ingenious, and guarantees non-blinding screen surfaces with the best screening performance. Two weights vibrating at the same frequency move relative to each other and tension the screen mats. The linear momentum of both vibrating weights is adjustable and allows optimum operation of the machine. All necessary parameters can be adjusted according to the material to be screened before each operation.



Floating Deck
Drive Arrangement



① Vibrating weight 1 circular amplitudes adjustable 2a = 4-7 mm
② Vibrating weight 2 ellipse 2a = 12-18 mm
③ Screen mat expansion or contraction



bivi-TEC Screen
Mat System

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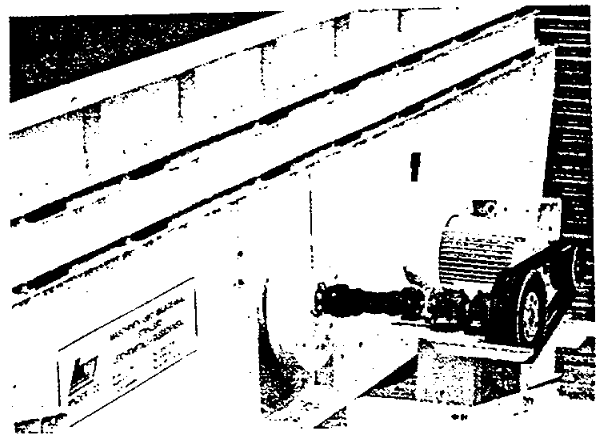
bivi-TEC®: COMPONENTS

The Drive

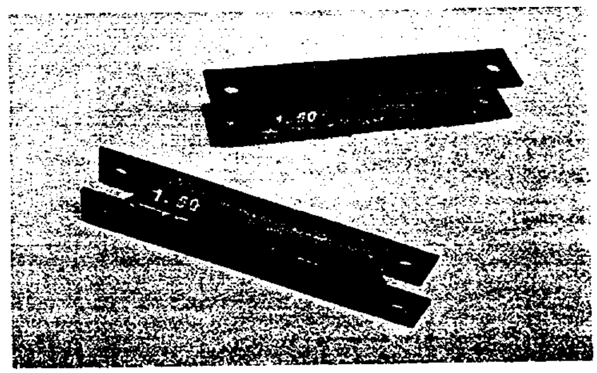
The drive unit is an TEFC motor, a V-belt drive, a cardan shaft and a shaft with unbalanced weights. Only low power input is necessary for the fundamental oscillation.



The Rubber Blocks

The dual vibration principle used by bivi-TEC screens results from a fundamental oscillation and an overlaid vibration. A circular or linear movement provides the fundamental oscillation, which is introduced by a circular or linear vibratory screen.

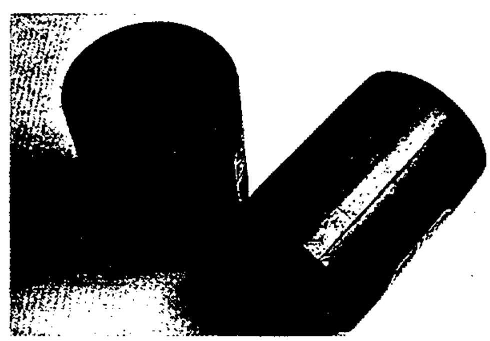
The overlaid vibration is introduced by the fundamental oscillation and performs an elliptical movement.



The Springs

The screen is mounted on hollow rubber springs which have the following advantages:

* Reduce dynamic forces,
* Operate with low noise,
* Have peak inflow and outflow properties, and
* Have long service lives.



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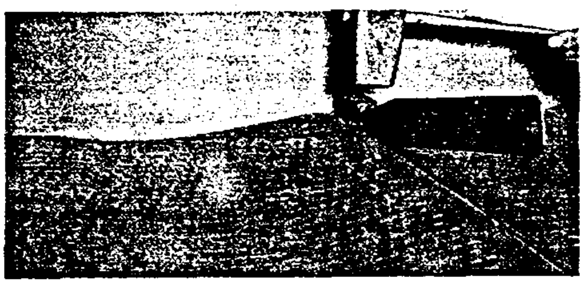
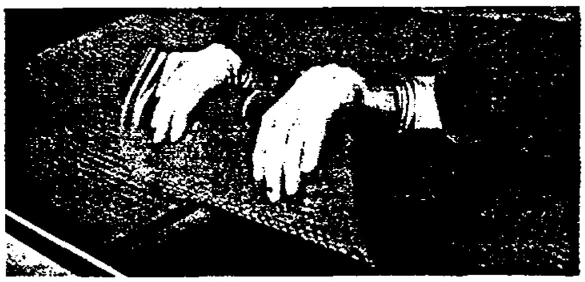
bivi-TEC®: MATS

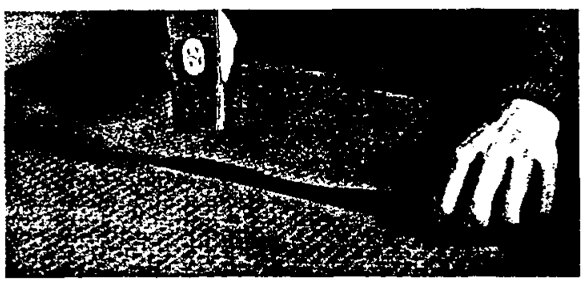
bivi-TEC screens are designed for screen cuts of 1-50 mm. The boltless attachment of screen mats guarantees gentle screening, rapid changes of the screen mats, and prevents caking. Approximately 1 working hour is needed to change 10 m^2 of screen surface.



DISMANTLING

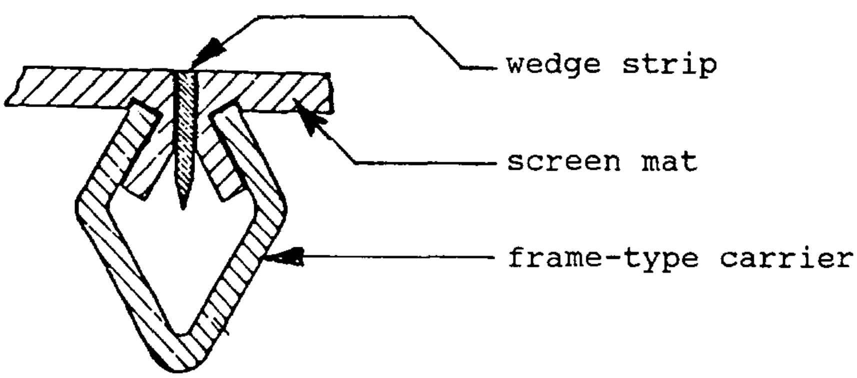
The screen elements can be removed from the carrier by driving down the clamping wedge.





INSTALLATION

The screen elements will be placed in the supporting structure and keyed into place by driving in the clamping wedge.



bivi-TEC®: TYPES AND SIZES / DESIGNATION

1. bivi-TEC KRL-ED 800 x 3 ... KRL-ED 2400 x 7:

   Standard machines single deck (ED) based on circular motion screen box (KRL)

2. bivi-TEC KRL-DD 800 x 3 ... KRL-DD 2400 x 7:

   Standard machines double deck (DD), both decks are real bivi-TEC with the typical floating frame.

3. bivi-TEC KR-ED ... and KR-DD ... series:

   These are in principle the same machines, but KR machines have the standard spacing of 246 mm of cross members, and the KRL types have a spacing of 328 mm. This gives 4 mats per meter length on KR machines and 3 mats per meter on KRL machines. These machines are used for very heavy loading.

4. Protection Deck, Mixed Versions:

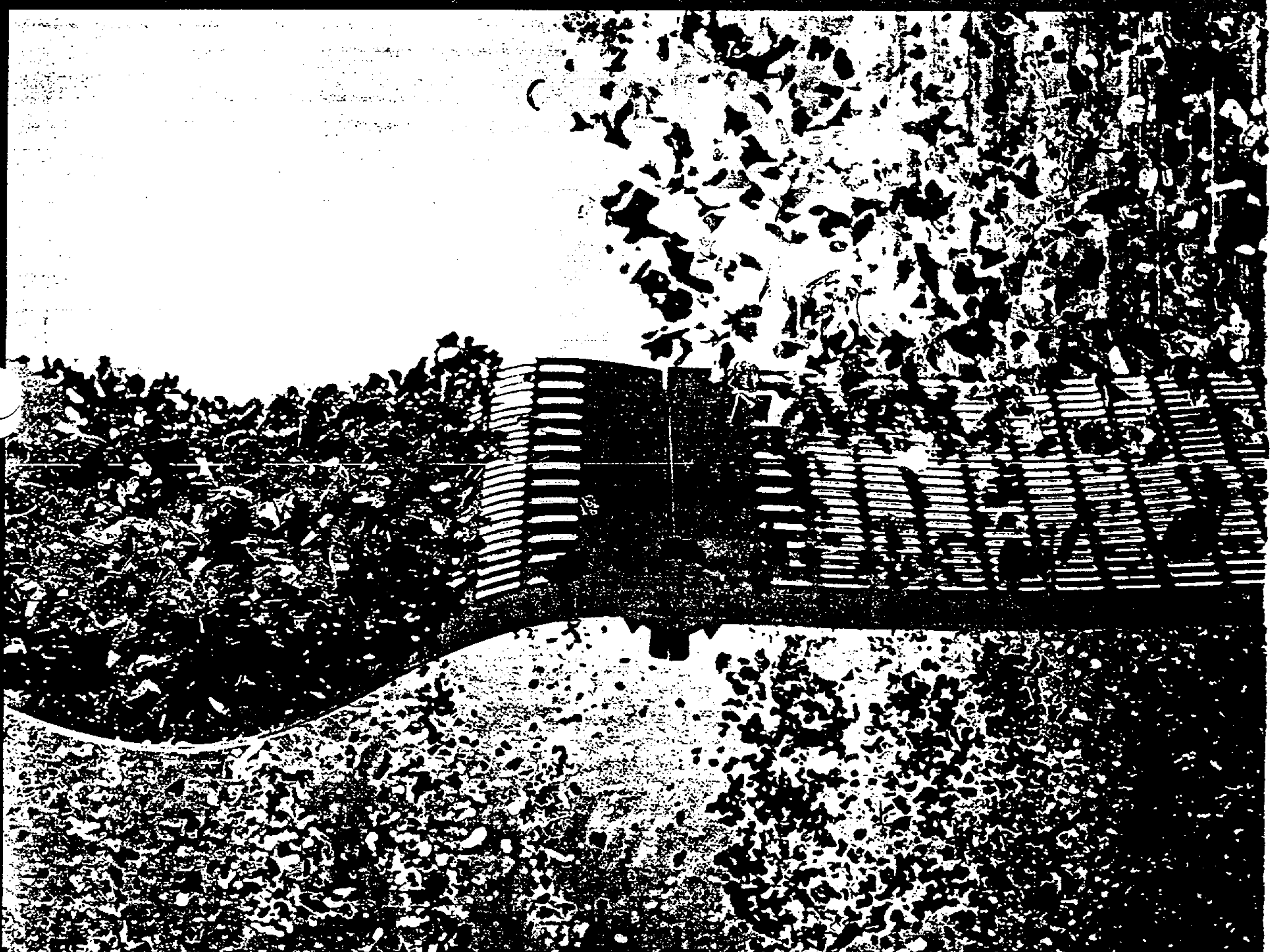
   Sometimes the operators want to make one separation only but big lumps have to be withheld from the flexible bivi-TEC elements. There are two ways:

   a). Make a real double-decker and fix the upper deck by steel blocks instead of rubber blocks and rigid polyurethane elements are available to fit the 246 mm spacing and create a step flanged deck. This is the expensive way with the advantage that the upper deck can be made to a bivi-TEC later if needed. Type designation is like for double deck versions.

   b). Make a rigid upper deck with inserted standard frames like in conventional screens but with typical bivi-TEC floating frame on the lower deck only. We call this the "mixed version". Type designation is like single decker bivi-TEC but with an S extension after the figure for length (e.g. KRL-ED 1300 x 4 S).

The bivi-TEC® Screen

Effective screening for the most difficult materials



AEI

The Task

There is a growing need to classify waste materials, raw materials, semi-finished products, and finished products more effectively.

Conventional vibrating screens and trommel screens are very limited when screening materials that cause a build-up on the screen, which results in clogging or blinding of the screen openings. The bivi-TEC was developed to screen even the most demanding materials.

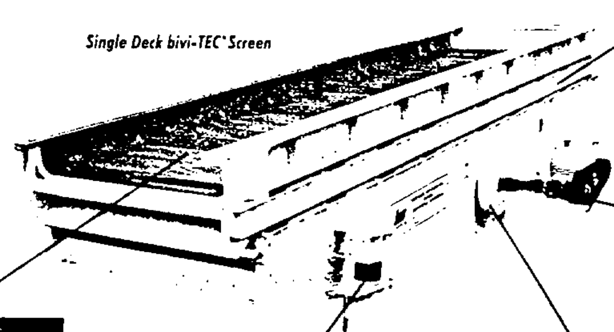
The bivi-TEC proves to be the best machine for screening:

- High-moisture materials combined with silt, mud, and clay.
- Incinerator ash, trash, waste coal, clayey sand, and slag.
- Compost, leafy materials, wood waste, and peat moss.
- Auto shredder fluff, shredded tires, and roofing shingles.

The bivi-TEC® Solution

Dual vibration from a single drive is the unique feature of the bivi-TEC Screen. Two weights, vibrating at the same frequency, move relative to each other which tensions and relaxes the screen mats. The linear momentum of both vibrating movements is adjustable, resulting in open screen surfaces and optimal screening performance.

Single Deck bivi-TEC® Screen



Floating Frame

Frame floats within screen box. Rubber blocks connect floating frame to the screen body.

Drive

TEFC motor, V-belt drive, cardan shaft with two bearings and straight shaft.

Deck and Screen Options

Select either single or double decks and a wide range of screen mats to meet your specific needs.

Rubber Springs

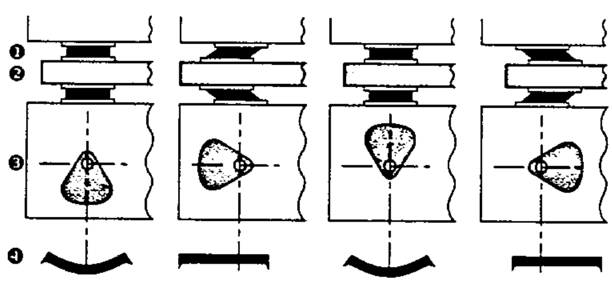
Hollow rubber springs reduce dynamic forces and allows the screen to operate quietly.

Unbalanced Counter Weights

The bivi-TEC® Operating Principle

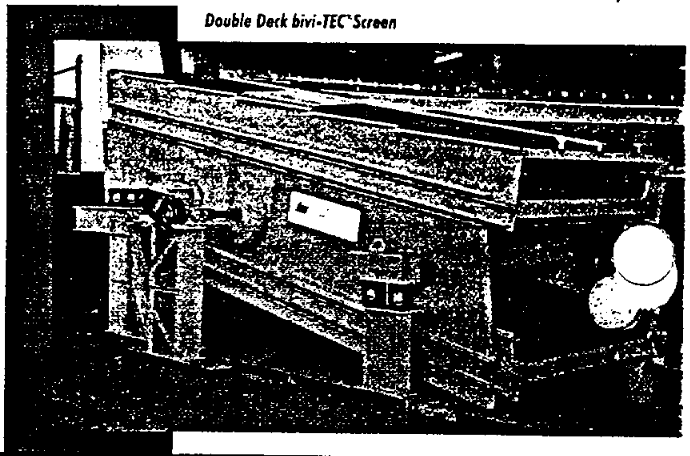
To assure the most effective screening, high-acceleration forces must be transferred to the feed material. The bivi-TEC Screen achieves these high forces by dynamically tensioning and relaxing the flexible screen mats using a dual-vibration principle. Enhanced by resonance, one drive can produce two vibration movements. The screen box is accelerated approximately 2g's while the screen mats can receive up to 50g's.

Applications, once judged impossible, can now be accomplished with the bivi-TEC Screen.



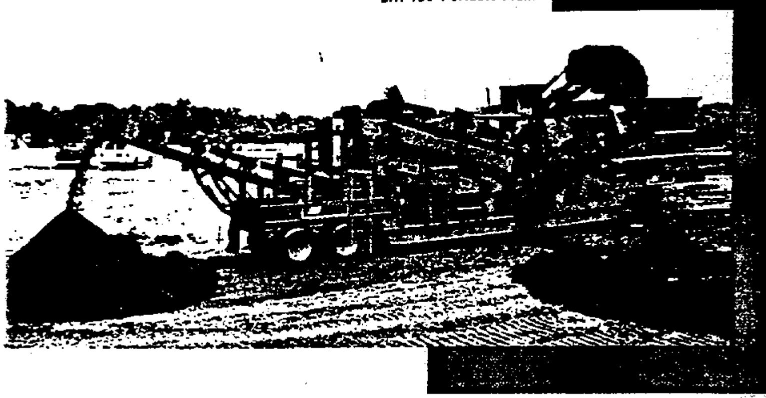
1 Rubber block
2 Floating deck
3 Vibrating weight
4 Screen mat

Double Deck bivi-TEC® Screen



The bivi-TEC® Advantages

bivi-TEC® Portable Plant



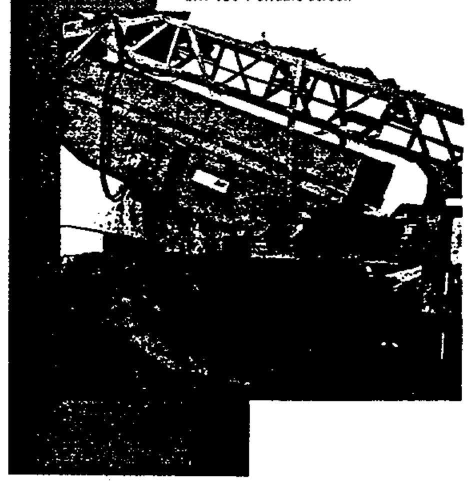
- Fine screening of very moist material.
- Disagglomerates clogging material.
- Large effective screen area—high capacity.
- Effective in all weather conditions.
- Flexible—can be adjusted for varying material requirements.
- High-wear-resistant polyurethane screen mats.
- Rugged construction—long life.
- Less horsepower.
- Low profile.

Testing and Demonstration

To properly size the bivi-TEC for each individual application, the following factors must be considered: material type, feed gradation, product specifications, moisture content, and required capacity.

AEI has bivi-TEC machines for testing of your materials.

bivi-TEC® Portable Screen



Screen Mats

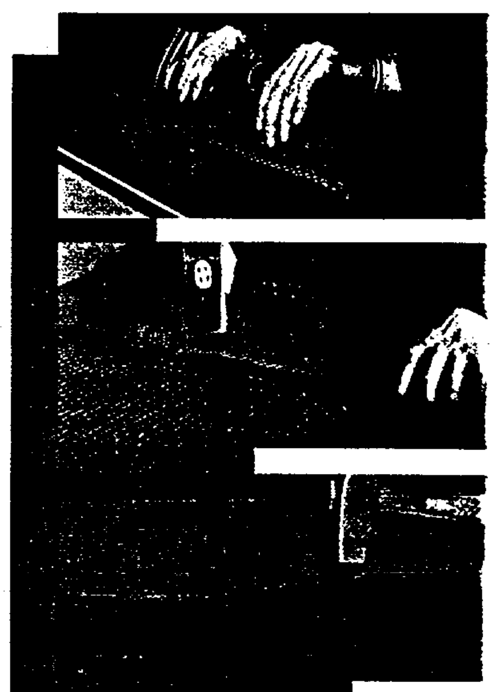
The bivi-TEC Screens are designed for screen cuts of 1-50 mm. The boltless attachment of polyurethane mats guarantees effective screening, rapid changing of screen mat, and elimination of clogging. The 13" wide mats offer greater flexibility in tuning the screen to achieve the final product—resulting in a lower replacement cost. Approximately one hour is needed to change 10m² of screen surface.

INSTALLATION

The screen mats are placed into the cross members and locked into place by driving in the rubber wedge strip.

DISMANTLING

The screen mats are released by driving down a corner of the wedge strip, followed by an easy pull on the mat.



Sized To Fit Your Needs

The bivi-TEC is available in sizes ranging from 800mm X 3M (3′ x 10′) to 2400 mm X 7M (8′ x 24′).
The following options are also available:

- single deck
- double deck
- rigid scalping deck
- portable/stationary units

Each bivi-TEC screen is built to fit the customer's specifications. AEI can also engineer and manufacture a complete material processing system including: conveyors, stackers, supports, chutes, etc.

For additional information and a video of the bivi-TEC, contact:

AEI

AGGREGATES EQUIPMENT, INC.*
9 Horseshoe Road, P.O. Box 39
Leola, PA 17540-0039
Tel: 717-656-2131
Fax: 717-656-6686

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U.S. Patented

CONVERSION SHEET

METRIC TO U.S. MEASUREMENTS

Metric Measurement	U.S. Measurement
25.4 millimeters	1"
1 meter = 1000 millimeters	
1 meter	39.4"
1 meter	3.3′
1 cubic meter	35.3 cu.ft.
1 cubic meter	1.3 cu.yd.
.9 metric ton (1 metric ton = 1000 kg)	1 short ton
2.2 kg	1 lb.

bivi-TEC®: SIZING OF SCREEN AREA

APPLICATION DATA

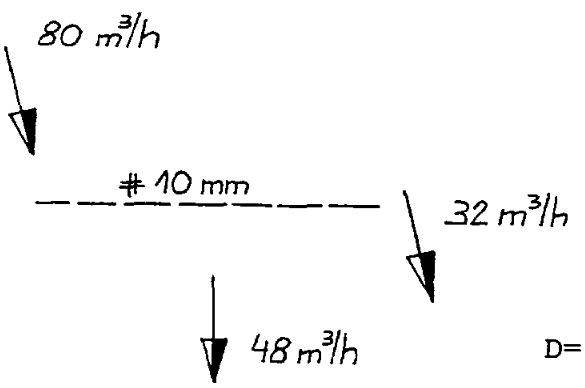
- Kind of material:
- Feeding capacity: TPH, m^3/h
- Bulk Density: to/m^3
- Moisture of the material: weight %
- Temperature: F°
- Shape of grain: ex. crushed, non-crushed...
- Grain distribution of feed: in %
- Desired grain fraction:

SOME PARAMETERS WHICH INFLUENCE THE SCREEN AREA:

N = regular screening capacity in relation to the task size the bigger the mesh size the higher the regular screening capacity.
F_o = free screening area, this is determined by the wire diameter of the screen.
U = oversize grain in % of feed.
K = small grain size, smaller than half the mesh size
S = screen-deck factor depending on the number of screen decks.
M = material-factor depending on crushed or non-crushed material.
H = moisture-factor

A screening calculation application: for example

Material:	Crushed Gravel
Bulk Density:	1.5 t/m^3
Capacity:	120 t/h, 80 m^3/h
Grain Size:	0-5 = 30%
	5-10 = 30%
	10 = 40%



N10# = 16.9 m^3/m^2h}
U = 32 m^3 of 80 m^3 = 40% = 0.95}
K = (0-5) = 24 m^3 of 48 m^3 = 50% = 1.2}
F_o = wire cloths = 0.56}
M = crushed material = 0.8}
S = 1.screen = 1}
{(figures of schedule)
H (= moisture factor) 0.6-0.95}

D= N.U.K.F_o.M.S. = 16.9.0.95.1,2.0,56.0,8.1=
= 8.6 m^3/m^2h
Screen Area: 48:8.6 = 5.6 m^2
Screen: 1.3 m x 5 m

AEI

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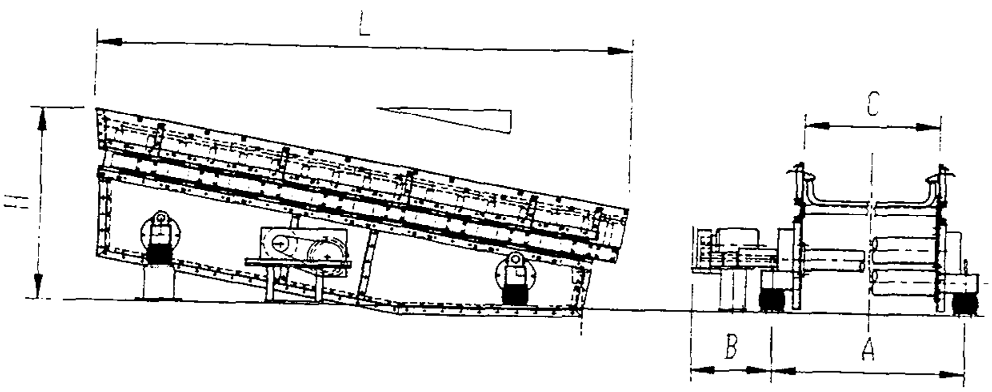
cut point separation size (mm)	capacity		oversize in feed	fines smaller then 0.5 x cut point	bed depth	conveying capacity separation size (mm)		
	N	%	Z	K	mm	+40	10–40	-10
2	6.2	14	1.02	0.60	2	2.8	1.6	2.4
3	8.0	16	1.02	0.63	4	5.6	3.2	4.8
4	9.6	18	1.01	0.67	6	8.4	4.8	7.2
5	11.1	20	1.01	0.70	8	11.2	6.4	9.6
6	12.3	22.5	1.01	0.73	10	14.0	8.0	12.0
7	13.1	25	1.00	0.76	12	16.8	9.6	14.4
8	14.8	27.5	0.99	0.80	14	19.6	11.2	16.8
9	16.2	30	0.98	0.84	16	22.4	12.8	19.2
10	16.9	32.5	0.97	0.88	18	25.2	14.4	21.6
12	19.2	35	0.96	0.92	20	28.0	16.0	24.0
14	21.5	37.5	0.96	0.96	22	30.8	17.6	26.0
16	23.1	40	0.95	1.00	24	33.6	19.2	28.8
18	24.9	45	0.93	1.1	26	36.4	20.8	31.2
20	26.9	50	0.91	1.2	28	39.2	22.4	33.6
25	30.8	55	0.88	1.3	30	42.0	24.0	36.0
30	34.5	60	0.86	1.4	32	44.8	25.6	38.4
35	38.5	65	0.82	1.55	34	47.6	27.2	40.8
40	41.5	70	0.78	1.7	36	50.4	28.8	43.2
45	44.6	75	0.74	1.9	38	53.2	30.4	45.6
50	47.6	80	0.70	2.2	40	56.0	32.0	48.0
55	50.8	85	0.60	2.6	42	58.8	33.6	50.4
60	53.9	90	0.50	3	44	61.6	35.2	52.8

Constant F_0		open area % : 100		
Open size (mm)		0–10	10–40	40
Mesh Screen	standard wires	0.60	0.65	0.70
	heavy duty wires	0.56	0.60	0.65
Grid screens		0.58	0.62	0.66
Perforated plate			0.52	

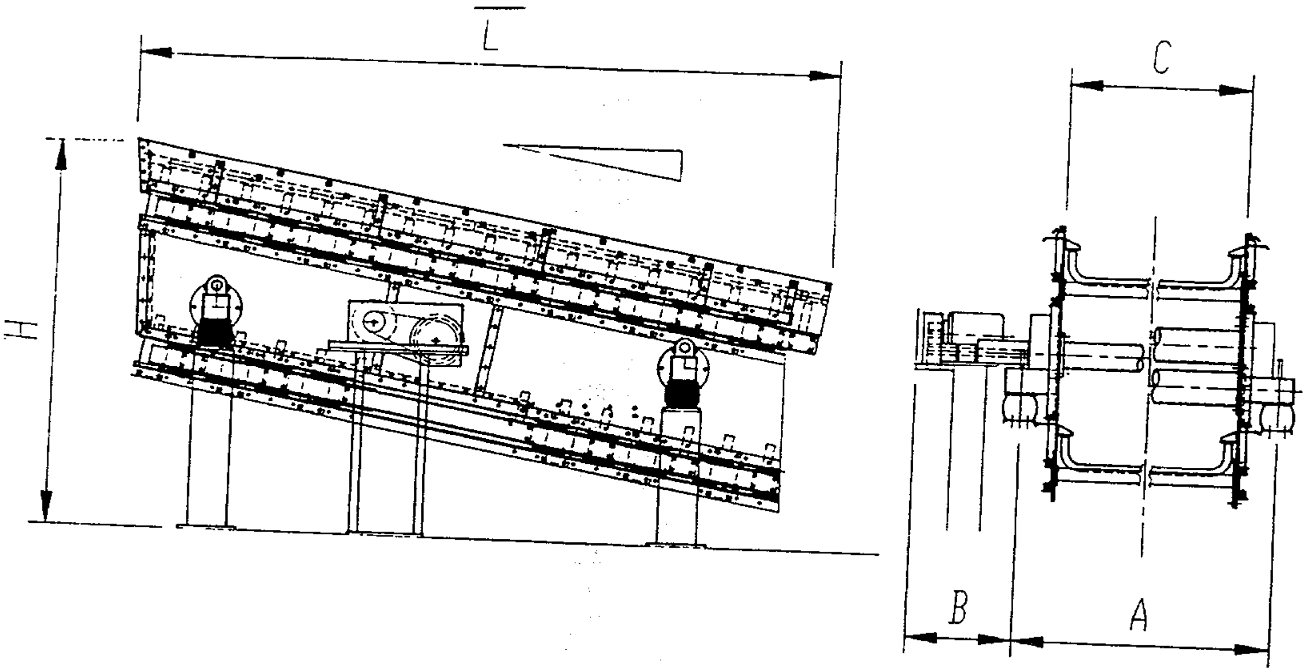
Constant M	0.95	1.05	0.8	0.75	0.80	0.75
Feed material	coal	sand, gravel	crushed product	coke	iron ore	salt

Constant S	1	0.9
Deck	upper deck	lower deck



SINGLE-DECK bivi-TEC

TYPE	A	B	C	H 10°	L 10°	H 12°	L 12°	H 15°	L 15°
	WIDTH			ANGLE OF INCLINATION					
800 x 3	52	16	31	62	140	68	140	80	140
800 x 4	52	17	31	68	179	74	178	80	178
1000 x 4	63	17	40	68	179	74	178	80	178
1000 x 5	63	17	40	56	217	84	218	91	216
1300 x 4	79	15	52	68	178	73	178	80	178
1300 x 5	79	19	52	56	217	82	218	91	216
1600 x 4	91	15	64	69	178	52	178	81	178
1600 x 5	91	19	64	56	217	82	218	91	216
1600 x 6	91	33	64	86	256	94	255	104	254
1900 x 5	103	33	75	80	217	86	218	95	215
1900 x 6	103	33	75	86	256	94	255	93	254
2200 x 5	114	33	87	80	217	86	218	95	215
2200 x 6	114	33	87	86	256	94	255	95	254
2200 x 7	114	33	87	110	292	120	294	131	290
2400 x 5	122	33	95	80	217	86	218	95	216
2400 x 6	122	33	95	86	256	94	255	104	254
2400 x 7	122	33	95	112	294	122	295	137	291



DOUBLE-DECK bivi-TEC®

TYPE	WIDTH			ANGLE OF INCLINATION					
	A	B	C	H 10°	L 10°	H 12°	L 12°	H 15°	L 15°
1000 x 4	67	33	40	107	179	114	177	122	177
1000 x 5	67	33	40	211	220	120	218	132	215
1300 x 4	79	33	52	107	179	114	177	122	178
1300 x 5	79	33	52	211	220	120	218	132	216
1600 x 5	91	33	64	211	220	120	218	132	216
1600 x 6	91	33	64	246	257	138	255	146	254
1900 x 6	103	37	75	246	257	147	255	135	254
1900 x 7	103	37	75	246	295	154	294	170	292
2200 x 6	114	41	87	246	257	147	255	155	254
2200 x 7	114	41	87	144	295	154	294	171	292
2400 x 6	122	39	95	247	257	144	255	160	254
2400 x 7	122	41	95	144	295	154	294	171	292

AEI

AGGREGATES EQUIPMENT, INC.

PHONE: 717/ 656-2131

FAX: 717/ 656-6686

SPECIFICATIONS FOR bivi-TEC® SCREENS

The screen body shall be driven by freely rotating eccentric weights mounted on a through shaft supported by two spherical roller bearings. Bearing seals shall be external triple labyrinth type. The through shaft shall be protected by a tubular enclosure.

A secondary ladder type frame shall be mounted on rubber isolators to the main screen body. The secondary frame shall support and incorporate alternate screen crossmembers with provisions for screen surface attachments. The alternate screen crossmember not attached to the secondary frame shall be attached to the main screen body and shall also provide for screen surface attachments.

The screen surface shall be constructed of highly flexible, high tensile strength polymer or rubber material. Screen surface attachment shall be by means of flanged panels with one flange of each adjacent panel extending into a slotted crossmember with a hard rubber wedge strip driven between the panel flanges to provide clamping force. When installed on the screen, the screen panels shall present a smooth top surface with no projections into the material stream.

The screen assembly shall be driven by a jack shaft provided with two U-joints and mounted by means of pillow block type spherical roller bearings. A V-belt drive and Cardan shaft shall connect the drive motor and the jack shaft.

A structural steel support wedge, including jack shaft support and adjustable motor mount, shall be included.

The screen body shall be supported from the wedge by means of cylindrical rubber springs.

The screen shall be supplied complete with a rubber fabric cover and a quick release/attachment system.

The screen shall be completely assembled and test run prior to shipment.

The screen shall be an AEI/bivi-TEC screen as manufactured by Aggregates Equipment, Inc. of Leola, PA (717)656-2131 under license by Binder & Co. AG of Austria.

QUESTIONNAIRE FOR bivi-TEC®

Name:____

Address:____

1. Feed Rate ______________ TPH Surging______________ TPH

2. Feed Size Gradation:

Size	Weight	Density	% Moisture

3. Typical Properties of Feed Material [Strike Out False Statements]

   Bone Dry - Dry - Modest Moisture - Sticky - Clogging - Wet - Dripping Wet - Slurry - Slime - Tendency to Build Up - Clayey - Other (Specify)________________________________

4. Total Moisture Content ________ % ________ % on Surface Only

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5. Material Description: (e.g. limestone, basaltic rock, lignites, sugar, grains, gravel, etc.) ______________________________

6. Types of Material: a) Crushed
   b) Natural Shaped
   c) Mixture of a and b

7. Special Properties of Feed Material: (e.g. temperature, chemically active, tendency to decompose, etc.) ______________________________
____

8. How is Material Fed to Screen? (e.g. belt conveyor, elevator, chute, etc.) ______________________________
____

9. Total Bulk Density ______________ Raw Density ______________

10. Special Requirements Desired/Necessary? (e.g. dust proof, explosion proof, etc.) ______________________________
____

11. Energy Supply: Voltage ______ Phases ______ Frequency ______

12. Product Size Gradations:

a) Size	b) Special Quality Requirements
______________	______________
______________	______________
______________	______________
______________	______________
______________	______________

13. % Oversize Allowed in Underflow ______________

% Undersize Allowed in Overflow ______________

Additional Remarks (Drawings of Site, Importance Restrictions, etc.)

____
____
____

Return Completed Questionnaire to Aggregates Equipment, Inc.

AEI

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Klassierung von siebschwierigen Gütern durch dynamische Sieberregung

Grading of "difficult to screen" bulks by dynamic screen excitation

Classement de matières difficiles grâce à l'excitation dynamique du crible

Clasificación de materiales difíciles por excitación dinámica de la criba

Dipl.-Ing. R. Reder, Gleisdorf

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BINDER+CO

Klassierung von siebschwierigen Gütern durch dynamische Sieberregung

Grading of "difficult to screen" bulks by dynamic screen excitation

Zusammenfassung

Es wird über eine neuartige Siebmaschine berichtet, bei der die Siebung durch Spannen und Strecken der Siebmatten erfolgt. Kennzeichnendes Merkmal sind zwei überlagerte Schwingungsformen und ein Antriebssystem, das die Anpassung der Schwingzahl und Schwingweite im Betrieb ermöglicht. Das in äußerst flach geneigter Lage arbeitende Sieb hat ein neues Mattenbefestigungssystem. Abschließend werden Betriebsergebnisse mitgeteilt.

Résumé

L'auteur nous informe au sujet d'un nouveau type de crible, dans lequel le criblage s'effectue moyennant la tension et la distension des toiles. Le crible est caractérisé par deux formes d'oscillations superposées et par un système de commande permettant d'adapter le nombre et l'amplitude d'oscillations au cours du service. Le crible, qui travaille dans une position très peu inclinée, dispose d'un nouveau système de fixation des toiles. Finalement, l'auteur nous informe des résultats obtenus au cours du service.

Resumen

Se informa sobre un nuevo tipo de máquina cribadora, en la cual el cribado se lleva a cabo por la tensión y distensión de las telas. La criba está caracterizada por dos formas de oscilaciones sobrepuestas y un sistema de accionamiento que permite adaptar el número y la amplitud de oscilaciones durante el servicio. La criba, que trabaja en una posición muy poco inclinada, dispone de un nuevo sistema de fijación de las telas. Finalmente, se informa sobre los resultados obtenidos durante el servicio.

1. Einleitung

Um die Jahrhundertwende kamen Ideen auf, Siebvorrichtungen zu bauen, bei denen die Siebmatten so verformt wurden, daß die Sieböffnungen von Klemmkorn freigehalten wurden. Diese Entwicklungen erlangten jedoch keine praktische Bedeutung, was sowohl an maschinentechnischen Problemen als auch an den Werkstoffen gelegen sein mochte. Für die Siebmatten, die einer ständigen Verformung ausgesetzt sind, standen lange keine geeigneten Werkstoffe zur Verfügung.

Die Patentliteratur gibt einen interessanten Überblick über die Wege, die auf diesem Gebiet beschritten wurden.

Summary

A new type of screening machine is presented in which screening occurs by tensing and stretching of the screen web. The characteristic features are two superimposed types of oscillations and a drive system which permits adaptation of oscillation number and vibration amplitude in operation. The screen, operating in an extremely shallow inclined position, has a new web attachment system. Finally, operation results are reported on.

1. Introduction

Around the turn of the century ideas arose for building screening apparatus in which the screen webs can be so deformed that the screen openings are kept free of clogs.

However, these developments attained no practical significance due to the machine technical problems as well as to the materials. For a long time no suitable materials were available for the screen webs which are subjected to constant deformation.

The patent literature gives an interesting survey of the paths taken in this field.

A break-through was achieved by the deformable screens known as tension wave screens (Spannwellensiebe) in the familiar design. With it, a technically high standard was attained which has proved itself in industrial operation in the past years.

The dynamically excited deformable screen presents a new development.

Beginning with the fact that high accelerations and good screening efficiency is achieved by alternately compressing and stretching a screen web, a system was developed which simply and appropriately evokes screen deformation*). In addition, considerable technical advantages arise.

2. Vibration system

The vibration system is explained using a simplified graphic illustration.

The excitor shown in Fig. 1 carries out a circular oscillation produced by a rotating unbalance.

The excitor amplitude is denoted by a and the angular frequency by Ω.

*) The development was supported by the "Forschungsförderungsfond für die Gewerbliche Wirtschaft".

Einen Durchbruch erzielten die verformenden Siebe als Spannwellensiebe in der bekannten Bauart. Damit wurde ein technisch hoher Stand erreicht, der sich in den letzten Jahren im industriellen Einsatz bewährt hat.

Eine Neuentwicklung stellt das dynamisch erregte verformende Sieb dar. Ausgehend von der Tatsache, daß beim abwechselnden Stauchen und Strecken einer Siebmatte hohe Beschleunigungen und gute Siebleistungen erzielbar sind, wurde ein System entwickelt, das die Siebverformung einfach und zweckmäßig hervorruft*). Zusätzlich treten erhebliche technische Vorteile auf.

2. Schwingsystem

Das Schwingsystem soll an Hand eines Ersatzschaubildes erklärt werden.

Der in Bild 1 gezeigte Erreger führt eine Kreisschwingung aus, die durch eine rotierende Unwucht erzeugt wird. Die Erregeramplitude ist mit a und die Kreisfrequenz mit Ω vorgegeben. An den Erreger ist über eine Feder c und ein Dämpfungsglied b die Masse m angekoppelt, die durch den Erreger in Schwingung versetzt wird.

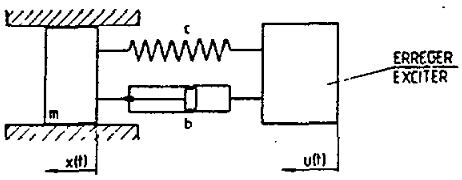

Bild 1: Ersatzschaubild
Fig. 1: Simplified graphic illustration

Es handelt sich um eine erzwungene Schwingung mit harmonischer Erregung, und zwar in der Form einer Stützenerregung.

Die Erregerfunktion ergibt sich wie folgt:

$$u(t) = a \cdot \sin \Omega t \qquad [1]$$

$$\begin{aligned} f(t) &= c \cdot u(t) + b \cdot \dot{u}(t) = \\ &= (c \cdot \sin \Omega t + b \cdot \Omega \cdot \cos \Omega t) \cdot u(t) \end{aligned} \qquad [2]$$

Nach Division der Gleichung durch m und Einführung des Dämpfungsgrades und der Eigenfrequenz erhält man folgende Differentialgleichung:

$$\ddot{x} + 2\,\vartheta\omega_o\,\dot{x} + \omega_o^2\,x = \omega_o\,(\omega_o \sin \Omega t + 2\,\vartheta\Omega \cos \Omega t)\,u \qquad [3]$$

Hierin sind:

Eigenfrequenz $\omega_o = \sqrt{\dfrac{c}{m}}$

Dämpfungsgrad $\vartheta = \dfrac{b}{2\sqrt{m \cdot c}}$

Auf den Lösungsansatz für die Differentialgleichung soll hier nicht weiter eingegangen werden.

Die Lösung der Differentialgleichung, die den Schwingweg x(t) der Masse m als Funktion von m, der Federkonstante c, Dämpfung b und den Erregerdaten Ω und a(t) ausdrückt, lautet wie folgt:

$$x(t) = \sqrt{1 + 4\vartheta^2\eta^2} \cdot [(1-\eta^2)^2 + 4\vartheta^2\eta^2]^{-\frac{1}{2}} \cdot a(t) \qquad [4]$$

Der Phasenverschiebungswinkel φ ist

$$\varphi = -\arctan \frac{2\vartheta\eta^3}{1-\eta^2+4\vartheta^2\eta^2} \qquad [5]$$

wobei η das Abstimmungsverhältnis $\dfrac{\Omega}{\omega_o}$ ist.

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*) Das Entwicklungsvorhaben wurde vom Forschungsförderungsfond für die Gewerbliche Wirtschaft unterstützt.

A spring c and a damping element b are used to couple the excitor to the mass m which is set in vibration by the excitor.

It is a forced vibration with harmonic excitation in the form of an excitation of the screen supports.

The excitor function is as follows:

$$u(t) = a \cdot \sin \Omega t \qquad [1]$$

$$\begin{aligned} f(t) &= c \cdot u(t) + b \cdot \dot{u}(t) = \\ &= (c \cdot \sin \Omega t + b \cdot \Omega \cdot \cos \Omega t) \cdot u(t) \end{aligned} \qquad [2]$$

Upon division of the equation by m and insertion of the damping coefficient and the natural frequency, the following differential equation is obtained:

$$\ddot{x} + 2\,\vartheta\omega_o\,\dot{x} + \omega_o^2\,x = \omega_o\,(\omega_o \sin \Omega t + 2\,\vartheta\Omega \cos \Omega t)\,u \qquad [3]$$

In it are the

Natural frequency $\omega_o = \sqrt{\dfrac{c}{m}}$

Damping coefficient $\vartheta = \dfrac{b}{2\sqrt{m \cdot c}}$

The method of solution of the differential equation will not be explained in further detail here.

The solution to the differential equation which expresses the displacement x(t) of the mass as a function of m, the spring constant c, damping b and the excitor data Ω and a(t) is as follows:

$$x(t) = \sqrt{1 + 4\vartheta^2\eta^2} \cdot [(1-\eta^2)^2 + 4\vartheta^2\eta^2]^{-\frac{1}{2}} \cdot a(t) \qquad [4]$$

The angle of phase difference φ is

$$\varphi = -\arctan \frac{2\vartheta\eta^3}{1-\eta^2+4\vartheta^2\eta^2} \qquad [5]$$

when η is the ratio of tuning $\dfrac{\Omega}{\omega_o}$.

The magnification function is of interest, it is the ratio of x to a and hence expresses the relative motion between the excitor and the mass. The magnification function is enclosed in the above solution to the differential equation; Fig. 2 shows the magnification functions for several damping coefficients.

3. Screening machine

3.1 Description of model

Prior to the actual description of the machine, an account of the machine vibration system and its type of functioning is given on a model.

The machine casing is set into circular vibration by the excitor. The mass m is led and fastened to the case by a rubber mounting and can perform a vibration in only one degree of freedom, i.e., a linear vibration relative to the screen casing. The screen web (cloth) is between the machine casing and the mass m and it is compressed and stretched only by the relative motion between mass and case.

3.2 Description of the machine

The machines are designed as circular vibrators. Due to the superposed vibration system and for exact introduction of support excitation it is necessary to design the fundamental structure in especially vibration rigid form.

The transverse supports are led through the side walls of the machine and together with their outside connection rods they form the vibrating mass.

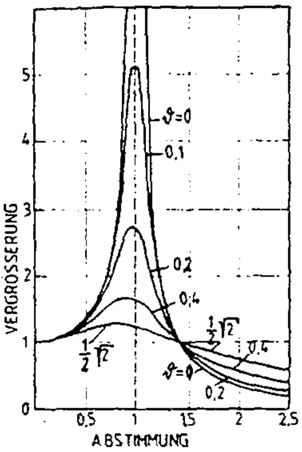


Bild 2: Vergrößerung V als Funktion der Abstimmung (Dampfungsgrad als Parameter)

Fig. 2: Amplification V as a function of tuning (Damping coefficient is parameter)

Von Interesse ist die Vergrößerungsfunktion, die das Verhältnis von x zu a und damit die Relativbewegung zwischen Erreger und Masse ausdrückt. Die Vergrößerungsfunktion ist in der oben angeführten Lösung der Differentialgleichung enthalten; in Bild 2 sind für einige Dämpfungsgrade die Vergrößerungsfunktionen dargestellt.

3. Siebmaschine

3.1 Modellbeschreibung

Vor der eigentlichen Maschinenbeschreibung soll zunächst das Schwingsystem der Maschine an einem Modell in seiner Funktionsweise beschrieben werden.

Der Maschinenkasten wird durch den Erreger in eine Kreisschwingung versetzt. Die Masse m ist am Kasten mittels Schubgummi geführt und befestigt und kann eine Schwingbewegung in nur einem Freiheitsgrad, d.h. eine lineare Schwingung relativ zum Siebkasten, ausführen. Zwischen dem Maschinenkasten und der Masse m befindet sich die Siebmatte, die nun durch die Relativbewegung zwischen Masse und Kasten gestaucht und gestreckt wird.

3.2 Maschinenbeschreibung

Die Maschinen werden als Kreisschwinger ausgeführt. Durch das überlagerte Schwingsystem und zur exakten Einbringung der Stützenerregung ist es notwendig, die Grundkonstruktion besonders schwingsteif auszuführen.

Durch die Seitenwangen der Maschine werden die Querträger durchgeführt, die gemeinsam mit ihren außenliegenden Verbindungsstangen die mitschwingende Masse bilden.

Als Feder- und Führungselemente werden Schubgummi verwendet.

Die Abstimmung der Maschine erfolgt so, daß das Schwingsystem Maschinenkasten—Unterstützungsfedern seinen Betriebszustand weit über der Eigenfrequenz hat, während das zweite System, bestehend aus der Masse der Querträger plus Verbindungsstangen und den Schubgummifedern, nahe der Eigenfrequenz läuft.

Die Abstimmung der Maschine kann sowohl über die Masse als auch über die Drehzahl erfolgen.

3.3 Betriebsverhalten

Wie schon erwähnt, treten bei der Maschine zwei Schwingungen auf. Die Kreisschwingung und parallel dazu eine lineare Schwingung, die sich vom ruhenden Beobachter als flache Ellipse darstellt.

Durch die Überlagerung dieser beiden Schwingungen wird ein besonders gutes Förderverhalten erreicht. Unter der Neigung von 5° beträgt die Fördergeschwindigkeit 0.25--0.30 m/s, ein Wert, der bei der Siebung gute Erfolge bringt.

Rubber mountings are employed for the spring and guiding elements.

Tuning of the machine occurs such that the vibration system: machine case-support springs has its operating condition well above natural frequency, while the second system consisting of the mass of the transverse supports plus the connection rods and the rubber mounting springs runs at almost natural frequency.

Tuning of the machine can occur by the mass as well as by the rotational speed.

3.3 Operation behaviour

As already mentioned, two types of vibration arise in the machine. The circular vibration and parallel to it linear vibration which presents itself as a shallow ellipse to the resting observer.

Especially good conveyance behaviour is obtained due to the superposition of these two vibrations. Below an inclination of 5° the conveyance velocity is 0.25–0.30 m/s, a value which brings good results in screening.

As Fig. 2 shows, the vibration amplitude of the transverse supports can be adjusted by the rotational speed. Here the driving motor, a three-phase short-circuited rotor, is adjusted using a frequency changer.

The practical significance of this construction feature can be demonstrated by the screening of brown coal.

When the moisture content of argillaceous brown coal increases due to climatic conditions it tends strongly towards adhesion. Higher accelerations are necessary in order to loosen-up the material layer lying on the screening machine and thus to permit screening. The rotational speed in increased on the adjusting potentiometer of the frequency changer: in addition to a higher rotational speed the vibration amplitude of the transverse supports also increases corresponding to the magnification function. Hence, the screen webs are more intensely stretched and adhesive or higher bulk layers are loosened-up.

However, in the case that the screening material is dry, and no appeciable adhesion takes place between the grains, the high acceleration values would be detrimental to the screening process.

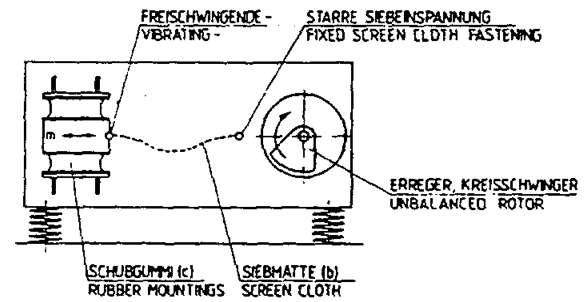


Bild 3: Schwingmodell

Fig. 3: Vibration model

Bild 4: Siebmaschine 1.3 x 4 m

Fig. 4: Screening machine 1.3 x 4 m

Wie Bild 2 zeigt, läßt sich die Schwingweite der Querträger über die Drehzahl regeln. Dabei wird der Antriebsmotor, ein Drehstromkurzschlußläufer, über einen Frequenzwandler geregelt.

Die praktische Bedeutung dieser konstruktiven Eigenart kann an Hand der Siebung von Braunkohle erläutert werden.

Wenn die Feuchtigkeit der lehmhaltigen Braunkohle witterungsbedingt zunimmt, neigt sie stark zum Kleben. Um die auf der Siebmaschine liegende Materialschicht aufzulockern und damit eine Siebung zu ermöglichen, sind höhere Beschleunigungen notwendig. Die Drehzahl wird am Stellpotentiometer des Frequenzwandlers vergrößert: zusätzlich zur höheren Drehzahl nimmt dann die Schwingweite der Querträger entsprechend der Vergrößerungsfunktion zu. Die Siebmatten werden damit intensiver gestreckt, und klebrige oder hohe Materialschichten werden aufgelockert.

Für den Fall, daß das Siebgut jedoch trocken vorliegt und keine erwähnenswerten Haftkräfte zwischen den Körnern vorhanden sind, wären die hohen Beschleunigungswerte dem Siebvorgang abträglich.

Das Siebgut würde zu weit geschleudert, damit zu rasch gefördert und befände sich die meiste Zeit oberhalb des Siebdecks und nicht am Deck, wo letztendlich der eigentliche Siebvorgang stattfindet.

Für diesen Fall wird die Drehzahl zurückgenommen und die Beschleunigungswerte dem Siebgut angepaßt. In gleicher Weise kann natürlich auch auf Schwankungen der Aufgabemenge reagiert werden. Über eine automatische Anpassung der Schwingdaten an die Aufgabebedingungen wird an anderer Stelle berichtet.

3.4 Siebmatten

Einen wesentlichen Einfluß auf den Betrieb haben die Siebmatten. Sowohl die Auswahl des geeigneten Werkstoffes als auch die richtig dimensionierten Sieböffnungen und die Mattenbefestigung sind für den wirtschaftlichen Industrieeinsatz wichtige Kriterien.

Die Siebmatten unterliegen einer ständigen Biegewechselbeanspruchung sowie einer Dehnung, da sie beim Ausschwingen der Querträger nicht nur gestreckt, sondern auch gedehnt werden. Zusätzlich sind sie je nach Art des Siebgutes einer mehr oder weniger starken Verschleißbeanspruchung ausgesetzt.

Hochwertige Polyurethanwerkstoffe entsprechen diesen Anforderungen.

Bezüglich der Mattenbefestigung wurde ein bewährtes System adaptiert, das bei Kunststoffsiebpaneelen seit einiger Zeit mit großem Erfolg angewendet wird.

Die Matten werden in die hinterschnittenen Querträger mittels einer Kunststoffleiste geklemmt.

Die vom Siebgut berührte Fläche ist damit frei von Schrauben und ähnlichen Befestigungselementen, die den Materialfluß hemmen und dem Verschleiß oder der Anbackung von klebrigem Material eine Angriffsfläche bieten.

4. Schwingsystem — Maschine, kritischer Vergleich

Das im zweiten Abschnitt beschriebene Schwingsystem hat für die Maschine begrenzte Gültigkeit. Obwohl es für die maschinentechnische Auslegung des Schwingsystems angewendet werden kann, ist seine Anwendbarkeit bei Überschreiten einer Schwingweite, die der Mattenstreckung entspricht, nicht mehr völlig gegeben. Das Dehnen der Siebmatten ist aus siebtechnischen Gründen erwünscht, da dadurch Klemmkorn aus den Sieböffnungen leichter ausgetragen wird.

Beim Dehnen wirkt die Siebmatte gleichzeitig als Zusatzfeder, die sich zwischen dem Siebkasten und den freischwingenden Querträgern befindet. Im Augenblick, in dem die Siebmatte als Zusatzfeder eingreift, ändert sich die

The screening material would be slung too far, thus conveyed too quickly and would mainly be above the screen decks, on which the actual process takes place.

For this case the rotational speed is reduced and the acceleration values are adapted to the screening material. Of course, fluctuations of input amount can be responded to in the same way. At a later point the automatic adaptability of the vibration data to the input conditions will be reported on.

3.4 Screen webs

The screen webs have an essential influence on operation. The choice of suitable material as well as correctly dimensioned web openings and web attachment are important criteria for economic industrial employment.

The screen webs are subjected to constant reverse bending stress as well as to expansion because during vibration of the transverse supports they are not only stretched but also strained as well. In addition, depending upon the type of screening material they are also subjected to more or less wear.

High quality polyurethane materials meet these requirements.

Regarding web attachment, a reliable system was adapted which has been employed for some time with synthetic screen panels.

The webs are clamped in the transverse supports, which are cut in the rear, by a synthetic strip.

Hence, the area in contact with the screening material is free from screws and similar attachment elements which hinder material flow and offer a surface for wear or packing of adhesive materials.

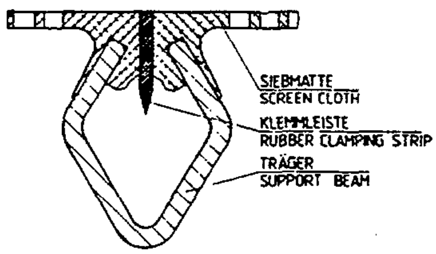


Bild 5: Schnittbild der Siebmattenbefestigung
Fig. 5: Cross-section of screen web attachment

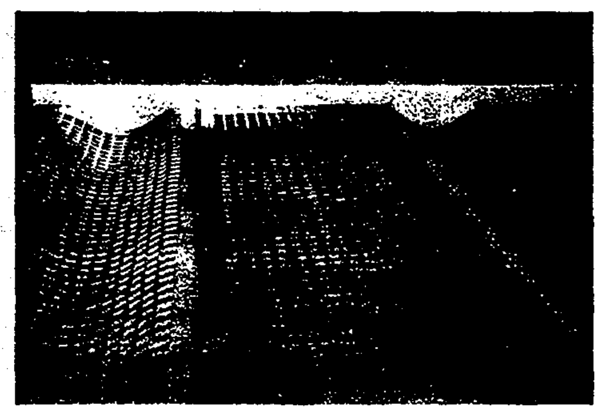
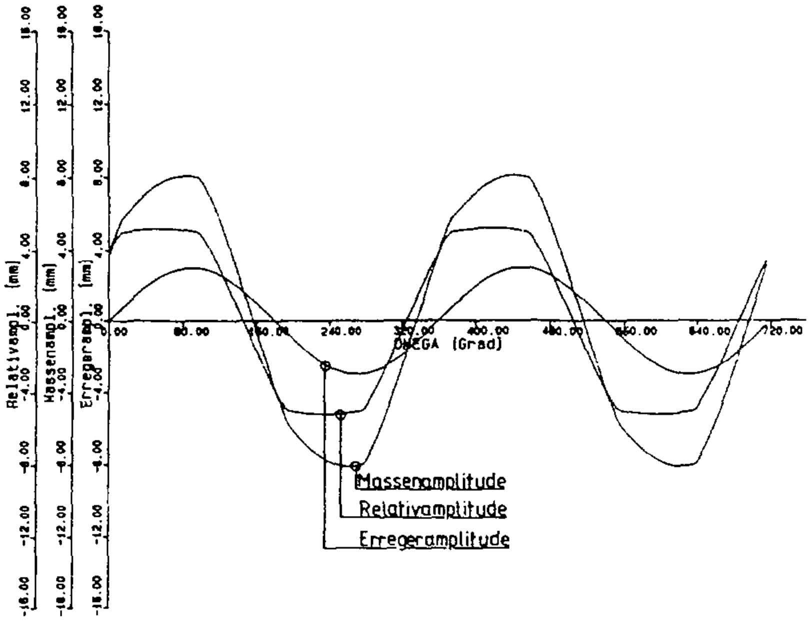


Bild 6: Siebmatten, in die Maschine eingebaut
Fig. 6: Screen webs built into machines

4. Vibration system — machine, critical comparisons

The vibration system described in the second part has limited validity for the machine. Although it can be



Erregerampl	=	3.0	[mm]
Erregerdrehz.	=	650	[U/min]
Gesamtfederkonst.	=	2375	[kN/m]
Dämpfung	=	4200	[Nm/s]
Mitschwin. Masse	=	360	[kg]
Federkonst. Matten	=	16000	[kN/m]
Freier Weg der Matte	=	5	[mm]
Dampfungsgrad	=	0.072	[-]
Abstimmung	=	0.838	[-]

Bild 7: Darstellung der tatsächlichen Schwingungsformen

Fig. 7: Presentation of the actual vibration forms

Eigenfrequenz des Systems, es entsteht eine pseudoharmonische erzwungene Schwingung.

Zur Berechnung dieser Schwingung sind in der Literatur grafische Verfahren zu finden. Die EDV-unterstützte numerische Mathematik läßt auch andere Berechnungsmöglichkeiten zu.

Bild 7 zeigt die Darstellung der Schwingungen, die mit einem Rechenprogramm ermittelt und mittels Plotter dargestellt wurden.

Ein Vergleich mit gemessenen Werten zeigt eine gute Übereinstimmung: vorhandene Differenzen sind zum Teil darin begründet, daß die Dämpfungswerte — insbesondere der Dämpfung durch das Siebgut — schwierig zu erfassen sind.

Es kann aber durchaus festgestellt werden, daß die erarbeiteten Berechnungen den Anforderungen der Praxis entsprechen.

5. Schlußfolgerung

Als Ergebnis der Entwicklung können folgende Aussagen gemacht werden:

- Die dynamisch erregte Siebmaschine hat aufgrund der beiden überlagerten Schwingungen ein sehr gutes Förder- und Siebverhalten auch bei extrem siebschwierigen Gütern.
- Durch die flache Neigung der Siebmaschine ergibt sich nicht nur eine geringe Bauhöhe, sondern die Sieböffnungen bieten sich auch dem Siebgut fast in der Normalprojektion an, was aus einer genaueren Übereinstimmung von Maschenweite und Trennkorngröße resultiert.
- Die durchgehend glatte Siebfläche ohne in den Materialfluß ragende Befestigungsteile verhindert ein Anbacken von Material und gewährleistet durch das patentrechtlich geschützte Befestigungssystem einen einfachen und raschen Austausch von Siebmatten.
- Die dynamische Erregung ermöglicht eine Anpassung der Mattendehnung an die Art und Menge des Aufgabegutes und läßt eine Automatisierung des Siebbetriebes erwarten.

Abschließend sollen noch Leistungsdaten und Trennerfolge angeführt werden.

5.1 Siebung von Rohbraunkohle, feucht aus dem Tagebau

Siebfläche:	1,3 x 4 m
Neigung:	5°
Maschenweite:	12 x 12 mm

employed for machine technical design of the vibration system its employment is no longer fully given when a vibration amplitude is surpassed which corresponds to the web stretching. Stretching of the screen web is desired for screen technical reasons because clogging grain is thereby more easily removed from the screen openings.

In stretching, the screen web at the same time acts as an additional spring which lies between the screen casing and the freely vibrating transverse supports. At the moment in which the screen web comes into action as an additional spring, the natural frequency of the system changes, a pseudoharmonic forced vibration arises.

For calculation of this vibration graphic methods can be found in the literature. Computer supported numerical mathematics also permits other possibilities for calculation.

Fig. 7 shows the presentation of the vibrations determined by a computer program and presented by a plotter.

A comparison with measured values shows good correspondence: differences present are partly due to the fact that the determination of damping factors, especially damping by the screening material, are difficult to register.

But, it can be positively established that the determined calculations correspond to the requirements in practice.

5. Conclusion

The following statements can be made as a result of the development.

- The dynamically excited screening machine has very good conveyance- and screen behavior, even with extremely difficult screening materials, due to the two superposed vibrations.
- Due to he shallow inclination of the screening machine not only a minimal construction height is obtained, but also, the screen openings are offered to the screening material almost in normal projection which results from an exact correspondance of web mesh and separation grain size.
- The continuously smooth screen surface without attachment parts projecting into the material flow prevents caking of material and by the patented attachment system insures simple and quick exchange of screen webs.
- The dynamic excitation makes possible the adaptation of web stretching to type and amount of input material and lets automatisation of screening operation be expected.

Finally, efficiency data and separation results are listed.

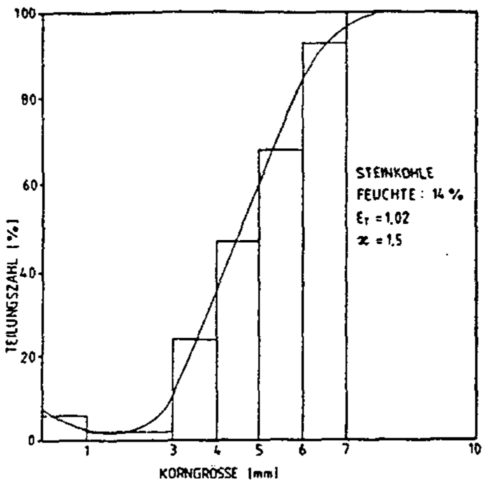


Bild 8: Teilungskurve für Steinkohlensiebung
Fig. 8: Separation graph for hard-coal screening

Aufgabe:	t/h	48,0	91,1
Maschinendrehzahl:	U/min	550	660
< 10 mm Aufgabe:	Gew.-%	9,5	17,9
< 10 mm Überkorn:	Gew.-%	1,2	3,6
> 10 mm Unterkorn:	Gew.-%	8,4	12,9
Siebgütegrad:		85,8	80,4
Unterkornausbringen:	Gew.-%	86,4	82,6

Bei der Steigerung der Aufgabemenge von 48 t/h auf 91,1 t/h — also beinahe auf das Doppelte — wurden gleichzeitig die Motordrehzahl und damit die Schwingdaten des Siebsystems erhöht. Damit konnte mit stark gestiegener Aufgabeleistung annähernd der gleiche Siebeffekt erzielt werden wie bei der ursprünglichen Auslegeleistung.

5.2 Siebung von russischer Rohsteinkohle, Feuchtigkeitsgehalt 14 Gew.-%

Siebfläche:	0,8 x 4 m
Neigung:	5°
Maschenweite:	6 x 6 mm

Aufgabemenge	9,3	t/h
< 5 mm Aufgabe:	98	Gew.-%
< 5 mm Überkorn:	69	Gew.-%
> 5 mm Unterkorn:	86,7	Gew.-%
Siebgütegrad:	69,1	
Unterkornausbringen:	94,2	Gew.-%

5.3 Siebung von Rohmagnesit, Feuchtigkeitsgehalt 7,3 Gew.-%

Siebfläche:	0,8 x 4 m
Neigung:	5°
Maschenweite:	5 x 5 mm

Aufgabemenge: 7,1 t/h.

Der feuchte Magnesit ist extrem klebrig, die Aufgabenstellung besteht darin, den Anteil < 2 mm soweit als möglich zu reduzieren.

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5.1 Screening of raw brown coal, moist, from strip mining

Screen surface:	1.3 x 4 m		
Inclination:	5°		
Mesh width:	12 x 12 mm		
Input:	t/h	48.0	91.1
Machine rotational speed:	r/min	550	660
< 10 mm input:	% weight	9.5	17.9
< 10 mm oversize:	% weight	1.2	3.6
> 10 mm undersize:	% weight	8.4	12.9
Screen quality level:		85.8	80.4
Undersize output:	% weight	86.4	82.6

When increasing the input amount from 48 t/h to 91.1 t/h, hence almost doubling it, — the motor rotational speed and also the vibration data of the screen system are simultaneously increased. With this, almost the same screening effect could be obtained with highly increased input efficiency as with the original delivery capacity.

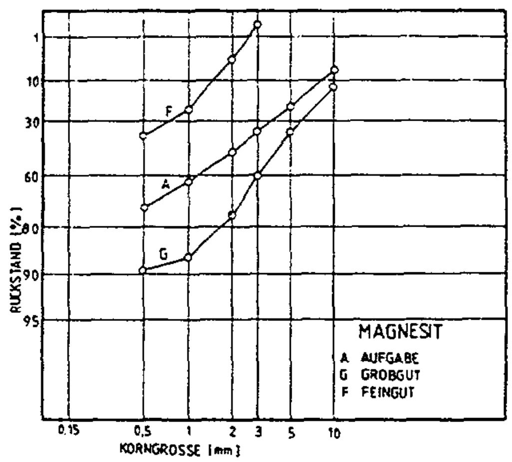


Bild 9: Körnungskennlinien von Magnesit
Fig. 9: Particle size distribution curve for magnesite

5.2 Screening of Russian raw hard coal, moisture content 14 % weight

Screen surface:	0.8 x 4 m
Inclination:	5°
Mesh width:	6 x 6 mm

Input amount:	9.3	t/h
< 5 mm input:	98	% weight
< 5 mm oversize:	69	% weight
> 5 mm undersize:	86.7	% weight
Screen quality level:	69.1	
Undersize output:	94.2	% weight

5.3 Screening of raw magnesite, moisture content 7.3 % weight

Screen surface:	0.8 x 4 m
Inclination:	5°
Mesh width:	5 x 5 mm

Input amount: 7.1 t/h

The moist magnesite is extremely adhesive, the task is to reduce the portion < 2 mm as much as possible.

Bildnachweis
Binder & Co. AG, A-8200 Gleisdorf

FEB. 1986

R.Reder
bivi-TEC - THE NEW SCREENING TECHNOLOGY
Translation by J.Aigelsreiter from a paper
published in TiZ-Fachberichte Vol.109/No.3 1985

The screening of hard-to-screen bulk material requires special precautions. Hard-to screen means that with machines of conventional design, i.e. linear vibrating or free vibrators a.s.o., those bulks are impossibly or insufficiently to separate in a technically unsatisfying range. The reasons are found in the material features that result from moisture, adhesive components, particle-shape or other properties that cause blinding on standard design machines or prohibit reasonable screening at all.

With the recently developped screening machine it is possible to separate those so called hard-to-screen materials perfectly and additionally to accomodate the screening machine to the particular material behaviour. The function of the machine is explained by fig. 1. The screen trough is a circular vibrator but only every second cross member is coupled to the side walls and makes the circular oscillation. Between those fixed cross members are the freely oscillating cross-members coupled to the trough via spring elements performing a linear respectively elliptic oscillation. The freely oscillating members are coupled to each other by longitudinal members and that ladder forms an oscillating frame. The screen mats are mounted between the fixed and the freely vibrating members. The adjustment of freely oscillating parts, spring elements and circular vibration is made for magnifying the oscillation amplitude of free members compared to the circular vibration of the trough with it's members. That creates a relative movement and this is responsible for the alternating slackening and tensioning of the mats. When tensioning the mats we can notice high accelleration forces up to 50 gravity while the machine itself has to bear only 2 - 3 gravity. With the high accellerations we get the break up of agglomerations that enables a screening process. The mats itself are slightly stretched during tensioning phase and by this the frames between the openings slim somewhat and entrapped grains can escape. The practical experience shows that even bulk materials like coke or slag that have a strong tendency to stick in the openings depart from the mats absolutely.

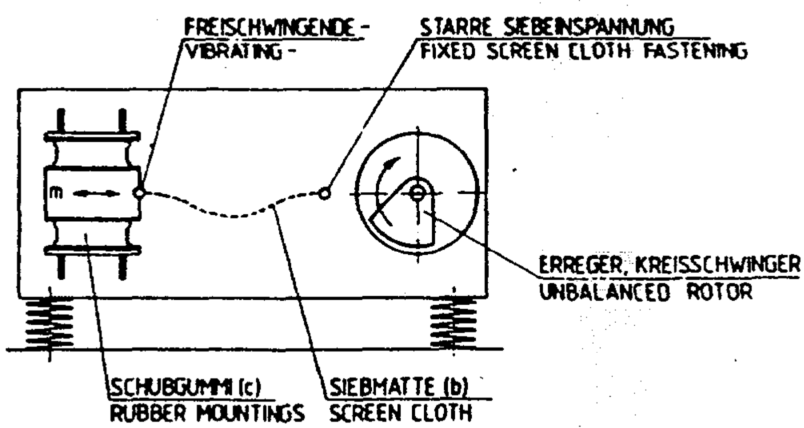


Fig 1: Vibration model

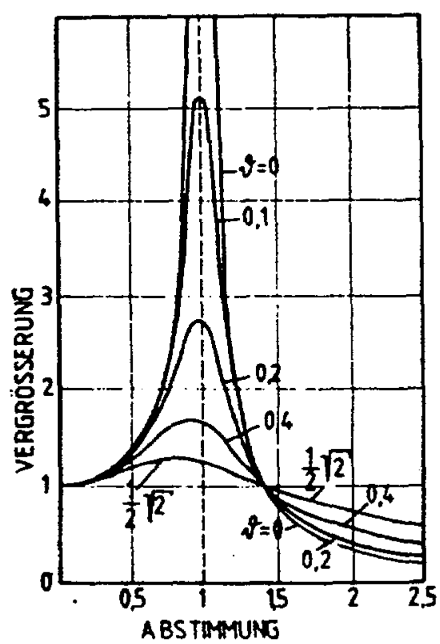


Fig.→ Amplification V as a function of tuning
(Damping coefficient is parameter)

As mentioned before, the crossmembers that hold the screen-mats perform two different kinds of oscillations. This also has a particular effect on transport features. With an inclination of 5 - 10 degr. sufficient conveying activity is given, and the construction height can be limited compared to other systems. The oscillation amplitude of the crossmembers can be controlled very exactly by tuning the speed of the drive motor. Fig.2 shows the magnification that is the relatio between circular and linear vibrating crossmembers related to motor speed resp. adjustment of the machine. The speed of the drive motor, which can be a standard 3 phase a.c. motor is set by a frequency controller The practical importance of this feature is shown in a case from industrial application.

Such a screening machine initially designed for 60 tph feed of adhesive lignites achieves an efficiency of 85 o/o. When feed capacity is increased to 90 tph, say 1.5 times nominal, the tuning up of machine's speed from 550 rpm to 660 rpm can maintain practically same efficiency. In reverse case for dry, non adhesive coal the reducing of speed also grants the excellent accuracy.

A really important contribution to the screening machine are the screening mats. Their design essentially influences the efficiency and the lifetime and therefore the operational cost,which means a lot to the operator. As the mats are exposed to a permanent reversed bending stress, to a tension load and additionally to the wear by screened material, only high valued and specially manufactured plastics remain in competition. Considering the fixation a system that overcame elements like bolts, clamps a.s.o. was selcted and fig. 3 shows a section that explains the mounting by rubber clamping strip. As the entire screen surfaces is even and contains no metal parts a safe protection from clogging of material is given. The mounting and dismantling of screen mats can be done with the most simple tools and requires almost no time. Fig. 4 shows the mats mounted in a machine.

The shown features and the available experience in industrial application give a machine that due to it's numerous possibilities and to the simple and maintenance free design can apply to screening problems hardly ever solved until now.

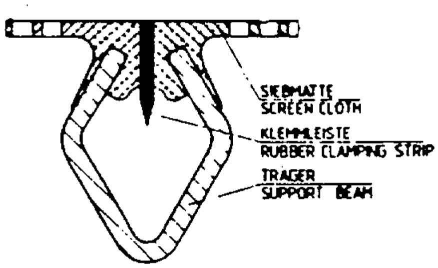
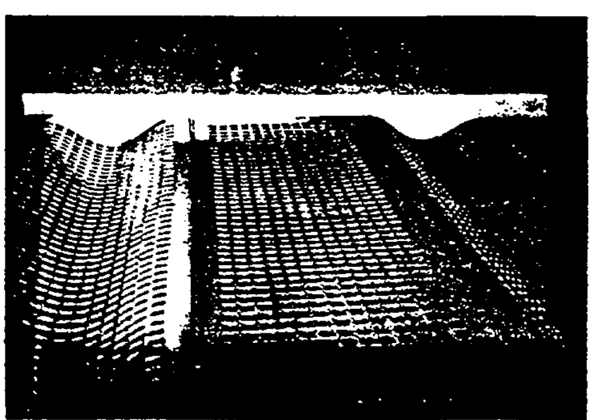


Fig ← Cross-section of screen web attachment

Fig ↘ : Screening machine 1.3 x 4 m

Fig ✓ Screen webs built into machines



FEB. 1986

R.Reder:
"NEW DEVELOPMENTS IN SCREENING TECHNOLOGY"

Translation by BV1/Aigelsreiter from a paper published in Berg- u. Huettenmaennische Monatshefte vereinigt mit Montan-Rundschau, Springer-Verlag, 1985.

1) General

There is rarely any mineral raw material that can be beneficiated and thereby prepared for further use without separation in size fractions, i.e. screened in the course of it's process. It is not to present the screening step as a key-unit in processing but it can be said that this section plays an important role.

Considering the processing of mineral products, screening can be seen for various purposes:

- making size fractions for final products as e.g. in sand and gravel preparation
- providing size fractions for further sorting units e.g. separation by gravity
- classification and separation simulaneously in one step as in used glass treatment or phosphates beneficiation where screening can be related to the selective comminution as a sorting process
- liquid-solid-separation as in dewatering

2) Requirements on screening machines

According to the function that a machine has to perform, the requirements are different. A closer look shows that the difference rather apears in technical details like vibration data, type of screen cloth a.s.o. The requirements are mainly dominated by three elements, (fig. 1, finer framed inserts).

- Requirements related to raw material
- Requirements related to operation mode
- Requirements related to process target

This also are the viewpoints to decide and evaluate new developments – not only in screening technology.

2.1) Requirements related to raw material

The influence of the raw material shall be shown by two examples.

In coal mining the screening technology often is challenged by new targets when finer and more humid raw coals are produced by changed stoping methods.

For concrete gravel production more clayey deposits have to be mined due to the lack or expiration of better sources. Additionally the buildings-industry sets higher quality standards.

Besides of that one should mention that completely new raw materials appear to screening technology from sources that have no direct connection to mining but result from recycling, from remining of shales deposits and from waste material processing.

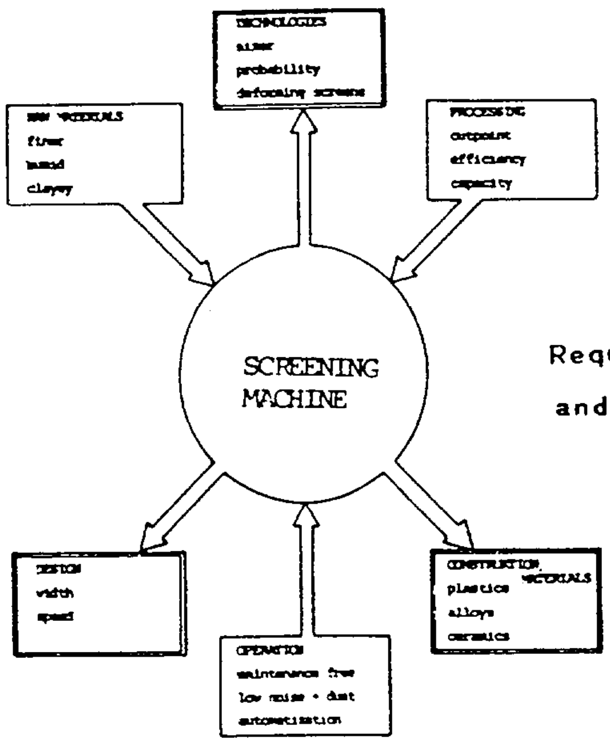


Fig. 1:

Requirements on screening machines and development tools.

2.2) Requirements on screening machines from the operator

The requirements that derive from the operation mode can be summarized as follows:

- High availability, that means longer life-time of wearing parts, rigid and mechanically insensible machine design.
- Low and predictable downtimes reached by easy changing of wear parts.
- Few and simple maintenance and cleaning work.
- Advantegeous design referring to operation and environment as noise and dust emmissions.
- Machine automatization.

An application for machines under extreme duties is the screening of hot sintered ores. Bulk temperatures of 800-850 C-grades extremely abrasive material and a 24 hrs. service put highest requirements on the machines. 70 o/o of the maintenance cost in this field is caused by wear.

An analysis showed three essential factors influencing the lifetime:

- the construction material itself

- the design of the screen plates and

- the operation mode

The requirements put on construction material are the following:

- heat resistance up to 850 grad C

- creep resistance under vibrating conditions

- toughness against shock

- hardness against wear by abrasion and

- possibility to repair cracks

Materials were developped that apply with Cr-contents of 20 - 25 o/o, Ni-contents in the range of 7 o/o or according Mo-contents. They are available in cast or in build-up-weld qualities.

The wear problem shows not only in the form of plates thinning and therefore reduced strength.
The fine material passing the screen openings causes wear on the holes' walls and that enlarges the openings. To make most efficient use from the wear material one has to dimension it's thickness that way that the limiting criterias enlargening of openings and arriving at strength minimum appear simultaneously in timely close related terms.
This naturally applies for other wear materials also e.g. Polyurethane screens (fig. 2). The element had been used on a machine for crushed rock. 50 o/o of the body were consumed, the strength was no longer given and the same time the openings had enlarged from 28 mm to 33 mm. In this case the element was changed after 3000 operation hours corresponding to a throughput of 800.000 tons.

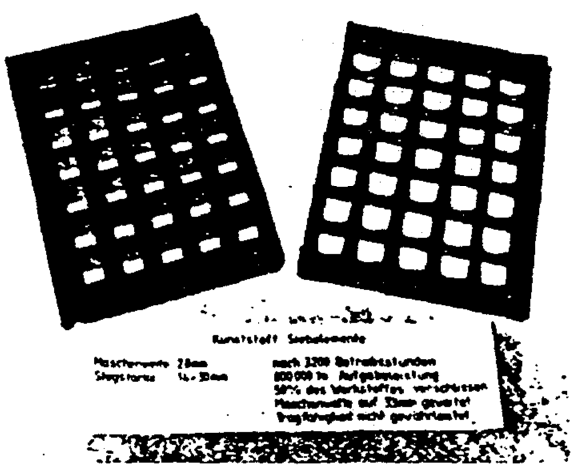


Fig. 2:

Polyurethane screenplates

new and worn

2.3) Requirements related the processing target:

The process requirements represent the widest range of challenges for the development.

The three targets:
- cutpoint
- screening efficiency
- screening capacity

are so closely related to each other that they can be discussed together only. Finer intergrowth requires finer cutpoints. With cutpoints at small mesh sizes the separation efficiency usually decreases or the specific throughput capacity is lowered to an uneconomic dimension. Referring to capcity of machine-units we notice a tendency - and the German bituminous coal mines show us this way - to execute the preparation plants in mono-lines with accordingly high capacities.

Jobs in screening that were done by wet screening with spraying water ten years ago, now have to be done with not more than the natural moisture of the material due to increasing cost for water and due to improving regulations for environment - and water protection. Natural moisture means that the bulk appears with a humidity that lets the fine sizes agglomerate by adhesive forces. Reasonably this specific water content is called the critical moisture. And the moisture content undergoes variations that are not constant but depend on weather and seasons.

As drying is very cost-intensive and bears environmental problems like dust emissions, the problem to screen the moist material has to be solved or at least screening has to be done as far as to prepare for a minimum water consumption in later processing steps.

In some openpit mines the hauled material also is wettened to prevent dust escape and installation of dedusting equipment but nevertheless then the expense for moist screening has to be borne.

3) Development of screening machines

This new requirements that are put on the screening machines are met with the following provisions (fig. 1 double framed inserts)

- use of new construction materials

- precautions in design

- improved and new screening technologies

This provisions are explained in examples below.

3.1) Construction materials

The reduction of vibrating frequency by 25 o/o resp. reducing the speed from 1000 rpm to 750 rpm brought double the life time of screenplates in a sintering plant. This shows the way to design machines with lowest possible speeds. To keep the necessary accelleration value for screening efficiency in the said case the amplitude had to be increased from 10 to 18 mm.

Amplitudes in this range can be reached with resonance machines. For free vibrators with linear vibrations, also known as geared screens, extremely heavy exciters had to be designed.

3.2) <u>Precautions in design:</u>

The design progress in screening machines targets bigger units, increase of operational safety and ease of maintenance.

As the most screening machines represent oscillating systems, the magnification in design finds it's limits. The stressing of the constructive parts, specially the cross-members result in a maximum of 4,5 m width for the machines. For special applications we find machines 5,5 m wide but this can be seen as really rare special designs.

Machine lengths of 9 m have been built for years with resonance machines. For other oscillation systems this lengths came on the market recently, where all this machines are operated with downward inclinations (fig. 3).

One possibility to enlarge the width of the machines is shown by a development from Poland. The bearing walls of the machine are situated inner the borders of the machine, by this the free clamping length of the crossmembers and therefore the bending-stress is considerably reduced (fig. 4). For prototype one ma-

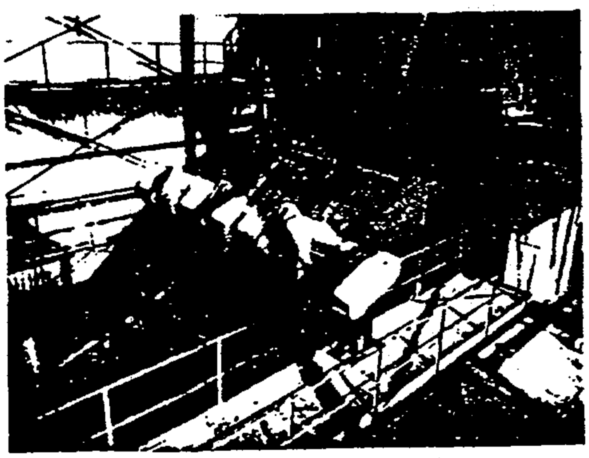


Fig. 3:

Screening machine 9 m in length, falling inclination

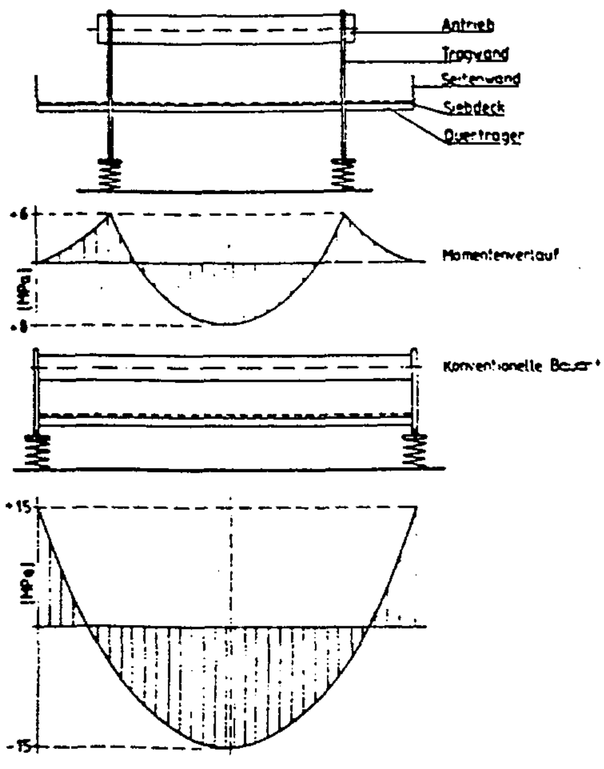


Fig. 4:

Constructive approaches to extend screening machine width chine of this type already was manufactured.

3.3) Screening technologies

For approximately 20 years the principle of the sizer has been known and finds wide application. The essential difference to the classical screening lies there in, that the cutpoint is not related to the mesh size but several in creasingly smaller screen-clothes over lay. The comparable high specific capacities with hard to screen bulk materials are confronted with the fact, that just according to the used principle an exact separation with a sharp cutpoint cannot be reached. So the sizers have not succeeded where exactly separated fractions with low contents of misplaced grain are demanded. In those cases the sizers are rather used for prescreeening to release a following screening machine that makes the perfect separation.

It suggests itself to combine the two systems, sizer and screen, in one machine (fig. 5). The patent specification 3 043 497 shows such a constructive solution. It depends on further experience to realize the good results of the laboratory screening in a combined machine as possibly the both partial systems have different requirements on the exciter oscillations.

A new concept for screening humid raw coal is presented with the rotating probability screen, an English development. From a vertical rotating shaft radial rods extend in a horizontal level similar to the spokes of a wheel. The openings between the spokes increase with the distance from the center, the rods are fixed at the inner end only and errect freely (fig. 6) . The feed is given to the inner side of the rotating wheel over the entire circle. The finer particles pass the openings between the rods, the coarser particles stay on the deck and are conveyed to the outer circumference by centrifugal force.

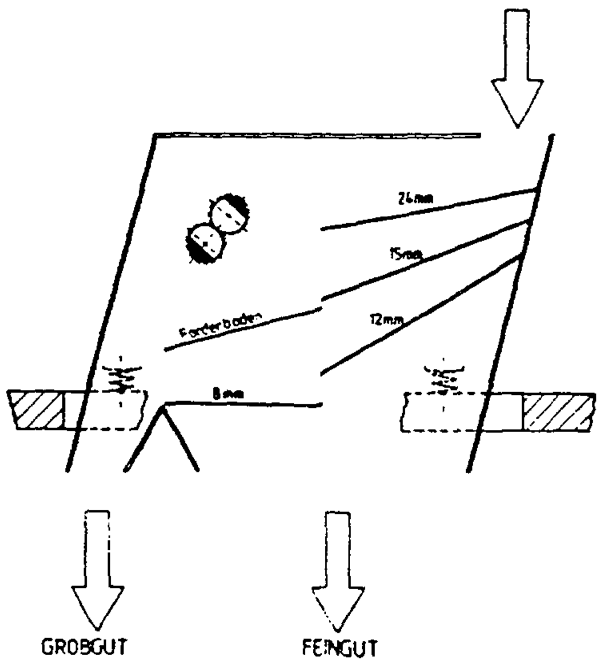


Fig. 5 :

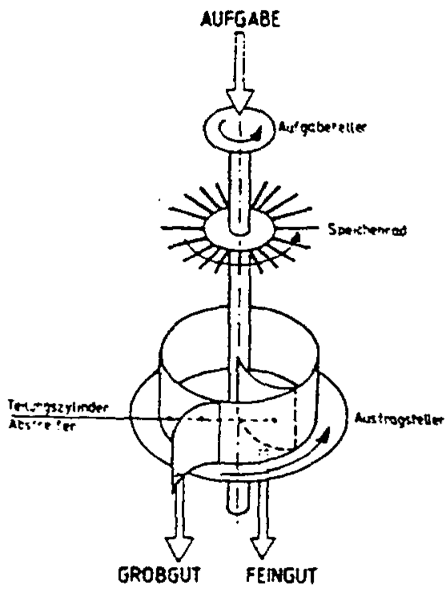


Fig. 6:

Shematic drawing of rotational

The cutpoint is defined by the distance of the rods and the rotational speed. The machines are used for screening in raw coal preparation in the range of 5 - 10 mm. As the machines separate similar to the sizer according to probability, corresponding efficiencies can be expected. An essential advantage is said to exist in non blinding of the openings between the rods also with adhesive and moist feed. The manufacturers report also the libration of the rods from build up material at extreme moisture contents. The advantage of a nonvibrating machine is opposed by the increased technical expense for even distribution of the feed and for collection of the over - and underflow products. The distributor - and collection - devices require considerably more drive power than the screendrive itself and for machines with a screen area of 2,5 sqm a construction height of about 4 m is required. How this development that fascinates from the basic idea can practically succeed, we will notice in the future.

Already when last century was passing, ideas became known and patents applied according to which screen mats are periodically deformed to keep the openings free of blinding grains. Mechanical and material problems hindered the use of such machines over five decades. With the Spannwellensieb the deforming screens reached a state of development that enables a wide technical application.

A new development is presented with the dynamically excited screening machine.

That is a machine, on which the screen mats also are alternatingly slackened and tensioned. Dynamic excitation, form of oscillation and operational performance show essential novelties.

With the Spannwellensieb of usual design the screen's deformation is created by the movement of two frames on eccentrics that are positioned 180 degree to one another. Related to this linear shifting the material acceleration occurs in right angle to the screen deck and it is necessary to erect the machines with an inclination up to 30 degree to provide sufficient material transport. The eccentrics define a fixed path for the movements.

The said new development in competition represents a freely oscillating system that is excited to vibrations by rotating unbalanced weights as they are used for the drive of circular oscillating screening machines (fig. 7).

The mass m is coupled to the vibrating box by shearing rubbers and guided that it can perform a linear oscillation relatively to the box. The screening mat is mounted to the circular vibrating box and to the linar vibrating mass. It is alternately tensioned and slackened by the relative movement between mass and box. So the screening machine performs two oscillations with same frequency but phase-shifted. Each second crossmember makes the circular movement and the crossmembers between make the linear movement.

The practical value of the two oscillations is given in sufficient material transport already at 5 - 10 degree inclination. This low inclination allows not only low construction heights but gives also positive coincidence between mesh size and cut-point (fig. 8).

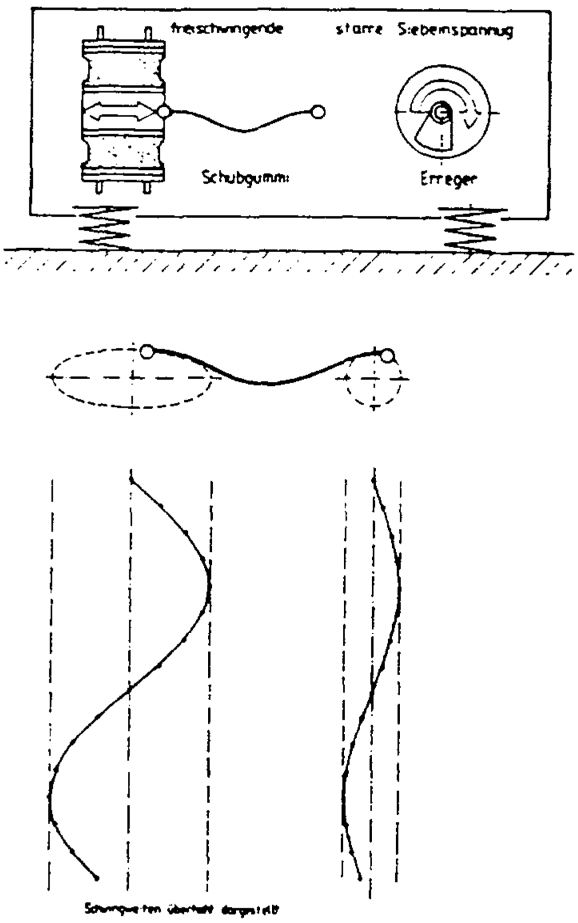
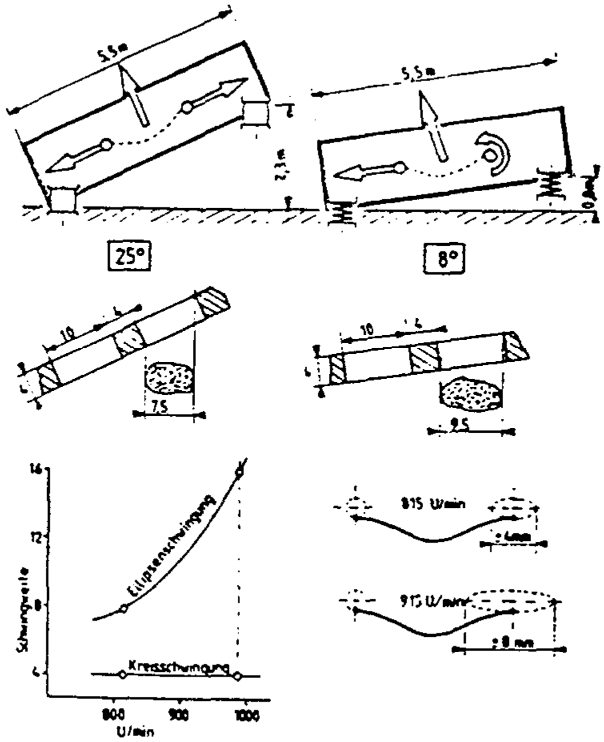


Fig. 7:

System of dynamic screen excitation

Fig. 8:

Features of the dynamically excited screen



A characteristic feature of this development is the free vibrating system. The spring/mass relatio is selected in a range that gives an operation point for the circular oscillation high above it's resonance while the linear oscillation runs close to resonance.

Changes in exciter's speed afflict the circular vibration unessentially but the elliptic amplitude varies strongly with the speed. That opens the chance to fit the mats' deformation, and thereby the screening-intensity, to the screened bulk material.

Increasing feed volumes and therefore thicker material beds require higher accellerations to break up. The same can be said for increasing moisture or adhesiveness of bulk. For the other case of lower adhesive forces between the grains the high accellerations are disadvantegeous to the screening process, because the bulk is thrown unnesessarily far and has less contact to the screen surface. The technical solution is a standard-three-phase electric drive motor controlled by frequency.

By this a screening machine that had been dimensioned for 45 tph feed could achieve almost the same fines recovery with 90 tph when the speed of the exciter was increased. Currently the tuning is done by hand.

For further the possibility appears to build up a control circuit that sets the oscillation data automatically best to the prevailing conditions required by screened material.

4) Conclusion

As the bulk materials that are to be separated have increased and changed, in the same scale the devices for separation had to develop and to modify. Technologies that had been known and invented decades ago had not been technically realized but now they stand for wide break through or are already in use. That the screening process still attracts the brains of technicians expresses in the number of patent applications that was more than hundred in last year only in German speaking contries.

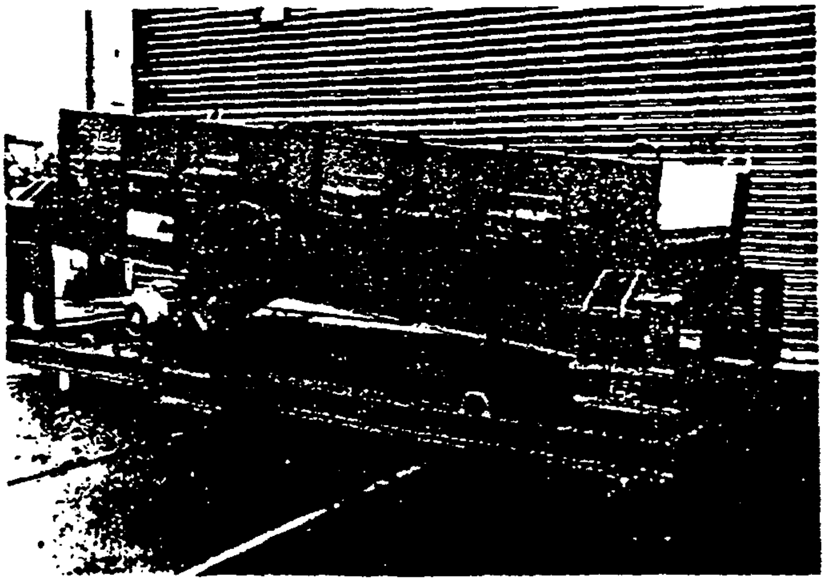


Fig. 9: Dynamically excited screening machine for screening lignitic coal.

references: Literature

Deutscher, O., M. Laude und R. Stelzer: Untersuchung an Heißsintersieben zur Verbesserung der Standzeit der Siebbeläge. Stahl u. Eisen *102* (1982), H. 14, S. 693—699. — Dr. Wahl - Verschleißtechnik: Firmenmitteilung DE 3043497 C 2. — Jachna, W., und T. Banaszewski: Möglichkeiten zur Verminderung der Konstruktionsmasse bei Siebmaschinen mit großer ...

INSTALLATION, OPERATION AND MAINTENANCE INSTRUCTIONS FOR BIVI TEC SCREEN

DESCRIPTION

DO NOT WELD ON TO THE bivi-TEC SCREEN OR ADD ATTACHMENTS WITHOUT FIRST CONSULTING AEI!!

Operating Principle:

The bivi-TEC non-blinding screen operates by alternately tensioning and relaxing flexible screen panels. This action produces up to 50 g's acceleration in the material which ejects sticking, matted, or jammed material from the surface of the screen openings. This action also liberates the fines in the material allowing them to migrate to the bottom of the bed of material and to be passed (if undersize) by the screen openings.

While the material is subjected to high acceleration, the screen box experiences acceleration in the range of 3 g's resulting in very low stress levels in the screen box assembly.

Machine Description:

The bivi-TEC consists of a screen box with a rigidly connected circular vibrator drive. A vibrating frame is coupled to the screen box by means of rubber spring elements. The spring elements are carefully selected to restrain the vibrating frame laterally and vertically, relative to the screen box, while allowing longitudinal motion. In addition, by carefully controlling the number of springs, their spring rate, frequency and amplitude of the screen box vibration, and the mass of the vibrating frame; the relative motion of the vibrating frame to the screen body can be controlled and matched.

The screen cross members are alternated with one attached to the screen box and the next attached to the vibrating frame. Flexible screen panels are attached to the cross members by use of a hard rubber wedge strip which is driven between flanges of two adjacent screen panels into the cross member. No bolts or other hardware are used in securing the screen panels. The wedge fastening system presents a smooth top surface to the material which eliminates a starting point for material build-up and blinding of the screen openings, as well as eliminating a wear point.

The screen panels are made of highly elastic, flexible, polymer material. The screen panels also resist abrasion wear by the material being screened which results in long relative life of the screen panels when compared to other materials. Screen panel life is obviously dependent upon actual operating conditions and the material processed.

The mechanical parts, i.e.: vibrator shaft and bearings are manufactured to close tolerances and have been proven during many years operation in bivi-TEC screens, as well as other types of vibrating screens. The complete screen is mounted on rubber springs which minimizes the transmission of dynamic loads to the supports.

- Check chutes and hoppers to assure clearance and to avoid material spillage.

- Attach all protective guards.

- Make electrical connections and check for proper rotation.

3. Operation

Start-Up

- Call AEI for advise on start-up.

- All bivi-TEC screens are test run at the AEI plant prior to being shipped; therefore, the screen can be started up by using the following procedure:

WARNING - IF PROBLEMS ARE ENCOUNTERED, STOP THE START-UP PROCEDURE AND CALL THE AEI REPRESENTATIVE.

- If the bivi-TEC screen is included in an automated sequential start/stop control system or an interlock system, make the first screen start-up under the manual mode.

- Energize the bivi-TEC motor.

- After assuring the bivi-TEC is running free with no interference with surrounding structure, start the material feed at 30-50% of the normal rate.

- Observe the feed trajectory onto the screen surface. Most of the feed should be making initial contact on the first screen panel (usually a blank panel). The feed material should be distributed symmetrically about the longitudinal centerline of the bivi-TEC.

  Adjust the feed arrangement as required to achieve symmetrical feed. The feed material will generally be distributed very rapidly across the width of the screen as it travels toward the discharge end from the feed point. If the feed is not distributed evenly across the width of the screen in 2-3 panel widths, modify the feed arrangement prior to feeding onto the bivi-TEC screen.

Shutdown

Stop the material feed to the bivi-TEC. After the screen has cleared of all material, the screen power may be shut off. By clearing the screen of all material prior to shutdown, the screen panels can be visually inspected and maintenance can be

TROUBLE SHOOTING

PROBLEM	CAUSE	SOLUTION
Screen Will Not Start	No Power to Motor	Check Wiring and Terminals
	Motor Failure	Check Motor Windings
	V-belts Slipping	Adjust Motor Base Tighten V-Belts
Clattering Noise	Contact with Structure or Chutes	Adjust Structure or Chutes
Change in Bearing Sound	Lack of Lubricant	Regrease Bearings
	Bearing Contaminated	Dismantle and Clean Bearing, Regrease
	Bearing Failure	Replace Bearing
Bearing Runs Hot	As Above	As Above
Different Amplitudes at Different Locations on Screen Box	Poor Feed Distribution	Clean Screen Box
	Material Caking on One Side of Screen Box	Adjust Feed to the Screen
Increasing Fines in Oversize Product	Plugged or Blinded Screen Panel Openings	Clean Screen Panels
		Reduce Feed Volume Use Larger Opening on a Portion of the Screen Deck
Oversize Particles in the Undersize Product	Damaged Screen Panel	Replace Damaged Screen Panel
	Damaged Wear Skirting	Replace Wear Skirt

APPENDIX 1

Part: Vibrator Drive

Temperature: Bearing temperature should be checked at weekly intervals by hand.

Note: The simplest method for checking bearing temperature is to lay the hand on the bearing housing on the inside of the screen side plate after the machine has been in operation for a minimum of one hour. If the bearing housing is too hot to touch, an actual temperature reading should be taken. Bearing temperature must not exceed ambient plus 100_{0} F.

If bearing temperature is excessive, take corrective action as outlined in the trouble shooting section.

Noise: If bearings are noisy, take corrective action as outlined in the trouble shooting section.

APPENDIX 2

Part: Motor

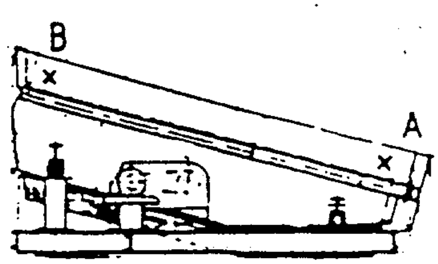
Cleanliness: The motor must be clean to assure proper cooling.

Remove dust and dirt on a regular interval, based upon the operating conditions.

APPENDIX 3

Part: Screen Box

Operation: Check the screen box amplitude monthly at location (A,B) on both sides of the screen.

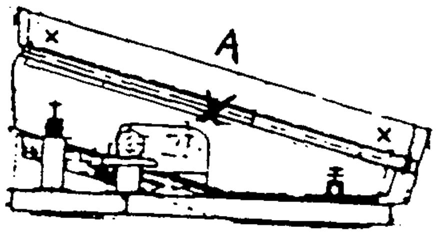


PHONE: 717/ 656-2131
FAX: 717/ 656-6686

APPENDIX 3B

Part: Floating Frame

Operation: Check the floating frame amplitude monthly at location (A) on both sides of the screen.



A deviation of more than 2 mm from the data sheet values requires immediate correction of the cause of the deviation:

- material build-up on the cross beams on one side of the side box
- variation of feeding capacity
- damage of screen mats
- fatigue or damage to rubber blocks
- variation of frequency

Noise: Clattering noise may indicate loose parts. Immediate inspection, location, and tightening of loose fasteners is required.

Damage: Visually inspect on a monthly basis for any evidence of mechanical damage, i.e. cracks, loose connection, etc.

APPENDIX 4

Part: Rubber Spring Blocks

Damage: Visually inspect the rubber spring blocks monthly for cracks and brittleness. If damage is evident, replace the spring blocks.

APPENDIX 5

Part: Wear Skirting

Wear: Check the wear skirting weekly. Wear skirting must be replaced when thickness reaches a minimum of 2 mm (.080").

Clamping: Check the wear skirt clamping system weekly. If the wedge strip or clamp strip is not fully engaged, realign and drive the wedge strip flush with the mating surfaces.

APPENDIX 6

Part: Screen Mats

Cleaning: Visually inspect as conditions dictate (initially twice daily, then determine frequency) and remove any material accumulation at the cross member attachments.

Wear: Determine the change frequency from the operating conditions and wear experience.

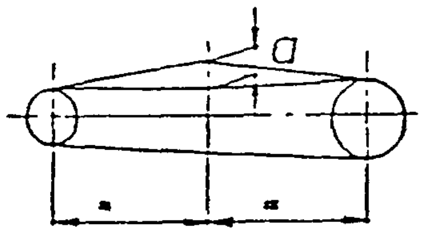
Clamping: All clamping pieces and wedge strips should be inspected weekly to insure proper fit. If wedge strips are not flush with the top of the screen surface, drive the wedge into the proper position. Replace the wedge strip if it is worn or damaged.

Screen Mats: Inspect the screen mats weekly for cracks or tears. Replace damaged screen mats. Do not allow oil or grease to contact the screen panels.

APPENDIX 8

Part:	V-belts
Adjustment:	Tension of the V-belts should be adjusted to the deflection shown below.

$$10 < a < 20$$



Alignment:	Properly align the V-belt drive to insure maintenance free operation.
Wear:	Worn V-belts may damage V-belt sheaves and vice versa. To prevent unnecessary damage, replace worn parts as soon as possible.

bivi-TEC®

OPERATION AND MAINTENANCE MANUAL

AGGREGATES EQUIPMENT, INC.

9 HORSEHOE ROAD, P.O. BOX 39

LEOLA, (LANCASTER COUNTY) PA 17540-0039

717-656-2131

bivi-TEC KRL/ED 1900 X 5

PATENTED OSCILLATION INCLINED SCREEN

1800 RPM

20 HP DRIVE

TYPE: V-BELT

SALES ORDER NO. E93-1561

SERIAL NO. 1236

CUSTOMER: ABC STEEL
920 ANY STREET
CITY, STATE ZIP

DATE: JULY 1993

bivi-TEC Screen

Drawing C-12696-2E

S/N 1181

TYPE: bivi-TEC KRL/ED 1900 X 5

BASIC MACHINERY DATA:

INCLINATION:	10 degrees
DRIVE MOTOR:	20 HP
SCREENING SURFACE:	9.5 m^2
MATERIAL:	bivi-TEC Screen Elements - Polyurethane

(2) 328 mm x 1910 mm
3 mm thick
Blank (Feed)

(2) 328 mm x 1910 mm
4 mm thick
1/2" x 1" Openings

(13) 328 mm x 1910 mm
4 mm thick
1/2" Square Openings

(1) 246 mm x 1910 mm
3 mm thick
Blank (Discharge)

TECHNICAL DATA

SCREEN MODEL:	bivi-TEC KRL/ED 1900 X 5
LENGTH/FULLY USEABLE:	5 meters
WIDTH/FULLY USEABLE:	1900 mm
HEIGHT:	1.9 meters
INCLINE ANGLE:	10°
SCREEN SURFACE AREA:	9.5 m^2
WEIGHT:	11,000 lbs. (approx.)
MOTOR TYPE:	TEFC
HORSEPOWER:	20
RPM:	1800
VOLTAGE/HERTZ/PHASE:	440/60/3
SCREEN DRIVE RPM:	794
V-BELT SPECIFICATION:	5V x 670 (3 required)
DRIVE SHEAVE DIAMETER:	6.2" P.D., B, 2 Groove, SDS Bush @ 1-3/8"
DRIVEN SHEAVE DIAMETER:	13.6" P.D., B, 2 Groove, SK @ 2-3/16"

AMPLITUDE:

SCREEN BOX - Vertical Motion = 7 mm
Horizontal Motion = 5 mm

FLOATING FRAME - Vertical Motion = 7.5 mm
Horizontal Motion = 16.0 mm

RUBBER SPRING BLOCKS: 32

APPLICATION DATA:

MATERIAL - Automobile Shredder Residue

AEI

AGGREGATES EQUIPMENT, INC.
PHONE: 717/ 656-2131
FAX: 717/ 656-6686

bivi-TEC Screen

Assembly Drawing C-12696-2E

Ref. No.	Drawing	Description	Quantity
100	XOAU 1022-07	Unbalance Exciter	1
110		Motor Electric Motor, high torque 20 HP, 1800 RPM, 230/400 volt 3 phase, TEFC	1
200	XURW 1403-02	Side Plates	1R/1L
205	XUSO 1047-04	Joint Pipe	2
211	XUVP 1059	Cross Member Channel Support	1R/1L
212	XUJK 1182	Clamping Piece	1
214	XUJK 1189	Clamping Piece	7
215	XUJK 1188	Clamping Piece	9
216	XURW 1341	Sealing Sheet	30
218	XHRK 1046	Plate	9
220	XURW 1404	End Plate	1
260	XUKF 1053-04	Spring Bracket	4
330	XUSG 1208	Rubber Curtain	2
331	XUSG 1210	Rubber Curtain	1
335	XUVC 1111	Bracket	1
336	XUSG 1209	Rubber Curtain	1
350	XEFG 1003	Rubber Spring	4
370	XEFG 1603	Rubber Block	44
400	XURW 1113-02	Support	1

bivi-TEC Screen

Assembly Drawing C-12696-2E

Ref. No.	Drawing	Description	Quantity
500	C-12727-2	Unit Drive Assembly	1
510	XUSV 1130	Guard Plate	1
520	SK-5039	Cover Clamp	18
530	SK-5040-1	Rubber Cover	4
531	SK-5040-2	Rubber Cover	5

bivi-TEC Screen

Drive Unit

Assembly Drawing C-12727-2E

Ref. No.	Drawing	Description	Quantity
1	XOAK 1014-2-A	Motor Base	1
8		Shaft, Drive, Splicer (2) - 351 U-Joints (2) - 3-2-429 Flange Yokes (1) - 3-3-1641KX Slip Yoke (1) - 3-82-1121 Yoke Shaft	
9		Bearing Dodge P.B. Double Interlock, 2-7/16" Bore, 2 Bolt Base, Non-Expansion Type	1
10		Bearing Dodge P.B. Double Interlock, 2-7/16" Bore, 2 Bolt Base, Expansion Type	1
21		Driver Sheave, 5.20 P.D. 5V, 3 Groove, SDS @ 1-5/8"	1
22		Driven Sheave, 11.3" P.D. 5V, 3 Groove, SF @ 2-7/16"	1
23		V-Belt 5V x 670 for 20.3 C/C (matched)	1
24	SK-5020	Shaft with Key	
27	XOAK 1014-2-B	Coupling Guard	1
28	XOAK 1014-2-C	Counterweight Guard	1
29	XOAK 1014-2-D	Drive Guard	1

bivi-TEC Screen

Drive Mechanism Assembly

Assembly Drawing XOAU 1022-07

Ref. No.	Drawing	Description	Quantity
001	XUWU 1024-04	Exciter Shaft	1
002	XUXU 1030-02	Unbalance Disc	1
003	XUXU 1024-03	Unbalance Disc	1
004	XULD 1092	Labyrinth Ring	1
005	XULD 1091-02	Bearing Cover	1
006	XULD 1090	Labyrinth Ring	1
007	XULG 1031	Bearing Housing	2
008	XUSO 1045-04	Joint Pipe	1
009	XUOR 1030	Thrust Ring	2
011	QUK 2816	Fitting Key	2
012	XHMS 1061	Disc	1
018	MLA 12001	Self Aligned Roller Bearing SKF 2234 A.S. MA C4 F80	2
019	MDO 25335	O-Ring	4
020	MLN 22324 JV	Nilos Ring 22324 JV	2
030	XULD 1097	Bearing Cover	1
032	XOEM 1006	Mounting Device	4

PHONE: 717/ 656-2131
FAX: 717/ 656-6686

DESCRIPTION

Operating Principle:

The bivi-TEC non-blinding screen operates by alternately tensioning and relaxing flexible screen panels. This action produces up to 50 g's acceleration in the material which ejects sticking, matted, or jammed material from the surface of the screen openings. This action also liberates the fines in the material allowing them to migrate to the bottom of the bed of material and to be passed (if undersize) by the screen openings.

While the material is subjected to high acceleration, the screen box experiences acceleration in the range of 3 g's resulting in very low stress levels in the screen box assembly.

Machine Description:

The bivi-TEC consists of a screen box with a rigidly connected circular vibrator drive. A vibrating frame is coupled to the screen box by means of rubber spring elements. The spring elements are carefully selected to restrain the vibrating frame laterally and vertically, relative to the screen box, while allowing longitudinal motion. In addition, by carefully controlling the number of springs, their spring rate, frequency and amplitude of the screen box vibration, and the mass of the vibrating frame; the relative motion of the vibrating frame to the screen body can be controlled and matched.

The screen cross members are alternated with one attached to the screen box and the next attached to the vibrating frame. Flexible screen panels are attached to the cross members by use of a hard rubber wedge strip which is driven between flanges of two adjacent screen panels into the cross member. No bolts or other hardware are used in securing the screen panels. The wedge fastening system presents a smooth top surface to the material which eliminates a starting point for material build-up and blinding of the screen openings, as well as eliminating a wear point.

The screen panels are made of highly elastic, flexible, polymer material. The screen panels also resist abrasion wear by the material being screened which results in long relative life of the screen panels when compared to other materials. Screen panel life is obviously dependent upon actual operating conditions and the material processed.

The mechanical parts, i.e.: vibrator shaft and bearings are manufactured to close tolerances and have been proven during many years operation in bivi-TEC screens, as well as other types of vibrating screens.

The complete screen is mounted on rubber springs which minimizes the transmission of dynamic loads to the supports.

1. <u>Shop Assembly</u>:

The bivi-TEC screen is delivered fully assembled. The screen has been shop run, and all operating specifications have been verified. Certain accessory items are packed separately to prevent shipping damage. Motor, V-belts, drive shaft, rubber support springs, rubber covers and curtains, the associated fasteners, and the support wedge are packed separately and must be assembled at installation of the bivi-TEC.

2. <u>Assembly and Erection</u>:

Assembly and erection of the bivi-TEC screen are very simple. Using good mechanical practices and the following sequence of installation, should result in a trouble free assembly and erection.

- Check the supporting structure for correct position of screen supports and motor support.

- Position the support wedge and attach to the supporting structure.

- Position the rubber support springs on each of the four supports.

- Lifting eyes are provided on all bivi-TEC screens. <u>Do not lift at any other point on the bivi-TEC screen</u>. Chain spreaders must be used for safe lifting and to assure that chains or cables do not pull against the sides of the screen box. <u>Failure to use proper chain spreaders may damage the screen box</u>.

- Lift the screen into position making sure the screen mounted are properly seated on the rubber support springs.

- Position and secure the motor support. Assemble the drive unit including the motor, V-belt drive, and the drive shaft assembly. Adjust the motor base to properly tension the V-belt drive.

- Check clearance between the screen box and all fixed structure. Minimum clearance to any fixed structure is 1 3/16". Adjust or modify any interfering structure to allow the minimum clearance.

- Attach all rubber curtains.

- Attach all rubber screen covers.

- Check chutes and hoppers to assure clearance and to avoid material spillage.

- Attach all protective guards.

- Make electrical connections and check for proper rotation.

3. Operation

Start-Up

- Call AEI for start-up service

- Normally an AEI representative will perform the field start-up of the bivi-TEC screen. All bivi-TEC screens are test run at the AEI plant prior to being shipped; therefore, if it is absolutely necessary, the screen can be started up prior to arrival of the AEI representative by using the following procedure:

WARNING - IF PROBLEMS ARE ENCOUNTERED, STOP THE START-UP PROCEDURE AND AWAIT THE ARRIVAL OF THE AEI REPRESENTATIVE.

- If the bivi-TEC screen is included in an automated sequential start/stop control system or an interlock system, make the first screen start-up under the manual mode.

- Energize the bivi-TEC motor.

- After assuring the bivi-TEC is running free with no interference with surrounding structure, start the material feed at 30-50% of the normal rate.

- Observe the feed trajectory onto the screen surface. Most of the feed should be making initial contact on the first screen panel (usually a blank panel). The feed material should be distributed symmetrically about the longitudinal centerline of the bivi-TEC.

  Adjust the feed arrangement as required to achieve symmetrical feed. The feed material will generally be distributed very rapidly across the width of the screen as it travels toward the discharge end from the feed point. If the feed is not distributed evenly across the width of the screen in 2-3 panel widths, modify the feed arrangement prior to feeding onto the bivi-TEC screen.

Shutdown

Stop the material feed to the bivi-TEC. After the screen has cleared of all material, the screen power may be shut off. By clearing the screen of all material prior to shutdown, the screen panels can be visually inspected and maintenance can be performed more easily. The bivi-TEC is provided with adequate power to start with a full material load; however, the starting power requirement will be higher when started with a material load on the deck(s). As a general rule, the bivi-TEC should only be shut down with material on the screen surface in cases of emergency.

Normal Operation

Under normal operation the bivi-TEC should have sufficient time to achieve full operating speed before material is fed to the screen. Conversely, during shutdown the feed should be stopped and sufficient time allowed for the bivi-TEC to clear of all material on the surface(s). If an automated sequential start/stop system is employed, check the timing through several start/stop cycles to assure the system meets the above requirements.

The most consistent screening results will be achieved by maintaining a uniform feed rate. If practical, a surge system should be employed ahead of the screen to smooth out fluctuations in the process. The bivi-TEC should then be fed at a uniform rate from the surge system.

4. Maintenance

Routine maintenance of the bivi-TEC is normally limited to lubrication of the bearings of the vibrator shaft and drive shaft, and visual inspection of the screen panels and the rubber springs.

See the detailed instructions for lubrication and inspection frequency.

5. Safety

The following practices are required for the safe operation of the bivi-TEC screen:

- All protective covers and guards must be in place and correctly mounted.

- Electrical cable must be properly protected and must not make contact with any vibrated surface of the screen.

- Maintenance and lubrication instructions must be followed carefully.

TROUBLE SHOOTING

PROBLEM	CAUSE	SOLUTION
Screen Will Not Start	No Power to Motor	Check Wiring and Terminals
	Motor Failure	Check Motor Windings
	V-belts Slipping	Adjust Motor Base Tighten V-Belts
Clattering Noise	Contact with Structure or Chutes	Adjust Structure or Chutes
Change in Bearing Sound	Lack of Lubricant	Regrease Bearings
	Bearing Contaminated	Dismantle and Clean Bearing, Regrease
	Bearing Failure	Replace Bearing
Bearing Runs Hot	As Above	As Above
Different Amplitudes at Different Locations on Screen Box	Poor Feed Distribution	Clean Screen Box
	Material Caking on One Side of Screen Box	Adjust Feed to the Screen
Increasing Fines in Oversize Product	Plugged or Blinded Screen Panel Openings	Clean Screen Panels
		Reduce Feed Volume Use Larger Opening on a Portion of the Screen Deck
Oversize Particles in the Undersize Product	Damaged Screen Panel	Replace Damaged Screen Panel
	Damaged Wear Skirting	Replace Wear Skirt

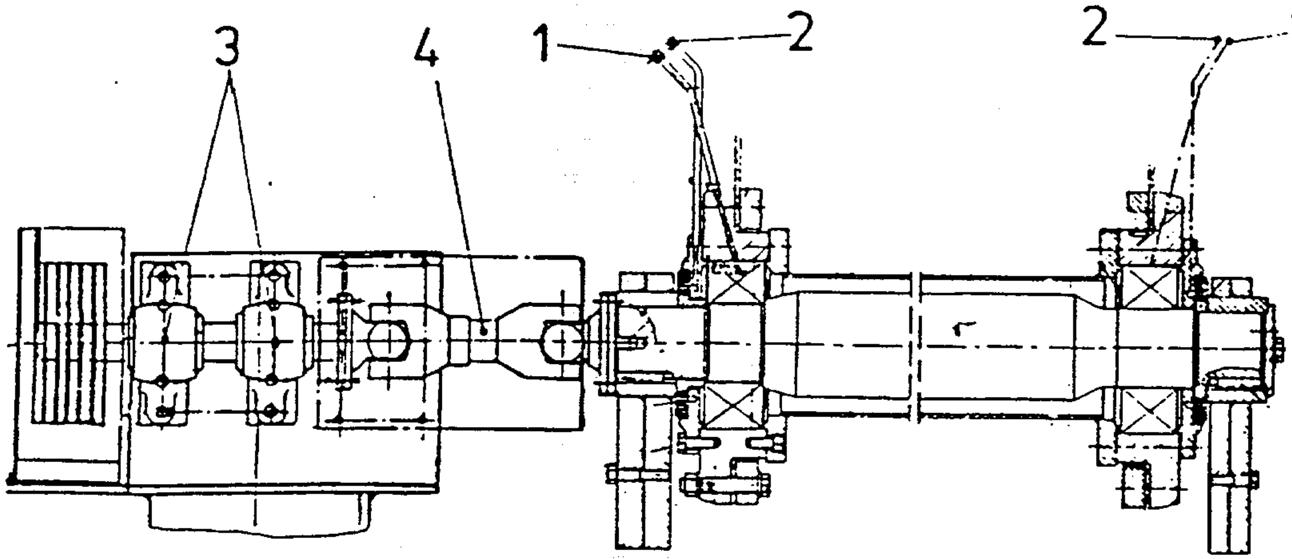
Vibrator Adjustment:

Each bivi-TEC screen is specifically tuned for the application data as provided at the time of purchase. The drive speed, vibrator setting, vibrating frame springs, and the mass of the vibrating frame or the screen box must not be altered without first consulting AEI.

Should operating conditions change, promptly consult AEI for the recommended settings for the new conditions. AEI will issue written instructions regarding any modifications required. Any changes issued should be inserted into this manual.

AEI will not be responsible for any damage caused by unauthorized modification to the bivi-TEC screens.

LUBRICATION INSTRUCTIONS



Component	Symbol	Quantity of Lubrication Points	Lubrication Frequency	Amount
Bearing	1	2	40 Hours	.7 oz
Bearing Seal	2	2	40 Hours	1.2 oz
Bearing	3	2	40 Hours	.7 oz
Drive Shaft	4	3	40 Hours	.3 oz

Lubrication Specification:

Type: Mineral oil base with lithium additives for increased pressure resistance, suitable for anti-friction bearings with high mechanical and dynamic loads.

Mobil Mobilux EP2
Mobil Mobilith 22
Shell Alvania EP2

Exxon Lidok EP2
or Equal

AEI

AGGREGATES EQUIPMENT, INC.

PHONE: 717/ 656-2131
FAX: 717/ 656-6686

APPENDIX 1

Part: Vibrator Drive

Temperature: Bearing temperature should be checked at weekly intervals by hand.

Note: The simplest method for checking bearing temperature is to lay the hand on the bearing housing on the inside of the screen side plate after the machine has been in operation for a minimum of one hour. If the bearing housing is too hot to touch, an actual temperature reading should be taken. Bearing temperature must not exceed ambient plus 100_{0} F.

If bearing temperature is excessive, take corrective action as outlined in the trouble shooting section.

Noise: If bearings are noisy, take corrective action as outlined in the trouble shooting section.

APPENDIX 2

Part: Motor

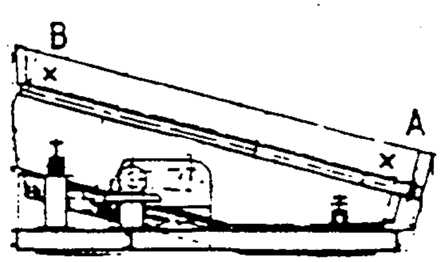
Cleanliness: The motor must be clean to assure proper cooling.

Remove dust and dirt on a regular interval, based upon the operating conditions.

APPENDIX 3

Part: Screen Box

Operation: Check the screen box amplitude monthly at location (A,B) on both sides of the screen.



A deviation of more than 1 mm (.04") from the data sheet values requires immediate correction of the cause of the deviation:

- material build-up on one side of the side box
- variation of frequency
- V-belt slipping
- fatigue or damage to springs
- electrical deviation

Noise: Clattering noise may indicate loose parts. Immediate inspection, location, and tightening of loose fasteners is required.

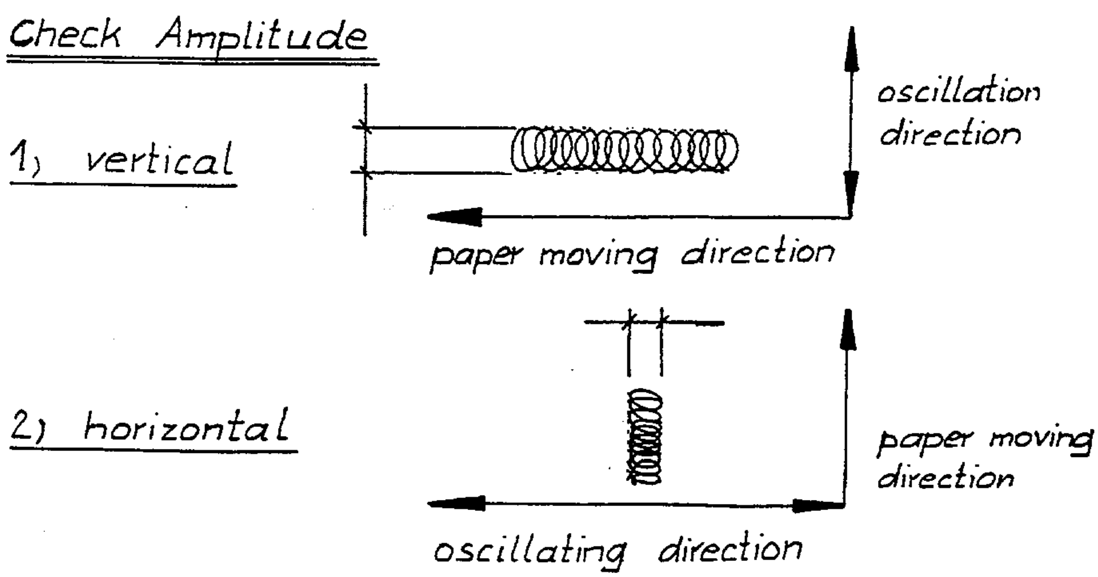
Damage: Visually inspect on a monthly basis for any evidence of mechanical damage, i.e. cracks, loose connection, etc.

APPENDIX 3A

Part: Screen Box

Operation: Procedure for checking amplitude

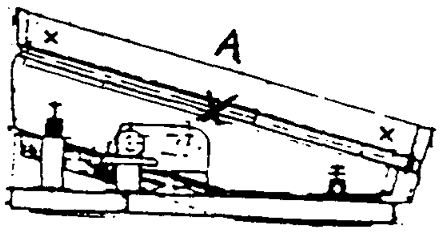
To check amplitude, attach a short pencil to a magnet. Place the magnet at the check point on the screen box. Use a sheet of paper attached to a clipboard and move the paper slowly past the pencil while the screen is operating.



APPENDIX 3B

Part: Floating Frame

Operation: Check the floating frame amplitude monthly at location (A) on both sides of the screen.



A deviation of more than 2 mm from the data sheet values requires immediate correction of the cause of the deviation:

- material build-up on the cross beams on one side of the side box
- variation of feeding capacity
- damage of screen mats
- fatigue or damage to rubber blocks
- variation of frequency

Noise: Clattering noise may indicate loose parts. Immediate inspection, location, and tightening of loose fasteners is required.

Damage: Visually inspect on a monthly basis for any evidence of mechanical damage, i.e. cracks, loose connection, etc.

APPENDIX 3C

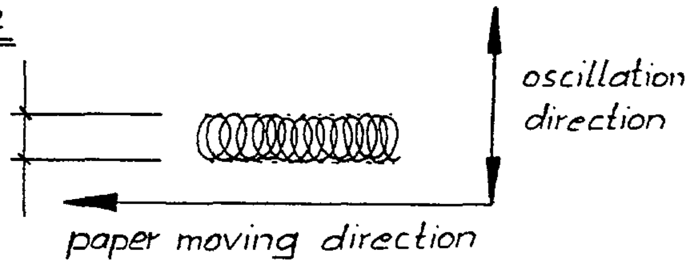
Part: Floating Frame

Operation: Procedure for checking amplitude

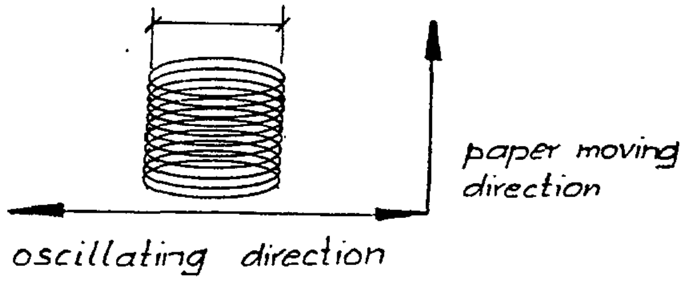
To check amplitude, attach a short pencil to a magnet. Place the magnet at the check point on the screen box. Use a sheet of paper attached to a clipboard and move the paper slowly past the pencil while the screen is operating.

Check Amplitude

1) vertical



2) horizontal



APPENDIX 4

Part: Rubber Spring Blocks

Damage: Visually inspect the rubber spring blocks monthly for cracks and brittleness. If damage is evident, replace the spring blocks.

APPENDIX 5

Part: Wear Skirting

Wear: Check the wear skirting weekly. Wear skirting must be replaced when thickness reaches a minimum of 2 mm (.080").

Clamping: Check the wear skirt clamping system weekly. If the wedge strip or clamp strip is not fully engages, realign and drive the wedge strip flush with the mating surfaces.

APPENDIX 6

Part: Screen Mats

Cleaning: Visually inspect as conditions dictate (initially twice daily, then determine frequency) and remove any material accumulation at the cross member attachments.

Wear: To obtain uniform wear, it is recommended that the screen panels be rotated through the length of the screen from time to time. Remove the first screen panel at the feed end, then move each panel one position toward the feed end. Reinstall the first panel at the last position at the discharge end.

Determine the change frequency from the operating conditions and wear experience.

Clamping: All clamping pieces and wedge strips should be inspected weekly to insure proper fit. If wedge strips are not flush with the top of the screen surface, drive the wedge into the proper position. Replace the wedge strip if it is worn or damaged.

Screen Mats: Inspect the screen mats weekly for cracks or tears. Replace damaged screen mats. Do not allow oil or grease to contact the screen panels.

Replacement of Screen Mats:

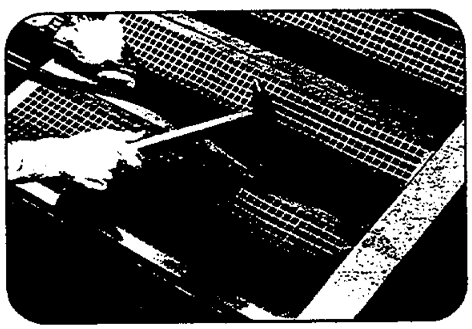
Installation

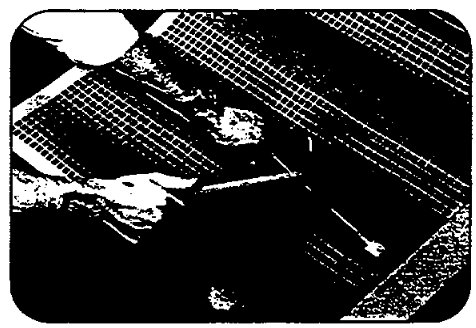
Place the flanges of adjacent screen panels in the opening at the top of the cross member and install the rubber wedge strip. Pound the rubber wedge strip into the gap until flush with the top of the screen panel.

Helpful hint: Apply water, liquid detergent or silicone spray lubricant to facilitate the installation of the rubber wedge strip.

Removal

At one side of the screen box, pound adjacent rubber wedge strips deeper into the cross member using the screen panel tool provided, until the screen panels are released for a length of 1 to 2 feet. Grasp the panel at the feed end, and pull it out of the cross member for its entire length.





APPENDIX 7

Part: Support Springs

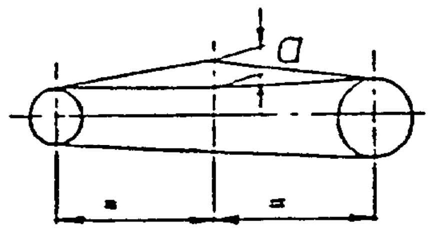
Wear: Visually inspect screen box support springs monthly for cracks and brittleness. If damage is evident, replace the springs.

APPENDIX 8

Part: V-belts

Adjustment: Tension of the V-belts should be adjusted to the deflection shown below.

$$10 < a < 20$$



Alignment: Properly align the V-belt drive to insure maintenance free operation.

Wear: Worn V-belts may damage V-belt sheaves and vice versa. To prevent unnecessary damage, replace worn parts as soon as possible.

PHONE: 717/ 656-2131
FAX: 717/ 656-6686

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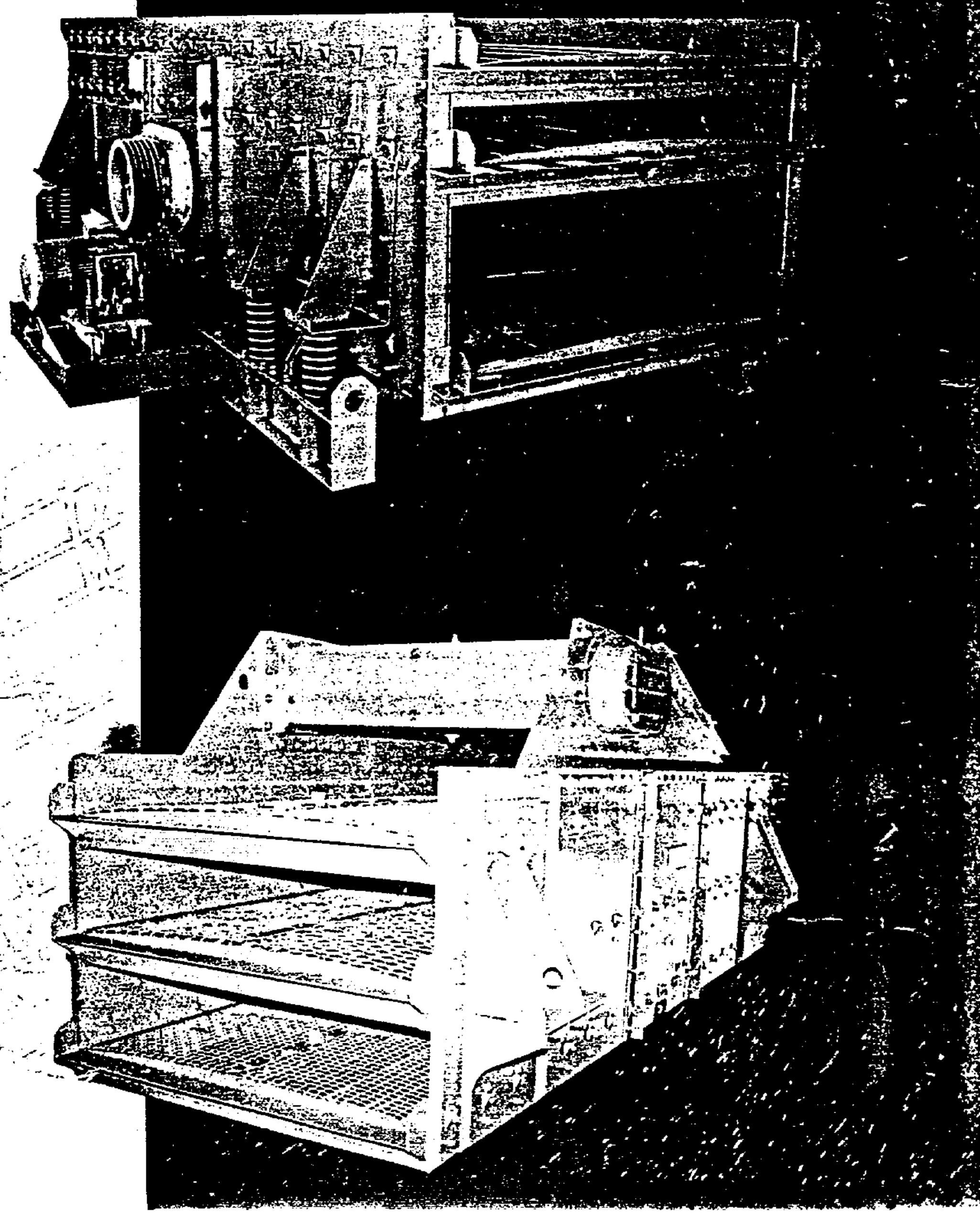
VOL 3 – ATTACH A – APPENDIX B
FIGURE

Franklin Environmental Services
Gravel Separation System

TAB 3

SIMPLICITY/DEISTER SCREENS

HORIZONTAL VIBRATING SCREENS



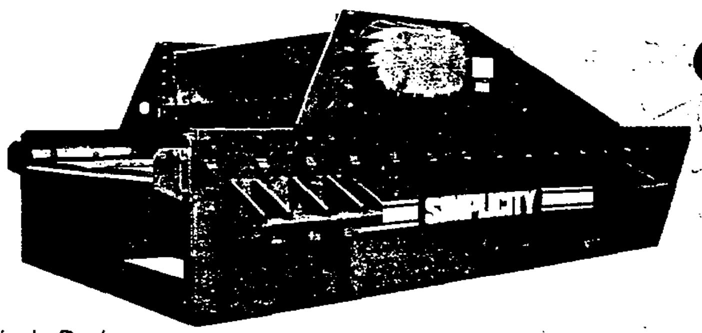
SIMPLICITY

Continuing Excellence in Quality Machinery

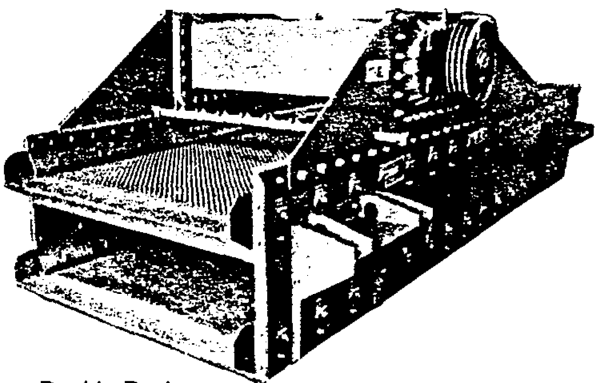
Simplicity Horizontal Vibrating Screens

Simplicity horizontal screens are built in many models and sizes, with deck styles to meet a variety of applications. Consult the Simplicity sales engineer in your area for assistance with your screening or dewatering problem. Certified drawings are available on request.

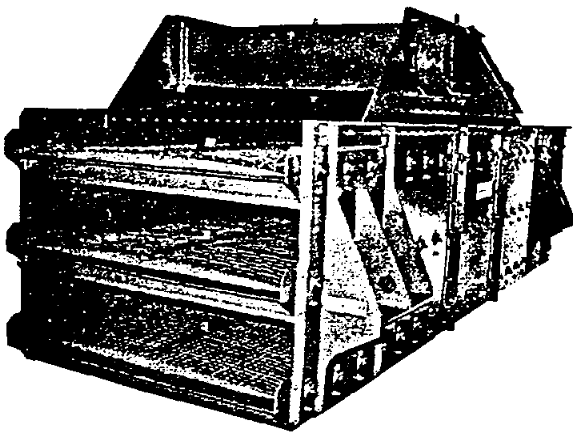
- Ideal for applications when the top size material is less than 9".
- Designed to operate in portable plants where load height and/or travel height must be held to a minimum.
- Available with three types of screen media:
  1) Stock spring steel screen cloth
  2) Perforated plate
  3) Urethane deck covering
- Shafts are connected by use of timing gears.
- Ideally suited to dewatering operations.
- A true ⅝" to ¾" stroke is standard on these machines.
- Stroke and speed are fully adjustable to suit various applications.
- Sizes ranging from 4' x 8' to 7' x 20'.



Single-Deck, Horizontal Screen



Double-Deck, Horizontal Screen



Triple-Deck, Horizontal Screen

For a high quality, dependable screen, contact Simplicity today.

Heavier Construction + Longer Stroke = Greater Capacity

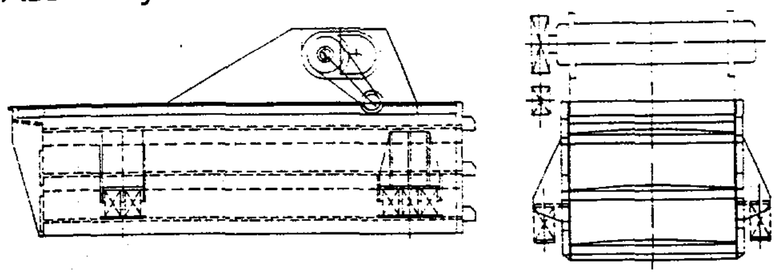
[illegible]

- Full ⅝" to ¾" straight line stroke
- Sharper motion
- Greater material acceleration
- Uses standard 1800 RPM motor
- Heavy-duty one-piece decks
- Pipe crossmembers
- Heavy channel sides
- Longitudinal filler bars
- Feed box installed ahead of a screen surface to take impact and spread the feed
- ...ted-type motor base which automatically maintains ...stant belt tension
- ...igh performance and capacity screening to maximize your production
- Proven reliability

[illegible]

- Motors
- Friction checks
- Wedge take-ups
- Ball trays
- End tension decks
- Spray bars
- AR steel liners for feed box
- Wear protection for deck cross members
- Rubber springs
- Discharge lip liners
- Center split cloth
- Recirculating oil lubrication systems —water or air cooled
- ...st enclosures
- ...echanism mounted below body
- Side plate liners/take-up rail liners

Assembly Above

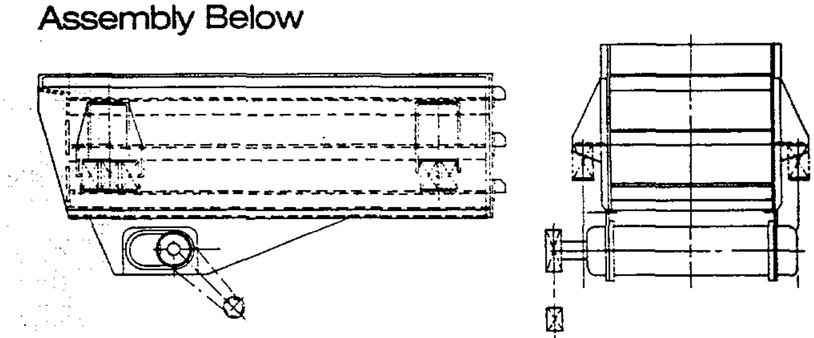


Rugged shaft assemblies have two full-length solid steel offset shafts. These counter-rotating shafts, properly geared together, with running-in-oil, heavy-duty precision bearings, provide extra power needed to operate large areas on an efficient basis.

Back plates are standard equipment on all Simplicity screens, offering extra rigidity and cleaner operation. Precision, huck-bolted construction assures a screen that will operate at peak efficiency with a minimum of maintenance...year after year.

Drive system can be mounted overhead or slung underneath the screen. (Also through the body of the machine—see low-profile screens)

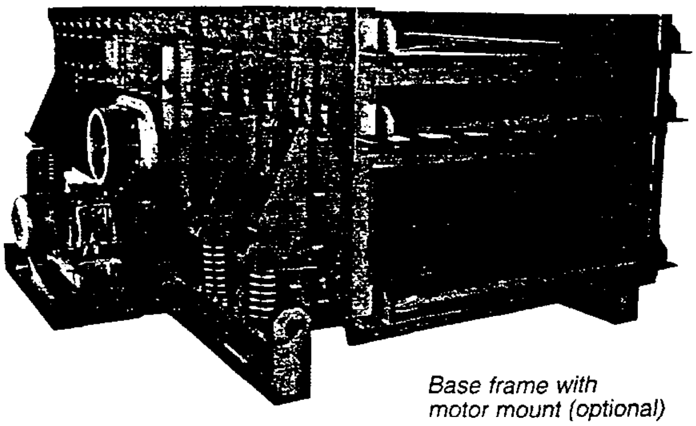
Assembly Below



Simplicity horizontal screens are also ideally suited for dewatering operations. They are superior both as to capacity handled and amount of liquids that can be removed. They have done an outstanding job in dewatering coal, gravel and ores, especially in recovery of "heavy media" from the "sink-float" concentration processes.

Low–Profile Vibrating Screens

with dual-shaft drive incorporated into the screen body for low profile.



Base frame with motor mount (optional)

Simplicity's horizontal low-profile vibrating screen is the ideal machine for your portable plant applications. With the drive system built into the screen body, it gives you a compact, low-profile screen.

Speed, stroke amplitude, and angle are easily adjusted to suit your screening requirements. The dual-shaft drive gives you all the features required in a horizontal screen, plus the ease of maintenance associated with two shafts and oil lubrication.

STANDARD FEATURES

- Adjustable stroke length, stroke angle, and speed
- Self-aligning spherical roller bearings
- Splash-type oil lubrication
- Feed box with liner
- 6" discharge lips
- Spray bar holes
- Huck® bolted construction
- Right hand drive
- Belt guard
- Rubber friction checks

Easy Stroke Adjustment

Stroke is readily adjustable from 5/16" to 3/4" This gives you both the longest stroke and the maximum adjustability available in the industry. Stroke angle is fully adjustable and the speed is also easily changed. This flexibility allows you to fine tune the unit to maximize production.

Rugged and Durable

Huck® fasteners are used to secure the decks to the side plates to provide permanent bolting that does not require retightening. Corner support brackets minimize load stresses on the side plates. A reinforcement angle in the drive area increases side plate strength and stiffness.

- Stroke is adjusted by changing weights on the gears.
- Speed and throw angle are adjustable.
- Dual-shaft requires less maintenance than competitors' triple-shaft drive.
- Drive system is built into the screen body to give you a compact low profile screen.
- Choose double or triple-deck models.
- Sizes ranging form 5' x 14' to 7' x 20'.

Low-Profile Vibrating Screen

A Few Reasons Why Simplicity's Horizontal Screen Design Leads the Field

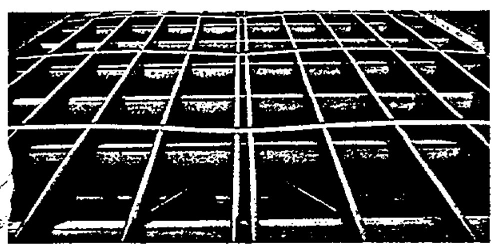
Over 50 Standard Sizes

Heavy-Duty Corner Supports

The corner support brackets provide for maximum reinforcement and are Huck® fastened (not welded) to all decks. This design assures the most effective load transfer from the decks to the support springs with minimal load stresses on the side plates.

Twin-Shaft Drive

Our unique heavy-duty twin-shaft drive design with only 4 bearings (instead of 6) means less and lower maintenance.



One-Piece Deck Construction

Decks are one-piece weldments with thick-wall round pipe cross members welded continuously at each end to the channel side members extending the full length of the side plate. The one-piece construction ensures high structural strength and provides resistance to racking. For added strength and rigidity, the crown bars are contoured and stitch-welded to the cross tubes rather than just welding the bars to the tops of the tubes. Round cross members prevent material buildup found on square members, improve your screen's efficiency, and provide a uniform strength and stiffness in the plane of action.

V-Belt Drive

A complete v-belt drive package is standard including: heavy-duty v-belts, deep groove sheaves, belt guards, and a ball bearing type pivoted motor base to maintain proper belt tension and minimize shock to motor.

Feed Box

Installed ahead of a screen surface to take impact and pread the feed. Fabricated from hot rolled steel plate with " replaceable liner.

Huck® Fastening

Simplicity uses Huck® fasteners to secure the decks to the side plates, and elsewhere, providing permanent bolting that does not require retightening. The Huck® fasteners feature a collar that is hydraulically crimped to lock the bolt in place. This approach eliminates the possibility of a conventional bolt coming loose. As standard, Simplicity uses a minimum of Grade #5 fasteners for high tensile strength.

The large 6' and 7' width screens are assembled using a double row of Huck® fasteners on each side of the deck for greater rigidity and more even load transfer to the side plates.

Full Screening Area

Every screen provides the full screening surface length and width according to the given screen size. We measure our screens from the inside of the side rails, rather than the outside of the rails, so you don't get a downsized screen. When you order a 7' x 20' model, you get a full 140 square feet of screening surface. The end result is greater production for you, our customer.

Efficient Screening and Long Cloth Life

Simplicity screens feature crown bar decks. In this design, screen cloth is held in two-way tension over a curved surface side to side to provide even cloth tensioning and to assist in distributing material across full screen width.

Crown bar design prevents cloth sag and whip. It greatly increases cloth life. Lighter cloth can be used with a corresponding increase in open area for higher capacity.

Screen cloth in tension over a crowned deck cuts cleanly through material being screened. Removal of undersize is more positive. Screening efficiency is substantially increased.

For greater economy, all Simplicity screen decks can be furnished to receive split cloth sections. In this concept, should a certain area of screen cloth be subjected to abnormal wear, only that section would be replaced.

Every Simplicity screen is equipped with heavy-duty take-up rails to compensate for uneven tightening of bolts after cloth replacement.

You get the Greatest Value for Your Screening Dollar with Simplicity Vibrating Screens.

Simplicity Engineering believes in providing the best heavy-duty machinery in the world. Since 1921, we have continuously improved all product lines to consistently offer the finest available.

At Simplicity, our reputation speaks for itself. Before accepting business, we encourage potential clients to contact other customers who have experienced the Simplicity service philosophy firsthand. We extend an open invitation to anyone who wishes to visit our facility to see manufacturing in progress. Our professionals are readily available to provide assistance after the sale, to ensure a smooth integration of the product into your plant or facility.

Whenever you purchase a machine from or develop a system design with Simplicity, you know you are receiving the best quality money can buy, and the best service to keep your operations running smoothly. For all your needs, Simplicity Engineering—simply the best.

The Simplicity Engineering plant in Durand, Michigan.

Outstanding Products Backed by Complete Service and Parts Availability...Simplicity Itself!

- Superior Equipment Design
- Universal Application Experience
- Two-Bearing Screens
- Four-Bearing Screens
- Dual Mechanism Screens
- Portable Plants
- High-Speed Screens
- Horizontal Screens
- Low-Profile Screens
- Heavy-Duty Pan Feeders
- Heavy-Duty Grizzly Feeders
- Scalper Screens

Distributed by:

SIMPLICITY

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Fax (517) 288-4113
Call Toll-Free: (800) 248-3821
www.simplicityengineering.com

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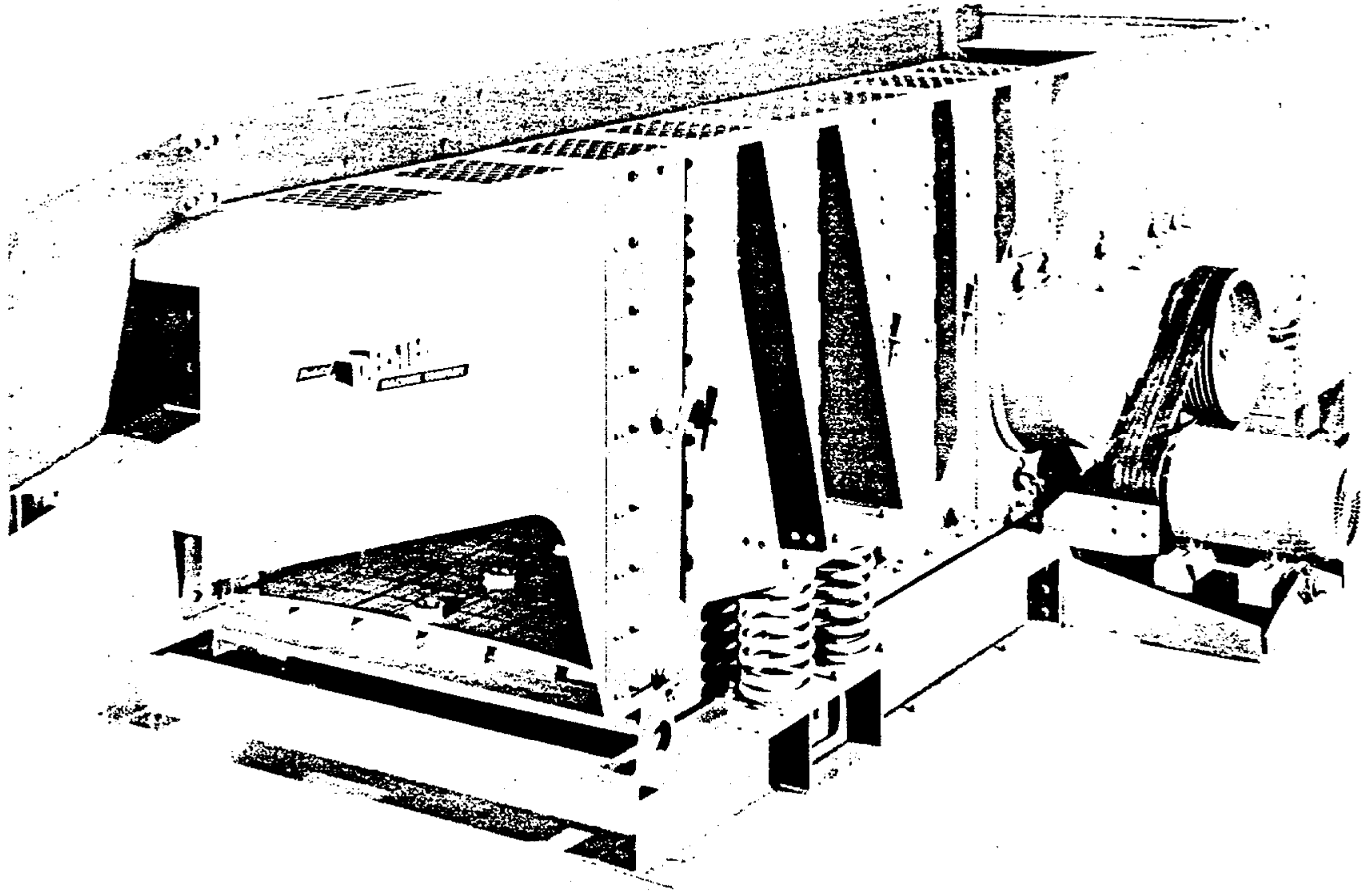
Bulletin No. 333



DEISTER®

INC. 1912

Heavy-duty Horizontal Triple Shaft VIBRATING SCREENS

Deister Heavy-duty Horizontal Triple Shaft Vibrating Screens

Deister horizontal triple shaft vibrating screens combine the efficiency and low head room of horizontal screens with the benefits of a smooth running oval stroke usually associated with inclined screens. Optimum performance and design flexibility make Deister vibrating screens the obvious choice of producers and portable plant designers throughout the industry. Deister engineers welcome the opportunity to work with you in solving your toughest screening problems.

Deister recognizes the need for truly rugged vibrating screens to perform in today's demanding portable plant as well as stationary plant applications. One look at Deister equipment tells you that no one builds vibrating screens with more quality. Extra protection is provided at all wear points. Heavy-duty bracing and frame members insure long vibrating frame life.

Available units vary in size from a double deck, 5' x 14' to a triple deck, 6' x 20'.

STANDARD FEATURES

Deister vibrating screens have many outstanding features which are standard equipment on each unit:

1. Oil lubricated vibrating mechanism
2. Pivoted motor base, motor sheave, wideband V-belt, guards
3. Trunnion type suspension system
4. "Automatic" spring-tension, tension wedge and "rubber-spring" or heavy-duty screen cloth tensioning devices
5. Interchangeable screen panels
6. Removable back plates completely seal feed end
7. 3/8" thick sideplates reinforced with 5/8" x 3½" vertical braces
8. Bolted construction for easy replacement of wear parts
9. Adjustable throw
10. Tension plates of exclusive design
11. 6" discharge lips
12. Access ports
13. Snubbers for quiet shutdown
14. Pick-up brackets
15. Feed Box with 3/8" A-R wearplate
16. Steel or rubber mechanism tube shield

Explanation of Model Letters

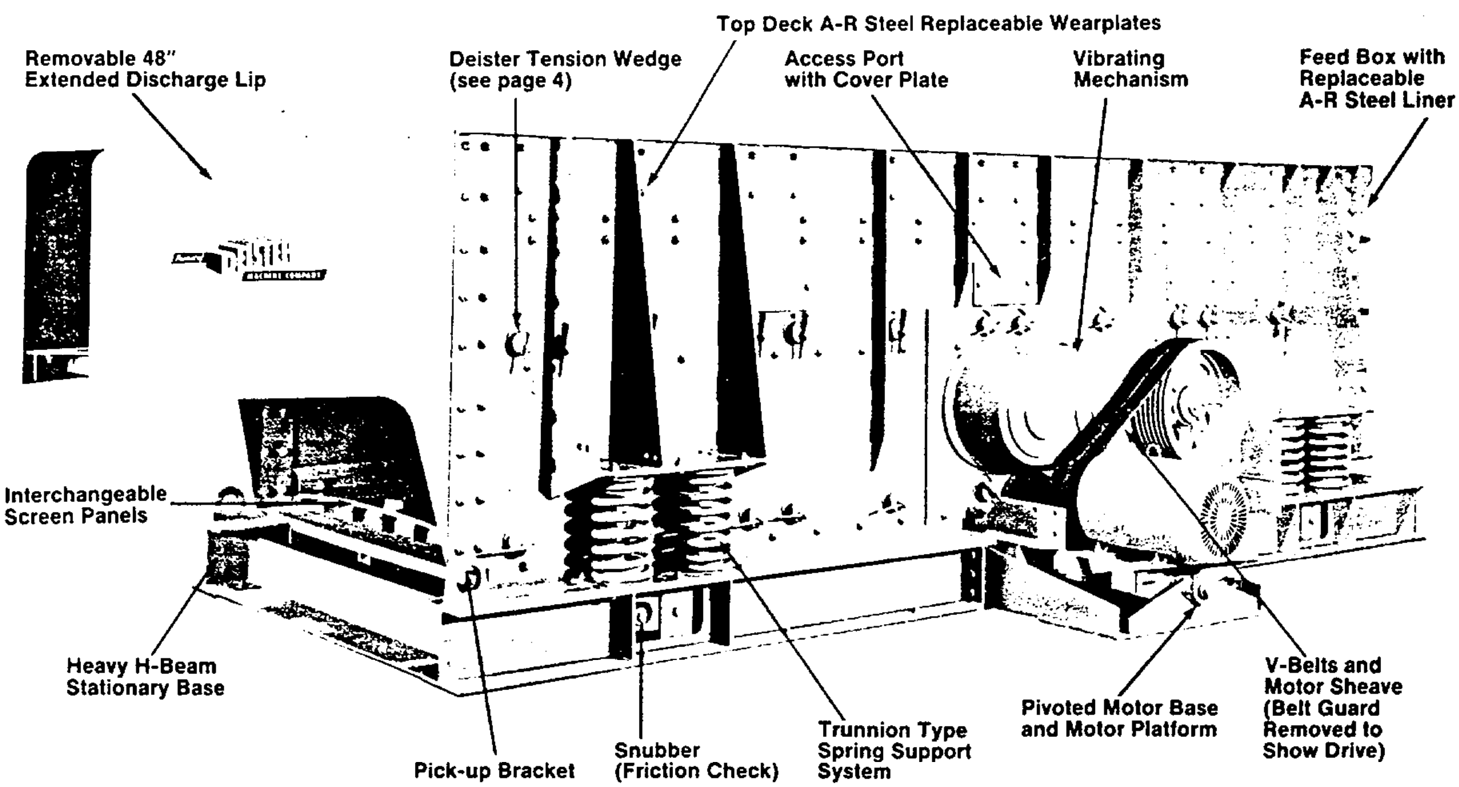
B = H Beam Base
T = Trunnion Type spring support system
F = Flat (horizontal)
M = Middle vibrating mechanism located between decks
3 = Three shaft
P = Portable Plant Type

Explanation of Model Numbers

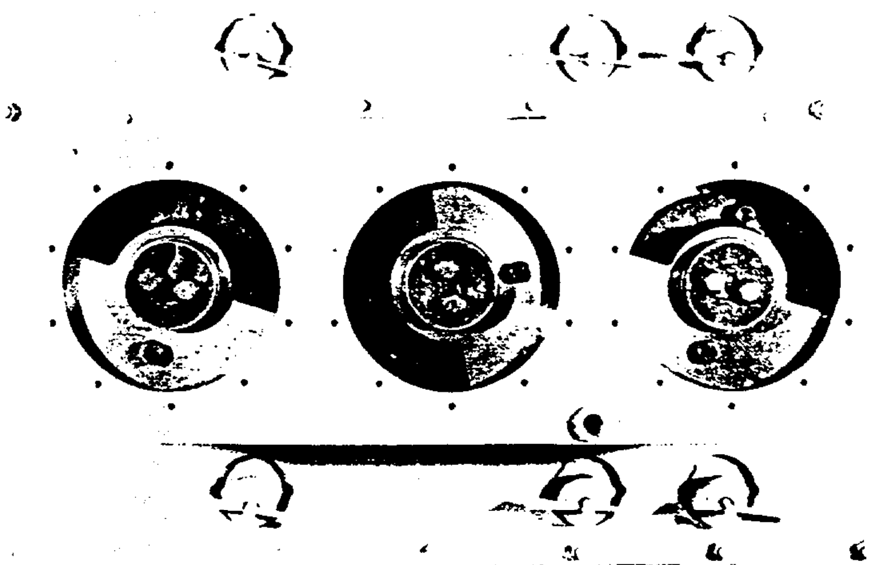
First Number = Number of Decks
Second Number = Width in Feet
Third and Fourth Number = Length in Feet

Example . . . BTFM3P-2616
H Beam Base . . . Trunnion Mounts . . . Horizontal . . . Mechanism between Decks . . . Three Shaft . . . Portable . . . Two Decks, 6' wide x 16' long.

Type BTFM3P-3516, 3 deck, 5' x 16' Triple Shaft Horizontal



FINE TUNE STROKE FOR MAXIMUM EFFICIENCY AND PROFIT



By simply adjusting accessible external slip-counterweights on each side of the machine, the stroke configuration can be changed from near linear (Fig. 1) to near circular (Fig. 2). Wedge shaped material that would plug an opening on typical horizontal screens is thrown free by the circular action. Finer adjustments of the stroke configuration can be made quickly at the center shaft.

In addition to an adjustable stroke configuration, the amplitude of the configuration can be easily changed from less than 3/8" to over 11/16" (Fig. 3). Thus, it is possible to fine tune the screening action for either coarse or fine openings from one site to another.

The rate of travel of material down the deck directly affects the depth of bed, and therefore, the screening efficiency. By changing the gear timing (engagement) the degree of incline of the stroke configuration axis can be changed from the standard 45°. Flattening the stroke axis will speed the flow and thin out a deep bed of material. Increasing the degree of incline of the stroke axis slows the rate of travel but improves the screening efficiency of a lightly loaded screen deck.

Screen operating speed can be changed depending on the available capacity of the roller bearings. Also, the direction of rotation can affect the flow rate of material significantly.

Five different adjustable parameters combine for hundreds of different possible operating modes.

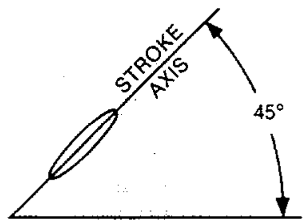


Figure 1

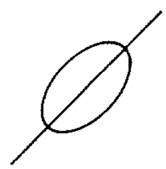


Figure 2

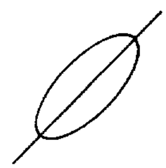


Figure 3

OPTIONAL EQUIPMENT INCLUDES:

1. H-beam base with motor platform
2. Bolted A-R steel or rubber wear liners
3. Extra heavy-duty (XH) models
4. Spray pipe holes
5. Spray pipe equipment
6. Ball tray decks
7. Polyurethane coating on exposed surfaces
8. Rubber-covered tension plates
9. Manganese and A-R steel wear plates for tension plates
10. Screen support panels for modular snap-in screen media
11. Dust enclosure
12. Special removable extended discharge lips

DEISTER LONG-LIFE VIBRATING MECHANISM

The entire vibrating mechanism is a precision constructed, jig assembled unit. It incorporates three eccentric shafts, two-bearings each, and runs in a bath of oil with internal and external labyrinth seals to prevent loss of oil and entrance of dirt.

A recirculating oil bath lubrication system insures maximum bearing and gear life. Deister's exclusive slingermist lubricating system makes it possible for Deister screens to operate at higher speeds and at lower operating temperatures. Separate oil reservoirs prevent simultaneous contamination of bearings on both sides of the screen. This system is the ultimate in oil lubrication of anti-friction bearings and assures safe operating temperatures under extremely hot climatic conditions where it, in effect, acts as an oil cooling system. The lower portion of the counterweight/gear cover serves as the oil reservoir. The oil is agitated by the counterweights and constantly envelops the spherical roller bearings and all moving parts. It should never be necessary to add oil to the mechanism, with oil changes recommended every 500 hours. Oil changes take only minutes with easily accessible external oil fill and drain plugs and a large oil sight glass.

Replaceable bronze sleeves between the inner race of the bearing and the shaft prevent wear on the shaft. Should wear on the sleeve occur, even after years of rugged service, the original close "factory tolerances" can be easily restored by the simple replacement of the sleeve. In its 62 years of building vibrating screens, Deister Machine Company has always designed its vibrating mechanisms with the bearing a slip fit on the shaft or replaceable sleeve, and a press fit in the housing (Sleeves not used prior to 1950). The replaceable sleeve is a slip fit on the shaft. Slip fits assure more even wear on bearings and sleeves—providing longer life—easier replacement.

The small steel shaft casing tubes can be protected by either steel or abrasion-resistant rubber shields.

Deck Surface Tension Systems

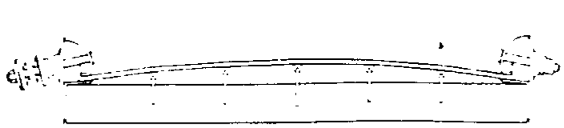


Figure 1

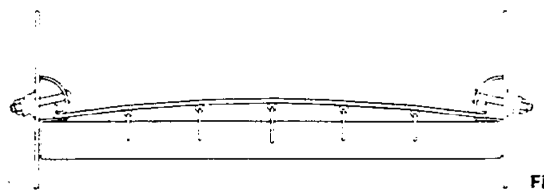


Figure 2

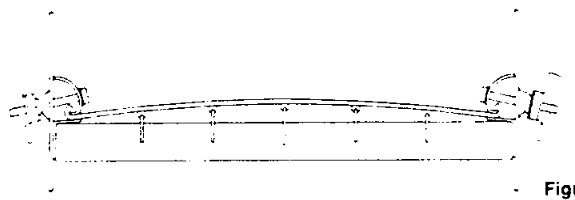


Figure 3

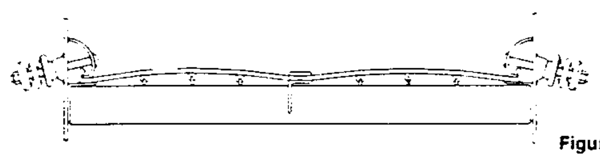


Figure 4

FIGURE 1. Standard "automatic" spring tension assembly for 5′ and 6′ wide models. Powerful coil tension springs and tension plates hold the screen cloth over a series of support bars arranged in an arc. Support spacing is governed by size of opening and shape of screening media. As the screen cloth wire wears thin or becomes stretched, the springs automatically keep the cloth in constant tension, thereby preventing whipping or flexing of the cloth, causing wire breakage. The side opposite the spring is held by a half-sphere cast iron nut with indentations fitting the lugs on the steel casting welded to the sideplate, which prevents the nut from backing off.

Ledge angles are formed to 94° to provide the correct interlocking fit between tension plate, screen cloth hook strip, and the supporting ledge angle—prevents pinching or "rocking-up" of the screen cloth in the hook-strip area, which causes premature breakage.

Fewer tension assemblies are required due to the stronger curved tension plates. The method shown in Figure 1 is recommended for medium and fine screen cloth or lightweight perforated plate.

All assemblies (Figures 1 thru 4) are interchangeable, as holes and castings in sideplates are identically located.

FIGURE 2. Standard heavy-duty tension assembly for heavy wire cloth or perforated plate with hook strips.

FIGURE 3. Standard tension wedge and "rubber-spring" assembly. See below.

FIGURE 4. Standard "automatic" spring tension assembly at both sideplates on 6′ wide units with center hold down.

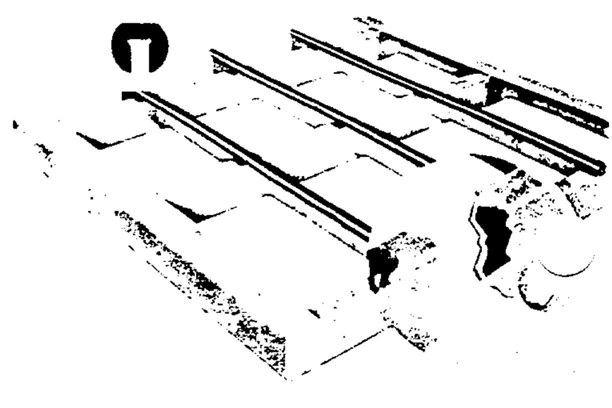
Standard tension plates are available with abrasion-resistant rubber or urethane wear surface, ¼" x 1¼" manganese steel wear surface or with A-R steel formed wear plates welded to tension plate.

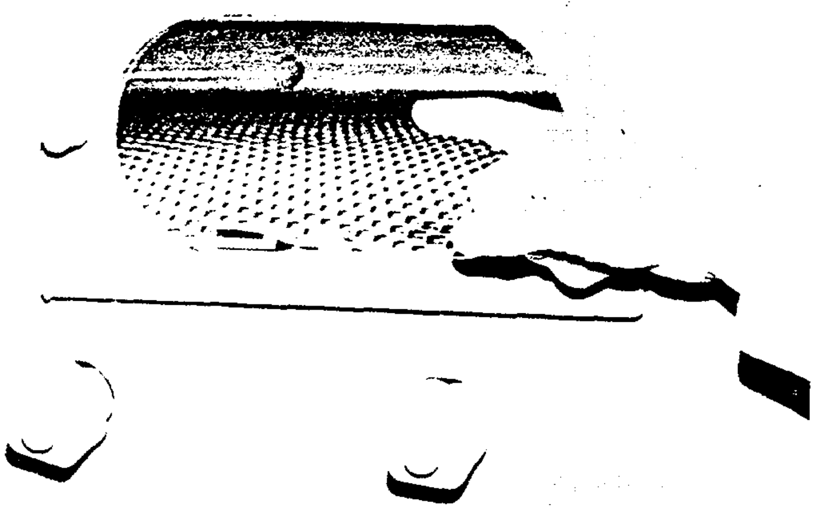
TENSION WEDGE

Deister Tension Wedge and "Rubber-Spring" screen cloth tensioning device, with the advantage of quick tightening or easy release, while at the same time providing constant tension through the action of the molded rubber spring.

REPLACEABLE SUPPORT TRAYS

Replaceable trays to support large opening screen cloth, perforated plate, rubber cloth, modular urethane screen panels or other special screening media are constructed of tubular or channel transverse members welded to side members bolted to the vibrating frame—constructed for each particular application but designed to permit interchangeability of screening medium with minimum alteration.





INTERCHANGE-ABLE SCREEN PANELS

Divided interchangeable screening sections are identical in size and may be readily interchanged or shifted to distribute normal wear and prolong the life of the screening medium.

One exception to the above is when the openings in the screen cloth are smaller than the normal spacing between the screen panels. In this case, one or more of the sections should be ordered approximately 1" to 1½" longer so that they can overlap.

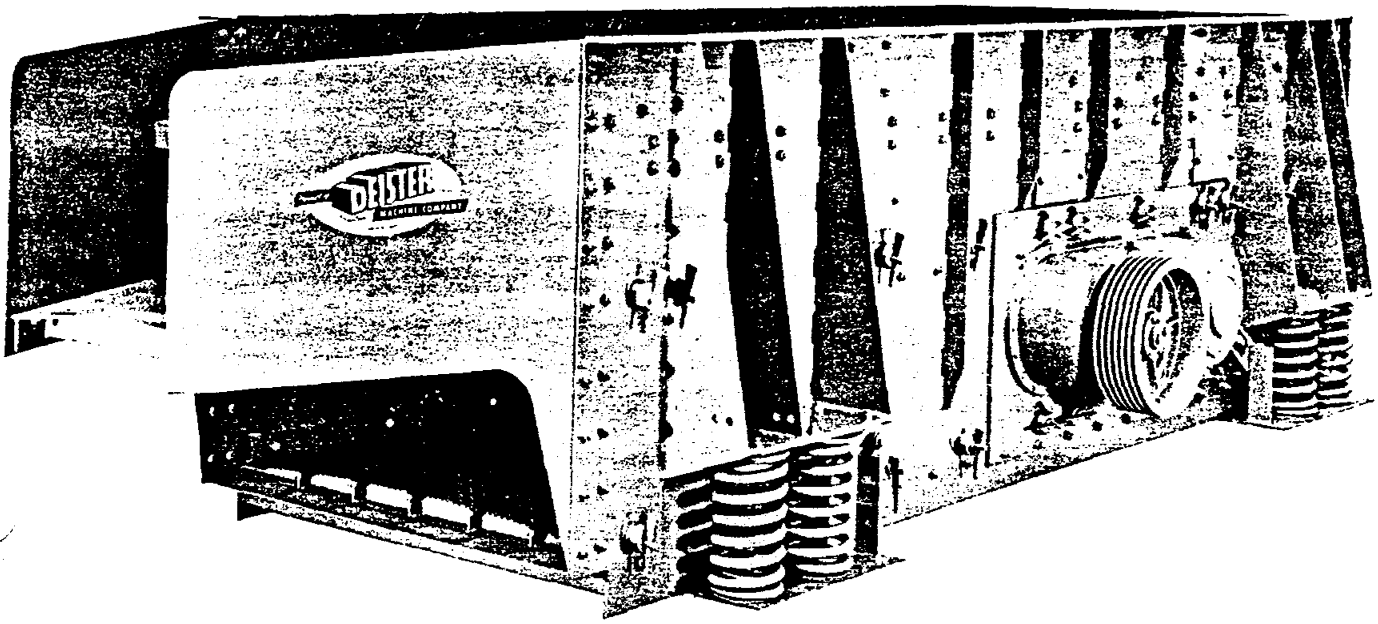
The screen sections are of bent edge or "shrouded hook-strip" construction to provide easiest screen cloth replacement and proper tensioning.

ACCESS PORTS

Access ports ("hand-holes") are provided on multiple deck units to permit removal and replacement of any one screening surface without disturbing the other decks and eliminating the necessity of a person or persons between decks when "hold-downs" are not used. These ports, with doors removed, also provide the operator easy inspection of the screening surface to check deck wear, possible blinding or plugging, depth of bed, or any matters connected with the operation of that particular deck.

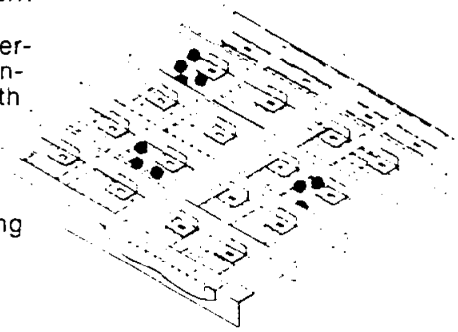
These oval-ended rectangular openings are reinforced with ⅝" thick steel frames welded to the sideplates. Easily removed plates cover the openings.

Type TFM3P-3516, 3 deck, 5' x 16', with 48" removable converging lip.



BALL TRAY DECKS

The ball tray is used as a means of reducing or eliminating blinding of the meshes in the screen cloth, usually in the bottom deck. It consists of a wire cloth panel or perforated plate with relatively large openings placed beneath the screen cloth, and the space between divided into compartments for the purpose of carrying resilient rubber cleaning balls. The vibration of the screen causes the balls to bounce up against the underside of the screen cloth, driving out the near-size irregular shaped particles wedging in apertures as well as creating a secondary vibration in the screen cloth that prevents fine particles from sticking and building up on the wires. In most cases, a ball tray will be effective with material containing as much as 5% moisture.



SPRAY PIPE EQUIPMENT

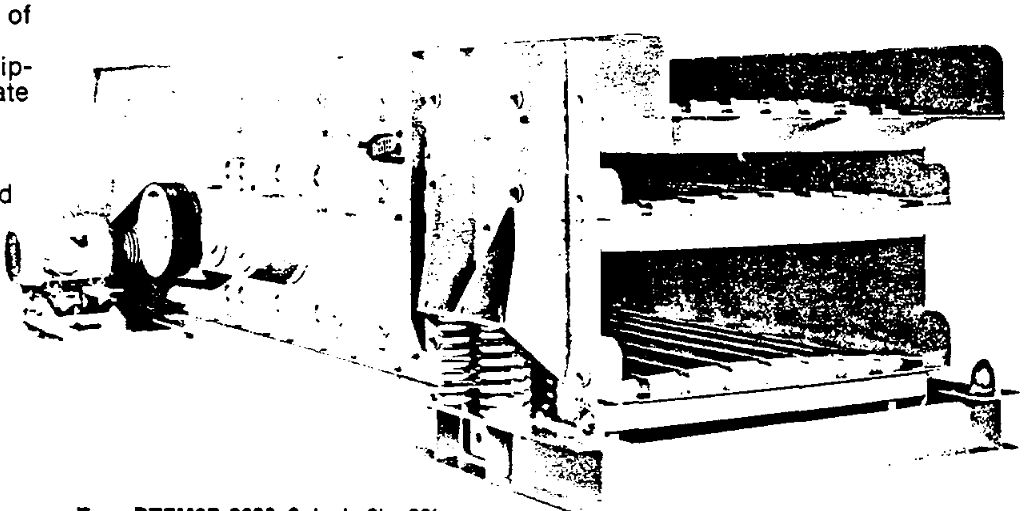
Deister Screens can be equipped with specially designed spray equipment—stationary supporting brackets and 2" pipe headers fitted with threaded spray nozzles, and complete manifold systems. The supporting framework is welded to the H-beam base, with the individual headers resting on small hardwood blocks to allow for height adjustment. Where the headers pass through the sideplates between decks, the round hole in the sideplate is reinforced by a ⅝" thick steel ring welded to the plate. The opening is sealed by a polyurethane flange that fits over the spray pipe and is placed against the reinforcing ring.

The brass or steel nozzles fan out water jets into sheets, which provide broad bands entirely across the screen, giving complete coverage under each header. The nozzles are "staggered" in order to provide two solid sheets of water per header.

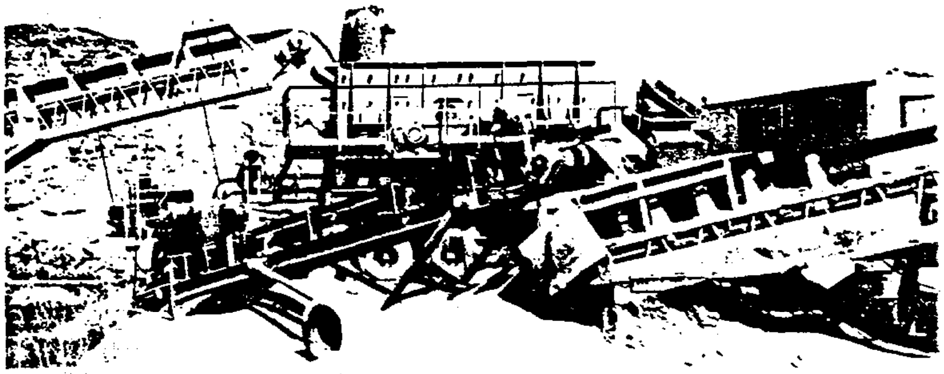
Complete manifold systems including all piping, fittings, and individual brass gate valves for each header, mounted on the H-beam base, can be furnished as optional equipment.

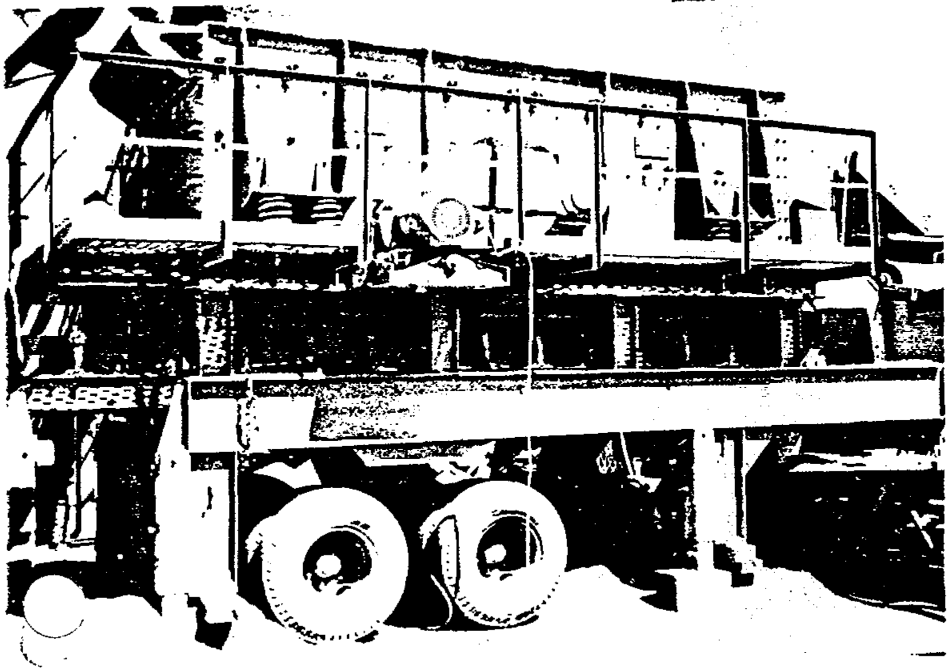
SPRAY PIPE HOLES

Spray pipe holes can be provided for operator installation of spray pipes or for possible future addition of spray equipment. The holes in the sideplate are reinforced by a ⅝" thick steel ring 8½" in diameter welded to the sideplate. This ring may be drilled and tapped to accommodate capscrews fastening a steel coverplate until future installation of spray pipe equipment.



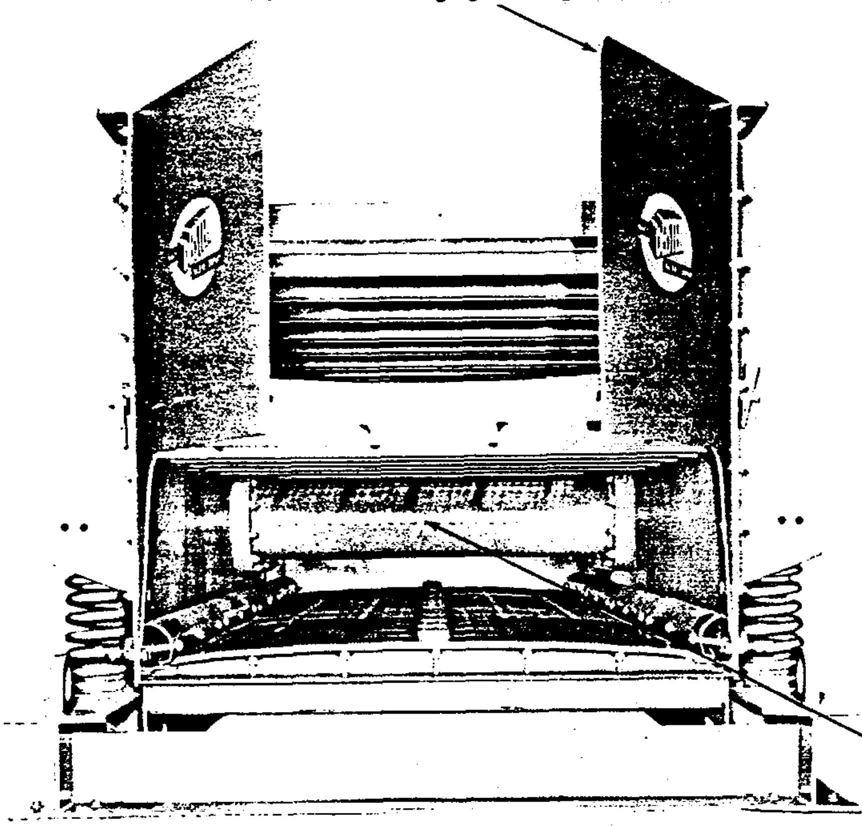
Type BTFM3P-3620, 3 deck, 6' x 20' *with 12" top deck discharge lip.* Shown without screening media and tensioning devices.





Type BTFM3P-3616, 3 deck, 6′ x 16′ Deister triple shaft horizontal vibrating screen mounted on a portable plant with a removable 49″ converging discharge chute.

Removable converging discharge chute.



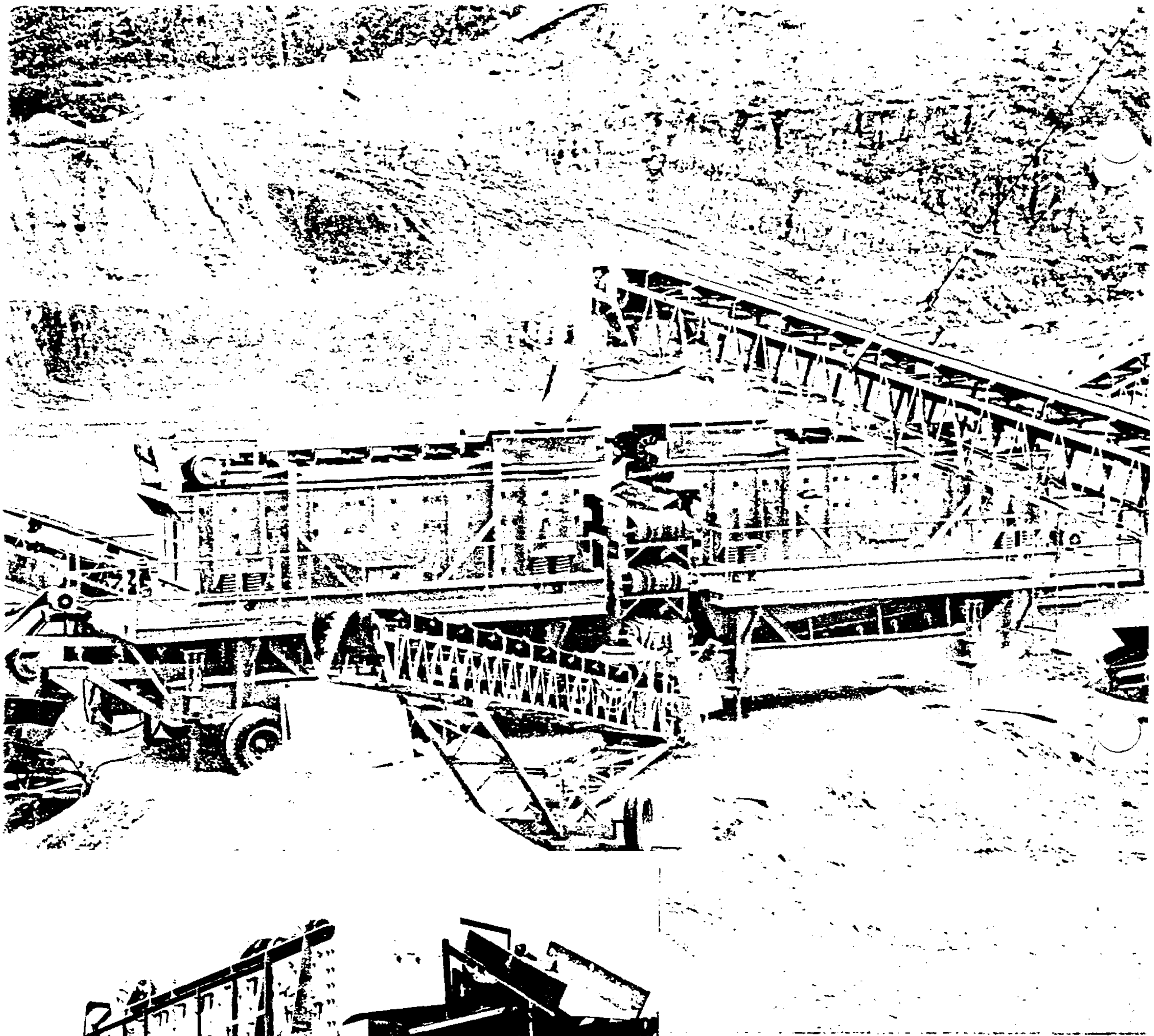
Wear resistant rubber tube shield glued to light gauge steel plate, tack-welded to tube.

FEED BOX

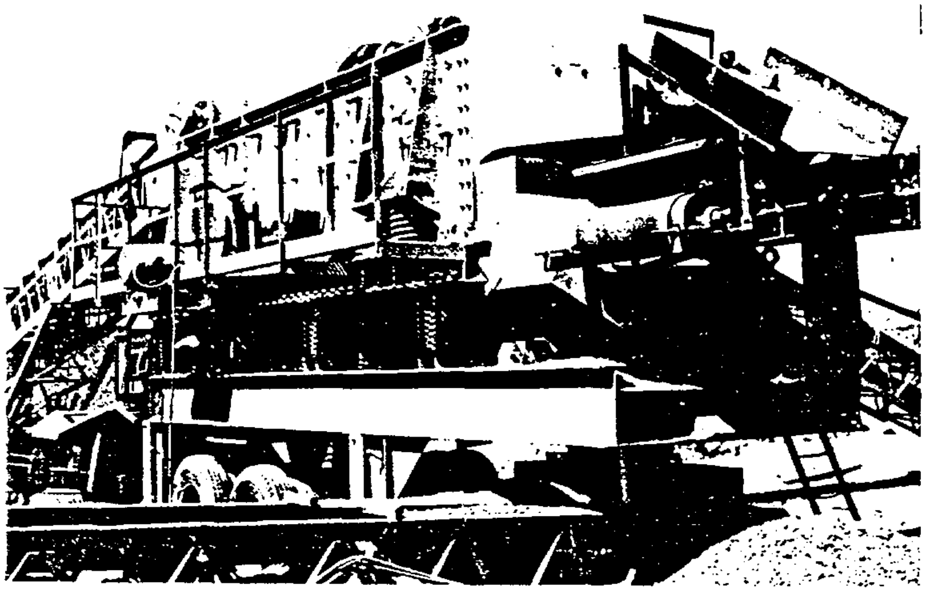
Feed boxes are standard equipment on most units with size depending on model and application of vibrating screen. Constructed of $\frac{5}{16}$″ thick steel plate, formed, braced and welded, with a $\frac{3}{8}$″ thick replaceable A-R steel wear plate in the bottom. The feed box is bolted to angles welded to the vibrating screen.

DISCHARGE LIPS

Up to 54″ long special discharge lips can be supplied to discharge onto belts, chutes, or into the top of a crusher. Both top and middle decks of a triple deck screen can easily discharge into a crusher since the vibrating mechanism is located between the middle and bottom decks.



Two BTFM3P-3620, 3 deck 6' x 20' screening 450 TPH of ¾" x 0 crushed stone.



BTFM3P-3616, 3 deck 6' x 16' screening 400 TPH of sand and crushed gravel.

DEISTER MACHINE COMPANY, INC.
P.O. Box 5188, Fort Wayne, Indiana 46895
Phone No. (219) 426-7495

DEISTER INC. 1912

Printed in U.S.A. 3M 6/88

Franklin Environmental Services
Gravel Separation System

TAB 4

SUPERIOR CONVEYORS

SUPERIOR INDUSTRIES

TABLE OF CONTENTS

Owner's Manual (PRSC)

SUPERIOR INDUSTRIES

09/02/99

To the owner:

Congratulations on your selection of a Superior Equipment portable radial stacking conveyor. This belt conveyor is one of the most economical means of transporting bulk material from one point to another. It has been designed to provide years of profitable and dependable service. To ensure maximum performance of your belt conveyor, it is mandatory that you thoroughly study this owner's manual and follow its recommendations. Proper operation and maintenance are essential to prevent injury or damage and to maximize machine life.

It is the owner's responsibility to:

- Operate and maintain this belt conveyor in a safe manner and in accordance with all applicable local, state, and federal codes, regulations and/or laws; and in compliance with on-product labeling and this owner's manual instructions.

- Make sure that all personnel have read this owner's manual, and thoroughly understand safe and correct installation, operation, and maintenance procedures.

- Make sure the belt conveyor is installed correctly before being placed in service, and at regular intervals thereafter serviced in accordance with procedures outlined in this owner's manual.

- Fulfill all warranty obligations so as not to void the warranties. The warranty section at the beginning of this owner's manual outlines the warranty policy of Superior Equipment. For a complete description of Superior Equipment's obligations arising from the sale of this equipment, refer to Superior Equipment's terms and conditions of sale on the back of Superior's sales contract.

Superior Equipment reserves the right to make product improvements to the equipment at any time.

WARRANTY

Seller warrants to original Buyer that merchandise manufactured by the Seller will be free from defects in material and workmanship when used under proper and normal use for a period of 1 year after delivery. Seller's liability under this warranty is expressly limited, in Seller's discretion, to replacing or repairing any merchandise found to be defective within 1 year after delivery. Buyer expressly agrees that replacement or repair of the merchandise is, in Seller's discretion, Buyer's sole and exclusive remedy for any breach of warranty. In the event any merchandise is found to be defective during the warranty period, Buyer shall notify Seller in writing of any claimed defect within 30 days after such defect is first discovered, but not later than 1 year from the date the merchandise was delivered to the Buyer and provide Seller with an opportunity to inspect and test the merchandise claimed to be defective. The effects of normal wear and tear do not constitute a defect for purpose of this warranty. Seller shall pay all reasonable transportation charges incurred in returning to Seller any merchandise agreed in writing by Seller to be defective; however, Buyer shall pay all transportation, removal, and replacement charges covering any merchandise returned that does not prove to be defective. This warranty is provided by the Seller solely to the original Buyer of the merchandise and applies to items manufactured by the Seller as well as any warranties provided by the Seller's suppliers.

THIS WARRANTY IS THE SOLE AND ENTIRE WARRANTY PERTAINING TO THE SELLER'S MERCHANDISE AND IS IN LIEU OF AND EXCLUDES ALL OTHER WARRANTIES OF ANY NATURE WHATSOEVER, WHETHER EXPRESSED, IMPLIED, OR ARISING BY OPERATION OF LAW, TRADE USAGE, OR COURSE OF DEALING, INCLUDING, BUT NOT LIMITED TO, WARRANTIES OF MERCHANTABILITY AND WARRANTIES OF FITNESS FOR A PARTICULAR PURPOSE.

SAFETY FIRST!

Accidents can be prevented by recognizing the causes or hazards before an accident occurs and doing something about them. Regardless of the care used in the design and construction of this equipment, there are some areas that cannot be safeguarded without interfering with accessibility and efficient operation.

⚠ *This message alert symbol identifies important safety messages on the equipment and in the owner's manual. When you see this symbol, be alert to the possibility of personal injury and carefully read the message that follows.*

This message alert symbol identifies information that must be heeded for proper operation of the equipment and to prevent damage or deterioration of the equipment.

In the owner's manual and on decals used on the equipment the words **DANGER, WARNING, CAUTION, IMPORTANT,** and **NOTE** are used to indicate the following:

DANGER: This word warns of immediate hazards which, if not avoided, will result in severe personal injury or death.

WARNING: This word refers to a potentially hazardous situation which, if not avoided, could result in severe personal injury or death.

CAUTION: This word refers to a potential hazard or unsafe practice which may result in minor or moderate personal injury.

IMPORTANT: Highlights information that must be heeded.

NOTE: A reminder of other related information that needs to be considered.

BE CERTAIN ALL EQUIPMENT OPERATORS ARE AWARE OF THE DANGERS INDICATED BY SAFETY DECALS APPLIED TO THE EQUIPMENT, AND BE CERTAIN THEY FOLLOW ALL SAFETY DECAL INSTRUCTIONS. CONTACT SUPERIOR EQUIPMENT FOR SAFETY DECAL REPLACEMENT.

SAFETY DECALS

Not all may apply to your equipment - see safety decal placement illustration.

19-00001

⚠ DANGER

MOVING PARTS HAZARD

Can crush or dismember hands and fingers.

- Keep hands away when belt is moving.
- Lock out power before cleaning or servicing.

ISO-0005

19-00002

⚠ DANGER

MOVING PARTS HAZARD

- Keep hands, clothing, and hair away from moving belts and parts.
- Replace guard before operating.

ISO-0007

19-00003

⚠ WARNING

PINCH POINT HAZARD

Can crush or dismember hands and fingers.

- Keep hands clear when undercarriage is moving.
- Replace or remove hitch pins only after undercarriage has stopped moving.

ISO-0006

19-00004

⚠ WARNING

MOVING PARTS HAZARD

Can crush or dismember hands and fingers.

Do not operate with guard removed.

ISO-0009

19-00005

⚠ DANGER

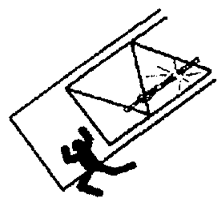
PINCH POINT HAZARD

Keep away from moving parts.

ISO-0020

19-00053

⚠ DANGER



19-00053

Wire rope WILL FAIL if worn-out, overloaded, misused, damaged, improperly maintained or abused. Wire rope failure may cause serious injury or death! Protect yourself and others

- [illegible] wire rope for WEAR, DAMAGE, or ABUSE BEFORE USE.
- [illegible] wire rope that is WORN-CUT DAMAGED or ABUSED.
- [illegible] Owner's Manual for INSPECTION REQUIREMENTS.
- [illegible] any body parts inside the truss frame unless stinger has been SECURED with chain.

19-00024

⚠ CAUTION

- Maximum travel speed 40 MPH on paved roads, SLOWER speed on other roads.
- Travel restricted to daylight hours and when clear visibility exceeds 500 feet.

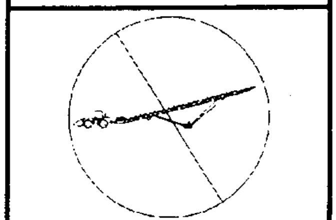
ISO-0021

SAFETY DECALS

Not all may apply to your equipment - see safety decal placement illustration.

19-00009

WARNING



During pit transport conveyor may tip over if not lowered to its lowest position.

19-00023

CAUTION

Crib machine before operation to prevent fatigue damage.

19-00006

DANGER

220 VOLTS

19-00015

DANGER

- Jack one wheel at a time.
- Block the other wheel, and anchor conveyer tail section before jacking.
- Telescoping & swiveling wheels are the only operations to be performed while jacked-up

19-00007

DANGER

440 VOLTS

19-00133

Axle Outriggers must be raised off ground before raising/lowering conveyor via undercarriage.

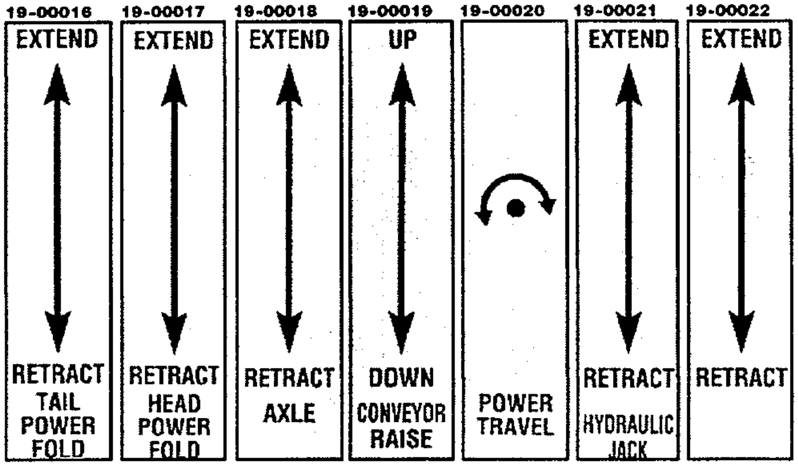
19-00132

Maintain 85 PSI Tire pressure

CONTROL AND IDENTIFICATION DECALS

Not all may apply to your equipment. Order replacements by part number.

19-00016 19-00017 19-00018 19-00019 19-00020 19-00021 19-00022



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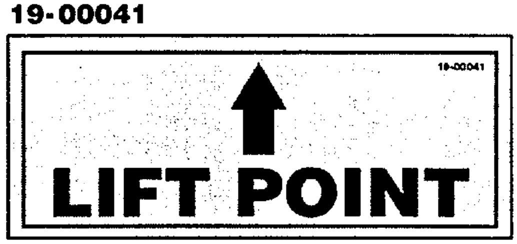
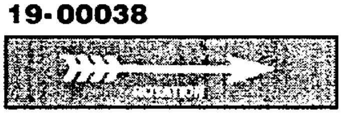


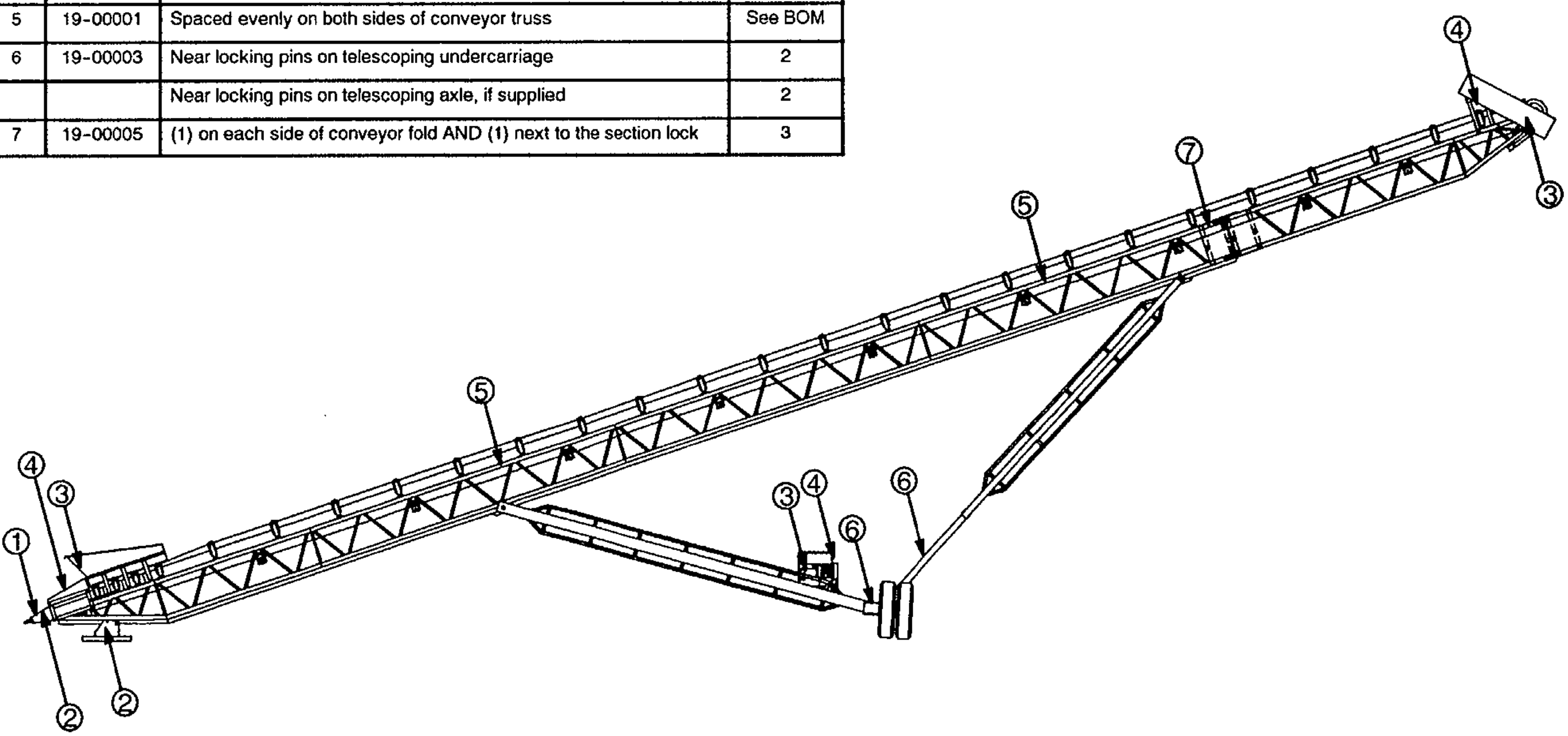
19-00038



19-00039

SAFETY DECAL PLACEMENT

Ref.	Part No.	Placement	Qty.
1	19-00009	(1) on top of ring tow hitch	1
2	19-00024	(1) on glad hand box OR	See BOM
		(1) on each side of 5th wheel hitch AND (1) next to 19-00009 OR	See BOM
		(1) next to 19-00009	See BOM
3	19-00002	On back side of receiving hopper, if supplied	1
		Inside drive guard on back plate	1
		Inside 3 HP pump drive guard, if supplied	1
4	19-00004	On top of tail pulley guard	1
		On side of drive guard cover	1
		On 3 HP pump drive guard, if supplied	1
5	19-00001	Spaced evenly on both sides of conveyor truss	See BOM
6	19-00003	Near locking pins on telescoping undercarriage	2
		Near locking pins on telescoping axle, if supplied	2
7	19-00005	(1) on each side of conveyor fold AND (1) next to the section lock	3



SAFETY INSTRUCTIONS FOR OPERATION AND MAINTENANCE

These are general safety considerations—additional precautions may be necessary to operate your equipment in a safe manner. Be certain you are operating your equipment in accordance with all safety codes, OSHA rules and regulations, insurance requirements; and local, state, and federal laws.

1. **Do not allow anyone to operate the conveyor until he or she has read the owner's manual and is completely familiar with all safety precautions.**

2. Do not allow the following people to operate or maintain the conveyor:
   - Children
   - Persons unfamiliar with the equipment, or unfamiliar with safe operating and maintenance procedures for the equipment.
   - Persons under the influence of alcohol, medications, or other drugs that can impair judgement or cause drowsiness.

3. Make sure everyone is clear of the conveyor before starting the belt during operation or maintenance. Never allow anyone to ride on the conveyor!

4. **Do not** wear loose hanging clothes, neckties, or jewelry. Long hair is to be placed under a cap or hat. These precautions will help prevent you from becoming caught in the moving parts of the conveyor.

5. **Do** wear safety glasses, ear protection, respirators, gloves, hard hats, safety shoes, and other protective clothing when required. Requirements for personal protective equipment will vary depending upon conveyor placement and material to be conveyed. It is the responsibility of conveyor operators to be certain they make use of all necessary personal protective equipment.

6. Buildup of materials on pulleys or idlers will lead to belt misalignment or damage. When removing such materials, the conveyor must be stopped and power controls must be locked-out or tagged-out.

7. The conveyor should not be used to handle materials other than those which were specified as part of its design and manufacture. It is the operator's responsibility to be aware of the conveyor system capacities and operate the conveyor accordingly.

8. Make sure the operator's area is clear of any distracting objects. Keep work areas clean, and free of grease and oil to avoid slipping or falling.

9. Periodically check all shields and structural members. Replace or repair anything that could cause a potential hazard.

10. When the belt is moving, the material travels at a speed sufficient to cause injury. Do not start the conveyor until you are certain no one is exposed to the moving parts or to the material being discharged from the end of the conveyor.

11. When doing maintenance work on structural parts or repairing any moving parts:
    - Disconnect and lock-out or tag-out all power sources. Know OSHA requirements.
    - When welding is required, disconnect all power sources and connect ground to point closest to welding area.
    - Block all wheels to prevent the conveyor from moving, and block any extended hydraulic cylinders to prevent them from moving or retracting.

12. If any safety devices are not functioning properly, do not use the conveyor. Remove it from service until it has been properly repaired.

13. Do not replace components or parts with other than factory-recommended service parts. To do so may decrease the effectiveness of the unit.

14. Do not lubricate parts while the conveyor is running.

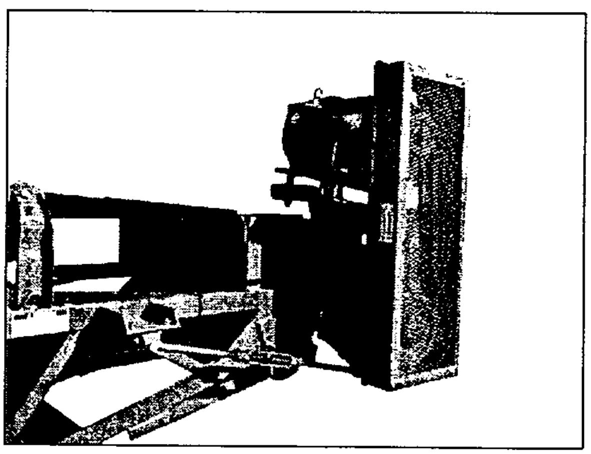
15. Before starting engines within enclosed areas, be certain ventilation is sufficient to avoid buildup of exhaust fumes.

16. Relieve any and all pressure before opening, repairing, or removing any air pressure lines, hydraulic lines, valves, fittings or seals. In the event of an hydraulic line rupture, **stay clear** of the area until pressure has been relieved. Clean up any spilled fluid before performing repairs in the area.

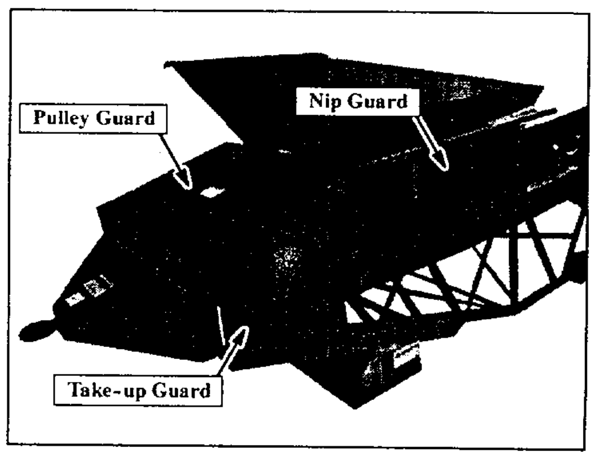
17. It is the operator's responsibility to be aware of equipment operation and work area hazards at all times.

18. Operators are responsible to know the location and function of all controls and indicators, including electrical power panels, hydraulic controls, motor controls, incline indicators, fuel and oil level indicators, belt scale controls, etc.

19. Operators are responsible to know the location and function of all guards and shields including but not limited to drive guards, pulley guards, and nip guards; and are responsible to make certain that all guards are in place when operating the conveyor (See below).

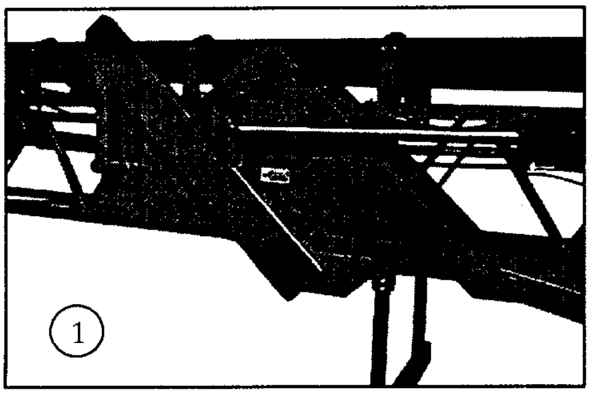


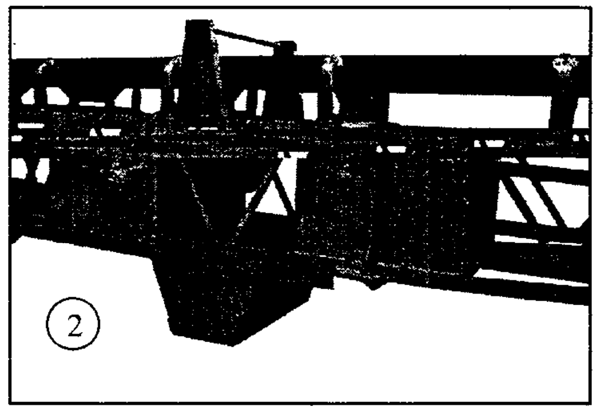
Typical head end drive guard

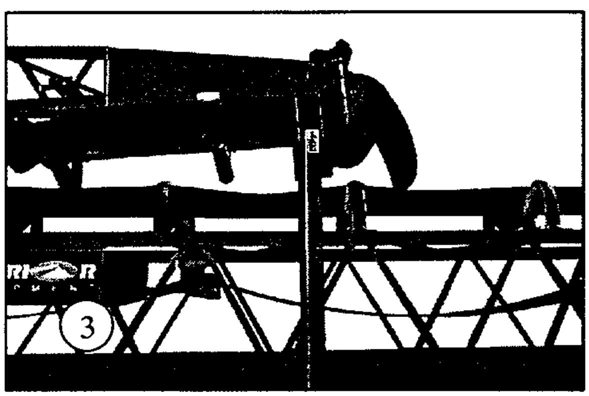


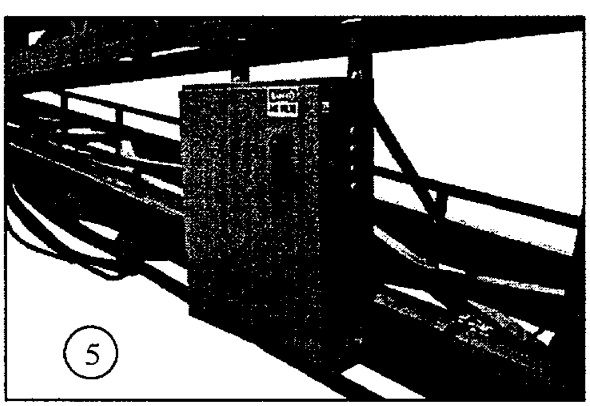
Typical tail end guards

20. Operators are responsible to be aware of safety hazard areas and follow instructions on warning, caution, or danger decals applied to the conveyor. Safety hazard areas may include but are not limited to:
    - Pinch points at fold hinge areas (#1, #2)
    - Pinch points at fold support areas (#3)
    - Pinch points where locking pins are used (#4)
    - Electrical control panels (#5)
    - Moving parts hazards on drives
    - Moving parts hazards where contact with belts and idlers is possible









SITE PREPARATION

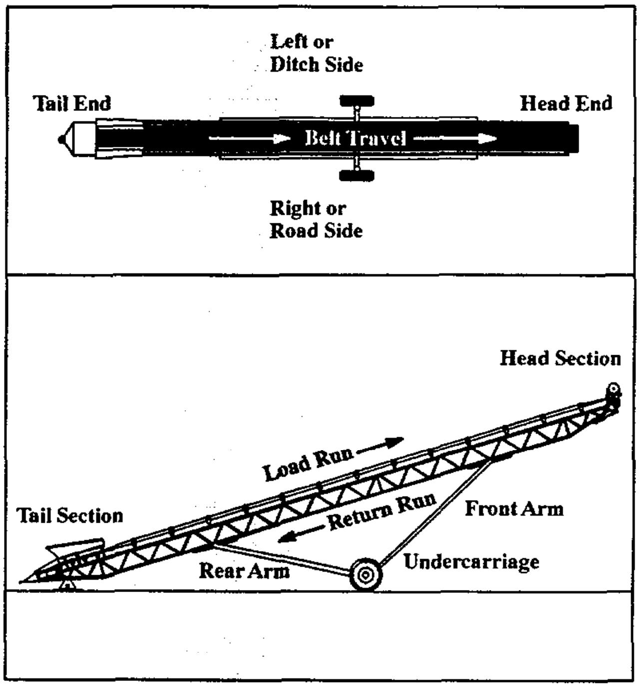


Figure 1. Conveyor terms.

Location of conveyor is generally determined by the location of the intake and discharge of material to be conveyed. Improper site conditions can adversely affect the operation and maintenance of your conveyor.

The area around the conveyor should be kept clear and level to make the loading of the conveyor and discharge of material as convenient as possible.

The conveyor tail section (Fig. 1) must have adequate clearance all around to allow for maintenance and the removal of material spillage.

> ***All portable conveyors must be kept reasonably level to maintain proper balance and to keep a permanent twist from setting into the conveyor frame and undercarriage.***

1. Position the conveyor in the working area as required.
2. If the conveyor has a removable hitch, disconnect the removable hitch from the tail section (Fig. 2).

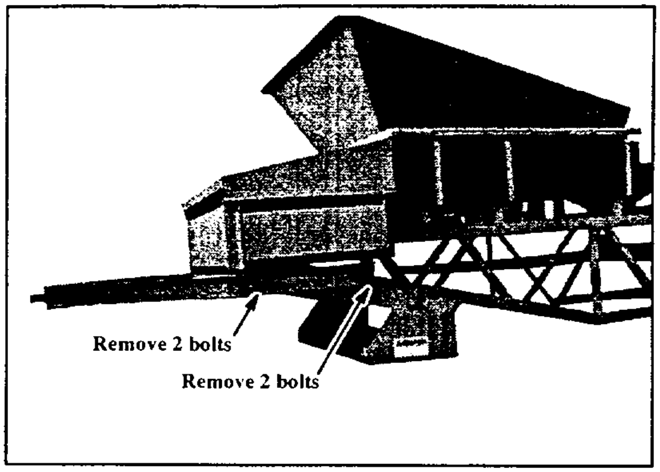


Figure 2. Conveyor tail section with removable hitch.

3. If the conveyor has no top-fold or side-fold sections, release the axle brakes (if supplied), remove all wheel blocking, and proceed to step #7.
4. If the conveyor axle has brakes, check to be sure the brakes have not been released after transport. If the brakes have been released, block the wheels in transport or road travel position (Fig. 3) to prevent rolling in either direction.

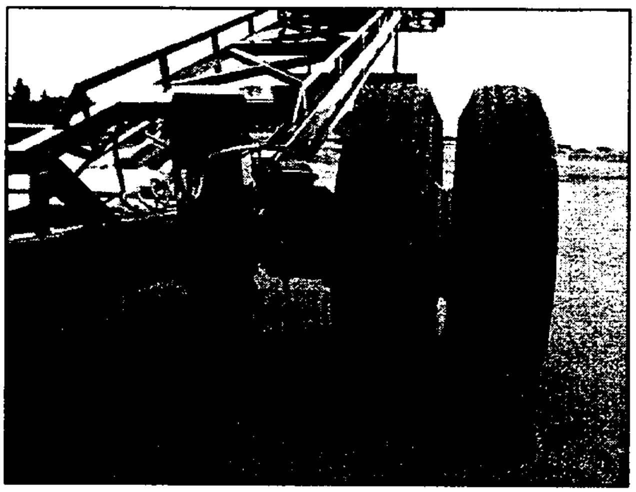


Figure 3. Swivel wheels in road travel position (parallel to conveyor).

UNFOLDING SECTIONS AND INSTALLING THE ANCHOR PIVOT BASE

When unfolding or folding conveyor sections, always be certain the wheels are blocked in transport position to prevent the conveyor from rolling in either direction and possibly causing injury to operators. When unfolding or folding side sections on conveyors, use equipment which will support the weight of the section.

When unfolding sections, either manually or by hydraulics, be certain enough slack is allowed on the load run side (Fig. 1) of the conveyor so the belt will not bind up, stretch, or prevent the conveyor unfolding.

5. See hydraulic controls (Fig. 4)

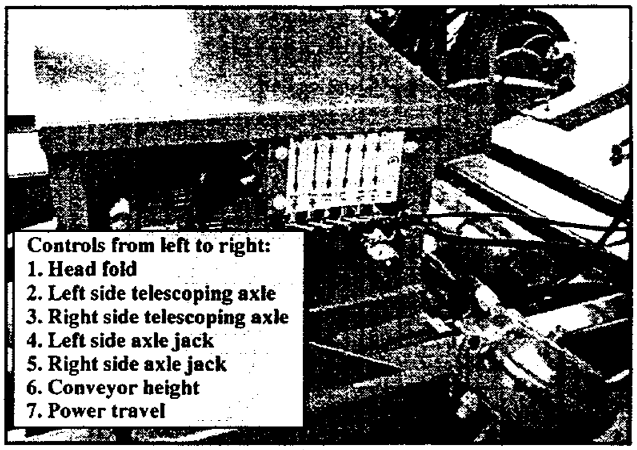


Figure 4. Hydraulic controls for a conveyor with full hydraulics. Not all may apply to your conveyor.

6. Unfold the conveyor head section, taking care that the belt does not bind up or catch. On side-folding conveyors, remove the safety pin before unfolding, and make certain the section latch and safety pin are locked after the section has been unfolded.
7. Using appropriate equipment, lift the tail section of the conveyor approximately one foot.
8. Position the base assembly under the pivot assembly (Fig. 5). The pivot assembly may need to be attached to the conveyor with the supplied hardware.

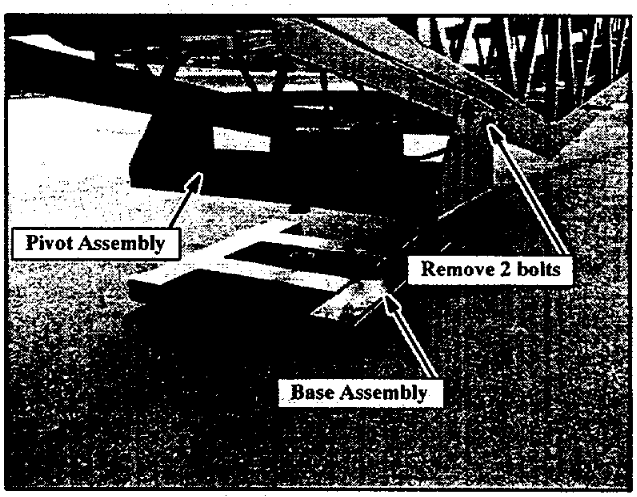


Figure 5. Conveyor anchor pivot base assembly.

9. On conveyors where the pivot assembly doubles as a fifth wheel hitch, two bolts must be removed to allow the assembly to pivot.
10. Lower the conveyor tail section until the pivot assembly is seated in the base assembly. Bolt together with supplied hardware.

TELESCOPING AXLES

11. Block the wheel(s) on one side of the conveyor.
12. Using hydraulic axle jacks (if supplied) or appropriate equipment, raise the axle on the other side of the conveyor just high enough to allow the wheels to move freely.
13. If the conveyor is equipped with power travel, install the power travel drive chain when the drive wheel is raised.
14. The conveyor may be supplied with up to four locking pins on each side (Fig. 6). The axle pin does not have a pull ring. The undercarriage locking pin is the shortest, and has a hair pin clip which must be used to keep it in place. The swivel box locking pin is longer than the telescoping axle locking pin.

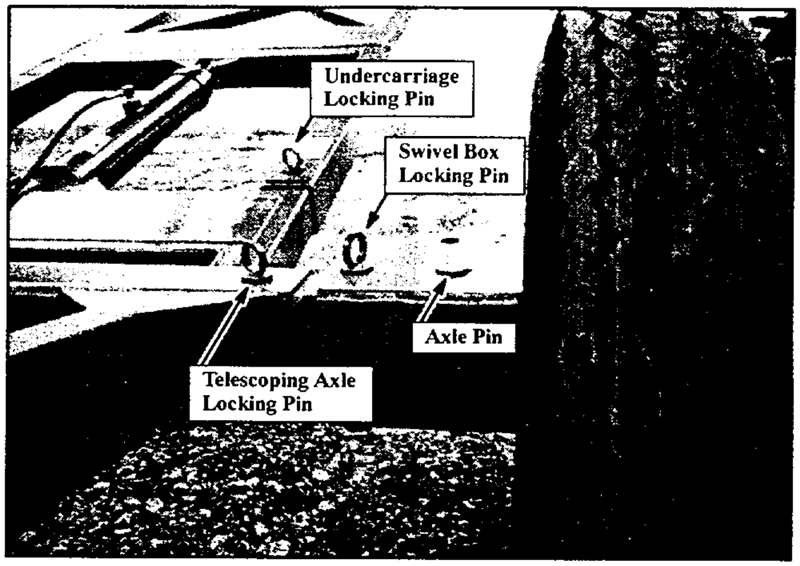


Figure 6. Conveyor undercarriage.

15. Remove the telescoping axle locking pin (Fig. 6) and fully extend the tube to the working position, either manually or by hydraulics.
16. Reinsert the telescoping axle locking pin, making certain it is fully engaged.
17. Lower the axle, and repeat for the other side.

ADJUSTING CONVEYOR HEIGHT

The swivel wheels must be in transport position (Fig. 3) when adjusting conveyor height. The wheels must be unblocked and allowed to move freely, and the tail section must also be allowed to move freely to prevent any damage to the conveyor undercarriage.

> ***When manually raising your conveyor, do not extend the outer tubes on the telescoping undercarriage more than a foot beyond the last pinning hole in the inner tubes. Doing so may cause injury to personnel or equipment damage if the outer tubes slide off the inner tubes.***

18. Slowly open the petcock on the brake air tank to bleed off the air if the brakes were not released after transport. Remove all wheel blocking.
19. Remove the undercarriage locking pins (Fig. 6), and raise the conveyor to the desired working height, either manually or by hydraulics.
20. Reinsert the undercarriage locking pins, making certain they are fully engaged. Reinsert the hair pin clips.

SWIVELLING WHEELS

21. Block the wheel(s) on one side of the conveyor.
22. Using hydraulic axle jacks (if supplied) or appropriate equipment, raise the axle on the other side of the conveyor just high enough to allow the wheel(s) to move freely.
23. Remove the swivel box locking pin (Fig. 6) and rotate the swivel box 90 degrees to the radial or working position (Fig. 7).

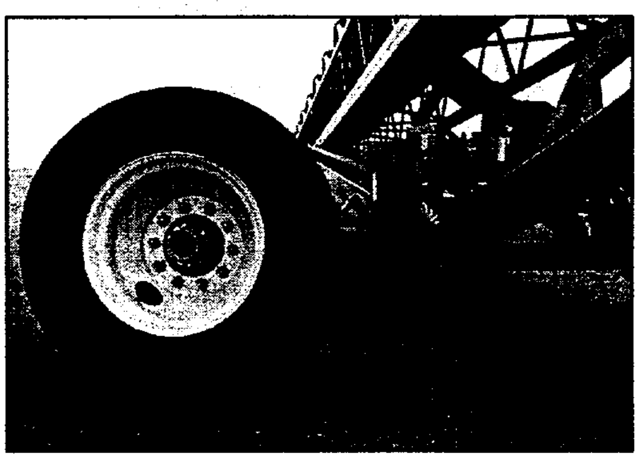


Figure 7. Swivel wheels in radial or working position.

24. Reinsert the swivel box locking pin, making certain it is fully engaged
25. Lower the axle, and repeat for the other side.

CONVERTING TO TRANSPORT POSITION

When converting from radial position to road or pit positions, be certain the conveyor is lowered to its lowest position to prevent tipping over!

1. Block the wheel(s) on one side of the conveyor.
2. Using hydraulic axle jacks (if supplied) or appropriate equipment, raise the axle on the other side of the conveyor just high enough to allow the wheel(s) to move freely.
3. If the conveyor is equipped with power travel, remove the power travel drive chain when the drive wheel is raised.
4. Remove the swivel box locking pin and rotate the swivel box 90degrees to transport position.
5. Reinsert the swivel box locking pin, making certain it is fully engaged.
6. Lower the axle, and repeat for the other side.
7. Remove all wheel blocking.

The swivel wheels must be in transport position (Fig. 3) when adjusting conveyor height. The wheels must be unblocked and allowed to move freely, and the tail section must also be allowed to move freely to prevent any damage to the conveyor undercarriage.

8. Remove the undercarriage locking pins and lower the conveyor to its lowest position.
9. Reinsert the undercarriage locking pins, making certain they are fully engaged. Reinsert the hair pin clips.
10. Using hydraulic axle jacks (if supplied) or appropriate equipment, raise the axle on one of the conveyor just enough to allow the wheel(s) to move freely.
11. Remove the telescoping axle locking pin and retract the tube to the closed position, either manually or by hydraulics.
12. Reinsert the telescoping axle locking pin, making certain it is fully engaged.
13. Lower the axle, and repeat for the other side.
14. Block the wheels in transport position to prevent rolling in either direction.

When unfolding or folding conveyor sections, always be certain the wheels are blocked in transport position to prevent the conveyor from rolling in either direction and possibly causing injury to operators. When unfolding or folding side sections on conveyors, use equipment which will support the weight of the section.

15. Slowly fold the conveyor head section, taking care that the belt does not bind up or catch. On side-fold conveyors, remove the safety pin before folding, and make certain the section latch and safety pin are locked after the section has been folded.

16. Disconnect the base assembly from the pivot assembly.

PRE-OPERATION CHECKLIST

BEFORE STARTING THE CONVEYOR FOR THE FIRST TIME:

1. Carefully read through all safety instructions in the owner's manual.
2. Return and trough idlers are either greaseable or non-greaseable. Check greaseable idlers to be sure they are filled with grease.
3. Check to be sure the reducer is filled to the proper oil level.
4. Check to be sure that skirtboards at loading points are installed and adjusted. Refer to the owner's manual Belt Loading instructions for skirtboard adjustments.
5. Check equipment wiring—any and all wiring must be done by a qualified electrician.
6. Loosen and remove the v-belts by adjusting the torque arm reducer or motor mount tension bolts. Turn the driven sheave by hand to determine the direction of rotation. Run the drive motor or use a phase rotation indicator to determine the drive sheave direction of rotation. If both sheaves are not rotating in the same direction, the unit must be rewired by a qualified electrician. Adjust the torque arm reducer or motor mount tension bolts to set v-belts at proper tension. See Gates Belt Preventive Maintenance Manual in the owner's manual for tensioning instructions.
7. When a belt scraper is used, be sure that it is properly installed and working. See belt scraper and tensioner materials included near the back of the owner's manual if applicable.
8. Continue through the steps outlined below.

EVERY TIME BEFORE STARTING THE CONVEYOR:

1. Check to be sure the reducer is filled to the proper oil level.
2. Check all other fluid levels.
3. Be certain all guards and safety devices are in place and in working order.
4. Visually inspect all hoses, lines and belts for leaks, wear and damage.
5. Check and remove all tools and any foreign objects from the belt, particularly on the return run side (Fig.1) where they may get between the pulleys and belt. Grease on the belt should be removed immediately as it will deteriorate the belt.
6. Make certain no parts of the conveyor power, hydraulics, or moving parts have been locked-out or tagged-out. If they have, determine who placed the lockouts, and have them remove the lockouts or tagouts before starting the conveyor.
7. Walk completely around the conveyor, making certain no other personnel are under, on top of, or next to the conveyor. Warn anyone nearby that you are starting up the conveyor.
8. After starting the conveyor, check all controls and indicators or gauges to be certain they are in working order.
9. Check the operation of safety stop lines and switches, if applicable, after starting the conveyor.

GENERAL OPERATION

A conveyor belt, correctly installed and trained, will run straight and true. The belt must run centered on all terminal, snub, and take-up pulleys; troughing and return idlers throughout the entire length. Straight running also requires that the belt contact the horizontal roller of the troughing idlers.

Never use side-guide idlers to compensate for erratic belt travel. Self-aligning idlers should not be used to force the belt into correct running position, but rather as a safeguard against unusual operating conditions after the belt has been properly trained.

> ***Incorrect belt installation and training can result in severe edge damage, material spillage and leakage through the skirtboards at the loading point, and excessive power demands.***

Material spillage is the usual reason for belt carcass ruptures and pulley cover gouging and stripping, while leakage at the skirtboards results in excessive belt cover wear under the skirtboards.

After the belt has been properly trained while running empty, load the belt to facilitate breaking it in. When operating, the conveyor must be running before receiving material from the discharge unit. When shutting down, the discharge unit must be stopped first, while the conveyor will continue to run until empty. Check to be sure the electric controls are wired to provide the proper starting and stopping sequence. If you are running very wet or moist material, run the belt empty for at least three complete revolutions to clean material from the belt.

With the belt operating under load, check the belt for runout and, if necessary, realign idlers as described in the Belt Training instructions in the owner's manual. No special tools or equipment are needed to either maintain or service your conveyor.

BELT TRAINING

Belt training is a process of adjusting idlers and loading conditions in a manner which will correct any tendency of the belt to run off. Never attempt to train the belt by unequal adjustment of take-up side adjusting bolts. The take-ups are only used for keeping the tail pulley square with the conveyor frame, and to produce the necessary belt tension to prevent slippage and excessive belt sag between idlers.

The training of a conveyor belt causing it to travel over the center area of troughing idlers, pulleys,and return idlers is vitally important to trouble-free operation and low maintenance cost. Unless a belt itself is warped and curved from improper manufacture, use, or storage, it is possible to train it for central running. The following recommendations are basic to belt training procedures:

1. Level all frames crosswise as gravity will force the belt off-center if one side of the conveyor frame is lower than the other.
2. Square the tail pulley with the frame, using a large carpenter's square.
3. Square all troughing and return idlers with the frame and tighten the attachment bolts. Check squareness from both side members.
4. Run the conveyor empty and at reduced speed if possible. If the belt should show a side creep at only the splice area and this progressed along the conveyor instead of remaining at one point on the frame, the splice may not be square and may have to be redone.
5. Check the belt splice for squareness. The belt ends should be squared from centerlines found through the method described in the Belt Installation instructions in the owner's manual. Check the belt run on the return run side of the conveyor, or place a large plywood board under the belt on the load side to get accurate measurements. Check to see if a line between points B (Fig.10) runs parallel to the belt fasteners.
6. If necessary resplice the belt, following instructions in the Belt Installation instructions in the owner's manual. If you don't have sufficient belt length to resplice after squaring the belt ends, you will have to add a section of belt. When adding belt sections, remove enough length from the original belt to allow for a minimum distance of 3 feet between belt splices.
7. If you have determined the splice is square, examine the return run side of the conveyor for side creep first, beginning at the head end and working down to the tail. Make adjustments where side creep occurs as follows:
   A. The point of maximum side creep requires adjustment of a preceding idler when you are facing in the direction of belt travel.
   B. Loosen the bolts and pivot the idler around its midpoint, making these adjustments in small amounts, tightening the bolts and making a test run after each adjustment to see the effect on side creep. Run the belt at least three revolutions for the adjustment to take effect. If the point of maximum side creep changes, adjust the idler that precedes that new point.
8. Examine the load run side of the conveyor, following the belt travel from tail to head end. Make the same adjustments where side creep occurs.
9. When the slow running belt is centered, change to a higher speed (if used). Load the belt with material and continue testing until normal operating conditions cause no deviations from central running.

BELT LOADING

After the conveyor has been thoroughly checked over and all belt training completed, the conveyor can be loaded. Start with a light load and gradually work up to the load that the conveyor was designed to handle. When stopping the conveyor, operate until the belt is clear of material, especially at the end of each working day. During cold weather, material remaining on the belt will freeze to the rubber covering and may cause damage.

> ***Check chutes to see that the material is being directed onto the center of the belt (Fig.8). Off-center loading is harmful to belt, idlers, and shafting. The loading point of a conveyor is the critical point. Here the belt receives its major abrasion and practically all of its impact. The ideal condition is to have the material pass from chute to belt at the same speed and direction of travel as the belt, with a minimum amount of impact.***

Rubber skirtboards are bolted to the trough to form the load centrally on the belt, to prevent side spillage, and to prevent material from spilling out the back or bottom of the trough. Larger material spilling out the back of the trough has potential to catch in the belt or damage the tail pulley. Skirtboards will require adjustment or replacement as they wear.

Material should be *stilled* on the belt before it reaches the end of the skirtboards. If the material particles are still tumbling as they pass the skirtboard ends, belt speed may need to be adjusted, feed arrangement or rate may need to be adjusted, or the trough and skirtboards may need to be extended in order to avoid side spillage of material.

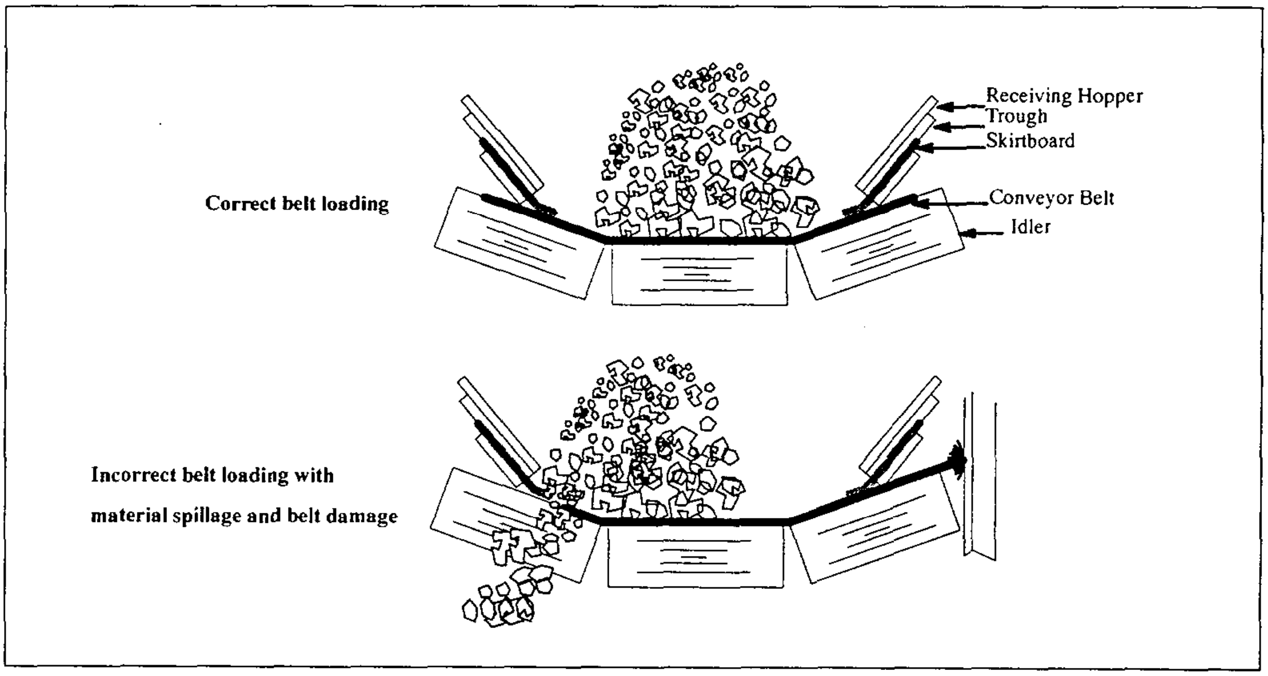


Figure 10. Belt Loading

BELT TIGHTENING

All Superior Equipment conveyors are equipped with take-up side adjusting bolts (Fig.9) at the tail end to maintain the necessary belt tension. With a wrench, use the take-up side adjusting bolts to move the sliding bearing assemblies forward. Apply the proper tension to the belt to prevent slippage and excessive belt sag between troughing idlers.

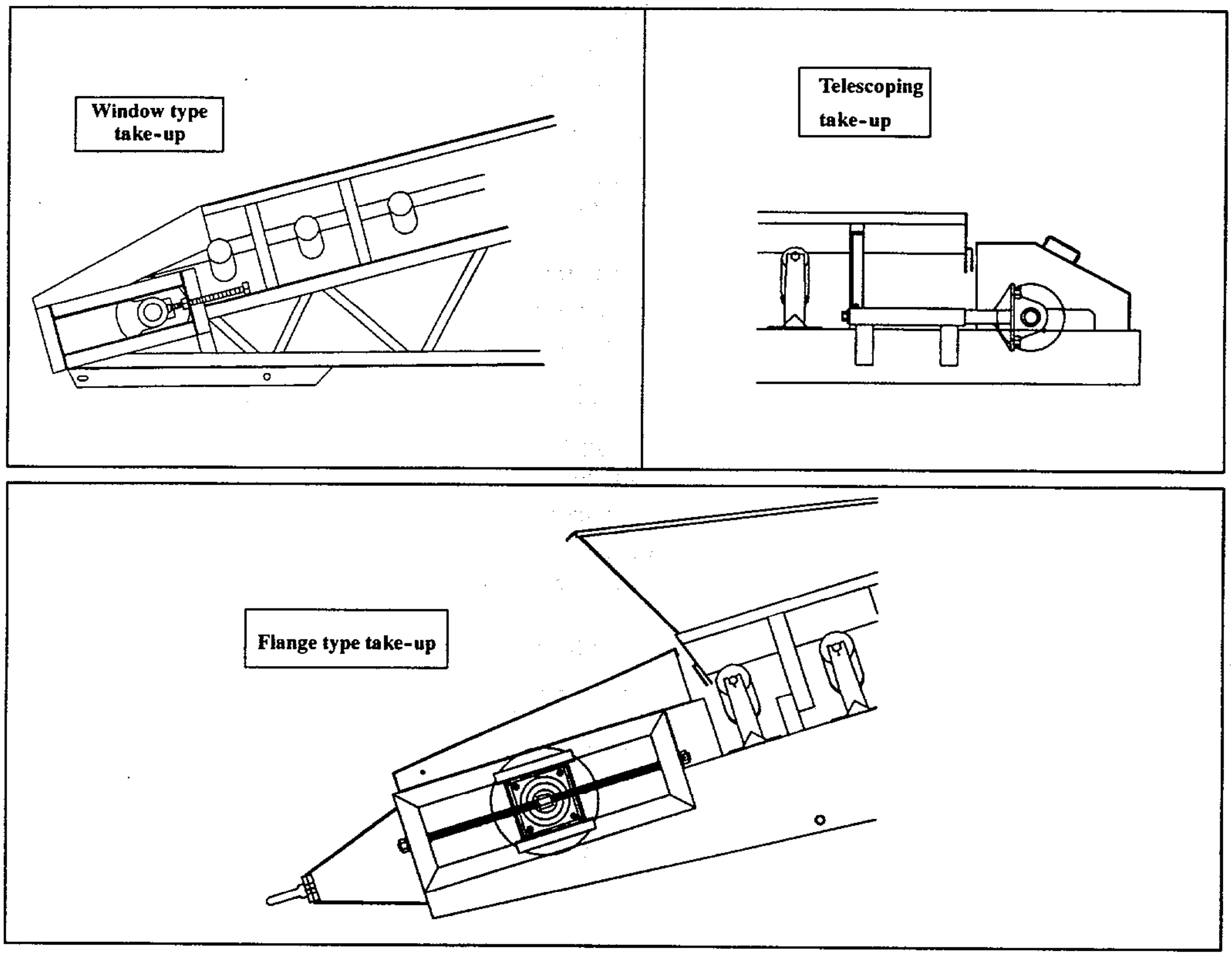


Figure 11. Side view of conveyor tail sections

BELT INSTALLATION

Belts are customarily packaged in crates which can be rolled from place to place. Crates and rolls are usually marked with an arrow which shows the direction in which they should be rolled. When hoisting the belt roll, a bar should be passed through the hole in the center of the roll. Fasten chain or cable to the ends of the bar for lifting, and use a spreader bar above the roll to prevent damage to the edge of the belt.

Always store the belt roll suspended on a tube or bar, or resting on the face width of the belt. Storing the belt roll with weight on one edge may stretch the belt, making it difficult to square at assembly and train during the initial operation. Belts should be stored in a dry, cool building. Never drop the belt or store it on its edges.

Installation of the belt begins with building a suitable stand behind the conveyor and then aligning the belting roll with the conveyor frame. If the area behind the conveyor will not permit this method of threading, the roll of belting can be suspended above the conveyor frame for threading.

Next, check the position of the side take-up bearings to make sure they are positioned all the way to the beginning of the adjustment frame. This will give you maximum take-up ability after belt installation. Then check the belt to make sure the load side (side with the thickest rubber covering) is facing up.

Most belting is shipped from the factory cut to length with additional allowance for squaring ends for the splice. Create a centerline for squaring the end of the belt by measuring and marking center points on the width of the belt at 3 foot intervals for at least 15 feet. Snap a chalkline or use a long steel rule to mark the average centerline through these points (Fig.10). Locate a centerline point (A) at least 10 feet from the edge of the belt. Locate points (B) equal distances from point (A) to connect as your cutting line. Use a straight edge as you cut the belt—a standard linoleum knife with hook usually works well.

Position the fastener manufacturer's template on the belt (or fashion one yourself given the manufacturer's recommendation for fastener spacing) and punch holes in the end of the belt for the fasteners. Always follow the manufacturer's recommendations as to the proper size of fasteners to be used on any belt. Attach a clamping plate onto the end of the belt to enable an even pull for threading the belt onto the conveyor (Fig.11).

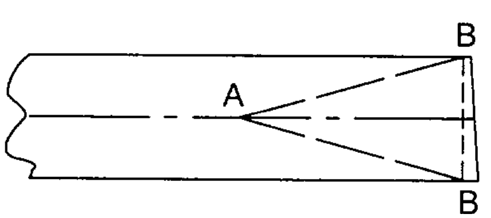


Figure 12. Squaring belt ends

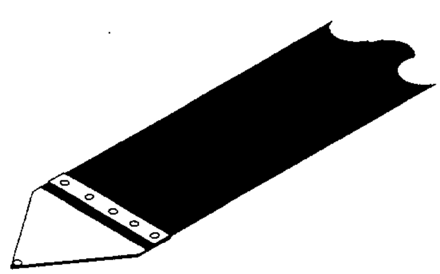


Figure 13. Clamping plate arrangement

Place the pulling plate on the bottom side of the belt so it will pass more easily over the troughing idlers. Bolt the clamping plate to the belt through the fastener holes—the number of bolts should be proportionate to the amount of pull exerted.

Connect a cable or rope to the clamping plate. A braking system can be made by using a belt clamp mounted on the conveyor frame to prevent belt runaway while threading. Slowly pull the belt into position (near the tail section for easy access) with a block and tackle or similar equipment.

Attach 2 stretcher clamps roughly 3 feet from each end of the belt. Make sure the stretcher clamp on the squared end of the belt is parallel with the belt end. Remove the clamping plate and firmly attach the parallel stretcher clamp to the conveyor frame.

Evenly draw the belt ends together, using a cable-jack or similar means, and pull the unsquared end of the belt over the top of the squared end until the correct belt tension is obtained. Maintaining this tension, create a centerline following the procedure described earlier, and mark a squared line where the belt must be cut for the splice.

Place a wooden plank under the splice point to facilitate the cutting and punching of holes in the belt. Cut the belt, position the fastener manufacturer's template on the belt end, and punch holes for the fasteners.

The use of belt tape under the belt fasteners is recommended to help reinforce the splice area. Refer to instructions included with the belt fasteners for proper installation.

> ***When adding or replacing sections of conveyor belt, always leave a minimum distance of 3 feet between belt splices. Installing belt sections of less than 3 foot length may place enough stress on the splices to cause damage if both splices run over the head or tail pulleys at the same time.***

BELT REPAIR

Fasteners can be used to make quick repairs to belt tears or to replace belt sections with new pads of the same belting (Fig.12). Coat all exposed edges or cuts with rubber cementing compound to prevent any moisture or foreign material from entering the belt carcass and causing further damage.

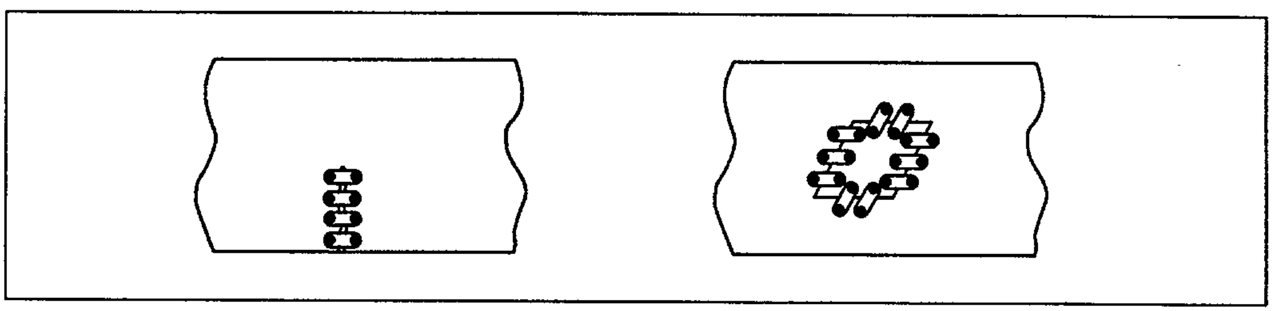


Figure 14. Repairing belt with fasteners

Problem	Solutions				
Belt runs off at the tail pulley	24	13	12	15	19
Belt runs off at the head pulley	26	13	20	19	14
Belt runs to one side at a particular point along the conveyor	13	12	5		
Belt section runs to one side along the full length of the conveyor	22	2	9	1	
Belt runs centered while empty, but off-center when loaded	15				
Belt slips	24	17	19	12	20
Belt slips on startup	24	17	20	8	
Excessive belt stretch	11	8	19	7	6
Belt breaks around the fasteners	2	21	11	10	18
Vulcanized splice separation	11	21	8	18	
Excessive belt top cover wear	10	23	15	19	6
Excessive belt bottom cover wear	19	12	17	18	20
Excessive belt edge wear	15	4	6	1	19
Belt cover swells or soft spots	6	10	8	18	
Belt hardens or cracks	6	21	20	16	
Lengthwise grooving or cracking of belt top cover	25	12	19	10	
Belt fabric decay	10	18	8	6	
Belt ply separation	11	21	9	6	3
Belt cleating separation, damage	21	31	30		
Belt fasteners pull out	2	32			
Hydraulic cylinders won't operate	33	34	35	36	37

1. The belt may be bowed. A new belt should straighten out after two to three hours running, or it must be replaced.

2. Improper or incorrectly installed belt fasteners.

3. Belt running speed may be too fast. Contact Superior Equipment about using a different drive sheave to change the running speed.

4. Belt may be strained on one side. A new belt should straighten out after two to three hours running. Belt section may require replacement.

5. Conveyor frame may not be level. Position the conveyor in a level work area.

6. Damage to belt by abrasives, chemicals, heat, oil, etc. Be certain belt was designed for use with specific materials being conveyed. If abrasive materials work into cuts and between plies, make spot repairs according to Belt Repair instructions in the owner's manual.

7. Dual pulley drives may not be running at the same speed. This is likely only if friction wheel drive tires were replaced. Contact Superior Equipment for replacement tires.

8. Drive may be underbelted. If you are not handling material for which the conveyor was manufactured, installation of another grade of belt may be required. Contact Superior Equipment.

9. Belt edge may be worn or broken. Remove worn section and splice in a new one according to Belt Installation and Repair instructions in the owner's manual.

10. Excessive impact of material on belt or fasteners. Modify feed to reduce impact. Contact Superior Equipment about installing impact idlers, where possible, to absorb impact.

11. Excessive belt tension. Reduce load being conveyed or adjust conveyor take-up side adjusting bolts to reduce tension.

12. Frozen idlers. Free idlers and lubricate according to Superior Components idler materials included near the back of the owner's manual. Replace idlers if necessary.

13. Idlers or pulleys out-of-square with center line of conveyor. Realign, following Belt Training instructions in the owner's manual.

14. Idlers improperly placed. Contact Superior Equipment about relocating idlers or inserting additional idlers spaced to support the belt.

15. Off-center loading. Material feed should be in direction of belt travel and at belt speed, centered on the belt. See Belt Loading instructions in the owner's manual.

16. Improper belt storage and handling.

17. Insufficient traction between belt and pulley. Lag the drive pulley, using grooved lagging in wet conditions. Contact Superior Equipment about increasing wrap with the addition of snub pulleys.

18. Material between belt and pulley. Remove accumulation and improve maintenance. Adjust the skirtboards, referring to Belt Loading instructions in the owner's manual.

19. Material build up. Remove accumulation and install cleaning devices, scrapers, or return belt covering.

20. Pulley lagging may be worn—replace if necessary. Use grooved lagging for wet conditions. Repair any protruding loose bolts.

21. Pulleys are too small. Contact Superior Equipment about using larger diameter pulleys.

22. Belt splices may not be square. Check and replace if necessary, following Belt Installation instructions in the owner's manual.

23. Material loading speed too high or too low. Adjust feed rate or change belt speed. Contact Superior Equipment to determine if a different drive sheave size may be used to change belt speed.

24. Insufficient belt tension. Use take-up side adjusting bolts to increase belt tension, following Belt Tightening instructions in the owner's manual.

25. Skirtboards improperly placed. Adjust skirtboards so that they do not rub against the belt, referring to the Belt Loading instructions in the owner's manual.

26. Idlers leading to head pulley may be out of alignment. Realign, following Belt Training instructions in the owner's manual.

27. Return rollers may be out of alignment. Inspect and realign at right angles to the center of the belt.

28. Sagging between idlers. Tighten belt according to Belt Tightening instructions in the owner's manual.

29. Material may be wedged between skirtboards and belt.

30. Material conveyed may be breaking the bond. Contact Superior Equipment.

31. Improper belt tracking, with cleating hitting the conveyor frame.

32. Splice area may be striking obstructions, including the conveyor frame.

33. Check power to hydraulic pump, and pump rotation. Have a qualified electrician rewire if necessary.

34. Check oil pressure. If gauge indicates low pressure, contact Superior Equipment about relief valve adjustments.

35. Check for hydraulic line leakage. Relieve line pressure before tightening or replacing fittings or hoses.

36. Check to be certain you are using recommended oil, particularly when running in hot or cold weather conditions.

37. Check dual overcenter valve. Contact Superior Equipment for instructions on replacement or repair.

GENERAL MAINTENANCE

Review safety instructions on pages 3-14 before starting maintenance.

To ensure efficient operation, the operator or maintenance personnel should inspect, lubricate, and make necessary adjustments and repairs at regular intervals. Parts that are starting to show wear should be ordered ahead of time, before a costly breakdown occurs and you have to wait for replacement parts. Keep good maintenance records, and adequately clean your conveyor after each use.

Proper lubrication is important. Too little lubricant will cause premature failure of a bearing. Too much lubrication usually causes high operating temperature and early failure of seals. Follow all Lubrication instructions included in this section.

Operator or maintenance personnel should:

DAILY:

1. Check for loose bolts and mechanical joints.
2. Check during operation for unusual sounds to warn of future trouble. Promptly correct any problems identified.
3. Check and correct belt travel if the belt is not running centered on all troughing and return idlers. See Belt Training and Belt Loading instructions in this owner's manual.
4. Check the operation of safety stop lines and switches.

WEEKLY:

5. Check belt tension. Tighten only if there is slippage on drive pulley or enough sagging between idlers to allow spillage. This is especially important when a belt scale is used, as a sagging belt could produce incorrect readings and affect end product specifications. See the Belt Tightening instructions in this owner's manual.
6. Inspect and replace drive pulley lagging as needed.
7. Make sure troughing and return idlers contact the belt and run free under load. Shimming may be necessary if a belt scale is used.
8. Check and adjust the skirtboards to prevent side spillage, and to prevent material from falling between the tail pulley and the belt.
9. At different points, check the level across the conveyor frame and correct as needed.
10. Inspect belt fasteners for wear and replace as needed.
11. Check the empty belt for tears and other damage. Repair any damage and eliminate the causes.
12. Check taper-lock bushings in the drive sheave and in the head and tail pulleys for tightness.

LUBRICATION

Lubricate the various parts as follows:

1. Bearings: Follow the guide in the instruction sheet for Dodge bearings included in this owner's manual. Bearings mounted on head and tail pulley shafts will run under 250 RPM, bearings mounted on balanced drive jack shafts will run around 1800 RPM.
2. Follow instructions in Superior Components idler materials included in this owner's manual. **Check** before attempting to lubricate, as some idlers are permanently sealed and cannot be greased.
3. Speed reducer (shaft-mounted): Maintain oil level. Follow oil recommendations in the gear reducer parts replacement manual included in this owner's manual.
4. Adjusting bolts: Lubricate as needed with standard oil with detergent.
5. Electric motors: Follow manufacturer's recommendations included in this owner's manual.
6. Wheel bearings: Repack at 5000 miles or every 6 months. Use same lubricant as that used with the other bearings.

SUGGESTED HYDRAULICS MAINTENANCE SCHEDULE

Daily (10hrs)

1. With all cylinders in retract position, check proper oil level in reservoir.
2. Check oil temperature during normal operation.

Monthly (250hrs)

1. Check thoroughly for oil leaks.
2. Check pressure gauge to ensure correct setting.
3. Clean breather cap on reservoir.

Biannually (1000hrs)

1. Remove and clean oil suction strainer in reservoir.
2. Replace return oil filter.
3. Check oil for contamination, change if any.
4. Check cylinder rods for nicks, polish off if found.

Annually (2000hrs)

1. Change oil and return oil filter. Do not mix brands of oil.
2. Send oil sample to a lab for analysis.

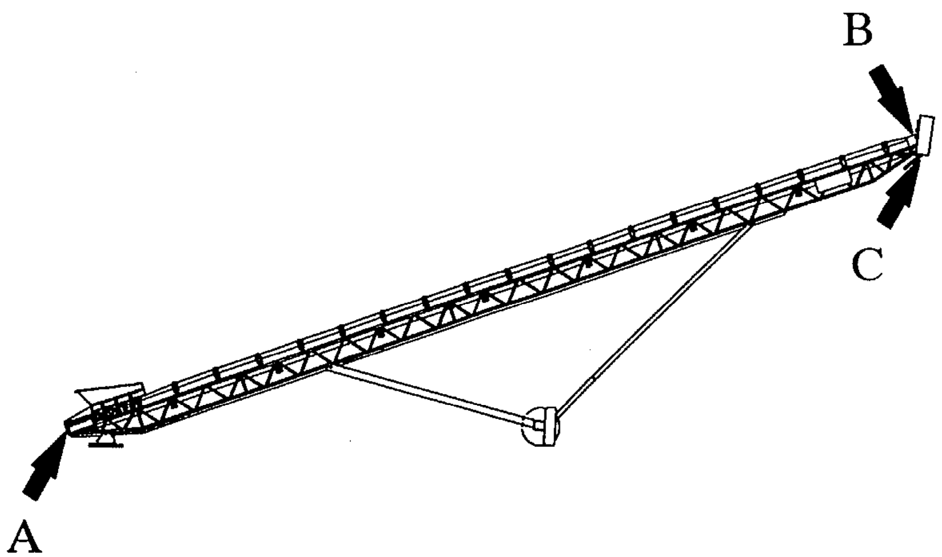
Hydraulic Oil

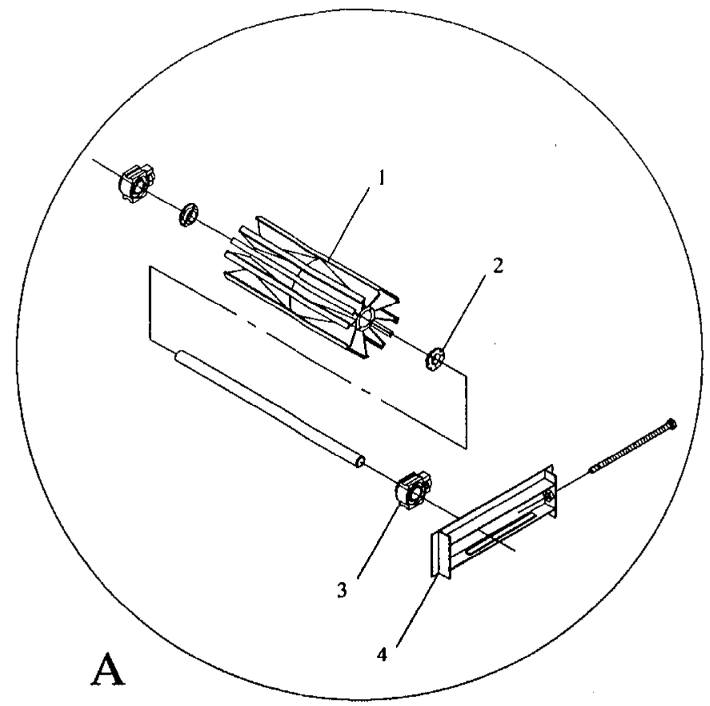
Use a good grade of oil with a viscosity of 150 to 225 ssu at 100 degrees f. If ambient temperatures are not within the parameters of the oil used it is recommended to change to an oil with a temperature range suitable to the application. Occasional oil analysis can determine if premature failure is about to transpire in any of the hydraulic components.

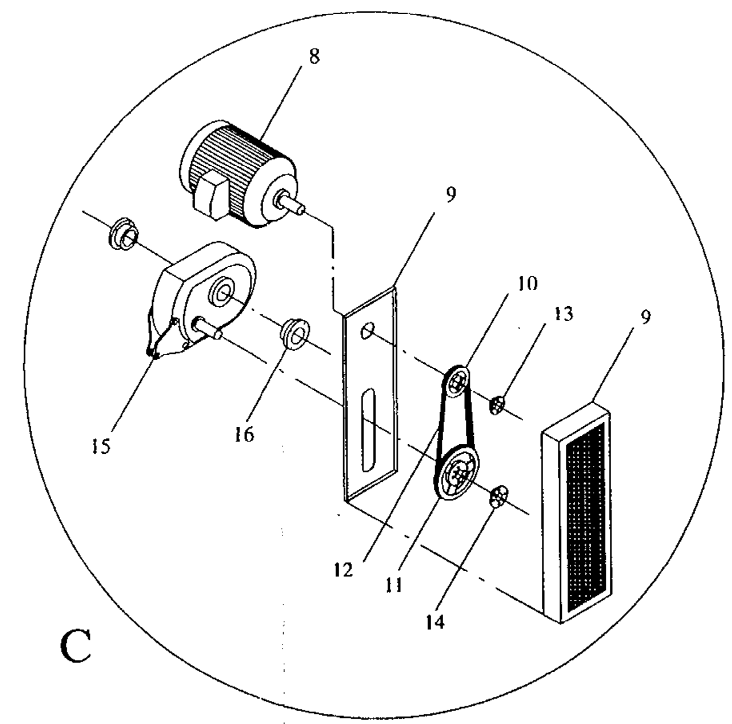
Spare Parts List

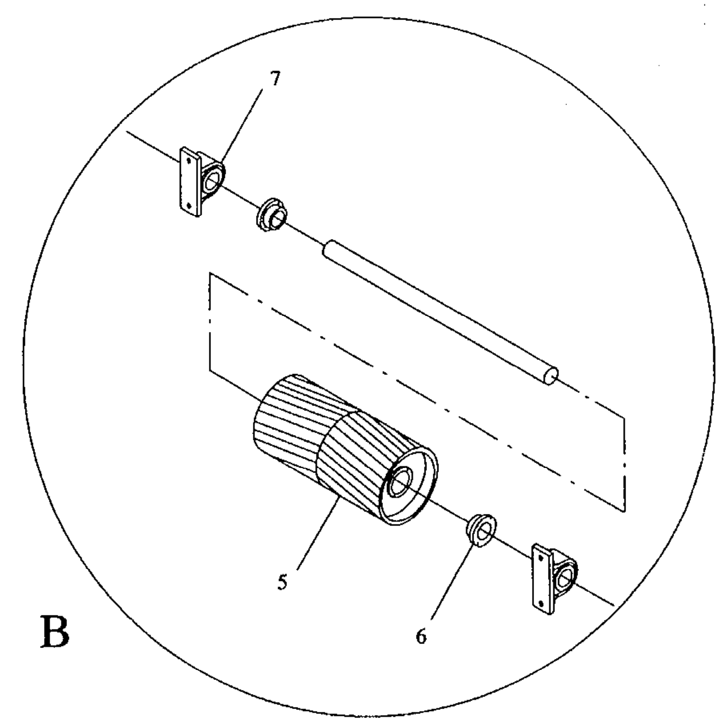
Description	Item Number	Qty
1. 40 micron breather cap	08-03077	1
2. 10 micron return filter	08-03079	1
3. 100 mesh 10 gpm suction strainer	08-03076	1

Pulley and Drive Parts









Ref. #	Item #	Description
A. Tail Pulley Components		
1	01-02021	14x38 CR HE30 Wing Pulley
2	02-02008	2-15/16" HE30 Bushing
3	03-00156	2-15/16" SCM WSTU Bearing
4	10-00224	Window Style Take-up
B. Head Pulley Components		
5	01-02233	16x38 CR HE30 1/2 HBL Drum Pulley
6	02-02008	2-15/16" XT30 Bushing
7	03-00122	2-15/16" SCM 2-bolt Pillow Block Bearing
C. Drive Components		
-	05-00131	TA-5M Motor Mount (not shown)
8	04-00333	20 HP, 1800 RPM, 256T TEFC Motor
9	10-00402	Drive Guard Small
10	06-00075	3B5.6 QDSD Sheave
11	06-00086	3B9.4 QDSK Sheave
12	07-00052	B75 V-belts
13	02-00132	1-5/8" QDSD Bushing
14	02-00162	1-15/16" QDSK Bushing
15	05-00009	TXT-515B Gear Reducer
16	05-00084	2-15/16" TDT5 Gear Reducer Bushing (pair)
-	05-00122	TXT-5B Gear Reducer Backstop (not shown)

PARTS REPLACEMENT

SUPPLY THE FOLLOWING INFORMATION WHEN ORDERING PARTS:

1. **Conveyor serial number:** Identify your equipment by serial number whenever possible.
2. **Part descriptions:** Use part numbers and descriptions from illustrations and the Bill of Materials to assist in identifying needed parts. Structural parts such as framework, bracing, etc. are not listed. To order these parts give size, shape, and part location to aid in identification.
3. **Quantities:** Order the exact number of parts required, do not order by *sets*.
4. **Shipping instructions:** Give company name, shipping point, and mailing address for notification if different than shipping point. State whether freight, express, parcel or other handling is desired. Confirm telephone orders in writing.

Inspection of parts when received is very important. Shortages or damage should be noted by the carrier agent at the time the parts are accepted. Shipper's responsibility ceases upon delivery of shipment to customer in good order. Claims for damage or loss are subject to the terms and conditions of sale as noted on your invoice.

Superior Equipment
PO Box 684
Morris, MN 56267

7:00-5:00 PM CST, Monday-Friday
(320) 589-2406
800-321-1558
FAX (320) 589-2260

AEI
AGGREGATES EQUIPMENT, INC.
9 HORSESHOE ROAD, P.O. BOX 39, LEOLA, PA 17540-0039, 717-656-2131 FAX: 717-656-6686

INSTALLATION, OPERATION AND MAINTENANCE INSTRUCTIONS FOR BELT CONVEYORS

INSTALLATION, OPERATION AND MAINTENANCE INSTRUCTIONS FOR BELT CONVEYORS

INTRODUCTION

This manual contains information for the purchaser of the product described to install, operate, and maintain the equipment to obtain the performance specified.

It is important that the instructions be understood and applied before installation and start-up to assure the safety of all persons involved, to prevent damage to the equipment, and to ensure that proper procedures are followed.

The purchaser should take special care to ensure that recommended lubrication procedures are followed and that the specified lubricants are used; preventive maintenance is less costly than repairs.

TABLE OF CONTENTS

SAFETY WARNING

DO NOT start or operate this machinery unless you are fully qualified.

DO NOT start or operate machinery unless all guards are in place.

DO NOT start or operate machinery unless all personnel are notified and all personnel and/or obstructions are clear of machinery.

DO NOT remove or reach behind safety guards while machinery is operating.

DO NOT remove gear covers or inspection covers while machinery is operating.

DO NOT lubricate, clean, or adjust while machinery is operating.

DO NOT remove covers from electrical equipment without disconnecting power source.

DO NOT attempt any maintenance or adjustments while machinery is operating. Disconnect and lock out power source prior to servicing.

NEVER enter or work on or in machinery, or process equipment, while the machine is operating or until the machine has stopped and the power source is off and locked out.

AGGREGATES EQUIPMENT, INC. WILL NOT BE HELD RESPONSIBLE FOR ANY WORK DONE, OR ALTERATIONS MADE TO ANY OF ITS PRODUCTS DURING THE WARRANTY PERIOD UNLESS NOTIFICATION IS GIVEN BY THE CUSTOMER TO AGGREGATES EQUIPMENT, INC. BEFORE SUCH WORK IS STARTED AND APPROVAL IS GRANTED.

AGGREGATES EQUIPMENT, INC.

SAFETY

INSTALLATION

The foundation must be solid, level, and must be adequate to support the load.

Assemble the equipment and connect to foundation according to instructions on Page 3 in the Parts Book.

When lifting equipment for installation, fasten adequate lifting slings to structural members only. While the equipment is raised in the air, be certain no one is underneath, or close enough to get hurt if the equipment should drop. Always make certain no electric wires are in the area that the lifting boom or equipment may contact.

OPERATION

Read instructions of the Parts Book thoroughly.

Wear required safety equipment as specified by U.S. Department of Labor, Occupational Safety and Health Administration, Washington, D.C. 20210; and the U.S. Department of Labor Mine Safety and Health Administration, 4015 Wilson Blvd., Arlington, Virginia 22203; and any other applicable governmental agencies.

Before attempting to start equipment, be certain all bolts are tight, all guards are in place, and all tools, scraps and trash are removed from the operating area. Be certain ladders, stairways, walkways, and handrails are in proper position and clear of any obstructions for safe movement of operating personnel.

Do not attempt to lubricate, adjust, or repair equipment while in operation. The equipment should be completely stopped and a lock out device should be installed on the power unit before personnel attempt any type of maintenance work.

Inspect the equipment daily for loose connections or defective parts, and replace parts that are worn or broken before operating the equipment.

After maintenance work has been completed, replace all guards before operating. Guards are installed for your protection. Do not reach around, over, through or crawl in under them while the equipment is running.

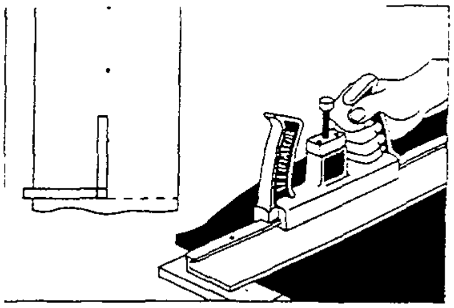
PROCEDURE FOR ASSEMBLY AND OPERATION

1. Read safety instructions.
2. All bolted connections must be complete and properly tightened. (See Page 9)
3. Head and tail pulleys must be in line and securely fastened in place. Troughing idlers must be mounted with the arrow pointing in the direction of material flow. For reversing conveyors, alternate the idler mounting direction.
4. Belt should be properly tensioned. (See Page 17)
5. Head and tail shafts must be square with the belt line.
6. Remove any tools, bolts, nuts, etc. that may have been left on the belt. Be certain to check return side also, as objects may travel over terminal pulleys and damage the belt. Remove any grease or oil which may be on the belt, as it will deteriorate the belt, unless the belt is of the "oil proof" variety.
7. Be certain all accessories are in place and properly adjusted, i.e.: guards, emergency pull cords and switches, zero speed switches, belt scrapers, rubber skirting, counterweights on gravity take-up units, flog gates, etc.
8. All reducers, chain cases, and hydraulic systems must be filled to proper fluid level.
9. Review electrical connections and fusing. Be certain motor line has minimum capacity of 125% of motor amperage stamped on name plate. Be certain the proper overload relays (3 pole) are installed to prevent damage to the motor if an overload occurs.
10. Jog motor to check for proper rotation. IMPORTANT - V-belts or drive connection must be removed before motor is tested if there is a backstop on the conveyor. Re-install V-belts or drive. Tension V-belts. (See Page 17).
11. Be certain the conveyor belt is not rubbing or scraping anywhere; then, run conveyor several complete revolutions while carefully observing the operation of all components.

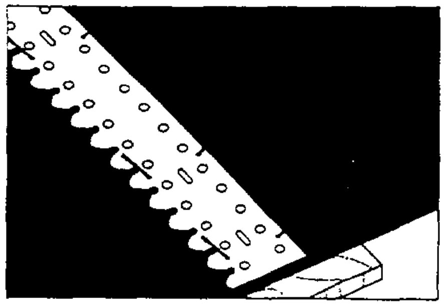
12. Proceed with the belt training procedure once assured that all components are functioning properly and need no further adjusting. (See Page 6)
13. After the belt has been properly trained while running empty, check to see that the electric controls are wired to provide proper starting and stopping sequence if the conveyor is part of a system.
14. Load the conveyor with a light load and gradually work up to the design load after checking chutes and loading hoppers to see that the material is loading and discharging properly. The skirt boards may have to be adjusted to prevent side spillage. Skirt boards should be adjusted to the maximum height which will allow the proper flow of material while exerting little or no pressure on the conveyor belt.
15. With the conveyor operating under normal load, check the belt for possible misalignment. If necessary, re-align idlers as described in the belt training procedure. (See Page 6)

CONVEYOR BELT SPLICING

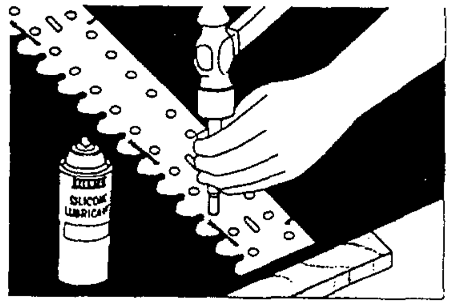
Directions for applying conveyor belt fasteners.



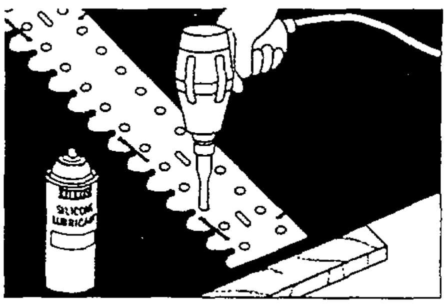
1. Square belt ends off centerline. Cut using an Alligator® 300 or 800 Series belt cutter.



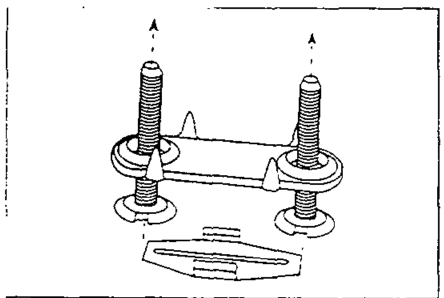
2. Support belt ends with wood plank. Nail Flexco Templet in position with belt ends tight against lugs.



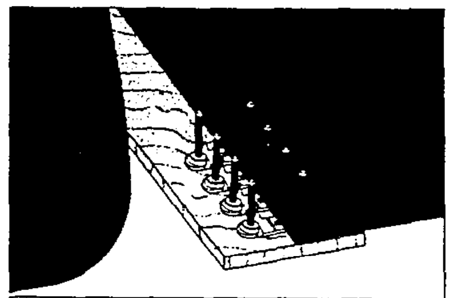
3. Spray templet holes with Flexco Silicone Lubricant. Punch or bore bolt holes. Remove templet.



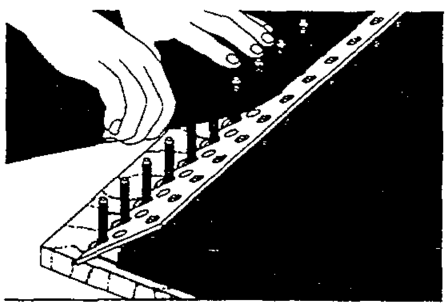
NOTE: A 1/2" square drive, air or electric wrench with Flexco 5552 Quick Change Chuck will speed hole boring operation.



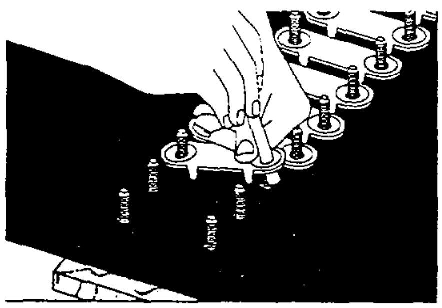
4. To assemble bottom plate insert 2 bolts and attach clip.



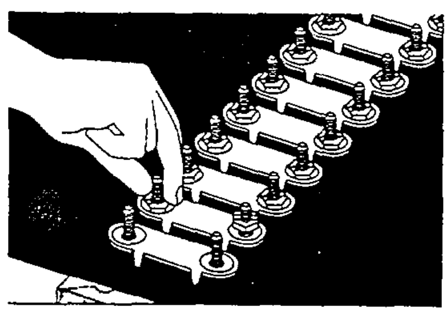
5. Fold one belt end back and insert impact bolts in one row of holes.



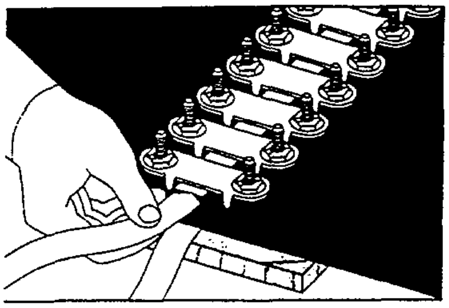
6. Align bolts with templet teeth and place the other belt end over bolts. Remove templet.



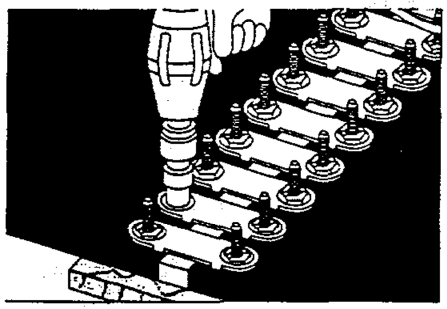
7. Place top plates over bolts using bolt horn.



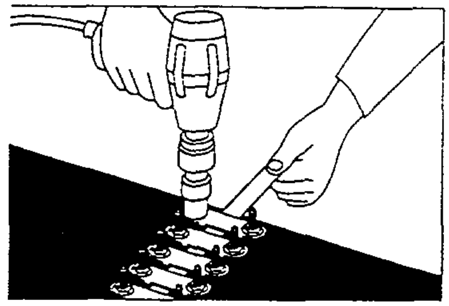
8. Start nuts on bolts by hand.



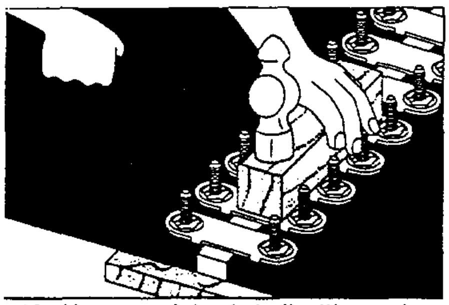
9. Cut Flexco-Lok® Tape 3-1/2 times the belt width and feed tape under top plates, under the bottom plates then back under top plates.



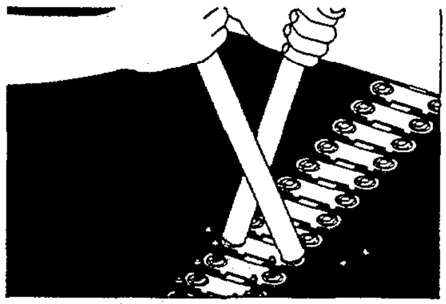
10. Pull tape tight and hold in position by tightening a fastener at each end. Then. tighten all other plates.



11. Tighten all fasteners from edges to center. Tighten all nuts uniformly. NOTE: A top plates.Flexco Power Wrench used with an impact tool will speed this step considerably.



12. Hammer plates in belt with wood block. Retighten nuts.



13. Break off excess bolt ends using two bolt breakers. Peen or grind bolts to finish.

FASTENERS SHOULD BE RETIGHTENED AT LEAST ONCE AFTER THE FIRST 24 HOURS OF SERVICE...ESPECIALLY ON BELTS OF THICK RUBBER COVERS

BELT INSTALLATION TIPS

SQUARING BELT ENDS

Accurately squaring the ends of a belt prior to fastener application will assure that the belt will track or train correctly. A properly squared belt also distributes the tension load evenly across the splice.

The simplest method to properly square the belt ends is as follows:

1. At intervals of 3 to 5 ft. mark three center points along the belt length. Chalk or pencil will suffice.
2. Draw an average center line using these center points as a guide.
3. Place one leg of a large steel square along the marked center line and position the other leg of the square at the point you wish to make the square cut. Draw a line along the square's leg, which is perpendicular to the center line, and extend it entirely across the belt. A cut made along this line will be properly squared to the belt.

45° ANGLE SPLICE

While the 90° angle joint is recommended for general applications, the 45° angle splice lessens belt strain in back of fasteners and provides smoother pulley contact. It takes approximately 1/3 more plates for a 45° angle joint.

Preparing belt for 45° angle splice:

1. Determine center line of belt as in steps one and two of "Squaring Belt Ends" instructions.
2. Cut square belt end on a 45° angle.
3. To cut other belt end accurately on a 45° angle, lay end that has already been cut on the uncut end. Be certain that the center lines match up and are straight.
4. Use the 45° cut belt end as a guide for cutting off the other end of the belt.

ALLOWING FOR BELT STRETCH

When splicing new belting, it is desirable to anticipate the normal amount of belt growth or stretch and; wherever practical, prestretch the belt with belt clamps so that some of the stretching that normally occurs when a conveyor is operated is accomplished before splicing. To assure that subsequent belt stretch can be controlled for proper belt tension, run the tail pulley take-up to its forward most position before splicing.

CONVEYOR BELT TRAINING

Correct alignment of idlers, pulleys and parallelism of shafts is essential. In troughed conveyors, head pulleys ordinarily need not be crowned. This crowning is relatively ineffective due to the strong training influence of the troughed idlers and is not worth the lateral mal-distribution of tension it produces in the belt. Tail pulleys and others that have a long unsupported span of belt preceding them may be crowned with benefit because it assists in centering the belt as it passes beneath the loading point. Take-up pulleys should be crowned to take care of any slight misalignment that occurs in the take-up carriage as it shifts position. Training the belt is a process of adjusting idlers, pulleys and loading conditions in a manner which will correct any tendency of a belt to run other than centrally on the conveyor.

When all portions of the belt run off through a part of the conveyor length, the cause is probably in the aligning or leveling of the structure, idlers or pulleys in that region. If one or more parts of the belt run off at all points along the conveyor, the cause is more likely in the belt itself, in the joints of the belt or in the loading of the belt.

Initially all idlers should be positioned normal to the line of belt travel. Training the belt with the troughing idlers is accomplished in two ways:

1. The feet of the idler stands may be knocked or shifted to correct a condition where the entire belt runs to one side along some portion of the conveyor. The belt may be centered by knocking ahead (in the direction of belt travel) the end of the idlers to which the belt runs. If the idler is in its most forward position on one side, additional adjustment can be made by moving the opposite side of the idler rearward. Shifting idlers in this fashion should be spread over some length of the conveyor preceding the region of the trouble. If the belt is over-corrected by shifting idlers, it should be restored by moving back the same idlers and not by shifting additional idlers in the other direction.

2. Tilting the troughing idlers forward (not over 2 degrees) in the direction of belt travel produces a good aligning effect. This may be accomplished by placing a steel washer under the rear feet of the idler stand. If the angle of tilt exceeds about 2 degrees, excessive wear may occur on the pulley side of the belt and on the troughing roll itself due to the rotation of these rolls on an axis not at a right angle to the path of belt travel.

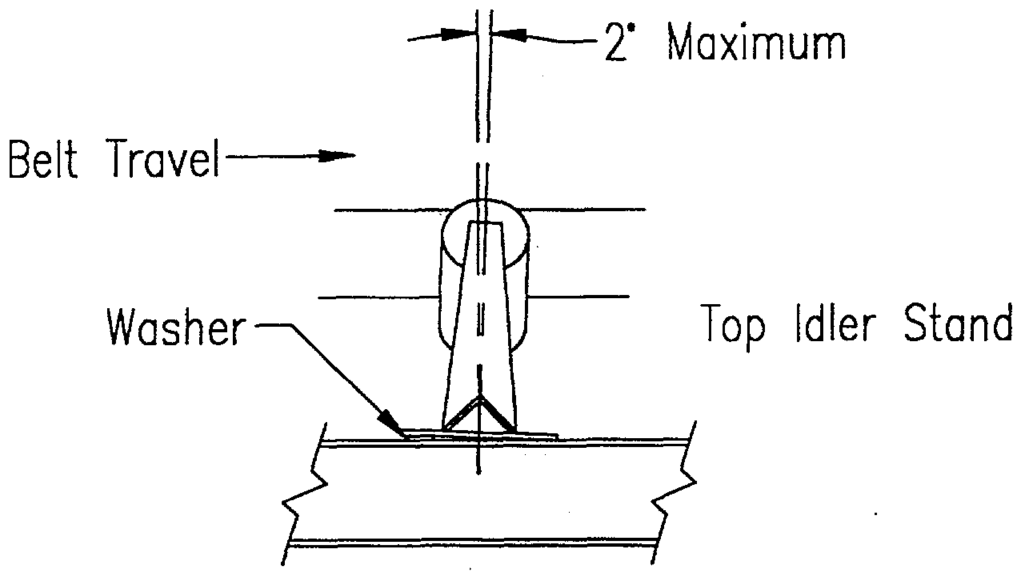


Fig. 1

This method has the advantage over "knocking idlers" in that it will correct movement of the belt to either side of the idler, hence, is useful for training erratic belts. (Note: Some idlers have built in angle, requiring no washers. Such idlers are unidirectional and must be mounted with the tilt in the direction of belt travel.)

Since both of the above are uni-directional adjustments, they are obviously not effective for a reversible belt. In reversible belts, all idlers should be placed and left square, and any corrections required made with self-aligning idlers designed for reversing operation.

Return idlers being flat provide no self aligning influence as in the case of tilted troughing idlers. However, by shifting their axis with respect to the path of the belt, the return roll can be used to provide a constant corrective effect in one direction.

A further aid to centering the belt as it approaches the tail pulley may be had by slightly advancing and raising the alternate ends of the return rolls nearest the tail pulley.

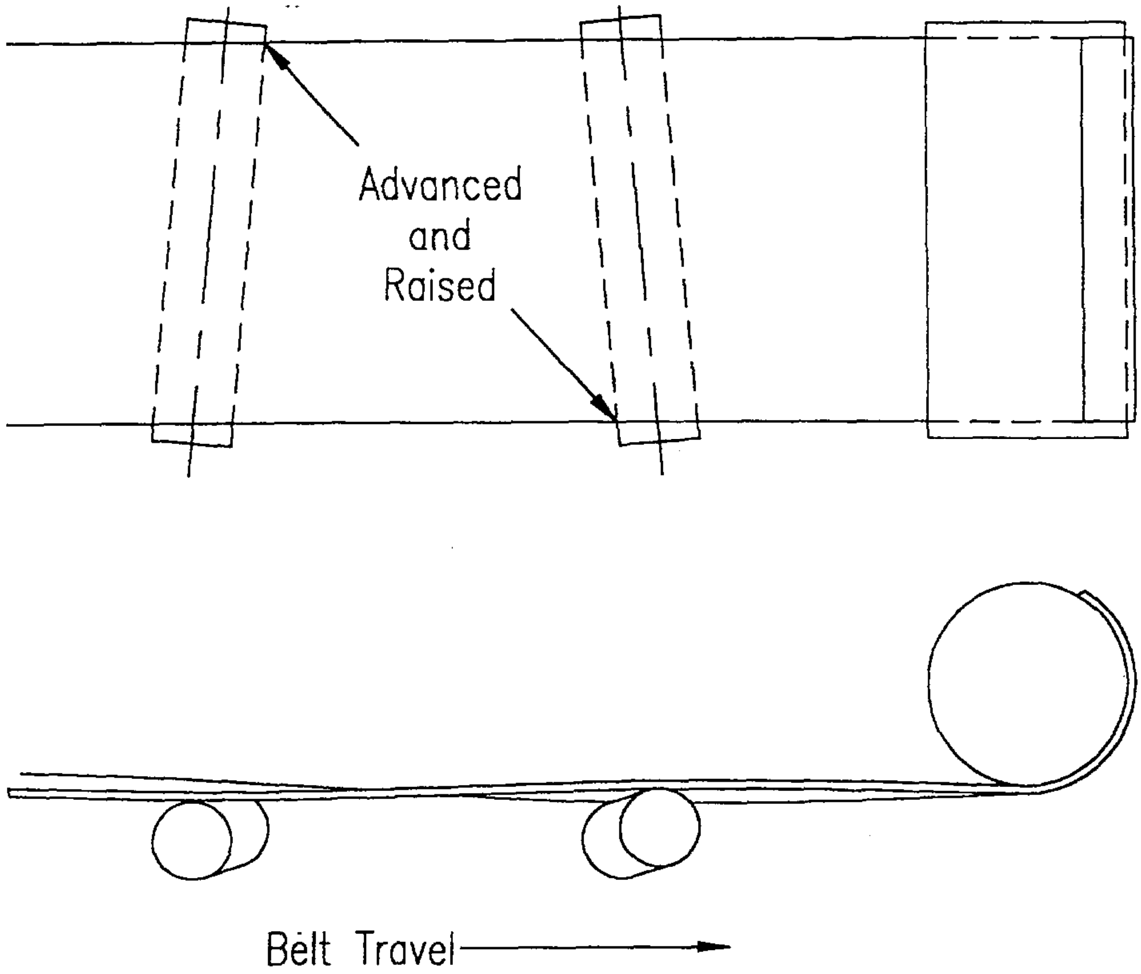


Fig. 2

Self-aligning idlers, both troughing and return rolls, are usually mounted on a center pivot. An off-center belt causes them to rotate about this center vertical pivot in such a direction as to bring the belt back to center. Those types which depend on pressure from the off center belt on eccentric discs at the ends of the troughing rolls will work for reversible belts. Those that depend on pressure from the belt edge on a side roller mounted on an arm extended in front of the idler will work for only one direction of belt travel. Self-aligning idlers are more effective if raised slightly above the two adjacent idlers to ensure good belt contact.

In general practice, side guide rollers are not recommended for constant use in forcing belts to run straight. They may be used to assist in training the belt initially and to prevent it from running off the pulleys, damaging itself against the structure. It is usually wise to provide them for protection at start-up prior to belt training and for emergencies , such as material build up, but if they are allowed to continually touch the belt edge excessive edge wear will result.

Idlers should not be over-lubricated. Excessive greasing causes build up of material at the roll junctions and grease is transferred to the belt causing rapid deterioration of the rubber. Lubrication every six months is usually sufficient, unless conditions are extremely dusty, and often once a year is all that is needed. In all cases, lubricate in accordance with the recommendations of the manufacturer.

MAINTENANCE

BOLTED CONNECTIONS

TYPES OF BOLTS:

The two basic types of high-strength bolts are those specified under ASTM designations A325 and A490. Both of these fasteners are heavy hex structural bolts, used with heavy hex nuts. Unless noted, all structural connections of AEI Conveyors, Bins and Structures utilize A325 bolts.

WASHERS USED IN HIGH-STRENGTH BOLTING

Generally one hardened washer is supplied with each bolt and it is recommended that it be placed under the turned element. When bolts pass through a beam (or channel) flange which has a slope of 1:20 or greater, a bevel washer should be used to create a seat for the bolt head or nut. The bevel washer, which must be hardened, replaces the hardened round washer ordinarily used in high-strength bolting.

INSTALLATION

High-strength bolts must be tightened to a tension equal to or greater than 70 percent of the specified minimum tensile strength. The "turn-of-nut" method of tightening is the most economical and efficient procedure developed so far for the job of tightening structural connections. Procedure is as follows:

1. Bring enough bolts to a "snug tight" condition to ensure that the parts of the joint are brought in good contact. Snug tight is defined as the tightness attained by a few impacts of an impact wrench or the full effort of a man using an ordinary spud wrench.

2. Tighten all bolts by the amount of nut rotation specified in the table below:

Table 1 -- Nut Rotation from Snug Tight Condition

	Disposition of Outer Faces of Bolted Parts		
Bolt Length (as measured from underside of head to extreme end of point)	Both faces normal to bolt axis	One face normal to bolt axis and other face sloped not more than 1:20 (bevel washer not used)	Both faces sloped not more than 1:20 from normal to bolt axis (bevel washers not used)
Up to and including 4 diameters	1/3 turn	1/2 turn	2/3 turn
Over 4 diameters but not exceeding 8 diameters	1/2 turn	2/3 turn	5/6 turn
Over 8 diameters but not exceeding 12 diameters	2/3 turn	5/6 turn	1 turn

REUSE OF BOLTS

Tests have indicated that A325 bolts which have been tightened previously by the "turn-of-nut" method can be reused once or twice. A490 bolts are not to be reused. Over tightening or loosening and retightening of the nut are not desirable because the rotational capacity and clamping force of the bolt will be decreased.

BEARING INSTALLATION

IMPORTANT NOTICE:

The performance of any mounted unit is dependent on proper installation, lubrication and maintenance. Reduced bearing life and performance may result if instructions are not followed.

1. Check Shaft

Shaft must be free of nicks and burrs. If old shafting is used, bearing should be located on a smooth, unworn section. For best results, a ground shaft should be used to obtain a snug fit. For heavy loads or high speeds, or where dynamic balance is important, a light press fit is recommended. The following tolerances are recommended for nominal shaft diameters to obtain a snug fit.

Table 2 -- Shaft Tolerances

Shaft Diameter	Recommended Shaft Tolerance
up to 1-1/2"	+.0000 - .0005
over 1-1/2" to 4"	+.0000 - .0010
over 4" to 6"	+.0000 - .0015
over 6" to 8"	+.0000 - .0020

2. Prepare Shaft

Clean the shaft and slide the unit on the shaft by applying pressure to the inner ring. DO NOT HAMMER THE ENDS OF THE INNER RACE OR ANY PART OF THE HOUSING AS SEVERE DAMAGE MAY RESULT.

3. Bolt Unit to Support

Bolt the housings to the supports and tighten the set screws on one bearing. Check the shaft for freedom of rotation and, if possible, run the bearings a short time under load. Then tighten all set screws within the recommended torque valves for the specific size listed in the following table:

Table 3 -- Recommended Torque For Tightening Set Screws

		Inch Pounds		Foot Pounds	
Set Screw Size	Socket Size	min.	max.	min.	max.
#10	3/32	25	33	2.1	2.8
1/4	1/8	65	87	5.4	7.3
5/16	5/32	124	165	10.3	13.8
3/8	3/16	218	290	18.2	24.2

4. Check Bearing Housing Alignment and Tighten Mounting Bolts

After the set screws have been tightened, check the alignment of the bearings in the housing, where supports may deflect, blocks should be shimmed so that bearings are aligned. Tighten mounting belts.

INSTALLATION INSTRUCTIONS FOR TORQUE-ARM™ REDUCERS WITH TAPERED BUSHINGS

See the instruction manual packaged with the reducer for proper positioning, lubrication, maintenance, etc. Read this manual before attempting to install the reducer.

INSTALLATION

1. One bushing assembly is required to mount the reducer on the driven shaft. An assembly consists of two tapered bushings, bushing screws and necessary shaft key or keys.
   The driven shaft must extend through the full length of the reducer. The reducer should be mounted the recommended minimum distance from the shaft bearing (shown as dimension "A" in the drawing and table below).
2. Place one bushing on the shaft and position per dimension "A" (as shown in the drawing and table below).
   If the reducer must be positioned closer to the bearing than dimension "A", place the screws in the unthreaded holes in the bushing before positioning. Allow 1/8" between the screw heads and the bearing.
3. Insert the output key in the shaft and bushing. For ease of installation, shaft keyseat should be at the top position.
4. Place the reducer in position on the shaft aligning hub keyway with the shaft key.
5. Insert screws in the unthreaded holes in bushing flange and align with threaded holes in bushing backup plate. If necessary, rotate bushing backup plate to align with bushing screws. Tighten the screws lightly.
6. Place the second taper bushing in position on the shaft and align the bushing keyway with the shaft key. Align the unthreaded holes in the bushing with the threaded holes in the backup plate. If necessary, rotate the backup plate to align with bushing holes. Insert bushing screws and tighten lightly.
7. Tighten the screws in both bushings alternately and evenly to the recommended wrench torque given in the table below.

Table 4 -- Torque-Arm Installation

Reducer Size	Wrench Torque ^	A *	Reducer Size	Wrench Torque ^	A *	Reducer Size	Wrench Torque ^	A *
TXT 115, TXT 125, HXT 115, HXT 125, TXT 105, HTX 105, TXT 1090	200	1-1/4	TXT 515, TXT 525, HXT 515,HXT 525, TXT 505,HXT 505, XT 509	360	1-13/16	TXT 915, TXT 926, TXT 905 TXT 1015, TXT 1024	900 900	2-7/16 2-7/16
TXT 215, TXT 225, HXT 215, HXT 225,HXT 205, HXT 205, TXT 209	200	1-1/4	TXT 615, TXT 625, HXT 615, HXT 625, TXT 605, TXT 609	360	1-13/16	TXT 1215, TXT 1225 TDT 1325	900 900	2-11/16 2-11/16
TXT 315, TXT 325, HXT 315, HXT 325, TXT 305, HXT 305, TXT 309	200	1-1/2	TXT 715, TXT 725, HXT 715, HXT 725, TXT 705, TXT 709	800	2-1/16	TDT 1425 TDT 1530	1600 1600	3 3-1/2
TXT 415, TXT 425, HXT 415, HXT 425, TXT 405, HXT 405, TXT 409	360	1-3/4	TXT 815, TXT 825, TXT 805	800	2-1/16			

^ In inch-pounds

* Recommended minimum distance to loosen bushings using bushing screws as jack-screws.

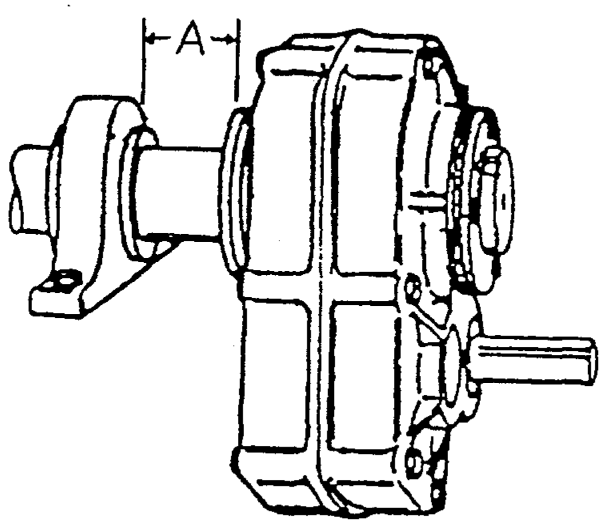


Fig. 3

Removal Instructions for TORQUE-ARM™ with Tapered Bushing
Removing the Reducer from the Shaft

1. Remove bushing screws.

2. Place the screws in the threaded holes provided in the bushing flanges. Tighten the screws alternately and evenly until the bushings are free on the shaft. For ease of tightening screws make sure screw threads and threaded holes in bushing flanges are clean.

If the reducer was positioned closer than the recommended minimum distance, loosen the inboard bushing screws until clear of bushing flange (approximately 1/8"). Use (2) two wedges at 180° between the bushing flange and bushing backup plate. Drive wedges alternately and evenly until the bushing is free on the shaft.

3. Remove the outside bushing, the reducer and then the inboard bushing.

INSTRUCTIONS FOR DODGE® TORQUE-ARM™ SPEED REDUCER BACKSTOPS

TO INSTALL BACKSTOP

STEP 1. Remove backstop cover plate. This plate is directly opposite the extended end of the input shaft.

STEP 2. Face reducer looking at the side from which the cover plate was removed. Determine carefully the direction of rotation desired. The directions of rotation of input and output shafts are identical in double reduction reducers (Nos. TXT115 thru TXT1225 and TDT1315 thru TDT1530) and opposite in single reduction reducers (Nos. TXT105 to TXT905). It is important that the direction be correctly determined because to reverse the direction after the backstop is installed, it is necessary to remove the backstop, turn it end for end and reinstall it.

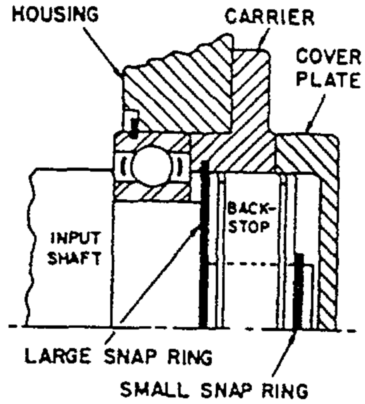
STEP 3. Match arrow on backstop to direction of rotation desired for input shaft. Note that reversing backstop end for end changes direction of arrow. The input shaft will rotate in the same direction as the arrow on the backstop.

STEP 4. Proceed as follows:

Nos. TXT109 to TXT525 and Nos. TXT105 to TXT505 Reducers -- For ease of installation slowly rotate input shaft in same direction as arrow on backstop. Without removing cardboard retainer from backstop, push backstop into reducer. When pushing backstop into reducer it is very important not to hammer on backstop although it can be tapped gently if necessary. Cardboard retainer will be pushed out automatically as backstop is pushed into reducer. Throw away retainer.

Nos. TXT609, TXT615, TXT625, and No. TXT605 Reducers -- Some of the backstops have keys of different lengths. Place the longer key in the input shaft keyseat. For ease of installation, backstop complete with inner race must be pushed into reducer as a unit. When pushing backstop into reducer, it is very important not to hammer on backstop although it can be tapped gently if necessary. Place small snap ring in snap ring groove on input shaft.

Nos. TXT709 to TXT1225, TDT1315 thru TDT1530, TXT705 toTXT905 Reducers -- Place large snap ring in I.D. of Carrier. Note: Large snap ring is not required for Nos. TD7A, TXT7 and TXT705 reducer and may be discarded. Some of the backstops require two keys on the input pinion. Dispose of extra key with units that require only one key. For ease of installation, backstop complete with inner race must be pushed into reducer as a unit. When pushing backstop into reducer, it is very important not to hammer on backstop although it can be tapped gently if necessary. Place a small snap ring in snap ring groove on input shaft.



STEP 5. Line up keyways between backstop and reducer by rotating input shaft in opposite direction from its driving direction. If backstop is properly installed, it will rotate with input shaft in this opposite direction.

STEP 6. Insert key and replace gasket, cover plate and screws. When input shaft will be located higher than output shaft, put some grease in cover plate for the purpose of lubricating backstop. Use a high grade grease made especially for roller bearing service.

NOTE: Some backstops have keys that are rectangular in width, keys should fit freely into respective keyways. Forcing keys into place could result in premature failure of backstop.

TO REMOVE BACKSTOP

WARNING: Remove all external loads from unit before removing or servicing unit or accessories.

STEP 7. Remove backstop cover plate.

STEP 8. Remove snap ring from end of shaft (snap ring is used only on Nos. TXT609 to TXT1225 and TDT1315 thru TDT1530 and Nos. TXT605 to TXT905 reducers).

STEP 9. Insert tool, such as a screwdriver, in groove around O.D. of backstop and pry backstop from retainer housing.

V-BELT DRIVE TENSIONING INFORMATION

Installing A Drive

Here are a few suggestions to keep in mind when installing the drive:

1. Use a matched set of belts.

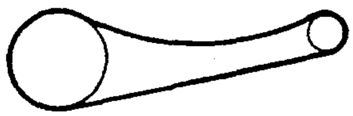
2. Clean oil and grease from the sheaves; remove any rust or burrs from the sheave grooves.

3. Shorten the center distance of the drive until the belts can be put on the sheaves without forcing.

4. Make sure that the sheaves are correctly aligned, that the shafts are parallel, that there is clearance for the drive to run and that the bearings have oil.

5. Work belts around in the groove by hand, so that the slack of all belts is on the top, or slack of all belts is on the bottom.

LIKE THIS:
(all slack at top)



OR LIKE THIS:
(all slack at bottom)

DO NOT APPLY THIS WAY:
(with slack at top and bottom)

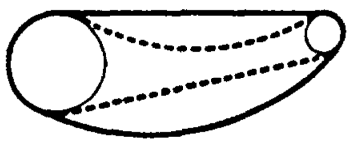


Fig. 4

Do not apply with the slack of some belts on the bottom (see solid line) and the slack of others on the top (see dotted line). Since V-belts will not slide in the groove, belts thus applied will be injured when tightened for operation.

Now tension the drive until only a slight bow appears on the slack side of the belts when they are operating.

6. In a day or so, when the belts have had time to seat in the grooves, re-tension the belts.

All V-belt drives should be guarded in such a manner as to comply with the Williams-Steiger Occupational Safety and Health Act and with all state and local laws and the American National Standard Institute (ANSI) safety code.

Tensioning The Drive

General Rules of Tensioning:
1. Ideal tension is the lowest tension at which the belt will not slip under peak load conditions.
2. Check tension frequently during the first 24-48 hours of run-in operation.
3. Overtensioning shortens belt and bearing life.
4. Keep belts free from foreign material which may cause slip.
5. Make V-drive inspection on a periodic basic. Tension when slipping.

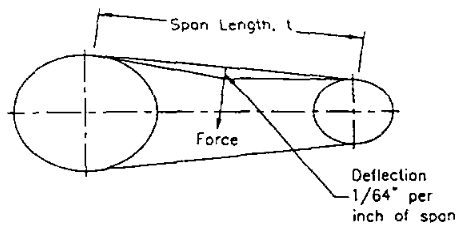


Fig. 5

Test the Tension

If you want to check the tension in a conventional V-belt drive, use the procedure below:
1. Measure the span length, t.
2. At the center of the span (t) apply a force (perpendicular to the span) large enough to deflect the belt 1/64" for every inch of span length. For example, the deflection of a 100 inch span would be 100/64 or 1-9/16 inches.
3. Compare the force you have applied with the values given in Table 5. If the force is between the values for normal tension, and 1-1/2 times normal tension, the drive tension should be satisfactory. A force below the value for normal tension indicates an under-tensioned drive. If the force exceeds the value for 1-1/2 times normal tension, the drive is tighter than it needs to be. A new drive can be tightened initially to two times normal tension to allow for the normal drop in tension during run in.

Installation and Take-up Allowances

After calculating a center distance from a standard pitch length, make provision for adjusting the center distance as in Table 6, to allow for installation of the belts without injury for tensioning and for maintenance of proper tension throughout the life of the belt.

Table 5 -- Belt Deflection Force

V-Belt Cross Section	Smallest Sheave Diameter Range	RPM Range	BELT DEFLECTION FORCE A, B, C, D Normal	BELT DEFLECTION FORCE A, B, C, D 1-1/2 x Normal	BELT DEFLECTION FORCE AX, BX, CX Normal	BELT DEFLECTION FORCE AX, BX, CX 1-1/2 x Normal
A	3.0 - 3.6	1000-2500	3.7	5.5	4.1	6.1
		2501-4000	2.8	4.2	3.4	5.0
	3.8 - 4.8	1000-2500	4.5	6.8	5.0	7.4
		2501-4000	3.8	5.7	4.3	6.4
	5.0 - 7.0	1000-2500	5.4	8.0	5.7	9.4
		2501-4000	4.7	7.0	5.1	7.6
B	3.4 - 4.2	860-2500			4.9	7.2
		2501-4000			4.2	6.2
	4.4 - 5.6	860-2500	5.3	7.9	7.1	10.5
		2501-4000	4.5	6.7	7.1	9.1
	5.8 - 8.6	860-2500	6.3	9.4	8.5	12.6
		2501-4000	6.0	8.9	7.3	10.9
C	7.0 - 9.0	500 -1740	11.5	17.0	14.7	21.8
		1741-3000	9.4	13.8	11.9	17.5
	9.5 - 16.0	500-1740	14.1	21.0	15.9	23.5
		1741-3000	12.5	18.5	14.6	21.6
D	12.0 -16.0	200-850	24.9	37.0		
		851-1500	21.2	31.3		
	18.0 - 20.0	200-850	30.4	45.2		
		851-1500	25.6	38.0		

V-Belt Cross Section	Smallest Sheave Diameter Range	RPM Range	BELT DEFLECTION FORCE 3V, 5V, 8V Normal	BELT DEFLECTION FORCE 3V, 5V, 8V 1-1/2 x Normal	BELT DEFLECTION FORCE 3VX, 5VX Normal	BELT DEFLECTION FORCE 3VX, 5VX 1-1/2 x Normal
3V	2.2-2.4	1000-2500			3.3	4.9
		2501-4000			2.9	4.3
	2.65-3.65	1000-2500	3.6	5.1	4.2	6.2
		2501-4000	3.0	4.4	3.8	5.6
	4.12 -6.90	1000-2500	4.9	7.3	5.3	7.9
		2501-4000	4.4	6.6	4.9	7.3
5V	4.4 - 6.7	500-1749			10.2	15.2
		1750-3000			8.8	13.2
		3001-4000			5.6	8.5
	7.1 -10.9	500-1740	12.7	18.9	14.8	22.1
		1741-3000	11.2	16.7	13.7	20.1
	11.8-16.0	500-1740	15.5	23.4	17.1	25.5
		1741-3000	14.6	21.8	16.8	25.0
8V	12.5-17.0	200-850	33.0	49.3		
		851-1500	26.8	39.9		
	18.0-22.4	200-850	39.6	59.2		
		851-1500	35.3	52.7		

Table 6 -- Center Distance Allowance For Installation And Take-Up

Standard Length Designation	Minimum Allowance Below Standard Center Distance for Installation of Belts (Inches) A, AX	A, AX Joined	B, BX	B, BX Joined	C, CX	C, CX Joined	D	D Joined	Minimum Allowance Above Standard Center Distance for Maintaining Tension (Inches) All Sections
26 to 37	0.75	1.20	1.00	1.50					1.00
38 to 59	0.75	1.20	1.00	1.50	1.50	2.00			1.50
60 to 89	0.75	1.30	1.25	1.60	1.50	2.00			2.00
90 to 119	1.00	1.30	1.25	1.60	1.50	2.00			2.50
120 to 157	1.00	1.50	1.25	1.80	1.50	2.10	2.00	2.90	3.00
158 to 194			1.25	1.80	2.00	2.20	2.00	3.00	3.50
195 to 239			1.50	1.90	2.00	2.30	2.00	3.20	4.00
240 to 269			1.50	2.00	2.00	2.50	2.50	3.20	4.50
270 to 329			1.50	2.20	2.00	2.50	2.50	3.50	5.00
330 to 419					2.00	2.70	2.50	3.60	6.00
420 and over					2.50	2.90	3.00	4.10	1.5% of belt length

Standard Length Designation	Minimum Allowance Below Standard Center Distance for Installation of Belts (Inches) 3V, 3VX	3V,3VX Joined	5V,5VX	5V,5VX Joined	8V	8V Joined	Minimum Allowance Above Standard Center Distance for Maintaining Tension (Inches) All Cross Sections
Up to and incl. 475	0.5	1.2					1.0
Over 475 to and incl.710	0.8	1.4	1.0	2.1			1.2
Over 710 to and incl.1060	0.8	1.4	1.0	2.1	1.5	3.4	1.5
Over 1060 to and incl.1250	0.8	1.4	1.0	2.1	1.5	3.4	1.8
Over 1250 to and incl.1700	0.8	1.4	1.0	2.1	1.5	3.4	2.2
Over 1700 to and incl.2000			1.0	2.1	1.8	3.6	2.5
Over 2000 to and incl.2360			1.2	2.4	1.8	3.6	3.0
Over 2360 to and incl.2650			1.2	2.4	1.8	3.6	3.2
Over 2650 to and incl.3000			1.2	2.4	1.8	3.6	3.5
Over 3000 to and incl.3550			1.2	2.4	2.0	4.0	4.0
Over 3550 to and incl.3750					2.0	4.0	4.5
Over 3750 to and incl.5000					2.0	4.0	5.5

V-BELT DRIVE MAINTENANCE

1. Check alignment of sheaves. Shafts should be parallel.
2. Maintain Uniform Tension. Idle belts should appear snug; in motion, they have a slight sag on slack side.
3. Avoid Heat. Above 140 degrees F., rubber is over cured and belt life is shortened.
4. Keep drives well-ventilated. Avoid heat build-up.
5. Never mix belts on a drive. Use new belts of the same make.
6. Always use matched seats of belts.
7. Never use belt dressing.
8. Worn sheaves reduce belt life. Check sheaves frequently.
9. Oil Carefully. Excessive oil on belts causes rubber to swell and belts to fail, prematurely.
10. Never force belts onto sheaves. Release take-up.
11. Equalize slack before tightening. All on top or bottom.

V-BELT DRIVE TROUBLE SHOOTING

LOSS IN DRIVEN SPEED

Check for slip
Shut drive down - test sheave temperature by feel. A slipping belt will heat sheave excessively.
Check for proper tension
Check sheave diameter ratio with ratio of RPM's

LOCALIZED WEAR

Check cross-section dimensions
- If narrow - pulley is spinning
- If full - internal breakdown with resultant swell

UNEQUAL STRETCH

Unequal coefficient of friction
Internal breaks
Broken strength members

EXCESSIVE ELONGATION

Check for overload. Check for internal breaks. Check amount of take-up since initial installation.

TRANSVERSE BOTTOM BREAK

If premature -- check for small sheaves.

SEPARATION

Check for small pulleys or excessive tension, if premature.

OPENING OF ENVELOPE SEAMS

Check for oil or rubber solvent.

ABNORMAL ENVELOPE WEAR

Check for worn sheave, improper sheave angle, slip, heat, chemical fumes, obstructions or abrasive condition.

BELT SOFTENING OR SWELLING

Check for oil or rubber solvent.

BELT ENVELOPE HARDENING AND CRACKING

Check for excessive heat and chemical fumes.

CONVEYOR BELT TENSIONING

The conveyor take-up should be adjusted to provide just enough tension to operate the belt under load without slipping. Excess tension places the belt and drive machinery under strain and reduces the operating life. Slippage between drive pulley and belt results from insufficient tension and will cause slippage which may stall the conveyor belt and will burn out the belt if allowed to continue.

To adjust belt tension with a screw type take-up at the tail pulley, turn take-up screws to move pulley in direction opposite to material flow until desired tension is achieved and the pulley is perpendicular to the axis of belt travel.

If the belt is being tensioned by use of a gravity take-up, consult the factory for the proper weight required for each conveyor.

Instructions for tensioning by use of automatic conveyor belt take-ups are included with parts books for conveyors so equipped.

The belt tension should be checked at frequent intervals and adjusted when necessary.

LUBRICATION

BEARINGS

Storage or Special Shutdown - If exposed to wet or dusty conditions or to corrosive vapors, extra protection is necessary: Add grease until it shows at the seals; rotate the bearing to distribute grease; cover the bearing. After storage or idle period, add a little fresh grease before running.

High Speed Operation - In the higher speed ranges, too much grease will cause overheating. The amount of grease that the bearing will take for a particular high speed application can only be determined by experience (see "Operating Temperature"). If excess grease in the bearing causes overheating, it will be necessary to remove grease fitting (also drain plug when furnished) to permit excess grease to escape. The bearing has been greased at the factory and is ready to run. When establishing a relubrication schedule, note that a small amount of grease at frequent intervals is preferable to a large amount at infrequent intervals.

Operation in Presence of Dust, Water or Corrosive Vapors - Under these conditions, the bearing should contain as much grease as speed will permit, since a full bearing with consequent slight leakage is the best protection against entrance of foreign material. In the higher speed ranges, too much grease will cause overheating (see "High Speed Operation). In the lower speed ranges, it is advisable to add extra grease to a new bearing before putting into operation. Bearings should be greased as often as necessary (daily if required) to maintain a slight leakage at the seals.

Normal Operation - This bearing has been greased at the factory and is ready to run. The following table is a general guide for relubrication. However, certain conditions may require a change of lubricating periods as dictated by experience (see "High Speed Operation" and "Operation in Presence of Dust, Water or Corrosive Vapors").

Operating Temperature - Abnormal bearing temperature may indicate faulty lubrication. Normal temperature may range from "cool to warm to the touch" up to a point "too hot to touch for more than a few seconds", depending on bearing size and speed, and surrounding conditions. Unusually high temperature accompanied by excessive leakage of grease indicates too much grease. High temperature with no grease showing at the seals, particularly if the bearing seems noisy, usually indicates too little grease. Normal temperature and a slight showing of grease at the seals indicate proper lubrication.

LUBRICATION GUIDE

Read Preceding Paragraphs Before Establishing Lubrication Schedule.

Table 7 -- Lubrication Guide

Hours Run Per Day	Suggested Lubrication Period in Weeks							
	1 to 250 RPM	251 to 500 RPM	501 to 750 RPM	751 to 1000 RPM	1001 to 1500 RPM	1501 to 2000 RPM	2001 to 2500 RPM	2501 to 3000 RPM
8	12	12	10	7	5	4	3	2
16	12	7	5	4	2	2	2	1
24	10	5	3	2	1	1	1	1

Kind of Grease - Many ordinary cup greases will disintegrate at speeds far below those at which bearings will operate successfully if proper grease is used. The bearings have been lubricated at the factory with No. 2 consistency lithium base grease, which is suitable for normal operating conditions. Relubricate with lithium base grease or a grease which is compatible with original lubricant and suitable for roller bearing service. In unusual or doubtful cases, the recommendation of a reputable grease manufacturer should be secured.

REDUCER

Important: Because reducer is shipped without oil, it is necessary to add the proper amount of oil before running. Use a high grade petroleum base, rust and oxidation inhibited (R &O) gear oil - see tables. Follow instructions on reducer nameplate, warning tags, and in the installation manual.

Under normal industrial operating conditions, the lubricant should be changed every 2500 hours of operation or every 6 months, whichever occurs first. Drain reducer and flush with kerosene, clean magnetic drain plug and refill to proper level with new lubricant. Caution: Too much oil will cause overheating and too little will result in gear failure. Check oil level regularly.

Under extreme operating conditions, such as rapid rise and fall of temperature, dust, dirt, chemical particles, chemical fumes, or oil sump temperatures above 200° F., the oil should be changed every 1 to 3 months depending on severity of conditions.

The volume of oil required may vary considerably with the position of the reducer. The volume shown in Table 8 below is for use when the reducer is mounted as shown in the left hand view of Fig. 6. For the four positions shown in Fig. 6, the oil level plug may be used to determine the volume of oil required. The reducer is not limited to these four positions.

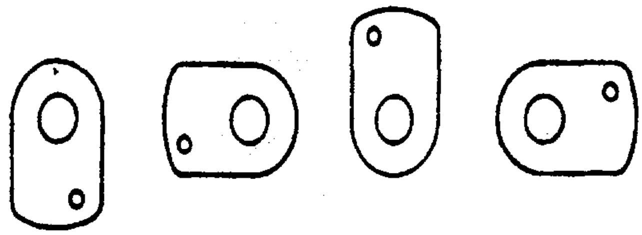


Fig. 6

Table 8 -- Volume Of Oil Required To Fill Reducer To Oil Level Plug

Reducer No.	Quarts ▲	Reducer No.	Quarts ▲	Reducer No.	Quarts ▲	Reducer No.	Quarts ▲	Reducer No.	Quarts ▲
T11, HT11	3/4	T18	15	TDT325, HT325	1-1/2	TDT715, HT715	7	TDT1024	14
T12, HT12	1	T19	15	TDT415, HT415	2-1/4	TDT725, HT725	7	TDT1115	24
T13, HT13	1-1/2	TDT115, HT115	3/4	TDT425, HT425	2-1/4	TDT815	11	TDT1125	24
T14, HT14	2-1/4	TDT125, HT125	3/4	TDT515, HT515	4	TDT825	11	TDT1215	38
T15, HT15	4	TDT215, HT215	1	TDT525, HT525	4	TDT915	13	TDT1225	38
T16	5-1/2	HDT225, HT225	1	TDT615, HT615	6	TDT926	13	TDT1325	62
T17	9	TDT315, HT315	1-1/2	TDT625, HT625	6	TDT1015	14	TDT1425	88

▲ U. S. Measure

LUBRICATION TABLE

Table 9 -- Oil Recommendations for Normal Operating Conditions

Ratio and Output RPM	Room Temp. ° Fahr.	OIL		VISCOSITY	
		S.A.E. No.	AGMA Lub. No.	ASTM SUS @ 100° F.	Metric Equiv. c St @ 37.8° C.
25:1 - Up to 45 rpm) 15:1 - Up to 75 rpm) 5:1 - Up to 225 rpm)	- 25° thru 60°	10W40	–	–	–
	0° thru 100°	40	4	626 to 765	135 to 165
	101° thru 180°	50	5	918 to 1122	198 to 242
25:1 - 46 rpm and Up) 15:1 - 76 rpm and Up) 5:1 - 226 rpm and Up)	-25° thru 60°	10W30	–	–	–
	0° thru 100°	30	3	417 to 510	90 to 110
	101° thru 180°	40	4	626 to 765	135 to 165

NOTE: Pour point of lubricant selected should be at least 10° F. lower than expected minimum ambient starting temperature.

Extreme pressure (EP) lubricants are not recommended for normal operating conditions.

Special lubricants may be required for food and drug industry applications where contact with the product being manufactured may occur. Consult a lubrication manufacturers representative for this recommendation.

Do not use oils containing slippery additives such as graphite or molybdenum disulphide in the reducer when backstop is used. These additives will destroy sprag action.

IDLERS EQUIPPED WITH LABYRINTH SEALS

Belt conveyor idlers equipped with labyrinth seals are factory lubricated with the following lubricant:

Socony Mobil Oil Company	
Mobilplex 47	
Type of Soap	Calcium-Lead Complex
Mineral Oil Viscosity	70/75 SUS @ 210F
Color	Medium Brown
Structure	Smooth
ASTM Penetration @ 77 F	
Unworked	295/325
Worked	295/325
Dropping Point	500° F
Timken OK Load (1lbs)	35 Min.

Idlers should be inspected prior to installation for possible damage in shipment. This is to include inspection of the extended lubrication lines or roller connections for idlers equipped with the SYNCHRO-LUBE system for possible breakage or disconnection in shipment.

Should idlers be stored for an extended period of time, they must be stored under cover. If idlers are not put into operation within 6 to 12 months after delivery (depending on the severity of the storage conditions), they must be field lubricated. Greases that are exposed to the elements and not under operating conditions can oxidize and thus have separation of oil and base. When greases separate, the bearing and seal riding surfaces are protected for a limited time only. When lubricating for the above conditions, grease each roller slowly until a bead of fresh grease is observed completely around each seal.

It is important that the idlers be relubricated with a grease compatible with that used at the factory. Greases of different soap type generally react on each other with separation of oil and base. Partial or total obstruction of lubricant lines and orifices could occur rendering effective lubrication impossible.

All safety precautions being taken, the best results will be obtained if the idlers are lubricated while running.

NOTE: For idlers equipped with the SYNCHRO-LUBE system and which have a connection between rollers without threaded fittings, the lubricant should not be applied at a pressure exceeding 200 PSI. The system provides for a metered amount of grease at each bearing. Therefore, should the greasing method used tend to introduce the grease at a rate of flow exceeding the capacity of the idler assembly, high pressure would develop in the system which could result in the rupture of the connection between rollers. This situation is not liable to occur when the lubrication is performed with a hand pump. High capacity powered pumps should be adjusted to relief at 200 PSI maximum. The quantity of lubricant required to lubricate one idler indicated below is such that the slow feed requirement should not appreciably increase the lubrication time.

Before regreasing, wipe the grease fitting so as not to introduce foreign material with the fresh lubricant. As to the quantity of lubricants, this will depend on the established schedule. The amount of fresh lubricant should be such as to flush all bearing cavities of contaminated grease. This will generally amount to about one tablespoon of grease per roller. After lubrication, wipe off excess grease from lubrication fitting. Excess grease should also be removed from roller ends if practical. This will preclude grease dripping on the belt and prevent gathering contaminants in the seals area which could reduce the idler's normal life.

No definite period of lubrication can be given as this depends on the application and environment. The purpose of greasing idler rolls is to lubricate the bearing and to force foreign material and contaminated grease out of the seal. For best results, it is recommended that a few idlers on every new installation be greased frequently and the grease emerging from the seals be observed for contamination. If the grease appears to be quite clean, the time between lubrication can be extended. In this manner, a suitable lubrication schedule can be established.

NOTE: All the information in this manual applies to all types of idlers and return rollers equipped with labyrinth seals.

MOTORS

Motors are sealed at the factory and require no further lubrication

ROLLER CHAIN DRIVES

Manual lubrication is accomplished by applying the oil with a brush. For open drives, oil is applied to the inside of the chain at the edges of the link plates. As the chain rides on the sprockets, the oil will be carried by centrifugal force to the pin and bushing surfaces. Apply a sufficient amount of oil so that the entire chain is lubricated. The frequency of application is governed by the local conditions and the chain speed. It is recommended to lubricate the chain daily.

For a bath lubricated drive, the lower strand of chain runs through a sump of oil in the drive housing. The oil level should reach the pitch line of the chain at its lowest point while operating.

Franklin Environmental Services
Gravel Separation System

TAB 5

SUPERIOR RINSE PLANT

TABLE OF CONTENTS

To the owner:

Congratulations on your selection of a Superior Equipment Wash Plant with a Fine Material Washer. This unit is one of the best means of classifying, washing, and dewatering materials to your requirements. It has been designed to provide years of profitable and dependable service. To ensure maximum performance of your wash plant, it is mandatory that you thoroughly study this owner's manual and follow its recommendations. Proper operation and maintenance are essential to prevent injury or damage and to maximize machine life.

It is the owner's responsibility to:

- Operate and maintain this wash plant in a safe manner and in accordance with all applicable local, state, and federal codes, regulations, and/or laws; and in compliance with on-product labeling and this owner's manual instructions.

- Make sure that all personnel have read this owner's manual, and thoroughly understand safe and correct installation, operation, and maintenance procedures.

- Make sure the wash plant is installed correctly before being placed in service, and at regular intervals thereafter serviced in accordance with procedures outlined in this owner's manual.

- Fulfill all warranty obligations so as not to void the warranties. The warranty section at the beginning of this owner's manual outlines the warranty policy of Superior Equipment. For a complete description of Superior Equipment's obligations arising from the sale of this equipment, refer to Superior Equipment's terms and conditions of sale on the back of Superior's sales contract.

Superior Equipment reserves the right to make product improvements to the equipment at any time.

WARRANTY

Seller warrants to original Buyer that merchandise manufactured by the Seller will be free from defects in material and workmanship when used under proper and normal use for a period of 1 year after delivery. Seller's liability under this warranty is expressly limited, in Seller's discretion, to replacing or repairing any merchandise found to be defective within 1 year after delivery. Buyer expressly agrees that replacement or repair of the merchandise is, in Seller's discretion, Buyer's sole and exclusive remedy for any breach of warranty. In the event any merchandise is found to be defective during the warranty period, Buyer shall notify Seller in writing of any claimed defect within 30 days after such defect is first discovered, but not later than 1 year from the date the merchandise was delivered to the Buyer and provide Seller with an opportunity to inspect and test the merchandise claimed to be defective. The effects of normal wear and tear do not constitute a defect for purpose of this warranty. Seller shall pay all reasonable transportation charges incurred in returning to Seller any merchandise agreed in writing by Seller to be defective; however, Buyer shall pay all transportation, removal, and replacement charges covering any merchandise returned that does not prove to be defective. This warranty is provided by the Seller solely to the original Buyer of the merchandise and applies to items manufactured by the Seller as well as any warranties provided by the Seller's suppliers.

THIS WARRANTY IS THE SOLE AND ENTIRE WARRANTY PERTAINING TO THE SELLER'S MERCHANDISE AND IS IN LIEU OF AND EXCLUDES ALL OTHER WARRANTIES OF ANY NATURE WHATSOEVER, WHETHER EXPRESSED, IMPLIED, OR ARISING BY OPERATION OF LAW, TRADE USAGE, OR COURSE OF DEALING, INCLUDING, BUT NOT LIMITED TO, WARRANTIES OF MERCHANTABILITY AND WARRANTIES OF FITNESS FOR A PARTICULAR PURPOSE.

08/19/99

SAFETY FIRST!

Accidents can be prevented by recognizing the causes or hazards before an accident occurs and doing something about them. Regardless of the care used in the design and construction of this equipment, there are some areas that cannot be safeguarded without interfering with accessibility and efficient operation.

⚠ *This message alert symbol identifies important safety messages on the equipment and in the owner's manual. When you see this symbol, be alert to the possibility of personal injury and carefully read the message that follows.*

This message alert symbol identifies information that must be heeded for proper operation of the equipment and to prevent damage or deterioration of the equipment.

In the owner's manual and on decals used on the equipment the words **DANGER, WARNING, CAUTION, IMPORTANT,** and **NOTE** are used to indicate the following:

DANGER: This word warns of immediate hazards which, if not avoided, will result in severe personal injury or death.

WARNING: This word refers to a potentially hazardous situation which, if not avoided, could result in severe personal injury or death.

CAUTION: This word refers to a potential hazard or unsafe practice which may result in minor or moderate personal injury.

IMPORTANT: Highlights information that must be heeded.

NOTE: A reminder of other related information that needs to be considered.

BE CERTAIN ALL EQUIPMENT OPERATORS ARE AWARE OF THE DANGERS INDICATED BY SAFETY DECALS APPLIED TO THE EQUIPMENT, AND BE CERTAIN THEY FOLLOW ALL SAFETY DECAL INSTRUCTIONS. CONTACT SUPERIOR EQUIPMENT FOR SAFETY DECAL REPLACEMENT.

SAFETY DECALS

Not all may apply to your equipment - see safety decal placement illustration.

19-00001

⚠ DANGER

MOVING PARTS HAZARD

Can crush or dismember hands and fingers.

- Keep hands away when belt is moving.
- Lock out power before cleaning or servicing.

19-00005

⚠ DANGER

PINCH POINT HAZARD
Keep away from moving parts.

19-00002

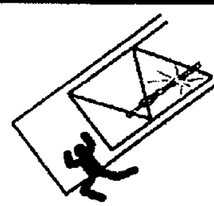
⚠ DANGER

MOVING PARTS HAZARD

- Keep hands, clothing, and hair away from moving belts and parts.
- Replace guard before operating.

19-00053

⚠ DANGER



Wire rope WILL FAIL if worn-out, overloaded, misused, damaged, improperly maintained or abused. Wire rope failure may cause serious injury or death! Protect yourself and others

- [illegible] wire rope for WEAR, DAMAGE, or ABUSE BEFORE USE.
- [illegible] wire rope that is WORN-CUT DAMAGED or ABUSED.
- [illegible] Owner's Manual for INSPECTION REQUIREMENTS.
- [illegible] any body parts inside the truss frame unless stinger has been SECURED with chain.

19-00003

⚠ WARNING

PINCH POINT HAZARD

Can crush or dismember hands and fingers.

- Keep hands clear when undercarriage is moving.
- Replace or remove hitch pins only after undercarriage has stopped moving.

19-00024

⚠ CAUTION

- Maximum travel speed 40 MPH on paved roads, SLOWER speed on other roads.
- Travel restricted to daylight hours and when clear visibility exceeds 500 feet.

19-00004

⚠ WARNING

MOVING PARTS HAZARD

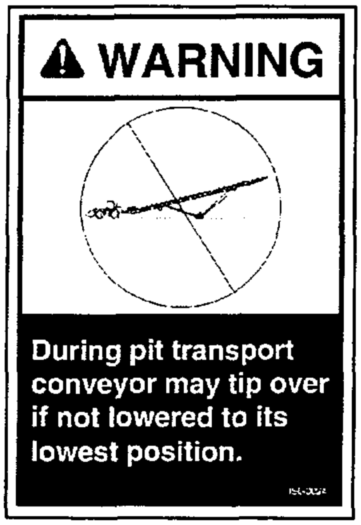
Can crush or dismember hands and fingers.

Do not operate with guard removed.

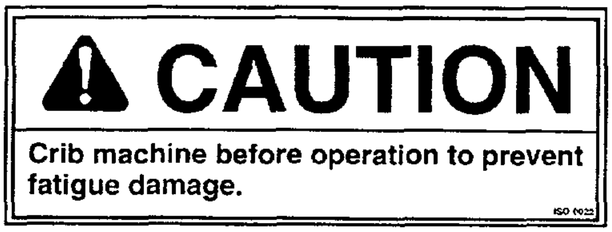
SAFETY DECALS

Not all may apply to your equipment - see safety decal placement illustration.

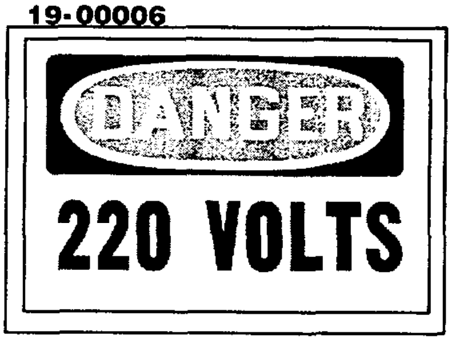
19-00009



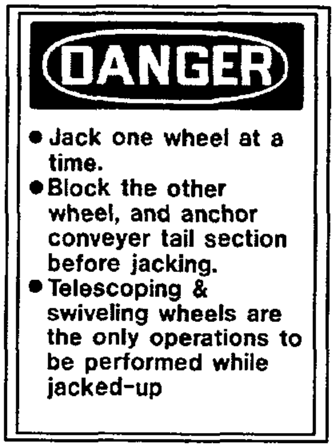
19-00023



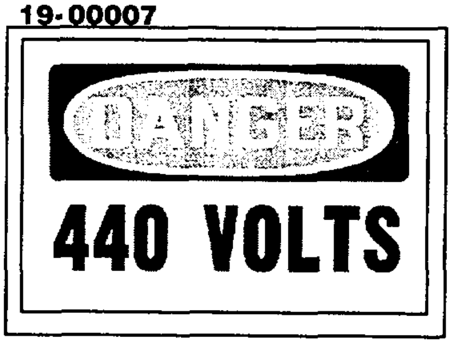
19-00006



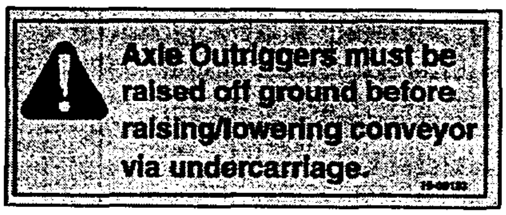
19-00015



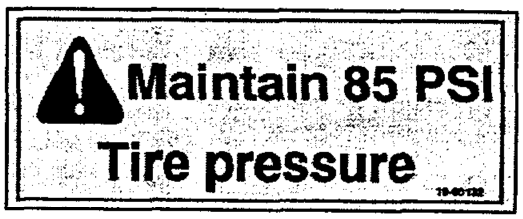
19-00007



19-00133



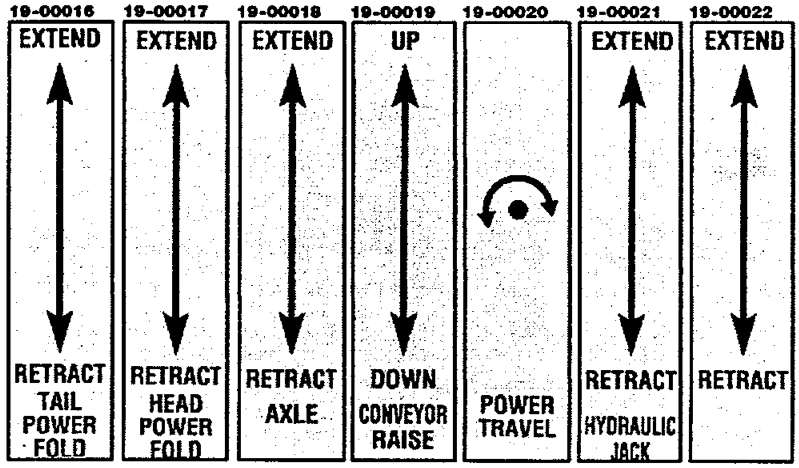
19-00132



CONTROL AND IDENTIFICATION DECALS

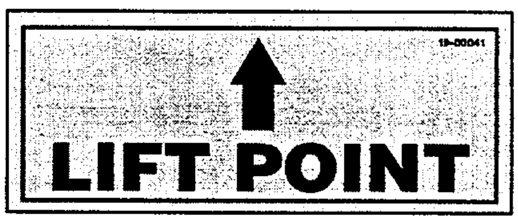
Not all may apply to your equipment. Order replacements by part number.

19-00016 19-00017 19-00018 19-00019 19-00020 19-00021 19-00022

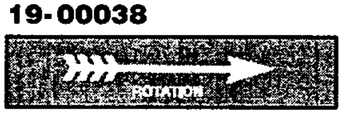


19-00008

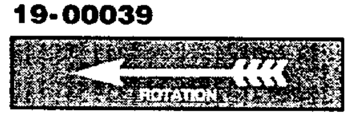
19-00041



19-00038

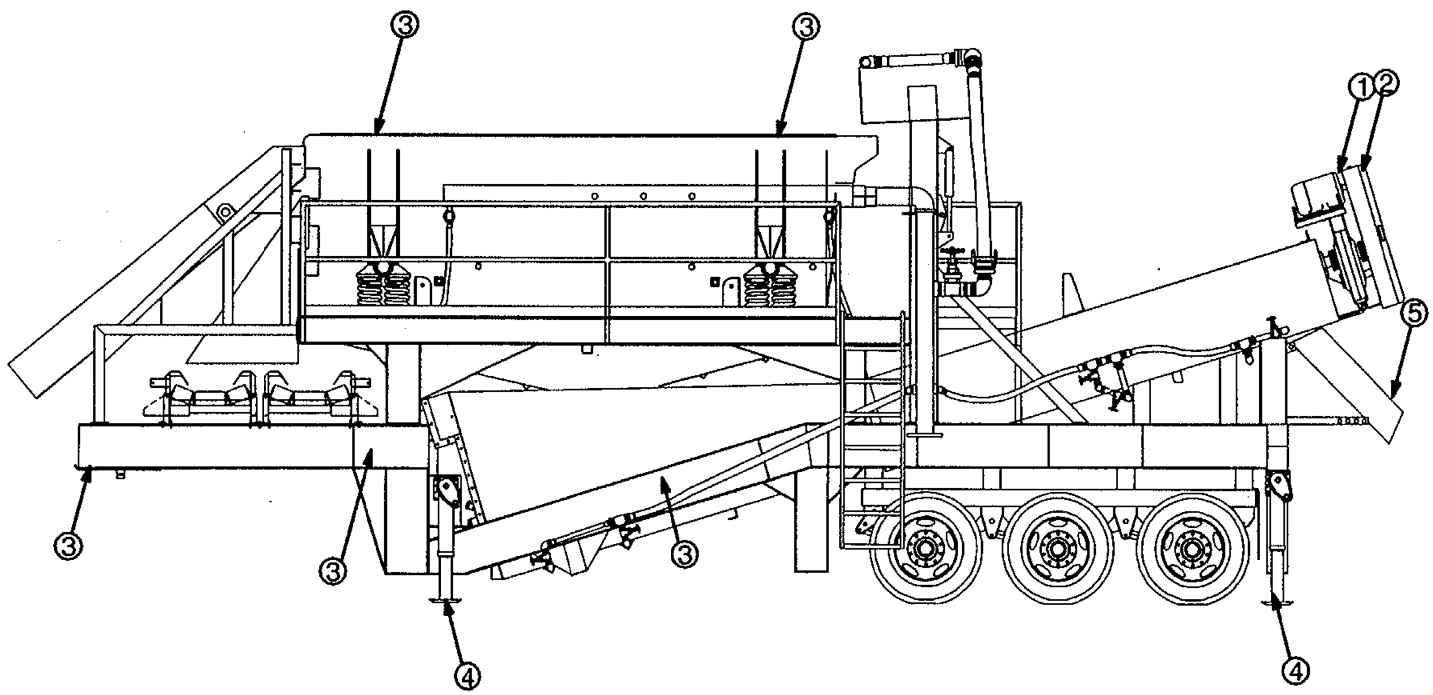


19-00039



SAFETY DECAL PLACEMENT

Ref.	Part No.	Placement	Qty.
1	19-00002	On back side of hopper above tail pulley guard	2
		Inside drive guard on back plate	4
2	19-00004	On top of tail pulley guard	2
		On side of drive guard cover	4
3	19-00001	On both sides of conveyor	12
4	19-00023	(1) on the outside of each support leg	6
5	19-00024	On front center of transport frame	1



SUPERIOR INDUSTRIES

SAFETY INSTRUCTIONS FOR OPERATION AND MAINTENANCE

> *These are general safety considerations—additional precautions may be necessary to operate your equipment in a safe manner. Be certain you are operating your equipment in accordance with all safety codes, OSHA rules and regulations, insurance requirements; and local, state and federal laws.*

1. **Do not allow anyone to operate the wash plant until he or she has read the owner's manual and is completely familiar with all safety precautions.**

2. Do not allow the following people to operate or maintain the wash plant:
   - Children
   - Persons unfamiliar with the equipment, or unfamiliar with safe operating and maintenance procedures for the equipment.
   - Persons under the influence of alcohol, medications, or other drugs that can impair judgement or cause drowsiness.

3. Make sure everyone is clear of the wash plant before starting the unit during operation or maintenance. Never allow anyone to ride on the wash plant!

4. **Do not** wear loose hanging clothes, neckties, or jewelry. Long hair is to be placed under a cap or hat. These precautions will help prevent you from becoming caught in the moving parts of the wash plant.

5. **Do** wear safety glasses, ear protection, respirators, gloves, hard hats, safety shoes, and other protective clothing when required. Requirements for personal protective equipment will vary depending upon wash plant placement and material to be handled. It is the responsibility of wash plant operators to be certain they make use of all necessary personal protective equipment.

6. Buildup of materials on conveyor pulleys or idlers will lead to belt misalignment or damage. When removing such materials, the wash plant and conveyors must be stopped and power controls must be locked-out or tagged-out.

7. The wash plant should not be used to handle materials other than those which were specified as part of its design and manufacture. It is the operator's responsibility to be aware of the wash plant system capacities and operate the wash plant accordingly.

8. Make sure the operator's area is clear of any distracting objects. Keep work areas clean and free of grease and oil to avoid slipping or falling.

9. Periodically check all shields and structural members. Replace or repair anything that could cause a potential hazard.

10. When the conveyors are moving, the material travels at a speed sufficient to cause injury. Do not start conveyors until you are certain no one is exposed to the moving parts or to the material being discharged from the end of conveyors.

11. When doing maintenance work on structural parts or repairing any moving parts:
    - Disconnect and lock-out or tag-out all power sources. Know OSHA requirements.
    - When welding is required, disconnect all power sources and connect ground to point closest to welding area.
    - Block all wheels to prevent the wash plant from moving, and block any extended hydraulic cylinders to prevent them from moving or retracting.

12. If any safety devices are not functioning properly, do not use the wash plant. Remove it from service until it has been properly repaired.

13. Do not replace components or parts with other than factory-recommended service parts. To do so may decrease the effectiveness of the unit.

14. Do not lubricate parts while the wash plant is running.

15. Before starting engines within enclosed areas, be certain ventilation is sufficient to avoid buildup of exhaust fumes.

16. Relieve any and all pressure before opening, repairing, or removing any air pressure lines, hydraulic lines, valves, fittings, or seals. In the event of an hydraulic line rupture, **stay clear** of the area until pressure has been relieved. Clean up any spilled fluid before performing repairs in the area.

17. It is the operator's responsibility to be aware of equipment operation and work area hazards at all times.

18. Operators are responsible to know the location and function of all controls and indicators, including electrical power panels, hydraulic controls, motor controls, incline indicators, fuel and oil level indicators, etc.

19. Operators are responsible to know the location and function of all guards and shields including but not limited to drive guards, pulley guards, and nip guards; and are responsible to make certain that all guards are in place when operating the wash plant.

20. Operators are responsible to be aware of safety hazard areas and follow instructions on warning, caution, or danger decals applied to the wash plant. Safety hazard areas may include but are not limited to:
    - Pinch points at fold hinge areas
    - Pinch points at fold support areas
    - Pinch points where locking pins are used
    - Electrical control panels
    - Moving parts hazards on drives
    - Moving parts hazards where contact with conveyor belts and idlers is possible

21. Carefully read through and follow all safety instructions in the vibrating screen information contained in section 4 of this wash plant owner's manual.

CONVEYOR PRE-OPERATION CHECKLIST

BEFORE STARTING THE CONVEYOR FOR THE FIRST TIME:

1. Carefully read through all safety instructions in the owner's manual.
2. Return and trough idlers are either greaseable or non-greaseable. Check greaseable idlers to be sure they are filled with grease.
3. Check to be sure the reducer is filled to the proper oil level.
4. Check to be sure that skirtboards at loading points are installed and adjusted. Refer to the owner's manual Belt Loading instructions for skirtboard adjustments.
5. Check and remove all tools and any foreign objects from the belt, particularly on the return run side where they may get between the pulleys and belt. Grease on the belt should be removed immediately as it will deteriorate the belt.
6. Check equipment wiring—any and all wiring must be done by a qualified electrician.
7. Loosen and remove the v-belts by adjusting the torque arm reducer or motor mount tension bolts. Turn the driven sheave by hand to determine the direction of rotation. Run the drive motor or use a phase rotation indicator to determine the drive sheave direction of rotation. If both sheaves are not rotating in the same direction, the unit must be rewired by a qualified electrician. Adjust the torque arm reducer or motor mount tension bolts to set v-belts at proper tension. See Gates Belt Preventive Maintenance Manual in the owner's manual for tensioning instructions.
8. When a belt scraper is used, be sure that it is properly installed and working. See belt scraper and tensioner materials included near the back of the owner's manual if applicable.
9. Continue through the steps outlined below.

EVERY TIME BEFORE STARTING THE CONVEYOR:

1. Check to be sure the reducer is filled to the proper oil level.
2. Check all other fluid levels.
3. Be certain all guards and safety devices are in place and in working order.
4. Visually inspect all hoses, lines and belts for leaks, wear and damage.
5. Make certain no parts of the conveyor power, hydraulics, or moving parts have been locked-out or tagged-out. If they have, determine who placed the lockouts, and have them remove the lockouts or tagouts before starting the conveyor.
6. Walk completely around the conveyor, making certain no other personnel are under, on top of, or next to the conveyor. Warn anyone nearby that you are starting up the conveyor.
7. After starting the conveyor, check all controls and indicators or gauges to be certain they are in working order.
8. Check the operation of safety stop lines and switches, if applicable, after starting the conveyor.

GENERAL OPERATION

A conveyor belt, correctly installed and trained, will run straight and true. The belt must run centered on all terminal, snub, and take-up pulleys; troughing and return idlers throughout the entire length. Straight running also requires that the belt contact the horizontal roller of the troughing idlers.

Never use side-guide idlers to compensate for erratic belt travel. Self-aligning idlers should not be used to force the belt into correct running position, but rather as a safeguard against unusual operating conditions after the belt has been properly trained.

> ***Incorrect belt installation and training can result in severe edge damage, material spillage and leakage through the skirtboards at the loading point, and excessive power demands.***

Material spillage is the usual reason for belt carcass ruptures and pulley cover gouging and stripping, while leakage at the skirtboards results in excessive belt cover wear under the skirtboards.

After the belt has been properly trained while running empty, load the belt to facilitate breaking it in. When operating, the conveyor must be running before receiving material from the discharge unit. When shutting down, the discharge unit must be stopped first, while the conveyor will continue to run until empty. Check to be sure the electric controls are wired to provide the proper starting and stopping sequence. If you are running very wet or moist material, run the belt empty for at least three complete revolutions to clean material from the belt.

With the belt operating under load, check the belt for runout and, if necessary, realign idlers as described in the Belt Training instructions in the owner's manual. No special tools or equipment are needed to either maintain or service your conveyor.

BELT TRAINING

Belt training is a process of adjusting idlers and loading conditions in a manner which will correct any tendency of the belt to run off. Never attempt to train the belt by unequal adjustment of take-up side adjusting bolts. The take-ups are only used for keeping the tail pulley square with the conveyor frame, and to produce the necessary belt tension to prevent slippage and excessive belt sag between idlers.

The training of a conveyor belt causing it to travel over the center area of troughing idlers, pulleys,and return idlers is vitally important to trouble-free operation and low maintenance cost. Unless a belt itself is warped and curved from improper manufacture, use, or storage, it is possible to train it for central running. The following recommendations are basic to belt training procedures:

1. Level all frames crosswise as gravity will force the belt off-center if one side of the conveyor frame is lower than the other.
2. Square the tail pulley with the frame, using a large carpenter's square.
3. Square all troughing and return idlers with the frame and tighten the attachment bolts. Check squareness from both side members.
4. Run the conveyor empty and at reduced speed if possible. If the belt should show a side creep at only the splice area and this progressed along the conveyor instead of remaining at one point on the frame, the splice may not be square and may have to be redone.
5. Check the belt splice for squareness. The belt ends should be squared from centerlines found through the method described in the Belt Installation instructions in the owner's manual. Check the belt run on the return run side of the conveyor, or place a large plywood board under the belt on the load side to get accurate measurements. Check to see if a line between points B (Fig.3) runs parallel to the belt fasteners.
6. If necessary resplice the belt, following instructions in the Belt Installation instructions in the owner's manual. If you don't have sufficient belt length to resplice after squaring the belt ends, you will have to add a section of belt. When adding belt sections, remove enough length from the original belt to allow for a minimum distance of 3 feet between belt splices.
7. If you have determined the splice is square, examine the return run side of the conveyor for side creep first, beginning at the head end and working down to the tail. Make adjustments where side creep occurs as follows:
   A. The point of maximum side creep requires adjustment of a preceding idler when you are facing in the direction of belt travel.
   B. Loosen the bolts and pivot the idler around its midpoint, making these adjustments in small amounts, tightening the bolts and making a test run after each adjustment to see the effect on side creep. Run the belt at least three revolutions for the adjustment to take effect. If the point of maximum side creep changes, adjust the idler that precedes that new point.
8. Examine the load run side of the conveyor, following the belt travel from tail to head end. Make the same adjustments where side creep occurs.
9. When the slow running belt is centered, change to a higher speed (if used). Load the belt with material and continue testing until normal operating conditions cause no deviations from central running.

BELT LOADING

After the conveyor has been thoroughly checked over and all belt training completed, the conveyor can be loaded. Start with a light load and gradually work up to the load that the conveyor was designed to handle. When stopping the conveyor, operate until the belt is clear of material, especially at the end of each working day. During cold weather, material remaining on the belt will freeze to the rubber covering and may cause damage.

Check chutes to see that the material is being directed onto the center of the belt (Fig.1). Off-center loading is harmful to belt, idlers, and shafting. The loading point of a conveyor is the critical point. Here the belt receives its major abrasion and practically all of its impact. The ideal condition is to have the material pass from chute to belt at the same speed and direction of travel as the belt, with a minimum amount of impact.

Rubber skirtboards are bolted to the trough to form the load centrally on the belt, to prevent side spillage, and to prevent material from spilling out the back or bottom of the trough. Larger material spilling out the back of the trough has potential to catch in the belt or damage the tail pulley. Skirtboards will require adjustment or replacement as they wear.

Material should be *stilled* on the belt before it reaches the end of the skirtboards. If the material particles are still tumbling as they pass the skirtboard ends, belt speed may need to be adjusted, feed arrangement or rate may need to be adjusted, or the trough and skirtboards may need to be extended in order to avoid side spillage of material.

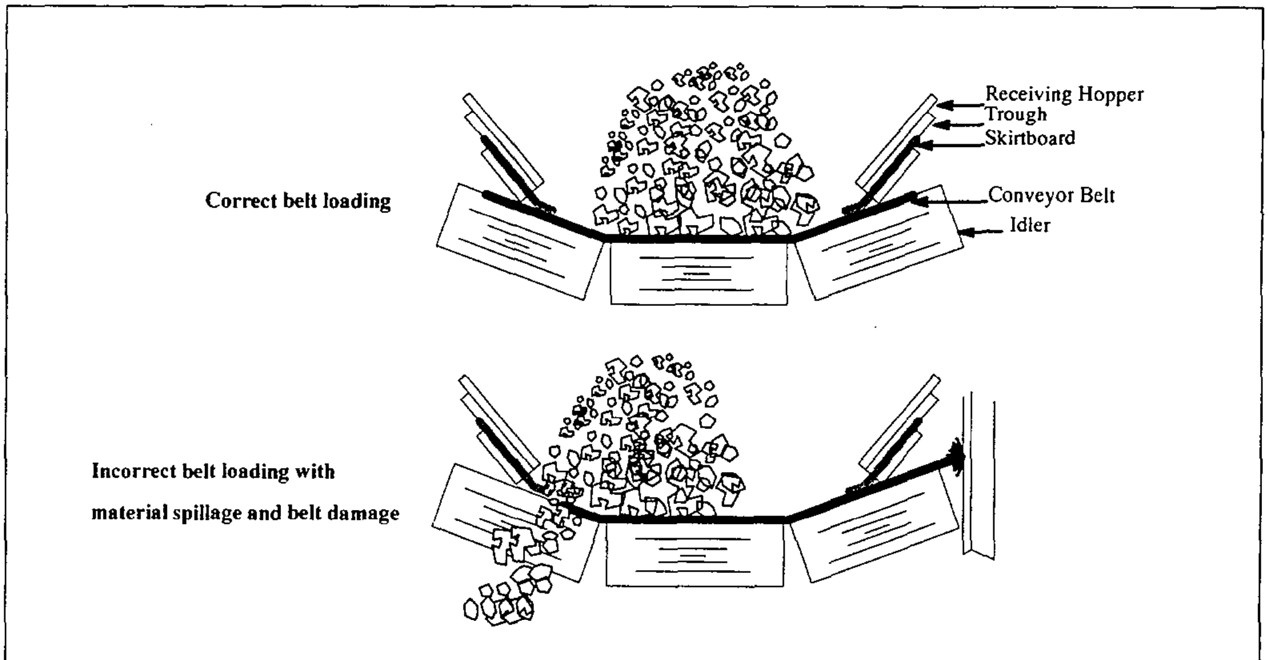


Figure 1. Belt Loading

BELT TIGHTENING

All Superior Equipment conveyors are equipped with take-up side adjusting bolts (Fig.2) at the tail end to maintain the necessary belt tension. With a wrench, use the take-up side adjusting bolts to move the sliding bearing assemblies forward. Apply the proper tension to the belt to prevent slippage and excessive belt sag between troughing idlers.

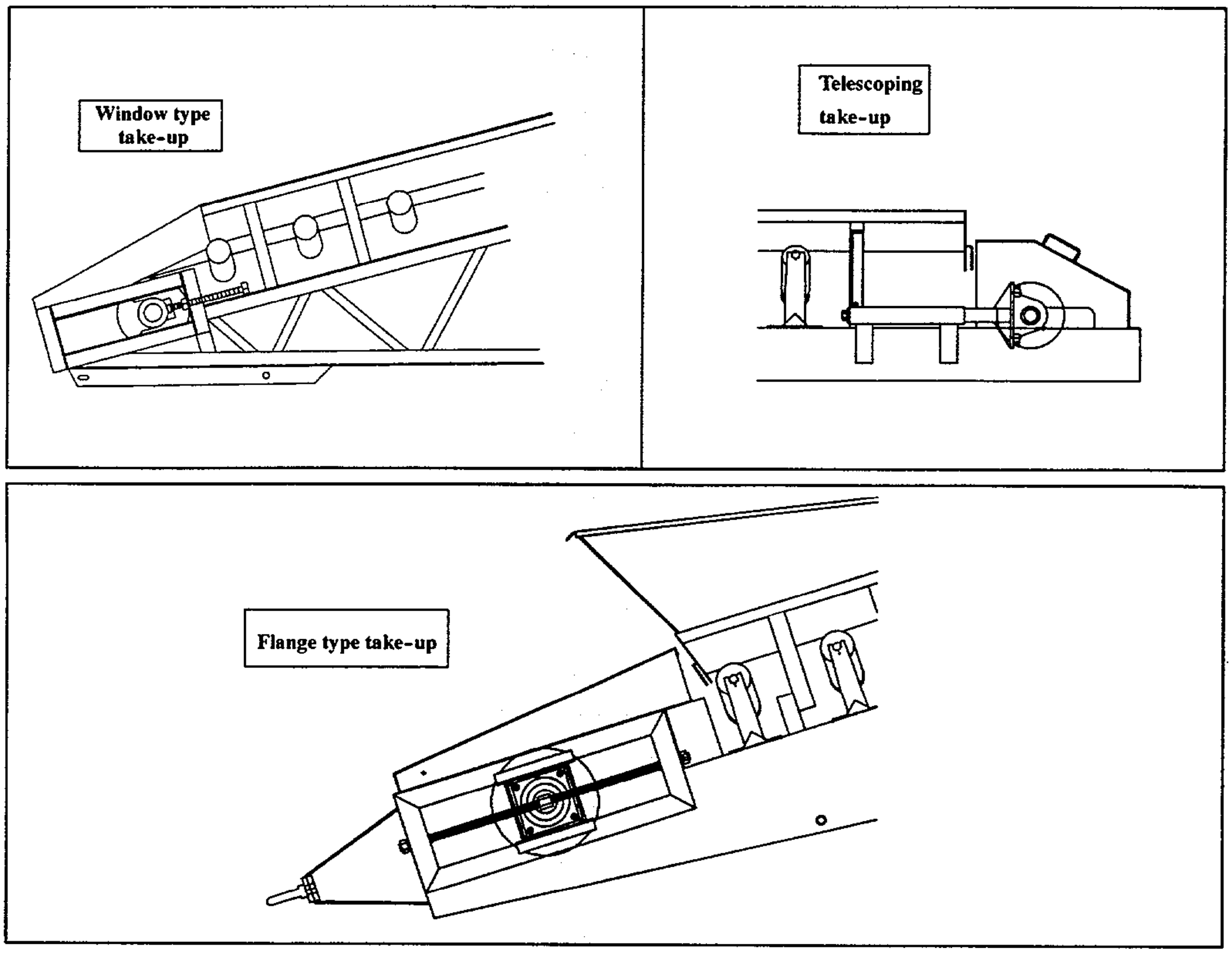


Figure 2. Side view of conveyor tail sections

BELT INSTALLATION

Belts are customarily packaged in crates which can be rolled from place to place. Crates and rolls are usually marked with an arrow which shows the direction in which they should be rolled. When hoisting the belt roll, a bar should be passed through the hole in the center of the roll. Fasten chain or cable to the ends of the bar for lifting, and use a spreader bar above the roll to prevent damage to the edge of the belt.

Always store the belt roll suspended on a tube or bar, or resting on the face width of the belt. Storing the belt roll with weight on one edge may stretch the belt, making it difficult to square at assembly and train during the initial operation. Belts should be stored in a dry, cool building. Never drop the belt or store it on its edges.

Installation of the belt begins with building a suitable stand behind the conveyor and then aligning the belting roll with the conveyor frame. If the area behind the conveyor will not permit this method of threading, the roll of belting can be suspended above the conveyor frame for threading.

Next, check the position of the side take-up bearings to make sure they are positioned all the way to the beginning of the adjustment frame. This will give you maximum take-up ability after belt installation. Then check the belt to make sure the load side (side with the thickest rubber covering) is facing up.

Most belting is shipped from the factory cut to length with additional allowance for squaring ends for the splice. Create a centerline for squaring the end of the belt by measuring and marking center points on the width of the belt at 3 foot intervals for at least 15 feet. Snap a chalkline or use a long steel rule to mark the average centerline through these points (Fig.3). Locate a centerline point (A) at least 10 feet from the edge of the belt. Locate points (B) equal distances from point (A) to connect as your cutting line. Use a straight edge as you cut the belt—a standard linoleum knife with hook usually works well.

Position the fastener manufacturer's template on the belt (or fashion one yourself given the manufacturer's recommendation for fastener spacing) and punch holes in the end of the belt for the fasteners. Always follow the manufacturer's recommendations as to the proper size of fasteners to be used on any belt. Attach a clamping plate onto the end of the belt to enable an even pull for threading the belt onto the conveyor (Fig.4).

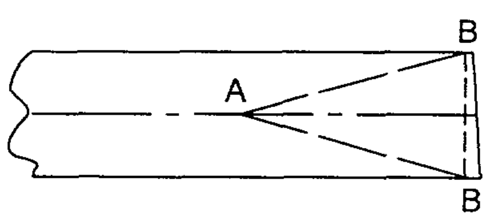


Figure 3. Squaring belt ends

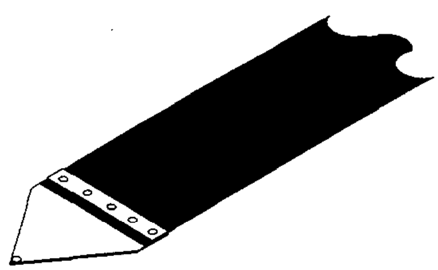


Figure 4. Clamping plate arrangement

Place the pulling plate on the bottom side of the belt so it will pass more easily over the troughing idlers. Bolt the clamping plate to the belt through the fastener holes—the number of bolts should be proportionate to the amount of pull exerted.

Connect a cable or rope to the clamping plate. A braking system can be made by using a belt clamp mounted on the conveyor frame to prevent belt runaway while threading. Slowly pull the belt into position (near the tail section for easy access) with a block and tackle or similar equipment.

Attach 2 stretcher clamps roughly 3 feet from each end of the belt. Make sure the stretcher clamp on the squared end of the belt is parallel with the belt end. Remove the clamping plate and firmly attach the parallel stretcher clamp to the conveyor frame.

Evenly draw the belt ends together, using a cable-jack or similar means, and pull the unsquared end of the belt over the top of the squared end until the correct belt tension is obtained. Maintaining this tension, create a centerline following the procedure described earlier, and mark a squared line where the belt must be cut for the splice.

Place a wooden plank under the splice point to facilitate the cutting and punching of holes in the belt. Cut the belt, position the fastener manufacturer's template on the belt end, and punch holes for the fasteners.

The use of belt tape under the belt fasteners is recommended to help reinforce the splice area. Refer to instructions included with the belt fasteners for proper installation.

When adding or replacing sections of conveyor belt, always leave a minimum distance of 3 feet between belt splices. Installing belt sections of less than 3 foot length may place enough stress on the splices to cause damage if both splices run over the head or tail pulleys at the same time.

BELT REPAIR

Fasteners can be used to make quick repairs to belt tears or to replace belt sections with new pads of the same belting (Fig.5). Coat all exposed edges or cuts with rubber cementing compound to prevent any moisture or foreign material from entering the belt carcass and causing further damage.

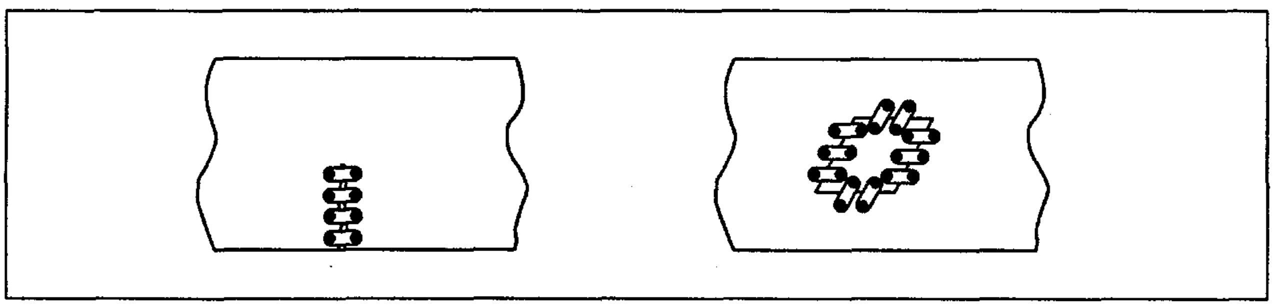


Figure 5. Repairing belt with fasteners

CONVEYOR MAINTENANCE

Review safety instructions on pages 3-12 before starting maintenance.

To ensure efficient operation, the operator or maintenance personnel should inspect, lubricate, and make necessary adjustments and repairs at regular intervals. Parts that are starting to show wear should be ordered ahead of time, before a costly breakdown occurs and you have to wait for replacement parts. Keep good maintenance records, and adequately clean your conveyor after each use.

Proper lubrication is important. Too little lubricant will cause premature failure of a bearing. Too much lubrication usually causes high operating temperature and early failure of seals. Follow all Lubrication instructions included in this section.

Operator or maintenance personnel should:

DAILY:

1. Check for loose bolts and mechanical joints.
2. Check during operation for unusual sounds to warn of future trouble. Promptly correct any problems identified.
3. Check and correct belt travel if the belt is not running centered on all troughing and return idlers. See Belt Training and Belt Loading instructions in this owner's manual.
4. Check the operation of safety stop lines and switches.

WEEKLY:

1. Check belt tension. Tighten only if there is slippage on drive pulley or enough sagging between idlers to allow spillage. This is especially important when a belt scale is used, as a sagging belt could produce incorrect readings and affect end product specifications. See the Belt Tightening instructions in this owner's manual.
2. Inspect and replace drive pulley lagging as needed.
3. Make sure troughing and return idlers contact the belt and run free under load. Shimming may be necessary if a belt scale is used.
4. Check and adjust the skirtboards to prevent side spillage, and to prevent material from falling between the tail pulley and the belt.
5. At different points, check the level across the conveyor frame and correct as needed.
6. Inspect belt fasteners for wear and replace as needed.
7. Check the empty belt for tears and other damage. Repair any damage and eliminate the causes.
8. Check taper-lock bushings in the drive sheave and in the head and tail pulleys for tightness.

CONVEYOR LUBRICATION

Lubricate the various parts as follows:

1. Bearings: Follow the guide in the instruction sheet for Dodge bearings included in this owner's manual. Bearings mounted on head and tail pulley shafts will run under 250 RPM, bearings mounted on balanced drive jack shafts will run around 1800 RPM.
2. Follow instructions in Superior Components idler materials included in this owner's manual. **Check** before attempting to lubricate, as some idlers are permanently sealed and cannot be greased.
3. Gear reducer (shaft-mounted): Maintain oil level. Follow oil recommendations in the gear reducer parts replacement manual included in this owner's manual.
4. Adjusting bolts: Lubricate as needed with SAE motor oil.
5. Electric motors: Follow manufacturer's recommendations included in this owner's manual.

Conveyor Troubleshooting Guide

SUPERIOR INDUSTRIES

Problem	*Solutions*				
Belt runs off at the tail pulley	24	13	12	15	19
Belt runs off at the head pulley	26	13	20	19	14
Belt runs to one side at a particular point along the conveyor	13	12	5		
Belt section runs to one side along the full length of the conveyor	22	2	9	1	
Belt runs centered while empty, but off-center when loaded	15				
Belt slips	24	17	19	12	20
Belt slips on startup	24	17	20	8	
Excessive belt stretch	11	8	19	7	6
Belt breaks around the fasteners	2	21	11	10	18
Vulcanized splice separation	11	21	8	18	
Excessive belt top cover wear	10	23	15	19	6
Excessive belt bottom cover wear	19	12	17	18	20
Excessive belt edge wear	15	4	6	1	19
Belt cover swells or soft spots	6	10	8	18	
Belt hardens or cracks	6	21	20	16	
Lengthwise grooving or cracking of belt top cover	25	12	19	10	
Belt fabric decay	10	18	8	6	
Belt ply separation	11	21	9	6	3
Belt cleating separation, damage	21	31	30		
Belt fasteners pull out	2	32			
Hydraulic cylinders won't operate	33	34	35	36	37

1. The belt may be bowed. A new belt should straighten out after two to three hours running, or it must be replaced.
2. Improper or incorrectly installed belt fasteners.
3. Belt running speed may be too fast. Contact Superior Equipment about using a different drive sheave to change the running speed.
4. Belt may be strained on one side. A new belt should straighten out after two to three hours running. Belt section may require replacement.
5. Conveyor frame may not be level. Position the conveyor in a level work area.
6. Damage to belt by abrasives, chemicals, heat, oil, etc. Be certain belt was designed for use with specific materials being conveyed. If abrasive materials work into cuts and between plies, make spot repairs according to Belt Repair instructions in the owner's manual.
7. Dual pulley drives may not be running at the same speed. This is likely only if friction wheel drive tires were replaced. Contact Superior Equipment for replacement tires.
8. Drive may be underbelted. If you are not handling material for which the conveyor was manufactured, installation of another grade of belt may be required. Contact Superior Equipment.
9. Belt edge may be worn or broken. Remove worn section and splice in a new one according to Belt Installation and Repair instructions in the owner's manual.
10. Excessive impact of material on belt or fasteners. Modify feed to reduce impact. Contact Superior Equipment about installing impact idlers, where possible, to absorb impact.
11. Excessive belt tension. Reduce load being conveyed or adjust conveyor take-up side adjusting bolts to reduce tension.
12. Frozen idlers. Free idlers and lubricate according to Superior Components idler materials included near the back of the owner's manual. Replace idlers if necessary.
13. Idlers or pulleys out-of-square with center line of conveyor. Realign, following Belt Training instructions in the owner's manual.
14. Idlers improperly placed. Contact Superior Equipment about relocating idlers or inserting additional idlers spaced to support the belt.
15. Off-center loading. Material feed should be in direction of belt travel and at belt speed, centered on the belt. See Belt Loading instructions in the owner's manual.
16. Improper belt storage and handling.
17. Insufficient traction between belt and pulley. Lag the drive pulley, using grooved lagging in wet conditions. Contact Superior Equipment about increasing wrap with the addition of snub pulleys.
18. Material between belt and pulley. Remove accumulation and improve maintenance. Adjust the skirtboards, referring to Belt Loading instructions in the owner's manual.
19. Material build up. Remove accumulation and install cleaning devices, scrapers, or return belt covering.
20. Pulley lagging may be worn—replace if necessary. Use grooved lagging for wet conditions. Repair any protruding loose bolts.
21. Pulleys are too small. Contact Superior Equipment about using larger diameter pulleys.
22. Belt splices may not be square. Check and replace if necessary, following Belt Installation instructions in the owner's manual.
23. Material loading speed too high or too low. Adjust feed rate or change belt speed. Contact Superior Equipment to determine if a different drive sheave size may be used to change belt speed.
24. Insufficient belt tension. Use take-up side adjusting bolts to increase belt tension, following Belt Tightening instructions in the owner's manual.
25. Skirtboards improperly placed. Adjust skirtboards so that they do not rub against the belt, referring to the Belt Loading instructions in the owner's manual.
26. Idlers leading to head pulley may be out of alignment. Realign, following Belt Training instructions in the owner's manual.
27. Return rollers may be out of alignment. Inspect and realign at right angles to the center of the belt.
28. Sagging between idlers. Tighten belt according to Belt Tightening instructions in the owner's manual.
29. Material may be wedged between skirtboards and belt.
30. Material conveyed may be breaking the bond. Contact Superior Equipment.
31. Improper belt tracking, with cleating hitting the conveyor frame.
32. Splice area may be striking obstructions, including the conveyor frame.
33. Check power to hydraulic pump, and pump rotation. Have a qualified electrician rewire if necessary.
34. Check oil pressure. If gauge indicates low pressure, contact Superior Equipment about relief valve adjustments.
35. Check for hydraulic line leakage. Relieve line pressure before tightening or replacing fittings or hoses.
36. Check to be certain you are using recommended oil, particularly when running in hot or cold weather conditions.
37. Check dual overcenter valve. Contact Superior Equipment for instructions on replacement or repair.

FINE MATERIAL WASHER OPERATION

The fine material washer will **classify, wash,** and **dewater** material to your specifications. Screw speed, water volume, turbulence, and wier plate adjustment factor into floating material to be rejected, and sinking material to be retained and conveyed upward by the screw. The tumbling action of the screw cleans and separates additional materials, and the desired fines are left to dewater as they move up the screw. A continuous stream of water from the backwash area allows excess water to drain from the desired fines.

1. Check all nuts and bolts to see that they are tight.
2. With the washer in operating position, check the reducer unit and oil level.
3. Check the tub and be certain the screw is free of materials.

> ***Never start the unit under load. Doing so may damage the drive unit and will void your warranty.***

4. Open water lines.

> ***Never start the drive motor on your washer until the tub has enough water in it to cover the rubber seal at the bottom, or you have lubricated the seal to prevent damage.***

5. When operating the unit for the first time, check the rotation direction of the screw. If the material will not be moved toward the drive end of the unit, have a qualified electrician rewire the motor.

> ***Do not stand or climb on the washer when it is operating!***

6. Once water has reached a level where it is overflowing the adjustable wier plates, start the drive motor on the screw.
7. Start the material feed. Material should be made to enter the washer with as little turbulence as possible.

8. The return flow area in the bottom of the tub must be kept open, with a continuous stream of water from the drive end of the tub to the bottom acting to dewater the material as it moves toward the drive end of the screw.

9. Allow time for the screw to clean itself before shutdown.

Adjusting Weirs:

1. Height adjustments in one or more of the overflow weir plates may be necessary - an *even overflow of water* is required for the best performance of your washer.

2. The weir plates are usually set at the highest position, but may need to be adjusted if the tub is not level in installation or as a result of settling.

Adjusting Screw Speed:

1. Screw shaft RPM may be changed by changing the motor sheave size. Slower screw shaft speeds will lower your production rate, but may be required for retention of very fine materials. Changes in motor sheave size must be accompanied by a change in motor horse power to avoid damage to the gear reducer:

RPM	Motor Sheave Size	Motor HP	Max Prod
20	2B 8.6	15	100 TPH
15	2B 6.4	10	75 TPH
12	2B 5.2	7.5	50 TPH

FINE MATERIAL WASHER MAINTENANCE

Review safety instructions on pages 2-8 before starting maintenance.

To ensure efficient operation, the operator should inspect, lubricate, and make necessary adjustments and repairs at regular intervals. Parts that are starting to show wear should be ordered ahead of time, before a costly breakdown occurs and you have to wait for replacement parts. Keep good maintenance records, and adequately clean your washer after each use.

Proper lubrication is important. Too little lubricant will cause premature failure of a bearing. Too much lubrication usually causes high operating temperature and early failure of seals. Follow all lubrication instructions.

Operator or maintenance personnel should:

DAILY:

1. Check tightness on all nuts and bolts.
2. Check during operation for unusual sounds or other signs of abnormal operation to warn of future trouble. Promptly correct any problems identified.
3. Check seals for leaking. The seal at the base of the tub must be replaced to prevent damage to the lower bearing.

WEEKLY:

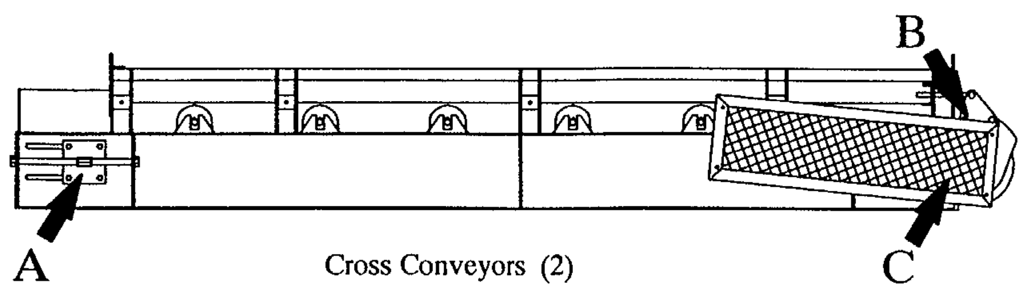
1. Check bushings for tightness.
2. Grease bearings and check lubricant levels.
3. Inspect sheaves for wear, and belts for cracking and necessary tension.
4. Inspect the rubber wear shoes. Replacement will be necessary when worn to within 1/8″ of the outer edge of the flighting.

FINE MATERIAL WASHER LUBRICATION

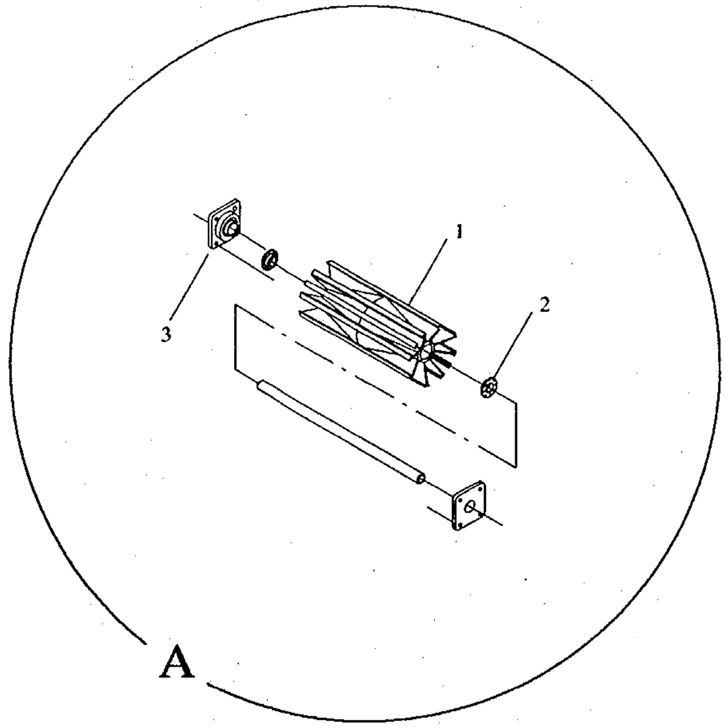
Lubricate the various parts as follows:

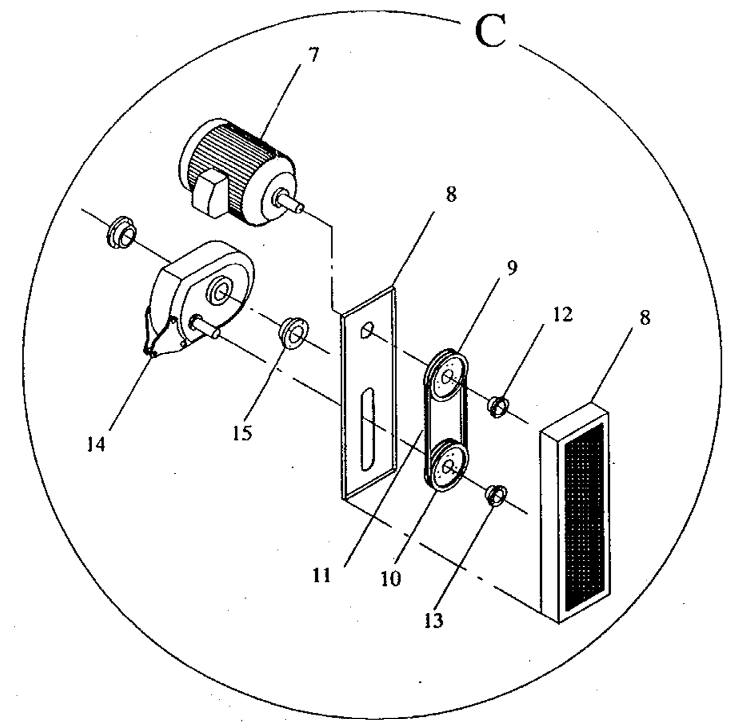
1. Bearings: Follow the guide in the instruction sheet for Dodge bearings included in this owner's manual.
2. Gear reducer (shaft-mounted): Maintain oil level. Follow oil recommendations in the gear reducer parts replacement manual included in this owner's manual.
3. Adjusting bolts: Lubricate as needed with standard oil with detergent.
4. Electric motors: Follow manufacturer's recommendations included in this owner's manual.

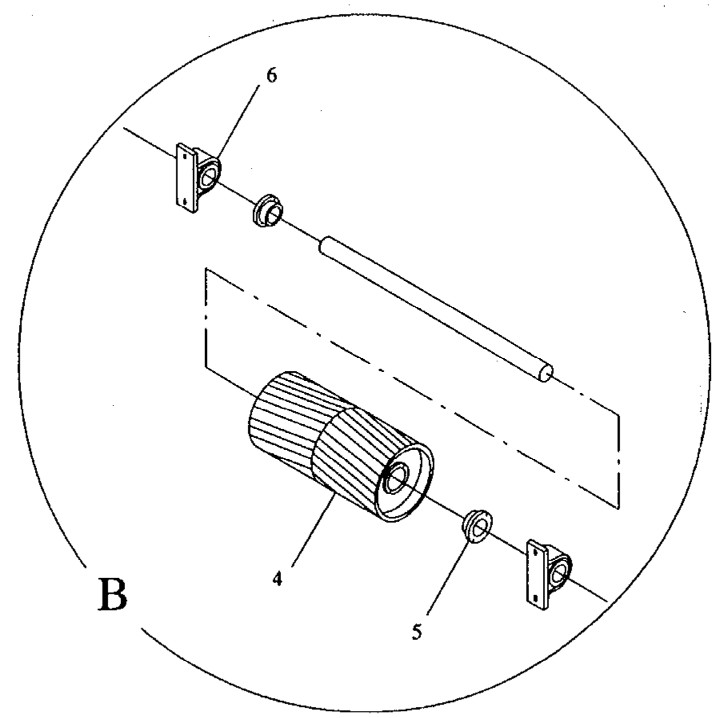
Pulley and Drive Parts



Cross Conveyors (2)







Ref. #	Item #	Description
A. Tail Pulley Components		
1	01-00025	10x26 CF XT25 Wing Pulley
2	02-00026	1-15/16″ XT25 Bushing
3	03-00049	1-15/16″ SC 4-bolt Flange Bearing
B. Head Pulley Components		
4	01-00108	10x26 CF XT25 3/8 HBL Drum Pulley
5	02-00026	1-15/16″ XT25 Bushing
6	03-00022	1-15/16″ SC 2-bolt Pillow Block Bearing
C. Drive Components		
7	04-00213	3 HP, 1800 RPM, 182T TEFC Motor
8	-	Drive Guard Small (if applicable)
9	06-00005	1B4.2 QDSH Sheave
10	06-00018	1B6.8 QDSDS Sheave
11	07-00014	B37 V-belts
12	02-00078	1-1/8″ QDSH Bushing
13	02-00098	1-1/8″ QDSDS Bushing
14	05-00003	TXT-215 Gear Reducer
15	05-00045	1-15/16″ TDT2 Gear Reducer Bushing (pair)

PARTS REPLACEMENT

SUPPLY THE FOLLOWING INFORMATION WHEN ORDERING PARTS:

2. **Wash plant serial number:** Identify your equipment by serial number whenever possible.
3. **Part descriptions:** Use part numbers and descriptions from illustrations and the Bill of Materials to assist in identifying needed parts. Structural parts such as framework, bracing, etc. are not listed. To order these parts give size, shape, and part location to aid in identification.
4. **Quantities:** Order the exact number of parts required, do not order by *sets*.
5. **Shipping instructions:** Give company name, shipping point, and mailing address for notification if different than shipping point. State whether freight, express, parcel or other handling is desired. Confirm telephone orders in writing.

Inspection of parts when received is very important. Shortages or damage should be noted by the carrier agent at the time the parts are accepted. Shipper's responsibility ceases upon delivery of shipment to customer in good order. Claims for damage or loss are subject to the terms and conditions of sale as noted on your invoice.

Superior Equipment
PO Box 684
Morris, MN 56267

7:00-5:00 PM CST, Monday-Friday
(320) 589-2406
800-321-1558
FAX (320) 589-2260

Franklin Environmental Services
Gravel Separation System

TAB 6

MISCELLANEOUS PLANT DATA

AEI
AGGREGATES EQUIPMENT, INC.
9 HORSESHOE ROAD, P.O. BOX 39, LEOLA, PA 17540-0039, 717-656-2131 FAX: 717-656-6686

INSTRUCTION AND PARTS MANUAL

(1) 42" wide X 13'-6" lòng CHANNEL FRAME CONVEYOR, BELT FEEDER

SALES ORDER NO. E96-4448

SERIAL NO. 1515

ITEM NO. 2

SOLD TO: AEI PORTABLE SALES PLANT

DATE: SEPTEMBER 1996

ERECTION DRAWING NO. C-13035-E

CUSTOMER: AEI PORTABLE SALES PLANT

AEI ORDER NO: E96-4448

DESCRIPTION: 42" W. X 13'-6" LONG CHANNEL FRAME CONVEYOR, BELT FEEDER S/N 1515

UNIT REQUIRED: ONE (1) ITEM NO: 2

REF	DESCRIPTION	NUMBER	QTY	TECHNICAL INFORMATION
	Belt Feed	C-13036-3	1	42" wide x 13'-6" Conveyor
	Tail Pulley		1	10" dia. x 44" lg. Wing Crown Face 2-15/16" Bore, Precision
	Take-Up	309	2	Bryant/Telescoper
	Tail Bearings		2	Dodge Type "SC", 2 Bolt Base, 2-7/16" Bore, Pillow Block
	Tail Shaft	SK-5315-2A	1	
	Loading Hopper	C-13036-1	1	
	Hopper Support	C-13036-2	2	
	Hopper Gate Cylinder Mount	C-13036-6	1	
	Loading Hopper Gate Assembly	C-13036-5	1	
	Snub Pulley		1	AEI
	Snub Bearing		1	Dodge Type "SC", 4 Bolt Flange, 1-15/16" Bore
	Head Pulley		1	12"ø x 44" Crown Face, 3/8" Vulcanized Herringbone Lagging, 3-15/16" Bore, Drum, Precision
	Head Bearings		2	Dodge Type "SC", 4 Bolt Flange, 2-15/16" Bore
	Head Shaft	SK-5315-2B	1	

ERECTION DRAWING NO. **C-13035-E**

CUSTOMER: **AEI PORTABLE SALES PLANT**

AEI ORDER NO: **E96-4448**

DESCRIPTION: **42" W. X 13'-6" LONG CHANNEL FRAME CONVEYOR, BELT FEEDER S/N 1515**

UNIT REQUIRED: **ONE (1)** **ITEM NO: 2**

REF	DESCRIPTION	NUMBER	QTY	TECHNICAL INFORMATION
	Reducer		1	Eurodrive FA 90A D36 OT100L 4 1.7 to 8.8. RPM Output with 5 HP 1800 RPM, 3/60/230-460 V TEFC Motor with ERC Variable Speed
	Picking Idler		3	CEMA C5 - 20°, 5" diameter, Greasable
	Carrying Idler		1	CEMA C5 - Flat, 5" diameter, Greasable
	Return Idler	U-1876-42	3	AEI
	Conveyor Belt		1	330 PIW, 3/16" x 1/16" Covers 42" wide x 30'-3" long with Hidden Splice
	Conveyor Column	C-13035-2	1	
	Impact Bed	C-12849-15	4	

AEI
AGGREGATES EQUIPMENT, INC.
9 HORSESHOE ROAD, P.O. BOX 39, LEOLA, PA 17540-0039, 717-656-2131 FAX: 717-656-6686

INSTRUCTION AND PARTS MANUAL

(1) 42" wide X 24'-0" long CHANNEL FRAME CONVEYOR, SCREEN FEED

SALES ORDER NO. E96-4448

SERIAL NO. 1516

ITEM NO. 3

SOLD TO: AEI PORTABLE SALES PLANT

DATE: SEPTEMBER 1996

ERECTION DRAWING NO.	**C-13035-E**
STOMER:	**AEI**
AEI ORDER NO:	**E96-4448**
DESCRIPTION:	**42" W. X 24'-0" LONG CHANNEL FRAME CONVEYOR, SCREEN FEED S/N 1516**
UNIT REQUIRED:	**ONE (1)** **ITEM NO: 3**

REF	DESCRIPTION	NUMBER	QTY	TECHNICAL INFORMATION
	Screen Feed	C-13037-1	1	42" wide x 24'-0" Conveyor
	Tail Pulley		1	10" dia. x 44" lg. Wing Crown Face 2-7/16" Bore, Precision
	Take-Up	312	2	Bryant/Telescoper
	Tail Bearings		2	Dodge Type "SC", 2 Bolt Base, 2-7/16" Bore, Pillow Block
	Tail Shaft	SK-5315-3A	1	
	Receiving Hopper	C-13037-5	1	
	Receiving Hopper Extension Belt Scraper	C-13037-3	1	
	Hopper Legs	U-1897	6	
	Head Pulley		1	12"ϕ x 44" Crown Face, 3/8" Vulcanized Herringbone Lagging, 2-15/16" Bore, Drum, Precision
	Head Bearings		2	Dodge Type "SC", Pillow Block, 2 Bolt Base, 2-15/16" Bore
	Head Shaft	SK-5315-3B	1	
	Drive Guard	C-13037-6	1	
	Reducer		1	Dodge with Backstop, TXT 325, 2-3/16" Bore, Class II
	Motor		1	5 HP, 1800 RPM, 184 T Frame WEG, 3/60/230-460 v, T.E.F.C.
	Motor Mount		1	Dodge TA-3M

ERECTION DRAWING NO. C-13035-E

USTOMER: AEI

AEI ORDER NO: E96-4448

DESCRIPTION: 42" W. X 24'-0" LONG CHANNEL FRAME CONVEYOR, SCREEN FEED S/N 1516

UNIT REQUIRED: ONE (1) **ITEM NO:** 3

REF	DESCRIPTION	NUMBER	QTY	TECHNICAL INFORMATION
	Driver Sheave		1	5.0" O.D. 3V, SH Bushing @ 1-1/8" Bore, 2 Groove
	Driven Sheave		1	6.0" O.D., 3V, SH Bushing @ 1-1/4" Bore, 2 Groove
	V-Belts		2	3V x 630 for 22.9" Centers
	Picking Idler		3	CEMA B5 - 20°, 5" diameter, Sealed for Life
	Troughing Idler		2	CEMA B5 - 20°, 5" diameter, Sealed for Life
	Return Idler		2	CEMA B5 - 5" diameter, 1-1/2" Drop Bracket, Sealed for Life
	Conveyor Belt		1	220 PIW, 3/16" x 1/16" Covers 42" wide x 52'-4" long, Splice Ready
	Belt Scraper	C-13037-7	1	AEI
	Emergency Pull Switch		1	CCC, RS-1 with Pull Cord + Clips
	Conveyor Adjustment Bracket	C-13037-3	1	
	Cross Member	C-11000-42	8	
	Screen Feed Box Extension	C-13037-4	1	

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INSTRUCTION AND PARTS MANUAL

(1) 42" wide X 34'-0" long CHANNEL FRAME CONVEYOR, UNDER SCREEN

SALES ORDER NO. E96-4448

SERIAL NO. 1517

ITEM NO. 4

SOLD TO: AEI PORTABLE SALES PLANT

DATE: SEPTEMBER 1996

ERECTION DRAWING NO. C-13035-E

CUSTOMER: AEI

AEI ORDER NO: E96-4448

DESCRIPTION: 42" W. X 34'-0" LONG CHANNEL FRAME CONVEYOR, UNDER SCREEN S/N 1517

UNIT REQUIRED: ONE (1) ITEM NO: 4

REF	DESCRIPTION	NUMBER	QTY	TECHNICAL INFORMATION
	Under Screen	C-13038-1	1	42" wide x 34'-0" Conveyor
	Tail Pulley		1	10" dia. x 44" lg. Wing Crown Face 2-7/16" Bore, Precision
	Tail Pulley Cover	C-13035-8	1	
	Tail Pulley Pinch Guard	SK-5318	1R/1L	
	Take-Up	312	2	Bryant/Telescoper
	Tail Bearings		2	Dodge Type "SC", 2 Bolt Base, 2-7/16" Bore, Pillow Block
	Tail Shaft	SK-5315-3A	1	
	Receiving Hopper and Extension	C-13038-4	1	
	Hopper Legs	U-1898	8	
	Head Frame	C-13038-2	1	42" wide x 34'-0" long Conveyor
	Head Pulley		1	12"ø x 44" Crown Face, 3/8" Vulcanized Herringbone Lagging, 2-15/16" Bore, Drum, Precision
	Head Bearings		2	Dodge Type "SC", Pillow Block, 2 Bolt Base, 2-15/16" Bore
	Head Shaft	SK-5315-3B	1	
	Drive Guard	C-13037-6	1	
	Reducer		1	Dodge with Backstop, TXT 325, 2-3/16" Bore, Class II
	Motor		1	5 HP, 1800 RPM, 184 T Frame WEG, 3/60/230-460 v, T.E.F.C.

ERECTION DRAWING NO.	C-13035-E
STOMER:	AEI
AEI ORDER NO:	E96-4448
DESCRIPTION:	42" W. X 34'-0" LONG CHANNEL FRAME CONVEYOR, UNDER SCREEN S/N 1517
UNIT REQUIRED:	ONE (1) ITEM NO: 4

REF	DESCRIPTION	NUMBER	QTY	TECHNICAL INFORMATION
	Motor Mount		1	Dodge TA-3M
	Driver Sheave		1	5.0" O.D. 3V, SH Bushing @ 1-1/8" Bore, 2 Groove
	Driven Sheave		1	6.0" O.D., 3V, SH Bushing @ 1-1/4" Bore, 2 Groove
	V-Belts		2	3V x 630 for 22.9" Centers
	Troughing Idler		5	CEMA B5 - 20°, 5" diameter, Sealed for Life
	Picking Idler		7	CEMA B5 - 20°, 5" diameter, Sealed for Life
	Return Idler		3	CEMA B5 - 5" diameter, 1-1/2" Drop Bracket, Sealed for Life
	Conveyor Belt		1	220 PIW, 3/16" x 1/16" Covers 42" wide x 71'-0" long, Splice Ready
	Belt Scraper	C-11076-42	1	AEI
	Emergency Pull Switch		1	CCC, RS-1 with Pull Cord + Clips
	Cross Member	C-11000-42	8	
	Cantilever Parts	C-13038-3	2	

AEI
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INSTRUCTION AND PARTS MANUAL

(1) 24" wide X 20'-3" long CHANNEL FRAME CONVEYOR, OVERS

SALES ORDER NO. E96-4448

SERIAL NO. 1518

ITEM NO. 5

SOLD TO: AEI PORTABLE SALES PLANT

DATE: SEPTEMBER 1996

ERECTION DRAWING NO. **C-13035-E**

USTOMER: **AEI**

AEI ORDER NO: **E96-4448**

DESCRIPTION: **24" W. X 20'-3" LONG CHANNEL FRAME CONVEYOR, OVERS S/N 1518**

UNIT REQUIRED: **ONE (1)** **ITEM NO: 5**

REF	DESCRIPTION	NUMBER	QTY	TECHNICAL INFORMATION
	Screen Overs Frame	C-13039-1	1	24" wide x 20'-3" Conveyor
	Tail Pulley		1	10" dia. x 26" lg. Wing Crown Face 1-15/16" Bore, Precision
	Tail Pulley Guard	C-13039-5	1	
	Take-Up	309	2	Bryant/Telescoper
	Tail Bearings		2	Dodge Type "SC", 2 Bolt Base, 1-15/16" Bore, Pillow Block
	Tail Shaft	SK-5315-5A	1	
	Receiving Hopper	C-13039-4A	1	
	Hopper Extensions	C-13039-4B	6	
	Hopper Legs	C-13039-4C	18	
	Head Pulley		1	12"ϕ x 26" Crown Face, 3/8" Vulcanized Herringbone Lagging, 1-15/16" Bore, Drum, Precision
	Head Bearings		2	Dodge Type "SC", Pillow Block, 2 Bolt Base, 1-15/16" Bore
	Head Shaft	SK-5315-5B	1	
	Drive Guard	C-13036-6	1	
	Reducer		1	Dodge with Backstop, TXT 225, 1-15/16" Bore, Class II
	Motor		1	3 HP, 1800 RPM, 182 T Frame WEG, 3/60/230-460 v, T.E.F.C.
	Motor Mount		1	Dodge TA-1M

ERECTION DRAWING NO. C-13035-E

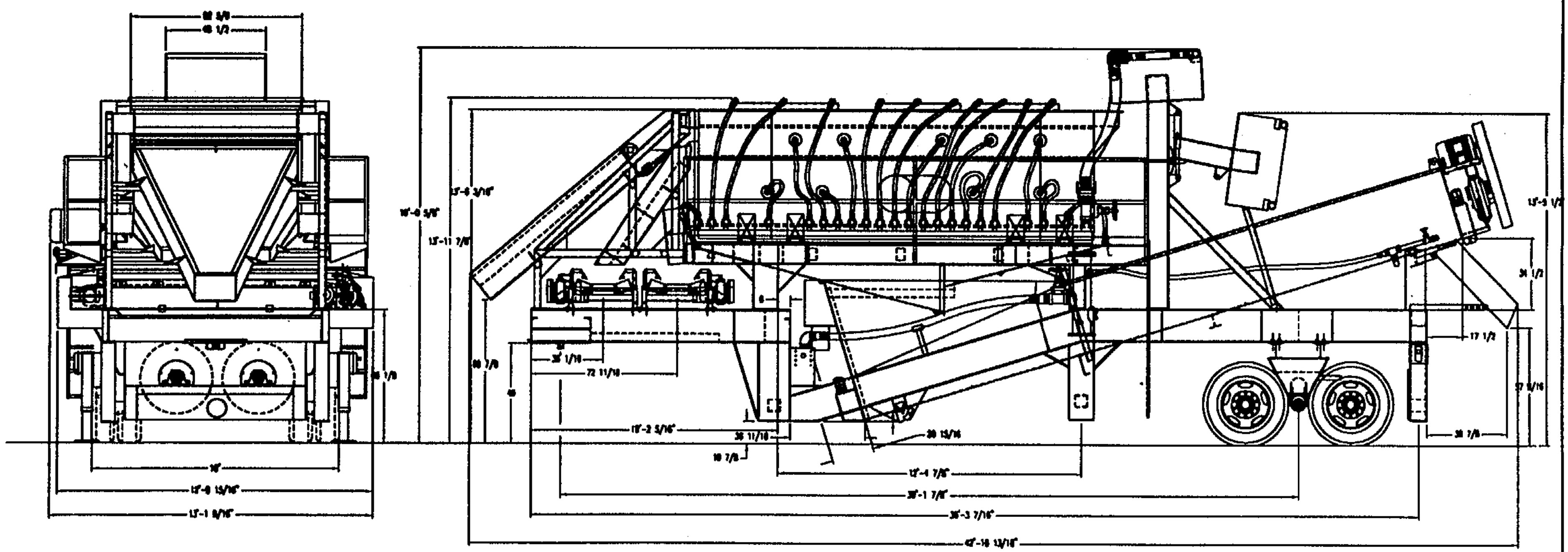
STOMER: AEI

AEI ORDER NO: E96-4448

DESCRIPTION: 24" W. X 20'-3" LONG CHANNEL FRAME CONVEYOR, OVERS S/N 1518

UNIT REQUIRED: ONE (1) **ITEM NO:** 5

REF	DESCRIPTION	NUMBER	QTY	TECHNICAL INFORMATION
	Driver Sheave		1	4.75" O.D. 3V, SH Bushing @ 1-1/8" Bore, 2 Groove
	Driven Sheave		1	6.0" O.D., 3V, SH Bushing @ 1-1/8" Bore, 2 Groove
	V-Belts		2	3V x 600 for 21.6" Centers
	Troughing Idler		7	CEMA B5 - 20°, 5" diameter, Sealed for Life
	Return Idler	U-325-24	1	AEI
	Return Idler		1	CEMA B5 - 5" diameter, 1-1/2" Drop Bracket, Sealed for Life
	Snub Bearing		2	Dodge Type "SC", Pillow Block, 2 Bolt Flange, 3/4" Bore
	Conveyor Belt		1	220 PIW, 3/16" x 1/16" Covers 24" wide x 43'-4" long, Splice Ready
	Belt Scraper	C-11076-42	1	AEI
	Emergency Pull Switch		1	CCC, RS-1 with Pull Cord + Clips
	Conveyor Support	SK-5330	1R/1L	



TOLERANCES UNLESS OTHERWISE NOTED: LINEAR: ± 1/16" ANGULAR: ± 1°			
ALL DIMENSIONS IN INCHES	2	12/96	[illegible]
	1		UPDATE FROM LAST BUILD
F61-616PWP	REV.	DATE	DESCRIPTION OF REVISION

SUPERIOR EQUIPMENT HIGHWAY 28 EAST MORRIS, MN 56267

WASH PLANT 6' X 16' SUPERIOR SCREEN AND 36" X 25' SUPERIOR TWIN SAND SCREW

SCALE	1/2"=1'-0"	ASSEMBLY NO.	
DATE	12/19/96	CHK'D	
DRAWN	K.SCHATZKE	APPD.	
FILE	\R\168\168-0100	DWG. OR PART NO. R168-0100	D

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Franklin Environmental Services
Gravel Separation System

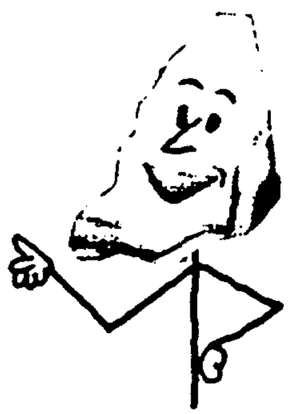
TAB 7

MISCELLANEOUS MANUFACTURER'S DATA

an AEI opener

BELT CONVEYOR

TROUBLE SHOOTING HINTS



AGGREGATES EQUIPMENT, INC.

9 Horseshoe Road, Leola (Lancaster County) PA 17540 717/656-2131

TROUBLESHOOTING BELT CONVEYORS

PROBLEM	CAUSED BY	CORRECTIVE PROCEDURE
Belt runs off-center for long distances.	Off center loading.	Adjust chutes and other loading devices to put load in center in direction of belt travel.
Belt runs off-center at a specific point or climbs sideways on some idlers.	(a) One or more idlers immediately ahead of trouble point not square.	(a) Advance end of idler to which belt has shifted in direction of belt travel.
	(b) Conveyor frame not straight.	(b) Straighten, using stretced string to determine how much.
	(c) Idler stand or stands not centered.	(c) Same as in (b) above.
	(d) Frozen idlers.	(d) Lubricate properly. Replace when required.
	(e) Loose idler.	(e) Reposition and fasten securely.
	(f) Low conveyor side.	(f) Level up and secure.
	(g) Material build up on idlers or terminal pulleys.	(g) Improve maintenance; install belt cleaning equipment; lag pulleys; add skirts.
Belt runs off at terminal.	(a) Pulley or approaching idlers not square.	(a) Align properly.
	(b) Material build up on idlers or terminal pulleys.	(b) Clean pulley.
Specific section of belt runs off-center all along conveyor.	(a) Crooked belt as a result of storage of telescoped rolls or with one edge close to damp ground or wall; stretching of worn edge due to high tension; or shrinkage from absorption of moisture.	(a) If "bow" is in new belt, it may disappear when belt is broken in. In belts in service, eliminate cause of bowing if possible, replace with new section. Increase take-up tension, checking first that belt's allowable working tension will permit.
	(b) Joint not square in mechanical splice or steps not matched in vulcanized splice.	(b) Resplice, being sure to square ends or match properly with vulcanized type.

PROBLEM	CAUSED BY	CORRECTIVE PROCEDURE
Belt wanders at random.	(a) Too stiff because of design.	(a) Use belt with more transverse flexibility or add extra aligning aids and tilt troughing idlers ahead not over 2^{o}.
	(b) Too stiff because of newness or cold weather.	(b) Allow proper break-in time. Speed up by letting belt stand loaded overnight.
Above ground belt runs off-center at certain times.	Wind pressure and effect of sun on side of steel conveyor frame.	Install hinged covers, wind hoops, L.S.P. troughing and return guide idlers.
Belt stretches excessively; splices weaken prematurely; cuts or breaks enlarge quickly.	Excess starting tension; excess belt tension.	Increase speed, keeping tonnage the same or reduce tonnage at same speed. Even up feeding rate. Decrease drag by proper idler lubrication, replacement of worn idlers and removal of spilled material. Lag drive pulley or increase the wrap by snub pulley or tandem or dual motor drive, to reduce tension required. Use minimum-weight counterweight. Replace with lower elongation belt or belt having greater strength.
Belt edges worn or gouged.	(a) Rubbing	(a) Realign belt if necessary; remove all obstructions. Use L.S.P. troughing and return guide idlers.
	(b) Off-center loading, misalignment, and/or defective self-aligning idlers.	(b) Reposition loading and transfer chutes. Align belt. Repair or replace faulty idlers. Suggest painting edges with self curing cement to limit absorption of moisture.
Excessive top cover wear.	(a) Poor cover quality.	(a) Replace with heavier cover or higher quality rubber. Change feed direction to reduce abrasion caused by material acceleration. Feed direction should be in the same direction as belt travel.
	(b) Slow running, stuck or misaligned return rolls.	(b) Clean belt and keep clean wit belt cleaners. Install L.S.P. double bladed spring loaded belt scraper and/or L.S.P. beater idler. Service and realign return rollers. Use rubber disc return rolls, if necessary.

PROBELM	CAUSED BY	CORRECTIVE PROCEDURE
	(c) Excessive sag between idlers.	(c) Check tension - increase if too low. Reduce idler spacing and/or graduate, particularly at loading end.
	(d) Abrasive skirt-boards.	(d) Use rubber skirt material, not old belting. Adjust properly.
	(e) Poor loading.	(e) Feed onto belt in same direction and at same speed (if possible).
	(f) Pile up at head and tail pulley.	(f) Keep clean. Load properly. Add skirt boards. Install L.S.P. double bladed spring loaded belt scraper and/or L.S.P. beater idler and/or L.S.P. tail pulley plow.
Top cover damage grooving, gouging, ripping or stripping	(a) Stiff skirt rubber riding on belt.	(a) Use more pliable skirts. Do not use old belt. Check skirt rubber adjustment.
	(b) Excessive openings between belt and skirt rubber.	(b) Adjust to minimum clearance. Decrease idler spacing check minimum belt tension to eliminate sag.
	(c) Material trapped under skirts as a result of belt's dropping down under weight of load or loading impact.	(c) Use cushion or pneumatic idlers to keep belt up. Also (b) above.
	(d) Feed jammings between skirts or feed chute side plates.	(d) Allow skirts or chute plates to diverge at least 1" in 4 feet.
	(e) Tramp iron punture or rip.	(e) Use rip protector, magnetic removal equipment or detector interlocked with driving motor. Short surge belt ahead of main belt worth consideration.
Bottom cover wear.	(a) Drive pulley slippage.	(a) Adjust screw takeup or counterweight to increase tension but do not exceed maximum rating of belt. Lag drive pulley (grooved lagging if wet). Increase arc of contact with snub pulley or tandem drive. Increase belt speed at same loading rate.

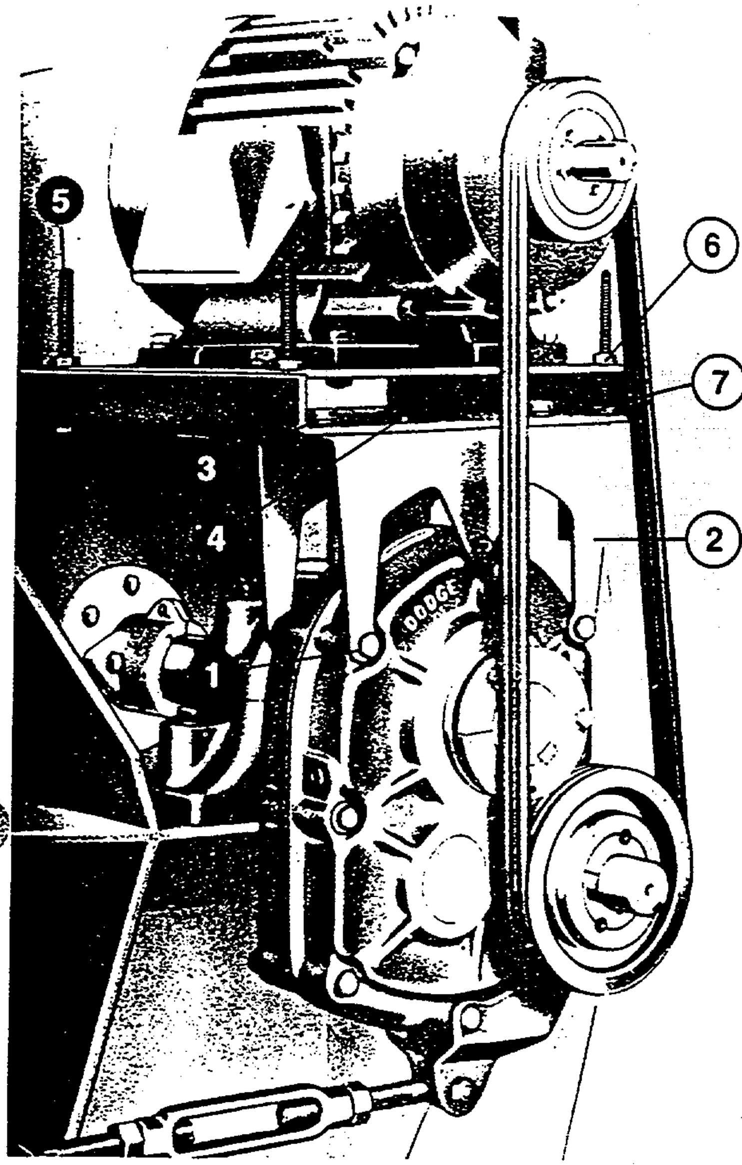
PROBLEM	CAUSED BY	CORRECTIVE PROCEDURE
	(b) sticking rollers	(b) Service and lubricate properly. Replace if necessary.
	(c) Excess troughing idler tilt.	(c) Not over 2° from a position perpendicular to the conveyor - should slope toward belt travel direction.
	(d) Bolt heads protruding above lagging.	(d) Tighten bolts. Replace worn lagging. Use slide lagging from AEI.
	(e) Material buildup due to spillage.	(e) Use good chute loading facilities. Do not load belt too heavily. Install decking. Install L.S.P. tail pulley plow. Use plate or vulcanized splices to check leakage. Inspect and clean regularly.
Shrinkage	Moisture	Splice in extra piece with the takeup half down. Check belt design for possible increase of slack side tension.
Reverse troughing	Oil	Eliminate oil source or use oil resistant belt. To relieve condition in existing belt, groove lengthwise with tire-grooving tool or turn belt over, carrying load on bottom side.
Spot swelling or lengthwise strip swelling of bottom cover, or separation of bottom cover	Oil	Avoid overlubrication and spillage of oil and grease.
Blister in cover	Fine materials working into cuts or punctures.	Spot repair, vulcanizing or use of "cold" type self curing repair material.
Fastener pull out	(a) Improper starting.	(a) Stepped starting.
	(b) Excess tension.	(b) Increase speed, keeping tonnage the same or reduce tonnage at same speed. Even up feeding rate. Decrease drag by proper idler lubrication, replacement of worn idlers. Lag drive pulley, or increase the wrap by snub pulley or tandem or dual motor drive. Use minimum weight counterweight. Replace with lower elongation belt or belt having greater strength.

PROBLEM	CAUSED BY	CORRECTIVE PROCEDURE
	(c) Improper fasteners or fasteners not properly tightened.	(c) Use correct fasteners. Retighten new fasteners after run-in. Inspect regularly.
	(d) Mildew	(d) Use mildew inhibited belt.
Crosswise breaks back of fasteners	Fastener plates too long.	Use smaller size fasteners. Put fasteners on 45° angle across belt. Use hinged type fastener. Increase pulley size. Use vulcanized splice.
Unusual wearing of pulley lagging.	Drive pulley slippage.	Increase slack side tension to point where slippage no longer occurs. (Note: Never exceed the maximum rating of belt.) Increase amount of belt wrap on drive pulley. Increase belt speed to reduce required effective tension.
Star breaks, or lengthwise breaks parallel to edge.	Impact.	Load at flat angle, at belt speed and in line with belt, where possible. Use cushion idlers.
Crosswise or transverse breaks with top or bottom cover intact or only bottom cover broken.	(a) Material trapped between belt and pulley.	Install L.S.P. tail pulley plow. Install L.S.P. "Spiral-Klean" tail pulley.
	(b) Material building up on pulley.	(b) Use proper belt cleaner and rubber lag; install L.S.P. double bladed spring loaded belt scraper and/or L.S.P. beater idler.
Crescent breaks	Mildew.	Use mildew inhibited belt.
Crosswise breaks at edge	(a) Belt edges folding up.	(a) Use limit switches to stop excessive shifting of belt. Remove obstructions and provide ample side clearance. Install L.S.P. troughing and return guide idlers.
	(b) Poor positioning of idler next to head pulley--too close or too high.	(b) Relocate or readjust idler or pulley position. Suggested distance is 1-1¼ times the belt width for 35° idlers.
	(c) Too sharp vertical curve.	(c) Cut down radius to reduce stresses on idlers and belt.

PROBLEM	CAUSED BY	CORRECTIVE PROCEDURE
	(d) Mildew.	(d) Use mildew inhibited belt.
Lengthwise carcass breaks, top and bottom covers intact.	(a) Belt running off and folding back.	(a) Use limit switches. Install L.S.P. troughing and return guide idlers.
	(b) Joining of impact breaks.	(b) Reduce impact.

TA1M thru TA7M Motor Mounts

for DODGE' Torque-Arm Speed Reducers
(Sizes TXT1 thru TXT7)



Note: Guards have been removed for photographic purposes.

INSTALLATION

Note: Refer to photo for position of all parts before installation.

1. Remove the two or three bolts required for mounting the TAM Motor Mount from the reducer housing. Install the front and rear supports (2) using the new reducer bolts (1) supplied with the motor mount. Make sure support flanges face output side of reducer. Tighten bolts securely.

2. Mount bottom plate (3) on supports with bolts supplied. Insert bolts (7) from top through slotted holes. Add flatwasher, lockwasher, and nut. Hand tighten.

3. Thread two nuts (6) on each threaded stud (5) leaving approximately 1" of stud protruding at one end. Insert threaded stud with 1" of threads through corner holes of bottom plate, thread a hex nut (6) on the stud and tighten securely.

4. Slide top plate (4) over the threaded stud, making sure center handling hole is positioned opposite input side of reducer. Thread a hex nut (6) on the studs and tighten securely.

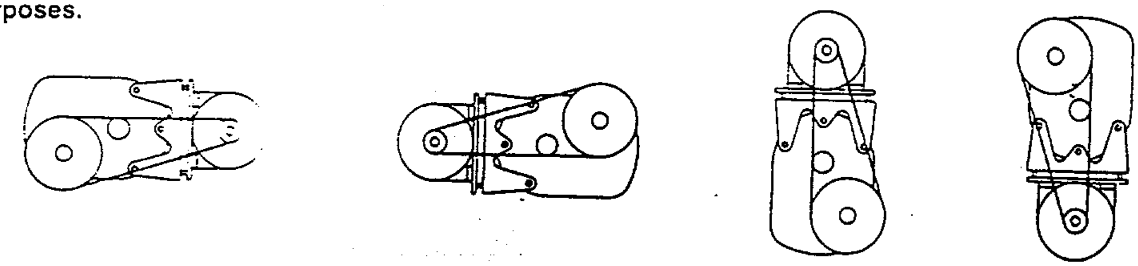
5. Locate the proper position for the motor and bolt it to the top plate. Tighten bolts securely.

WARNING
If electrical connections to motor are installed at this time, disconnect and lock out power supply before proceeding.

6. Install motor sheave and reducer sheave as close to motor and reducer housings as possible. Accurately align the motor and reducer sheave by sliding bottom plate in relation to supports. Tighten bolts (7) securely.

7. Install V-belts and tension belts by alternately adjusting nuts (6) on the threaded studs (jackscrews). Make certain that all bolts are securely tightened, the V-belt drive is properly aligned and the belt guard is installed before operating the drive.

MOUNT MOTOR AT ANY POINT AROUND DRIVE SHAFT ▶



WARNING: Because of the possible danger to person(s) or property from accidents which may result from the improper use of products, it is important that correct procedures be followed: Products must be used in accordance with the engineering information specified in the catalog. Proper installation, maintenance and operation procedures must be observed. The instructions in the instruction manuals must be followed. Inspections should be made as necessary to assure safe operation under the prevailing conditions. Proper guards and other suitable safety devices or procedures as may be desirable or as may be specified in safety codes should be provided, and are neither provided by Reliance Electric Industrial Company nor are the responsibility of Reliance Electric Industrial Company. This unit and its associated equipment must be installed, adjusted and maintained by qualified personnel who are familiar with the construction and operation of all equipment in the system and the potential hazards involved. When risk to persons or property may be involved, a failsafe device must be an integral part of the driven equipment beyond the speed reducer output shaft.

DODGE / P.O. Box 499 / 2 Ponders Court / Greenville, South Carolina 29602-0499 / 803-297-4800

RELIANCE ELECTRIC

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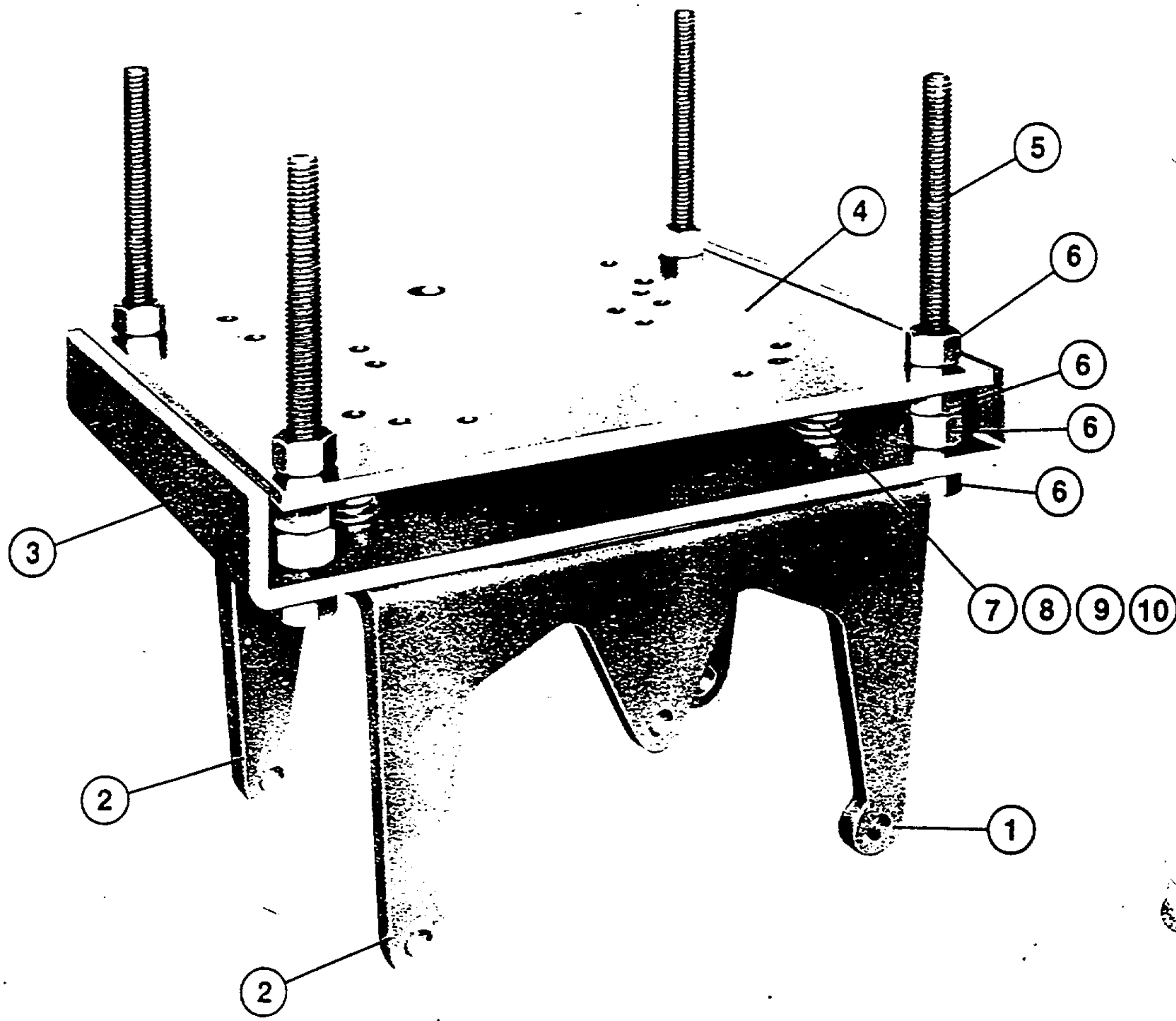
Instruction Manual 499369



Replacement Parts for TA1M thru TA7M Motor Mounts

Ref. No.	Name of Part	No. Req'd.	TA1M Part No.	TA3M Part No.	TA4M Part No.	TA5M Part No.	TA6M Part No.	TA7M Part No.
1	Housing Bolts	*3	411420	411424	411444	411466	411468	411499
2	Support	2	241385	243385	244355	245385	246385	247385
3	Bottom Plate	1	351180	351180	354183	354183	356216	356267
4	Top Plate	1	351181	351181	354184	354184	356214	356268
5	Threaded Stud	4	408004	408004	408003	408003	408003	408591
6	Hex Nut	16	407093	407093	407095	407095	407095	407215
7	Bolt	4	411456	411456	411456	411456	411456▲	411456▲
8	Washer	4	419079	419079	419079	419075	419079▲	419079▲
9	Lockwasher	4	419013	419013	419013	419013	419013▲	419013▲
10	Nut	4	407091	407091	407091	407091	407091▲	407091▲

* 2 Req'd. on TA1M
▲ 6 Req'd. on TA6M & TA7M

TAKE-UPS
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CONVEYOR PRODUCTS

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Fax: 1-800-553-5733
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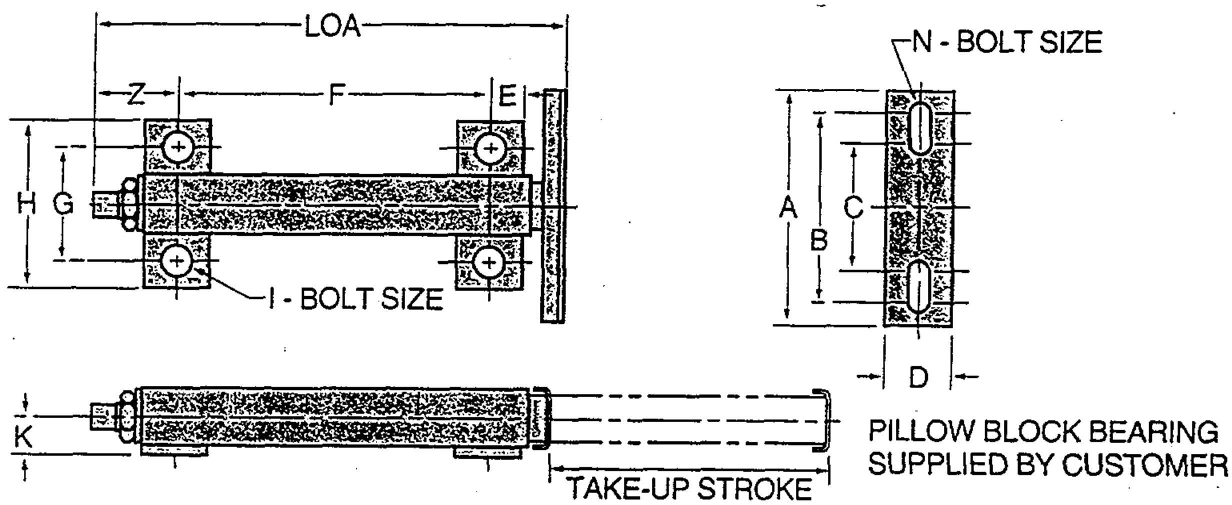
MILD STEEL AND STAINLESS STEEL MODELS

ALL STANDARD MODELS IN STOCK FOR IMMEDIATE SHIPMENT.



HOW TO SPECIFY AND ORDER						STANDARD TELESCOPER® DIMENSIONS - ALL IN INCHES																
BEARING BORE RANGE	TUBE SERIES	TAKE-UP STROKE	MATERIAL	MTG. FEET	BEARING PLATE			BEARING PLATE DIMENSION					FOOT DIMENSION						SQ. TUBE SIZE		ADJUSTER	
2	3	4	5	6	7	LOA	K	A	B	C	D	N BOLT	E	F	G	H	I BOLT	Z	SLIDER	BODY	SQ. DRIVE	THD. UNC.
1/2 TO 1	100	3 6 9	MS SS	SF	BP	6.88 10.38 14.38	.88	5.25	4.31	2.94	1.50	3/8	.75	3.56 7.06 11.06	2.63	3.69	1/2	1.84	1.00	1.25	3/8	5/8-11
3/4 TO 1 3/4	250	3 6 9 12	MS SS	SF	BP	8.50 11.50 14.50 17.50	1.13	7.00	5.69	3.81	2.04	1/2	1.00	4.38 7.38 10.38 13.38	3.00	4.00	1/2	2.25	1.50	1.75	1/2	3/4-10
1 3/4 TO 2 15/16	300	6 9 12 18	MS SS	SF	BP	11.13 15.13 19.13 26.13	1.50	10.00	8.69	5.56	2.84	5/8	1.25	6.12 10.12 14.12 21.12	4.00	5.25	5/8	2.63	2.25	2.50	1/2	7/8-9
1 3/4 TO 2 15/16	350 HD	9 12 18 24	MS	SF	BP	19.00 22.00 28.00 34.00	1.75	10.00	8.69	5.56	3.00	5/8	1.25	13.00 16.00 22.00 28.00	4.50	5.75	5/8	3.50	2.50	3.00	---	7/8-6 ACME
2 7/16 TO 3 1/2	400	12 18 24	MS	SF	BP	27.75 33.75 39.75	2.13	14.00	11.75	8.50	3.50	3/4	1.75	20 26 32	5.50	7.50	3/4	4.25	3.00	3.50	Pinned Nut	1 1/4-5 ACME
3 11/16 TO 6	500	18 24 36	MS	SF	BP	41.38 47.38 63.38	3.50	BEARING PLATE BUILT PER CUSTOMER SPEC					2.50	31 37 49	9.00	11.50	1.00	6.50	5.00	6.00	Pinned Nut	2 1/4-4 ACME

TURN PAGE OVER FOR DETAILS ON "HOW TO ORDER".

Instruction Manual
For

DODGE®

TORQUE-ARM™
Speed Reducers
Straight Bore & Taper Bushed

SIZES: TXT309A — TXT315A — TXT325A
TXT409A — TXT415A — TXT425A
TXT509B — TXT515B — TXT525B

WARNING: Because of the possible danger to person(s) or property from accidents which may result from the improper use of products, it is important that correct procedures be followed: Products must be used in accordance with the engineering information specified in the catalog. Proper installation, maintenance and operation procedures must be observed. The instructions in the instruction manuals must be followed. Inspections should be made as necessary to assure safe operation under prevailing conditions. Proper guards and other suitable safety devices or procedures as may be desirable or as may be specified in safety codes should be provided, and are neither provided by Reliance Electric Industrial Company nor are the responsibility of Reliance Electric Industrial Company. This unit and its associated equipment must be installed, adjusted and maintained by qualified personnel who are familiar with the construction and operation of all equipment in the system and the potential hazards involved. When risk to persons or property may be involved, a holding device must be an integral part of the driven equipment beyond the speed reducer output shaft.

ODGE/P.O. Box 499/6040 Ponders Court/Greenville, SC 29602-0499/803-297-4800

RELIANCE ELECTRIC

Printed in U.S.A. Instruction Manual 499833 10/91 16M-K

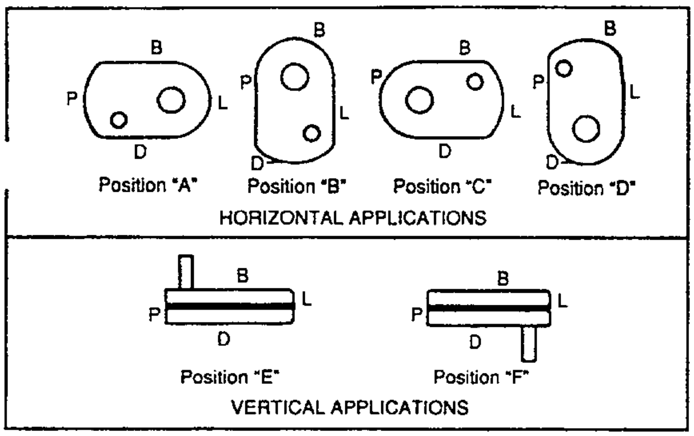
The products described in this instruction manual are manufactured by Reliance Electric Industrial Company.

On sizes TXT3A, TXT4A, and TXT5B use lifting lug to lift reducers.

2. ~~Determine the running position of the reducer.~~ (See Fig. 1) Note that the reducer is supplied with either 4 or 7 plugs; 4 around the sides for horizontal installations and 1 on each face for vertical installations. These plugs must be arranged relative to the running positions as follows:

Horizontal Installations—Install the magnetic drain plug in the hole closest to the bottom of the reducer. Throw away the tape that covers the filler/ventilation plug in shipment and install plug in topmost hole. Of the 3 remaining plugs on the sides of the reducer, the lowest one is the minimum oil level plug.

Vertical Installations—Install the filler/ventilation plug in the hole provided in the top face of the reducer housing. Use the hole in the bottom face for the magnetic drain plug. Of the 5 remaining holes on the sides of the reducer, use a plug in the upper housing half for the minimum oil level plug.



B: Breather; D: Drain; L: Oil Level Plug; P: Plug

Fig. 1 — Mounting Positions

The running position of the reducer in a horizontal application is not limited to the four positions shown in Figure 1. However, if running position is over 20° either way from sketches, the oil level plug cannot be safely used to check the oil level, unless during the checking the torque arm is disconnected and the reducer is swung to within 20° of the positions shown in Figure 1. Because of the many possible positions of the reducer, it may be necessary or desirable to make special adaptions using the lubrication fitting holes furnished along with other standard pipe fittings, stand pipes and oil level gages as required.

WARNING

To ensure that drive is not unexpectedly started, turn off and lock out or tag power source before proceeding. Failure to observe these precautions could result in bodily injury.

3. Mount reducer on driven shaft as follows:

For Straight Bore: Mount reducer on driven shaft as close to bearing as practical. If bushings are used, assemble bushings in reducer first. A set of bushings for one reducer consists of one keyseated bushing and one plain bushing. Extra length setscrews are furnished with the reducer. Driven shaft should extend through full length of speed reducer. Tighten both setscrews in each collar.

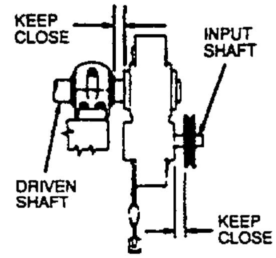


Fig. 2

For Taper Bushed: Mount reducer on driven shaft per instruction sheet No. 499629 packed with tapered bushings.

4. Install sheave on input shaft as close to reducer as practical. (See Fig. 2)

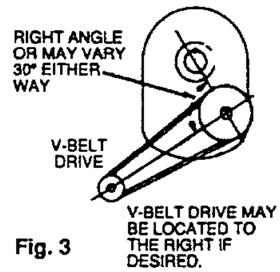


Fig. 3

5. Install motor and V-belt drive so belt pull will approximately be at right angles to the center line between driven and input shaft. (See Fig. 3) This will permit tightening the V-belt drive with the torque arm.

6. Install torque arm and adapter plates using the long reducer bolts. The bolts may be shifted to any of the holes on the input end of the reducer.

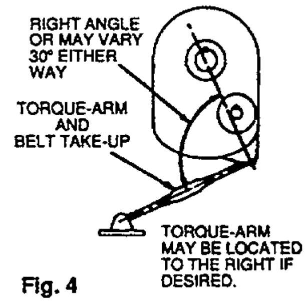


Fig. 4

7. Install torque arm fulcrum on a rigid support so that the torque arm will be approximately at right angles to the center line through the driven shaft and the torque arm anchor screw. (See Fig. 4) Make sure that there is sufficient take-up in the turnbuckle for belt tension adjustment when using V-belt drive.

8. Fill gear reducer with recommended lubricant.

CAUTION

Unit is shipped without oil. Add proper amount of recommended lubricant before operating. Failure to observe these precautions could result in damage to, or destruction of, the equipment.

Use a high grade petroleum base, rust and oxidation inhibited (R & O) gear oil—see tables. Follow instructions on reducer nameplate, warning tags, and in the installation manual.

Under average industrial operating conditions, the lubricant should be changed every 2500 hours of operation or every 6 months, whichever occurs first. Drain reducer and flush with kerosene, clean magnetic drain plug and refill to proper level with new lubricant. Check oil level regularly.

CAUTION

Extreme pressure (EP) lubricants are not recommended for average operating conditions. Failure to observe these precautions could result in damage to, or destruction of, the equipment.

CAUTION

Too much oil will cause overheating and too little will result in gear failure. Check oil level regularly. Failure to observe these precautions could result in damage to, or destruction of, the equipment.

Under extreme operating conditions, such as rapid rise and fall of temperature, dust, dirt, chemical particles, chemical fumes, or oil sump temperatures above 200°F, the oil should be changed every 1 to 3 months depending on severity of conditions.

CAUTION

Do not use oils containing slippery additives such as graphite or molybdenum disulphide in the reducer when backstop is used. These additives will destroy sprag action. Failure to observe these precautions could result in damage to, or destruction of, the equipment.

Table 1 — Oil Volumes

Reducer Size	Volume of Oil Required to Fill Reducer to Oil Level Plug																	
	† Position A			† Position B			† Position C			† Position D			† Position E			† Position F		
	Fluid Ounces (Approx)	▲ Quarts (Approx)	Liters (Approx)	Fluid Ounces (Approx)	▲ Quarts (Approx)	Liters (Approx)	Fluid Ounces (Approx)	▲ Quarts (Approx)	Liters (Approx)	Fluid Ounces (Approx)	▲ Quarts (Approx)	Liters (Approx)	Fluid Ounces (Approx)	▲ Quarts (Approx)	Liters (Approx)	Fluid Ounces (Approx)	▲ Quarts (Approx)	Liters (Approx)
TXT309A TXT315A TXT325A	48	1 1/2	1.42	48	1 1/2	1.42	24	3/4	.71	72	2 1/4	2.13	84	2 5/8	2.48	96	3	2.84
TXT409A TXT415A TXT425A	60	1 7/8	1.77	72	2 1/4	2.13	40	1 1/4	1.18	56	1 3/4	1.66	108	3 3/8	3.19	136	4 1/4	4.02
TXT509B TXT515B TXT525B	104	3 1/4	3.08	128	4	3.79	104	3 1/4	3.08	128	4	3.79	224	7	6.62	272	8 1/2	8.04

† Refer to Fig. 1 on page 2 for mounting positions.
▲ U.S. Measure: 1 quart = 32 fluid ounces = .94646 liters.

Note: If reducer position is to vary from those shown in Figure 1 either more or less oil may be required. Consult factory.

Table 2 — Oil Recommendations for Average Operating Conditions

Ratio and Output RPM	Room Temp. ° Fahr.	Oil		Viscosity	
		S.A.E. No.	AGMA Lub. No.	ASTM SUS @ 100°F	Metric Equiv. c St @ 40°C
25:1 — Up to 45 rpm 15:1 — Up to 75 rpm 9:1 — Up to 120 rpm	−25° thru 50°	10W30	—	—	—
	15° thru 50°	30	3	417 to 510	90 to 110
	50° thru 125°	40	4	626 to 765	135 to 165
25:1 — 46 rpm and Up 15:1 — 76 rpm and Up 9:1 — 121 rpm and Up	−25° thru 50°	10W40	—	—	—
	15° thru 50°	40	4	626 to 765	135 to 165
	50° thru 125°	50	5	918 to 1122	198 to 242

NOTE:

Pour point of lubricant selected should be at least 10°F lower than expected minimum ambient starting temperature.

Special lubricants may be required for food and drug industry applications where contact with the product being manufactured may occur. Consult a lubrication manufacturers representative for his recommendation.

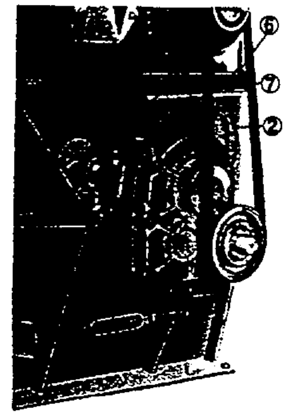
Note: Refer to photo for position of all parts before installation.

WARNING

To ensure that drive is not unexpectedly started, turn off and lock out or tag power source before proceeding. Failure to observe these precautions could result in bodily injury.

1. Remove the two or three bolts required for mounting the TAM Motor Mount from the reducer housing. Install the front and rear supports (2) using the new reducer bolts (1) supplied with the motor mount. Make sure support flanges face output side of reducer. Tighten bolts securely.
2. Mount bottom plate (3) on supports with bolts supplied. Insert bolts (7) from top through slotted holes. Add flatwasher, lockwasher, and nut. Hand tighten.
3. Thread two nuts (6) on each threaded stud (5) leaving approximately 1" of stud protruding at one end. Insert threaded stud with 1" of threads through corner holes of bottom plate, thread a hex nut (6) on the stud and tighten securely.
4. Slide top plate (4) over the threaded stud, making sure center handling hole is positioned opposite input side of reducer. Thread a hex nut (6) on the studs and tighten securely.
5. Locate the proper position for the motor and bolt it to the top plate. Tighten bolts securely.

Note: Guards have been removed for photographic purposes.



6. Install motor sheave and reducer sheave as close to motor and reducer housings as possible. Accurately align the motor and reducer sheave by sliding bottom plate in relation to supports. Tighten bolts (7) securely.
7. Install V-belts and tension belts by alternately adjusting nuts (6) on the threaded studs (jackscrews). Make certain that all bolts are securely tightened, the V-belt drive is properly aligned and the belt guard is installed before operating the drive.

DANGER

The user is responsible for conforming with the National Electrical Code and all other applicable local codes. Wiring practices, grounding, disconnects and overcurrent protection are of particular importance. Failure to observe these precautions could result in severe bodily injury or loss of life.

GUIDELINES FOR TORQUE-ARM REDUCER LONG-TERM STORAGE

During periods of long storage, or when waiting for delivery or installation of other equipment, special care should be taken to protect a gear reducer to have it ready to be in the best condition when placed into service.

By taking special precautions, problems such as seal leakage and reducer failure due to the lack of lubrication, improper lubrication quantity, or contamination can be avoided. The following precautions will protect gear reducers during periods of extended storage:

Preparation

1. Drain the oil from the unit. Add a vapor phase corrosion inhibiting oil (VCI-105 oil by Daubert Chemical Co.) in accordance with Table 3.
2. Seal the unit air tight. Replace the vent plug with a standard pipe plug and wire the vent to the unit.
3. Cover the shaft extension with a waxy rust preventative compound that will keep oxygen away from the bare metal. (Non-Rust X-110 by Daubert Chemical Co.).
4. The instruction manuals and lubrication tags are paper and must be kept dry. Either remove these documents and store them inside or cover the unit with a durable waterproof cover which can keep moisture away.
5. Protect the reducer from dust, moisture, and other contaminants by storing the unit in a dry area.
6. In damp environments, the reducer should be packed inside a moisture-proof container or an envelope of polyethylene containing a desiccant material. If the reducer is to be stored outdoors, cover the entire exterior with a rust preventative.

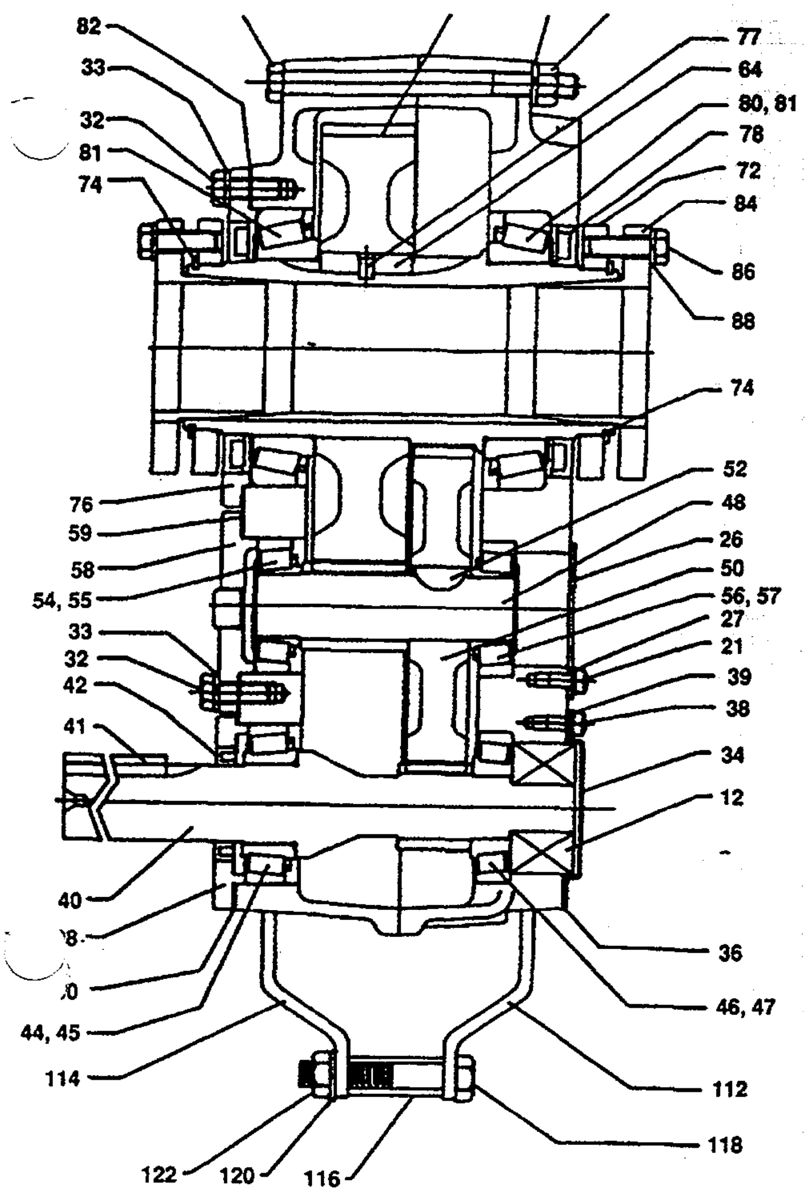
When Placing the Reducer into Service

1. Assemble the vent plug into the proper hole.
2. Clean the shaft extensions with a suitable solvent.
3. Fill the unit to the proper oil level using a recommended lubricant. The VCI oil will not affect the new lubricant.
4. Follow the installation instructions provided in this manual.

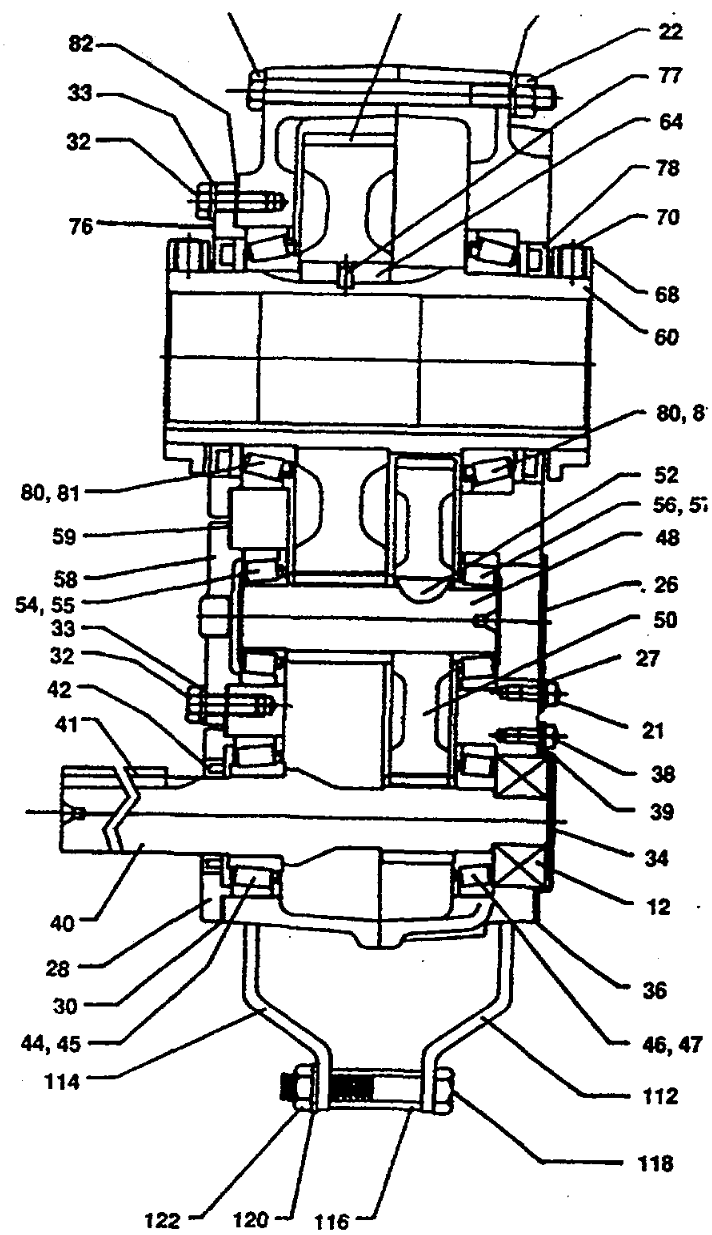
Table 3 — Quantities of VCI #105 Oil DODGE Part Number 415112-80-DB

Case Size	Quarts or Liters
TXT3A	.1
TXT4A	.2
TXT5B	.3

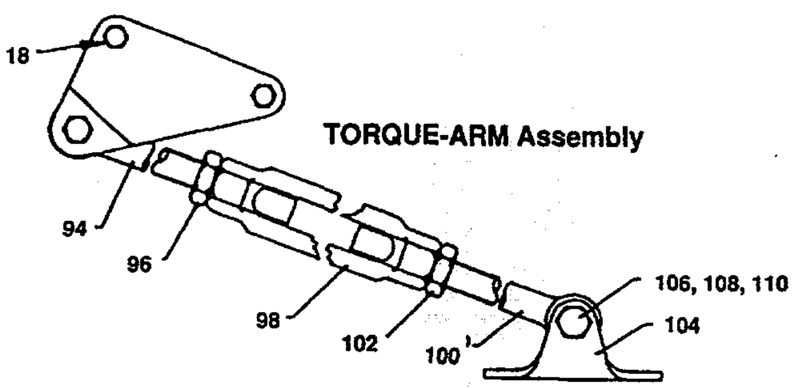
VCI #105 & #10 are interchangeable.
VCI #105 is more readily available.



Taper-Bushed



Straight Bore



TORQUE-ARM Assembly

Note: The two-digit numbers are for reference only. Order parts by the six-digit numbers in the Parts List. Each six-digit number is a complete identification of the part or assembly.

12	Backstop Assembly	1	243106	244106	245154
	HOUSING	1	243534	244567	245587
‡	Air Vent	1	241237	241237	245237
16	Housing Bolt	6	411440	411442	411464
18	Adapter Housing Bolt	2	411442	411444	411466
19#	Washer	4	419094	419094	419096
20	Lockwasher	6	419012	419012	419013
22	Hex Nut	8	407089	407089	407091
24	Dowel Pin	2	420055	420055	420110
‡	Pipe Plug	2	430031	430031	430033
‡	Magnetic Plug	1	430060	430060	430062
21	Countershaft Cover Screws (Backstop Side)	4	416524	411035	411394
26	Countershaft Brg. Cover (Backstop Side)	1	243559	244574	244574
27	Lockwasher	4	419007	419009	419009
28	Input Seal Carrier	1	243543	244577	245597
30*	Input Shaft Bearing Shim Pack	2†	389704	389711	389732
32	Carrier and Cover Screws	●	411390	411407	411407
33	Lockwasher	●	419010	419011	419011
34	Backstop Cover	1	243560	244493	245547
38	Backstop Cover Screw	4	416524	411035	411406
39	Lockwasher	4	419007	419009	419009
40*	Input Shaft with Pinion — 9:1 Ratio	1	243549	244579	245599
	15:1 Ratio	1	243550	244580	245600
	25:1 Ratio	1	243551	244581	245601
41	Input Shaft Key	1	443032	443082	443113
44*	Input Shaft Brg. (Input Side) — Cone	1	402204	402280	402144
45*	Cup	1	403139	403027	403104
46*	Input Shaft Brg. (Backstop Side) — Cone	1	402273	402142	◇
47*	Cup	1	403094	403102	403073
	COUNTERSHAFT ASSEMBLY★ — 9:1 Ratio	1	389729	389730	389731
	15:1 Ratio	1	389700	389707	389714
	25:1 Ratio	1	389701	389708	389715
48	▲Countershaft with Pinion	1	243555	244590	245596
50*	▲First Reduction Gear — 9:1 Ratio	1	243237	244482	245482
	15:1 Ratio	1	243238	244214	245214
	25:1 Ratio	1	243239	244212	245212
52*	▲Key	1	243215	244215	244215
54*	Countershaft Brg. (Input Side) — Cone	1	402273	402000	402203
55*	Cup	1	403094	403000	403027
56*	Countershaft Brg. (Backstop Side) — Cone	1	402273	402000	402203
57*	Cup	1	403094	403000	403027
58	Countershaft Brg. Cover (Input Side)	1	243545	244578	245594
59*	Countershaft Brg. Shim Pack	2†	389705	389712	389718
	OUTPUT HUB ASSEMBLY★ — Straight Bore	1	389702	389709	389716
	Taper Bushed	1	389703	389710	389717
60*	▲Output Hub — Straight Bore	1	243557	244589	245591
	Taper Bushed	1	243556	244588	245590
62*	▲Output Gear	1	243570	244188	245186
64*	▲Output Gear Key	2	243216	244217	355064
68	Output Hub Collar ◆	2	243572	244658	245598
70	Collar Screw ◆	4	400098	400150	400154
72	Bushing Back-up Plate ■	2	243308	244099	245114
74	Retaining Ring ■	2	421109	421108	421107
76	Output Hub Seal Carrier (Input Side)	1	243547	244591	245592
77	Roll Pin	1	409022	409022	409022
80*	Output Hub Bearing — Cone	2	402272	402268	402193
81*	Cup	2	403127	403163	403016

82*	Output Hub Bearing Shim Pack	2†	389706	389713	389719
	SEAL KIT★*	1	389720	389721	389722
36*	▲Backstop Cover Gasket	1	243561	244593	245220
42*	▲Input Shaft Seal	1	243558	244524	355011
78*	▲Output Hub Seal	2	243578	244673	245545
‡	RTV Sealant, Tube	1	465044	465044	465044
84	BUSHING ASSEMBLY★ — 1 5/16" Bore	1	243282	......	......
	1 3/8" Bore	1	243284	......	......
	1 7/16" Bore	1	243260	244079	......
	1 1/2" Bore	1	243262	244081	......
	1 5/8" Bore	1	243264	244083	......
	1 11/16" Bore	1	243268	244085	......
	1 3/4" Bore	1	243266	244087	......
	1 7/8" Bore	1	243270	244089	245084
	1 15/16" Bore	1	243272	244093	245086
	2" Bore	1	243274	244095	245088
	2 1/8" Bore	1	......	244109	......
	2 3/16" Bore	1	243276	244111	245090
	2 1/4" Bore	1	......	244113	245092
	2 7/16" Bore	1	......	244115	245094
	2 1/2" Bore	1	......	......	245099
	2 11/16" Bore	1	......	......	245110
	2 15/16" Bore	1	......	......	245112
86	▲Bushing Screw	6	411407	411408	411435
88	▲Lockwasher	6	419011	419011	419012
90	▲Key, Bushing to Shaft — 1 5/16" Bore	1	443264	......	......
	1 3/8" Bore	1	443264	......	......
	1 7/16" Bore	1	443265	443254	......
	1 1/2" Bore	1	443265	443254	......
	1 5/8" Bore	1	443265	443254	......
	1 11/16" Bore	1	443266	443254	......
	1 3/4" Bore	1	443266	443254	......
	1 7/8" Bore	1	443267	443255	443251
	1 15/16" Bore	1	443269	443255	443251
	2" Bore	1	443268	443255	443251
	2 1/8" Bore	1	......	443258	......
	2 3/16" Bore	1	443270	443259	443251
	2 1/4" Bore	1	......	443260	443251
	2 7/16" Bore	1	......	443261	443243
	2 1/2" Bore	1	......	......	443244
	2 11/16" Bore	1	......	......	443245
	2 15/16" Bore	1	......	......	443250
‡	▲Key, Bushing to Output Hub	1ß	443262	......	443202
‡	▲Key, Bushing to Output Hub — 1 3/8" thru 1 7/8" Bore	1	......	443257	......
	1 15/16" & 2" Bore	1	......	443257	......
	TORQUE-ARM ASSEMBLY★	1	243097	245097	245097
94	▲Rod End	1	243245	245245	245245
96	▲Hex Nut	1	407095	407097	407097
98	▲Turnbuckle	1	243246	245246	245246
100	▲Extension	1	243247	245247	245247
102	▲L.H. Hex Nut	1	407244	407246	407246
104	▲Fulcrum	1	243249	246249	246249
106	▲Fulcrum Screw	1	411484	411484	411484
110	▲Hex Nut	1	407093	407093	407093
	ADAPTER ASSEMBLY★	1	259153	259154	259155
112	▲R.H. Adapter Plate	1	243242	244244	245242
114	▲L.H. Adapter Plate	1	243241	244243	245241
116	▲Adapter Bushing	1	243243	245243	245243
118	▲Adapter Bolt	1	411437	411460	411460
120	▲Lockwasher	1	419012	419013	419013
122	▲Hex Nut	1	407089	407091	407091

★ Includes parts listed immediately below marked "▲." Housing assembly also includes a two-piece housing. Bushing assemblies include 2 bushings.
▲ Parts marked "▲" make up the assemblies under which they are listed.
‡ Not shown on drawing.
● 14 required for TXT3A & TXT4A, 15 required for TXT5B.
Ref. #19 is listed but not shown on parts drawing. Washer is used on housing bolts at the dowel pin locations.

† See last paragraph under "ORDERING PARTS."
◆ Straight bore only.
■ Taper bushed only.
* Recommended spare parts
ß On size TXT3A for 1 15/16" thru 1 3/4" bores and TXT5B for 1 7/16" thru 2 1/4" bores.
◇ Use part # 402266 for TXT525B, use part # 402269 for TXT509B & TXT515B.

A DODGE TORQUE-ARM Speed Reducer can be disassembled and reassembled by careful attention to the instructions following, using tools normally found in a maintenance department.

Cleanliness is very important to prevent the introduction of dirt into the bearings and other parts of the reducer. A tank of clean solvent, an arbor press, and equipment for heating bearings and gears should be available for shrinking these parts on shafts.

Our factory is prepared to repair reducers for customers who do not have proper facilities or who for any reason desire factory service.

The oil seals are of the rubbing type and considerable care should be used during disassembly and reassembly to avoid damage to the surface on which the seals rub.

The keyseat in the input shaft as well as any sharp edges on the output hub should be covered with tape or paper before disassembly or reassembly. Also be careful to remove any burrs or nicks on surfaces of the input shaft or output hub before disassembly or reassembly.

ORDERING PARTS:

When ordering parts for reducer, specify reducer size number, reducer serial number, part name, part number and quantity.

It is strongly recommended that when a pinion or gear is replaced, the mating gear or pinion be replaced also.

If the large gear on the output hub must be replaced, it is recommended that an output hub assembly with a gear assembled on the hub be ordered to secure undamaged surfaces on the output hub where the oil seals rub. However, if it is desired to use the old output hub, press the gear and bearing off and examine the rubbing surface under the oil seal carefully for possible scratching or other damage resulting from the pressing operation. To prevent oil leakage at the shaft oil seals the smooth surface of the output hub must not be damaged.

If any parts must be pressed from a shaft or from the output hub, this should be done before ordering parts to make sure that none of the bearings or other parts are damaged in removal. Do not press against outer race of any bearing.

Because old shaft oil seals may be damaged in disassembly it is advisable to order replacements for these parts.

If replacing a bearing or a shaft, it is advisable to order a set of shims for adjustment of bearings on the shaft assembly. If replacing a housing, a set of shims should be ordered for each shaft assembly because the adjustment of the bearings on each shaft assembly is affected.

REMOVING REDUCER FROM SHAFT:

WARNING

To ensure that drive is not unexpectedly started, turn off and lock out or tag power source before proceeding. Failure to observe these precautions could result in bodily injury.

WARNING

External loads may cause machine movement. Block machine before removing any drive train components. Failure to observe these precautions could result in bodily injury.

STRAIGHT BORE —

Loosen screws in both output hub collars. Remove the collar next to end of shaft. This exposes three puller holes in output hub to permit use of wheel puller. In removing reducer from shaft be careful not to damage ends of hub.

TAPER BUSHED —

1. Remove bushing screws.
2. Place the screws in the threaded holes provided in the bushing flanges. Tighten the screws alternately and evenly until the bushings are free on the shaft. For ease of tightening screws make sure screw threads and threaded holes in bushing flanges are clean.
3. Remove the outside bushing, the reducer and then the inboard bushing.

DISASSEMBLY:

1. Remove all bolts from housing. Drive back hollow dowel pins on either side of housing. Remove back-up plates and snap rings on the output hub on taper-bushed reducers. Open housing evenly to prevent damage to parts inside.
2. Lift shaft, gear and bearing assemblies from housing.
3. Remove seals, seal carriers and bearing cups from housing.

REASSEMBLY:

1. **Output Hub Assembly:** Heat gear to 325° to 350°F for shrinking onto output hub. Heat bearing cones to 250° to 270°F for shrinking onto output hub.
2. **Countershaft Assembly:** Heat gear to 325° to 350°F and bearing cones to 250° to 270°F for shrinking onto shaft.
3. **Input Shaft Assembly:** Shaft and pinion are integral. Heat bearing cones to 250° to 270°F for shrinking onto shaft.
4. Drive the dowel pins back into position in the right-hand housing half.
5. Install countershaft cover in right-hand housing half. Place housing half on blocks to allow for protruding end of output hub. Install bearing cups in right-hand housing half making sure they are properly seated.
6. Mesh output hub gear and small countershaft gear together and set in place in housing. Set input shaft assembly in place in the housing. Make sure bearing rollers (cones) are properly seated in their cups. Set bearing cups for left-hand housing half in place on their rollers.

sure not to nick or scratch flange face. Place a new bead of gasket eliminator on flange face and spread evenly over entire flange leaving no bare spots. Place other housing half into position and tap with a soft hammer (rawhide not lead hammer) until housing bolts can be used or draw housing halves together. Torque housing bolts per torque values listed below.

8. Place output hub seal carrier in position without shims and install two carrier screws diametrically opposed. Torque each screw to 25 lb.-ins. Rotate the output hub to roll in the bearings and then torque each screw once to 50 lb.-ins. **Do not retorque screws.** Again turn output hub to roll in the bearings. With a feeler or taper gage, measure the gap between the housing and the carrier, clockwise from and next to each screw. To determine the required shim thickness, take the average of the two feeler gage readings. Remove carrier and install the required shims. Note: Total shim thickness per carrier should not include more than .009" plastic shims and each plastic shim should be inserted between two metal shims. Place a 1/8" diameter bead of Dow Corning RTV732 sealant on the face around the I.D. of the end shim (sealant is to be between reducer housing and shim) and install carrier on reducer housing. Torque carrier bolts to value shown in Table 4. Output hub should have an axial end play of .001" to .003".

Table 4 — Bolt Tightening Torque Values

Reducer Size	Housing Bolts (in.-lbs.)	Seal Carrier Bolts (in.-lbs.)
TXT309A TXT315A TXT325A	600	204
TXT409A TXT415A TXT425A	600	360
TXT509B TXT515B TXT525B	900	360

Table 5 — Manufacturers' Part Numbers For Replacement Output Hub Bearings

TORQUE-ARM Reducer Drive Size	Output Hub Bearing	
	DODGE Part Number	Timken Part Number
TXT309A TXT315A TXT325A	402272 403127	LM814849 LM814810
TXT409A TXT415A TXT425A	402268 403163	498 492A
TXT509B TXT515B TXT525B	402193 403016	42381 42584

as in step 8 above. The axial end play should be .001" to .003".

10. Again using the same procedure as in step 8, adjust the input shaft bearings, except the axial end play should be .002" to .003".

11. Apply sealant to the input shaft cover gasket and install input shaft cover in right-hand housing half. Install input and output seals. Extreme care should be used when installing seals to avoid damage due to contact with sharp edges on the input shaft or output hub. The possibility of damage and consequent oil leakage can be decreased by covering all sharp edges with tape or paper prior to seal installation. Fill cavity between seal lips with grease. Seals should be pressed or tapped with a soft hammer evenly into place in the carrier applying pressure only on the outer edge of the seals. A slight oil leakage at the seals may be evident during initial running in but should disappear unless seals have been damaged.

12. Install bushing back-up plate and snap rings on Taper Bushed reducers.

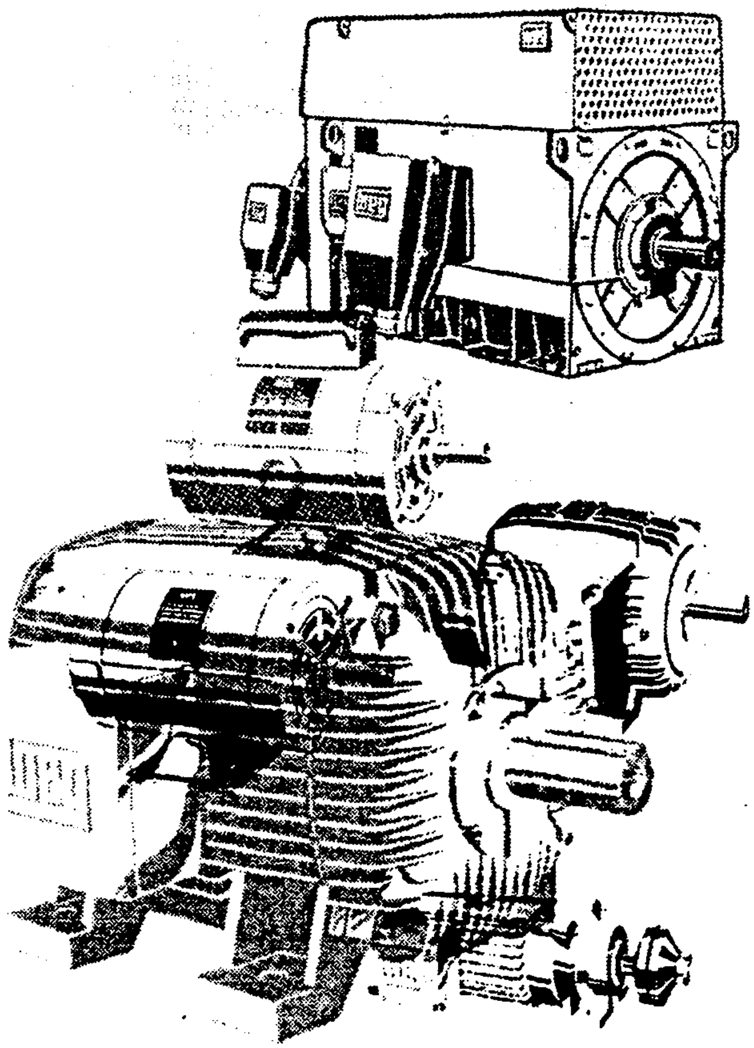
Table 6 — Manufacturers' Part Numbers For Replacement Countershaft Bearings

TORQUE-ARM Reducer	Countershaft Bearing Input Side		Countershaft Bearing Adapter Side	
Size	DODGE Part No.	Timken Part No.	DODGE Part No.	Timken Part No.
TXT309A TXT315A TXT325A	402273 403094	15102 15245	402273 403094	15012 15245
TXT409A TXT415A TXT425A	402000 403000	M86649 M86610	402000 403000	M86649 M86610
TXT509B TXT515B TXT525B	402203 403027	2789 2720	402203 403027	2789 2720

Table 7 — Manufacturers' Part Numbers For Replacement Input Shaft Bearings

TORQUE-ARM Reducer	Input Bearing Input Side		Input Bearing Adapter Side	
Size	DODGE Part No.	Timken Part No.	DODGE Part No.	Timken Part No.
TXT309A TXT315A TXT325A	402204 403139	LM48548A LM48510	402273 403094	15102 15245
TXT409A TXT415A TXT425A	402280 403027	2788 2720	402142 403102	26118 26283
TXT509B TXT515B TXT525B	402144 403104	28579 28521	402266 403073	350A 352

INSTALLATION AND MAINTENANCE MANUAL FOR NEMA LOW VOLTAGE ELECTRIC MOTORS



The electric motor is the item of equipment most widely used by man in his pursuit of progress, as virtually all machines and many renowned inventions depend upon it.
By virtue of the prominent role the electric motor plays in the comfort and welfare of mankind, it must be regarded and treated as a prime power unit embodying features that merit special attention, including its installation and maintenance.
This means that the electric motor should receive proper attention.
Its installation and routine maintenance require specific care to ensure perfect operation and longer life of the unit.
THE WEG ELECTRIC MOTOR INSTALLATION AND MAINTENANCE MANUAL provides the necessary information to properly install, maintain and preserve the most important component of all equipment:

THE ELECTRIC MOTOR!

WEG MOTORES LTDA.

YOU MAY NEED TO READ OTHER WEG INSTALLATION AND MAINTENANCE MANUALS:

• For Low and High Voltage Large Motors Induction, Slip Ring, H Line, K Line, etc.	Manual Nr 673
• For Brushless DKBH Synchronous Generators	Manual Nr 1008
• For DC Motors	Manual Nr 1005
• For Tacho Generator Dynamo	Manual Nr 1007

YOU CAN REQUEST THE ABOVE MANUALS FROM YOUR NEAREST WEG SALES OFFICE OR DIRECTLY WITH WEG HEADQUARTER:

WEG EXPORTADORA S.A.
Rua: Joinville, 3000
89256-900 JARAGUA DO SUL - SC - BRAZIL
PHONE: (55) (473) 72-4000 PABX
FAX: (55) (473) 72-4060

INSTALLATION AND MAINTENANCE MANUAL

FOR NEMA LOW VOLTAGE ELECTRIC MOTORS

Contents

1 - Introduction

This manual covers all the three-phase and single-phase asynchronous squirrel-cage induction motors, from 140T to 580T frame sizes.

The motors mentioned in this manual are subject to continous improvement, therefore, information is subject to change without notice.
For further details, please consult WEG.

2 - Basic Instructions

2.1 - Safety Instructions

All personnel involved with electrical installations, either handling, lifting, operation and maintenance, should be well-informed and up-to-dated concerning the safety standard and principles that govern the work and carefully follow them.
Before work commences, it is the responsibility of the person in charge to ascertain that these have been duly complied with and to alert his personnel of the inherent hazards of the job in hand.
It is recommended that these tasks be undertaken only by qualified personnel and they should be instructed to:
- avoid contact with energized circuits or rotating parts,
- avoid by-passing or rendering inoperative any safeguards or protective devices,
- avoid extended exposure in close proximity to machinery with high noise levels,
- use proper care and procedures in handling, lifting, installing, operating and maintaining the equipment, and
- follow consistently any instructions and product documentation supplied when they do such work.

Before initiating maintenance procedures, be sure that all power sources are disconnected from the motor and accessories to avoid electric shock.
Fire fighting equipment and notices concerning first aid should not be lacking at the job site; these should be visible and accessible at all times.

2.2 - Delivery

Prior to shipment, motors are factory-tested and balanced. They are packed in boxes or bolted to a wooden base.
Upon receipt, we recommend careful handling and a physical examination for damage which may have occured during transportation.
In the event of damage and in order to guaranty insurance coverage, both the nearest WEG sales office and the carrier should be notified without delay.

2.3 - Storage

Motors should be raised by their eyebolts and never by their shafts. It is important that high rating three-phase motors be raised by their eyebolts. Raising and lowering must be steady and joltless, otherwise bearings may be harmed.
When motors are not immediately installed, they should be stored in their normal upright position in a dry even temperature place, free of dust, gases and corrosive atmosphere.
Other objects should not be placed on or against them.
Motors stored over long periods are subject to loss of insulation resistance and oxidations of bearings.

Bearings and the lubricant deserve special attention during prolonged periods of storage. Depending on the length and conditions of storage it may be necessary to regrease or change rusted bearings. The weight of the rotor in an inactive motor tends to expel grease from between the bearing surfaces thereby removing the protective film that impedes metal-to-metal contact. As a preventive measure against the formation of corrosion by contact, motors should not be stored near machines which cause vibrations, and avery 3 month their shafts should be rotated manually.

Insulation resistance fluctuates widely with temperature and humidity variations and the cleanliness of components. When a motor is not immediately put into service it should be protected against moist, high temperatures and impurities, thus avoiding damage to insulation resistance.
If the motor has been in storage more than six month or has been subjected to adverse moisture conditions, it is best to check the insulation resistance of the stator winding with a megohmeter.
If the resistance is lower than ten megohms the windings should be dried in one of the two following ways:
1) Bake in oven at temperatures not exceeding 194 degree F until insulation resistance becomes constant.
2) With rotor locked, apply low voltage and gradually increase current through windings until temperature measured with thermometer reaches 194 degree F. Do not exceed this temperature.
If the motor is stored for an extensive period, the rotor must be periodically rotated.
Should the ambient conditions be very humid, a periodical inspection is recommended during storage. It is difficult to prescribe rules for the true insulation resistance value of a machine as the resistance vary according to the type, size and rated voltage and the state of the insulation material used, method of construction and the machine's insulation antecedents. A lot of experience is necessary in order to decide when a machine is ready or not to be put into service. Periodical records are useful in making this decision.

The following guidelines show the approximate values that can be expected of a clean and dry motor, at 40°C test voltage in applied during one minute.

Insulation resistance Rm is obtained by the formula:

$$\boxed{Rm = Vn + 1}$$

where: Rm - minimum recommended insulation resistance in MΩ with winding at 40°C
Vn - rated machine voltage in kV

In case that the test is carried out at a temperature other than 40°C, the value must be corrected to 40°C using a approximated curve of insulation resistance v.s temperature of the winding with the aid of Figure 2.1; it's possible verify that resistance practically doubles every 10°C that insulating temperature is lowered.

Example:

Ambient temperature = 50°C
Motor winding resistence at 50°C = 1,02 MΩ
Correction to 40°C

$$R_{40°C} = R_{50°C} \,.\, K_{50°C}$$
$$R_{40°C} = 1{,}02 \,.\, 1{,}3$$
$$R_{40°C} = 1{,}326\ M\Omega$$

The minimum resistence Rm will be:

$$Rm = Vn + 1$$
$$Rm = 0{,}440 + 1$$
$$Rm = 1{,}440\ M\Omega$$

On new motors, lower values are often attained due to solvents present in the insulating varnishes that later evaporate during normal operation. This does not necessarily mean that the motor is not operational, since insulating resistance will increase after a period of service.

On motor which have been in service for a period of time much larger values are often attained. A comparison of the values recorded in previous tests on the same motor under similar load, temperature and humidity conditions, serves as a better indication of insulation condition than that of the value derived from a single test. Any substantial or sudden reduction is suspect and the cause determined and corrective action taken.
Insulation resistance is usually measured with a MEGGER.
In the event that insulation resistance be inferior to the values derived from the above formula, motors should be subjected to a drying process.

2.3.1 - Drying the Windings

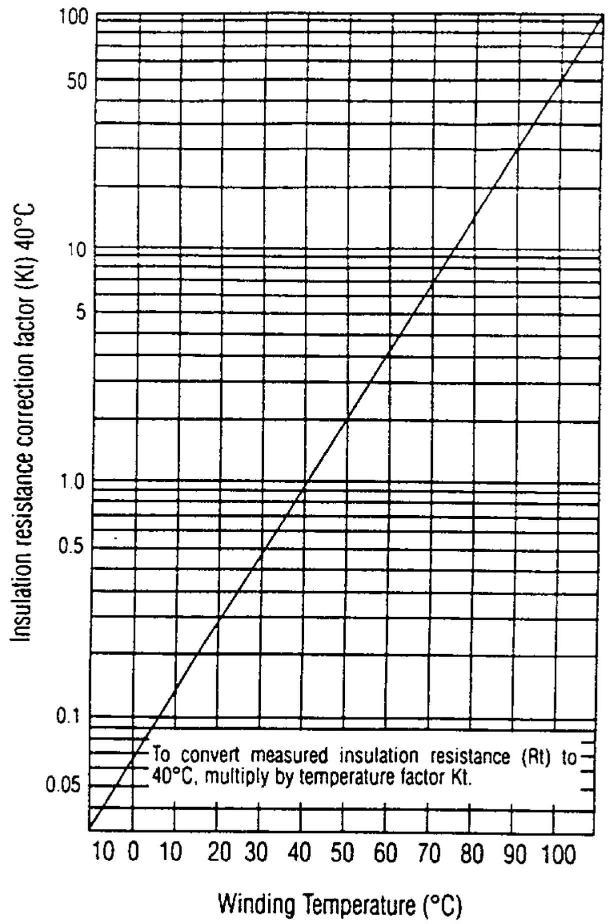
This operation should be carried out with maximum care, and by only qualified personnel. The rate of temperature rise should not exceed 5°C per hour and the temperature of the winding should not exceed 105°C. An overly high final temperature as well as a fast temperature increase rate can both generate vapour harmful to the insulation.

Temperature should be accurately controlled during the drying process and the insulation resistance measured at regular intervals.

During the early stages of the drying process, insulation resistance will decrease as a result of the temperature increase, but the resistance will increase again when the insulation becomes dryer.

The drying process should be extended until sucessive measurements of insulation resistance indicate that a constant value above the minimum acceptable value has been attained.
It is extremely important that the interior of the motor be well ventilated during the drying operation to ensure that the dampness is really removed.

Heat for drying can be obtained from outside sources (an oven), energization of the space heater (optional), or introducing a current through the actual winding of the moto be dried.



$R_{40°C} = R_t \times K_{t40°C}$

Fig. 2.1.

Electric machines should be installed in order to allow an easy access for inspection and maintenance. Should the surrounding atmosphere be humid, corrosive or contain flammable substances or particles, it is essential to ensure an adequate degree of protection.
The installation of motors in ambients where there are vapours, gases or dusts, flammable or combustible materials, subject to fire or explosion, should be undertaken according to ppropriate and governing codes, suchas NEC Art. 500 (National Electrical Code) and UL-674 (Underwriters Laboratories, Inc.) Standards.
Under no circumstances can motors be enclosed in boxes or covered with materials which may impede or reduce the free circulation of ventilating air.
Machines fitted with external ventilation should be at least 50cm from the wall to permit the passage of air.
The opening for the entry and exit of air flow should never be obstructed or reduced by conductors, pipes or other objects.
The place of installation should allow for air renewal at a rate of 700 cubic feet per minute for each 75 HP motor capacity.

3.1 - Mechanical Aspects

3.1.1 - Foundation

The motor base must be levelled and as far as possible free of vibrations. A concrete foundation is recommended for motors over 100 HP.
The choice of base will depend upon the nature of the soil at the place of erection or of the floor capacity in the case of buildings.
When dimensioning the motor base, keep in mind that the motor may occasionally be run at a torque above that of the rated full load torque.
Based upon Figure 3.1, foundation stresses can be calculated by using the following formula:

$$F1 = 0.2247\left(0{,}009 \,.\, G \,.\, W - 213\,\frac{Tmax}{A}\right)$$

$$F2 = 0.2247\left(0{,}009 \,.\, G \,.\, W + 213\,\frac{Tmax}{A}\right)$$

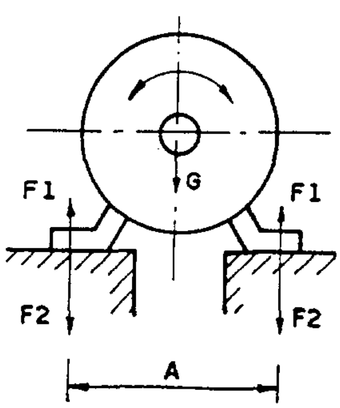


Fig. 3 - Base Stresses

Where:

F1 and F2 - Lateral stress (Lb)
g - Force of gravity (32.18 ft/s²)
G - Weight of motor (Lb)
Tmax - Maximum torque (Lb . Ft)
A - Obtained from the dimensional drawing of the motor (in)

Sunken bolts or metallic base plates should be used to secure the motor to the base.

3.1.2 - Types of Bases

a) Slide Rails

When motor drive is by pulleys the motor should be mounted on slide rails and the lower part of the belt should be pulling.
The rail nearest the drive pulley is positioned in such a manner that the adjusting bolt be between the motor and the driven machine. The other rail should be positioned with the bolt in the opposite position, as shown in Fig. 3.2.
The motor is bolted to the rails and set on the base. The drive pulley is aligned such that its center is on a plane with the center of the driven pulley and the motor shaft and that of the machine be parallel.

The belt should not be overly stretched, see Fig. 3.11.
After the alignment, the rails are fixed.

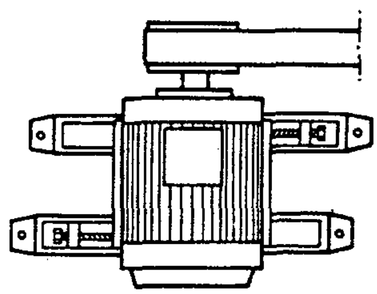


Fig. 3.2 - Positioning of slide rails for motor alignment.

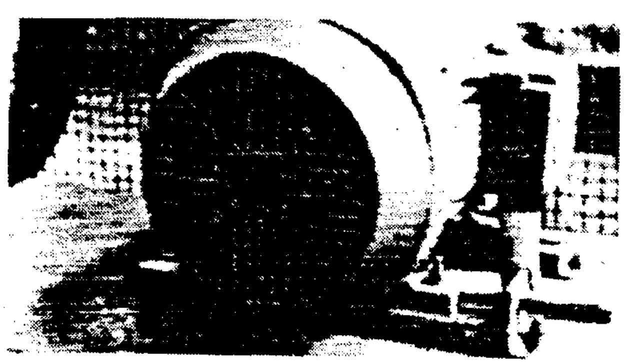


Fig. 3.3 - A Three-phase induction motor mounted on securing rails.

b) Foundation Studs

Very often, particularly when drive is by flexible coupling the motor is anchored directly to the base with foundation studs.
It is recommended that shim plates of approximately 0.8 inches be used between the foundation studs and the feet of the motor for replacement purposes. These shim plates are useful when exchanging one motor for another of larger shaft height due to variations allowed by standard tolerances
Foundation studs should neither be painted nor rusted as both interfere with to the adherence of the concrete, and bring about loosening.
After accurate alignment and levelling of the motor, the foundation studs are cemented and their screws tightened to secure the motor.

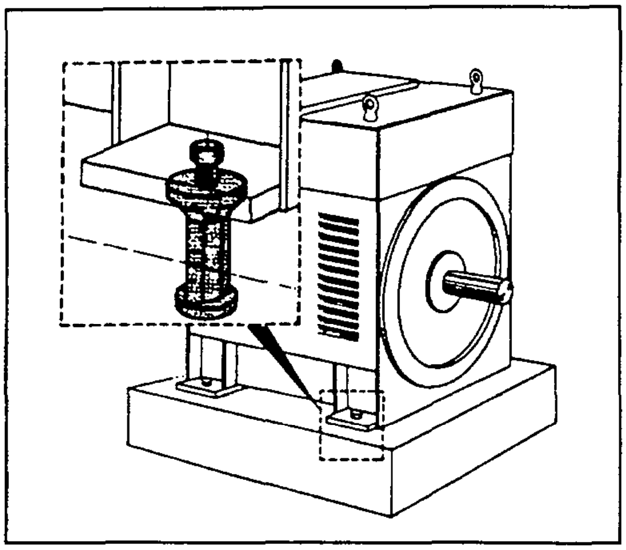


Fig. 3.4 - Motor mounted on a concrete base with foundation studs.

c) Metallic Base

Motor-generator sets are assembled and tested at the factory prior to delivery. However, before putting into service at site, coupling alignment should be carefully checked as the metallic base could have suffered dislocation during transit due to internal stresses of the material.
The metallic base is susceptible to distortion if secured to a foundation that is not truly flat.
Machines should not be removed from their common metallic base for alignment; the metallic base should be levelled on the actual foundation with the aid of a spirit level (or similar instrument).
When a metallic base is used to adjust the height of the motor shaft end with the machine shaft end, the latter should be levelled on the concrete base.
After the base has been levelled, foundation, studs tightened, and the coupling checked, the metal base and the studs are cemented.

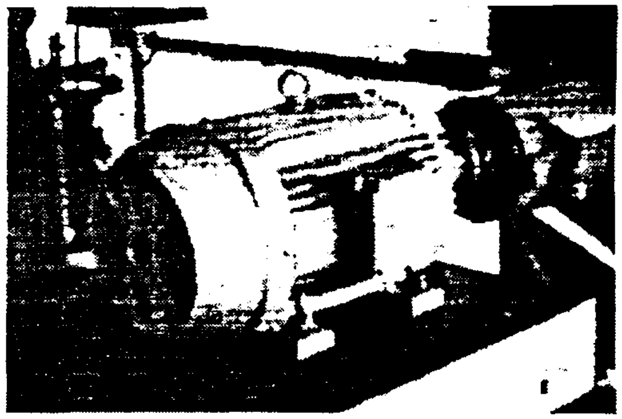


Fig. 3.5 - Three-phase motor mounted on a metallic base.

3.1.3 - Alignment

The electric motor should be accurately aligned with the driven machine, particularly in cases of direct coupling. An incorrect alignment can cause bearing failure vibrations and even shaft rupture.
The best way to ensure correct alignment is to use dial gauges placed on each coupling half, one reading radially and the other exially - Fig. 3.6.

Fig. 3.6 - Alignment with dial gauges.

Thus, simultaneous readings are possible and allow for checking for any parallel (Fig. 3.6a) and concentricity deviations (Fig. 3.6b) by rotating the shafts one turn.
Gauge readings should not exceed 0.02 inches. If the installer is sufficiently skilled, he can obtain alignment with feeler gauges and

a steel ruler, providing that the couplings are perfect and centered (Fig. 3.6c).

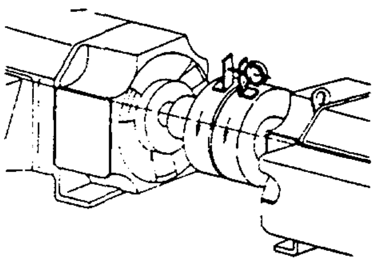


Fig 3.6a - Deviation from parallel

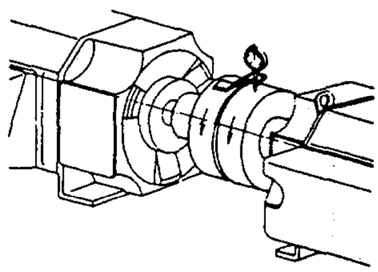


Fig. 3.6b - Deviation from concentricity

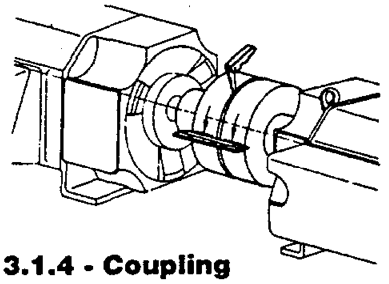


Fig. 3.6c - Alignment with a steel ruler

3.1.4 - Coupling

a) Direct Coupling

Direct coupling is always preferable due to its lower cost, space economy, no belt slippage and lower accident risk.
In the case of speed ratio drives, it is also common to use a direct coupling with a reducer (gear box).

CAUTION: Carefully align the shaft ends using, whenever feasible, a flexible coupling.

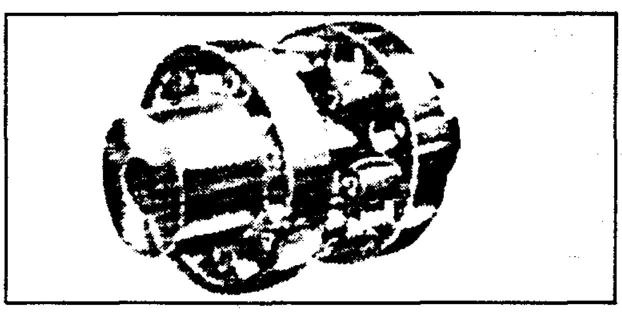


Fig. 3.7 - A type of direct coupling

b) Gear Coupling

Poorly aligned gear couplings are the cause of jerking motions which bring about the vibration of the actual drive and vibrations within the motor.
Therefore, due care must be given to perfect shaft alignment: exactly parallel in the case of straight gears, and at the correct angle for bevel or helical gears.

Perfect gear engagement can be checked by the insertion of a strip of paper on which the teeth marks will be traced after a single rotation.

c) Belt and Pulley Coupling

Belt coupling is most commonly used when a speed ratio is required.

Assembly of Pulleys: To assemble pulleys on shaft ends with a keyway and threaded end holes the pulley should be inserted halfway up the keyway merely by manual pressure.
On shafts without threaded end holes the heating of the pulley to about 80°C is recommended, or alternatively, the devices illustrated in Figure 3.8 may be employed.

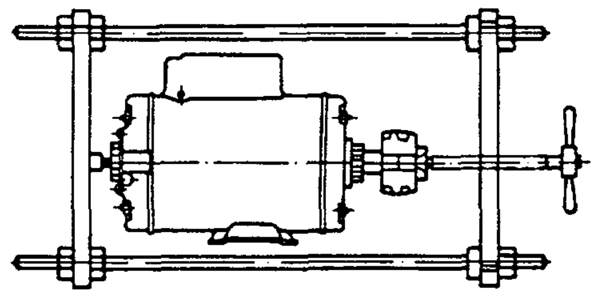


Fig. 3.8 - Pulley mounting device

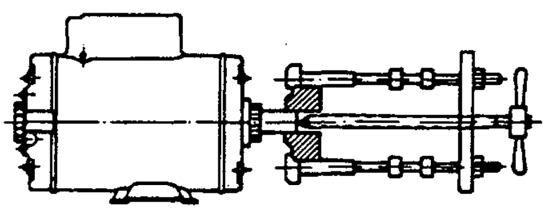


Fig. 3.8a - Pulley extractor

Hammers should be avoided during the fitting of pulleys and bearings. The fitting of bearings with the aid of hammers leaves blemishes on the bearing races. These initially small flaws increase with usage and can develop to a stage that completely impairs the bearing.
The correct positioning of a pulley is shown in Figure 3.9.

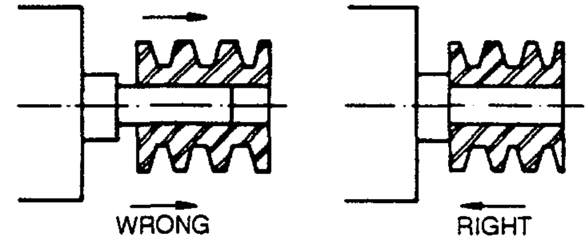


Figure 3.9 - Correct positioning of pulley on the shaft

RUNNING: To avoid needless radial stresses on the bearings it is imperative that shafts are parallel and the pulleys perfectly aligned. (Figure 3.10).

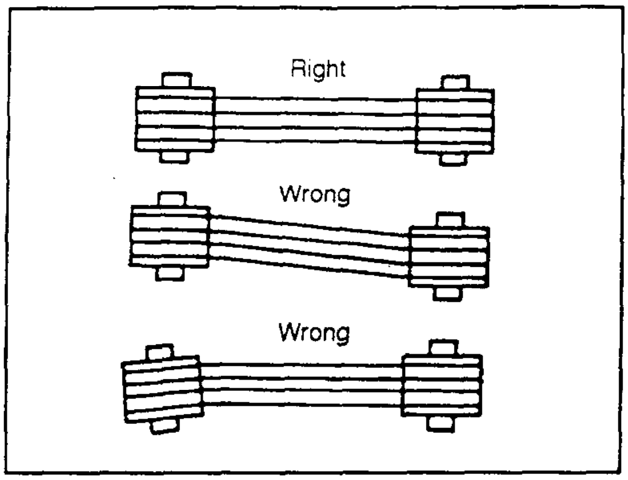


Figure 3.10 - Correct pulley alignment

Laterally misaligned pulleys, when running, transmit alternating knocks to the rotor and can damage the bearing housing. Belt slippage can be avoided by applying a resin (rosin for example).

Belt tension should be sufficient to avoid slippage during operation (Figure 3.11).

Pulleys that are too small should be avoided; these cause shaft flexion because belt traction increases in proportion to a decrease in the pulley size. Table 1 determines minimum pulley diameters, and Tables 2 and 3 refer to the maximum stresses acceptable on motor bearings up to frame 580. Beyond frame size 600, an analysis should be requested from the WEG engineering.

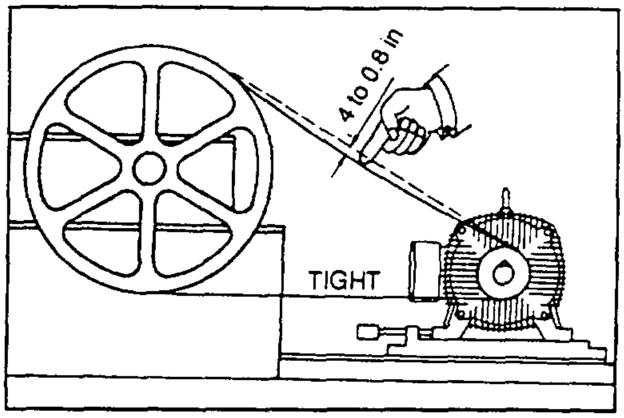
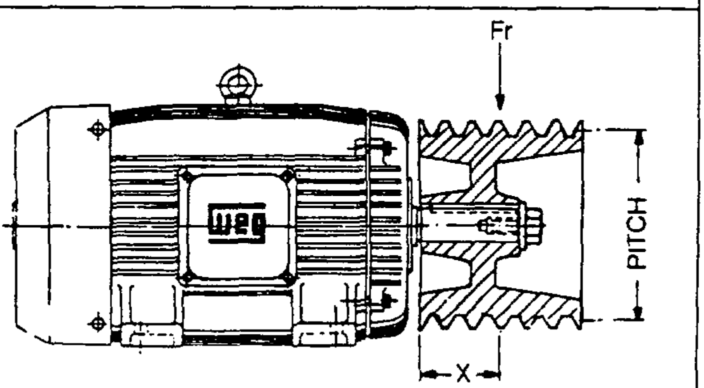


Figure 3.11 - Belt tensions

TABLE 1 - MINIMUM PITCH DIAMETER OF PULLEYS

Frame	Ball Bearings						
	Bearing	Size X Inches					
		0.79	1.57	2.36	3.15	3.94	4.72
140	6205-Z	1.7	1.85	2			
W 180	6206-Z	3.03	3.23	3.46			
180	6307-Z	1.69	1.81	1.93			
W 210	6308-Z		2.86	3.00	3.16		
210	6308-Z		2.90	3.06	3.22		
W 250	6309 C3		4.37	4.54	4.72	4.92	
250	6309 C3		4.41	4.59	4.77	4.97	
280	6311 C3			5.08	5.19	5.47	5.65
320	6312 C3			7.44	7.76	7.94	8.18
360	6314 C3			8.73	9.00	9.28	9.57



Frame	Poles	Ball Bearing					Roller Bearing						
		Bearing	Size X Inches				Bearing	Size X Inches					
			1.97	3.15	4.33	5.51		1.97	3.15	4.33	5.51	6.69	8.27
400	II	6314 C3	7.3	7.62	7.94	8.24		-	-	-	-	-	-
	IV-VI-VIII	6314 C3					NU 316	4.13	4.31	4.49	4.67	4.85	-
440	II	6314 C3	11.75	12.16	12.61	13.08		-	-	-	-	-	-
	IV-VI-VIII	6319 C3					NU 319	4.02	4.17	4.32	4.47	4.62	4.82
500	II	6314 C3	23.54	24.34	25.12	25.87		-	-	-	-	-	-
	IV-VI-VIII	6319 C3					NU 319	6.52	6.73	6.95	7.17	7.39	7.67
580	II	6314 C3	57	58	59	60		-	-	-	-	-	-
	IV-VI-VIII	6322 C3					NU 322	10.72	10.91	11.11	11.31	11.50	11.76

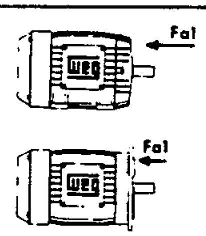
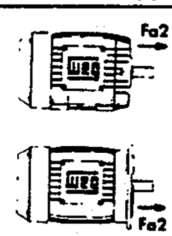
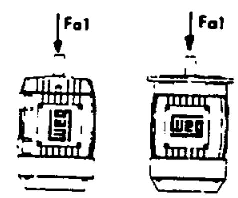
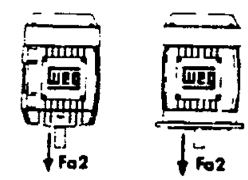
Important:
1) Peripheral speeds for solid grey cast iron pulleys FC 200 is V = 115 ft/s.
2) Use steel pulleys when peripheral speed is higher than 115 ft/s.
3) V-belt speed should not exceed 115 ft/s.

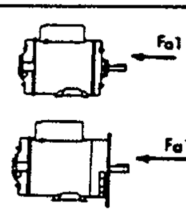
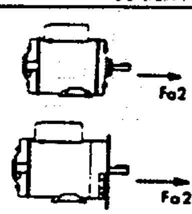
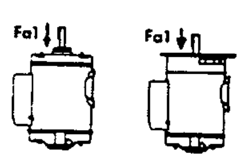
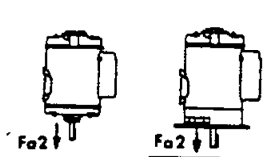
TABLE 2 - MAXIMUM ACCEPTABLE RADIAL LOAD (Lbf)

Nema 56 Motors				
Frame	Radial Force (Lbf)			
	Poles	Distance X		
		1	1,18	2
56 A	II	88	-	59
	IV	88	-	59
56 B	II	88	-	59
	IV	86	-	59
56 D	II	127	-	70
	IV	141	-	70

Saw Arbor Motors				
80 LMS	II	-	355	-
80 MMS	II	-	359	-
80 SMS	II	-	357	-
90 LMS	II	-	427	-
	IV	-	555	-

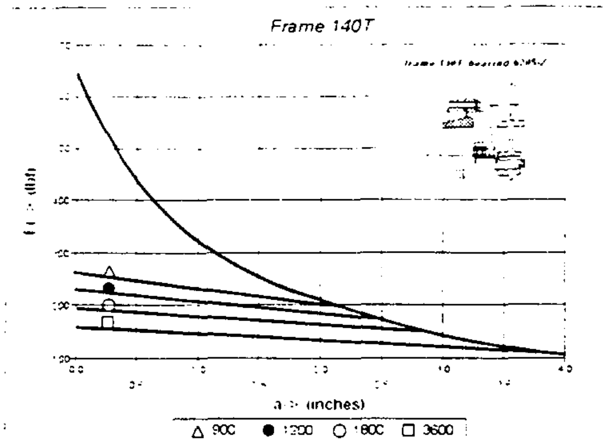
TABLE 3 - MAXIMUM ACCEPTABLE AXIAL LOAD (Lbf)

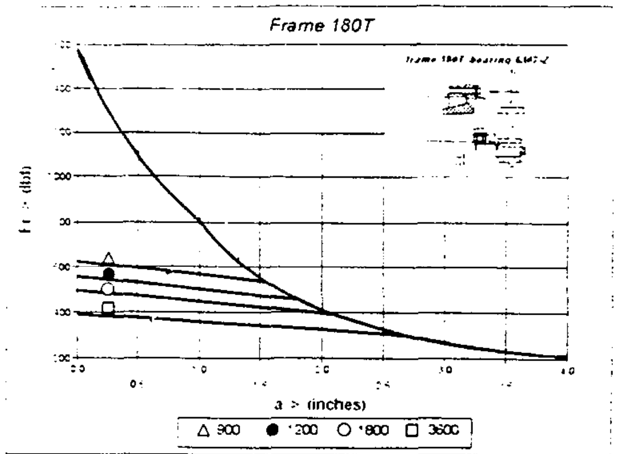
IP-54 Totally Enclosed Motors - 60 Hz																
Frame	Position / Construction Form															
																
	II	IV	VI	VIII	II	IV	VI	VIII	II	IV	VI	VIII	II	IV	VI	VIII
140	103	141	167	187	112	152	185	207	99	132	158	178	105	143	174	198
W 180	108	145	180	202	154	209	255	286	94	130	165	183	141	194	240	269
180	149	207	249	286	269	370	443	500	136	189	229	266	253	352	421	480
W 210	196	264	326	368	329	447	544	610	176	238	297	339	310	421	518	582
210	189	257	315	357	324	443	533	599	160	220	275	310	295	405	493	553
W 250	282	372	443	485	471	620	734	811	240	317	394	414	430	564	685	743
250	273	368	436	485	463	615	727	813	220	310	379	421	410	557	672	749
280	355	480	551	624	621	826	959	1,082	275	388	427	502	540	736	838	961
320	374	498	588	668	703	930	1,091	1,232	266	366	432	511	597	793	937	1,078
360	890	1,181	1,144	1,323	890	1,181	1,375	1,552	745	985	1,144	1,323	745	985	1,144	1,323
400	877	1,148	1,347	1,521	877	1,148	1,347	1,521	705	890	1,060	1,241	705	890	1,060	1,241
440	842	1,303	1,563	1,821	842	1,303	1,563	1,821	568	884	1,109	1,488	568	884	1,109	1,488
500	769	1,250	1,481	1,728	769	1,250	1,481	1,728	355	721	844	1,190	355	721	844	1,190
580	679	1,406	1,649	1,865	679	1,406	1,649	1,865	033	474	549	597	033	474	549	597

Open Motors - NEMA 56 Frames - 60Hz								
Frame	Position / Construction Form							
								
	II	IV	II	IV	II	IV	II	IV
56 A	68	90	83	112	63	85	79	108
56 B	66	90	81	110	63	83	77	105
56 D	63	88	105	145	59	81	101	138

The maximum radial load for each frame are determined, by graphs.

INSTRUCTIONS ON HOW TO USE THE GRAPHS





1 - Maximum radial load on shaft.
2 - Maximum radial load on bearings.

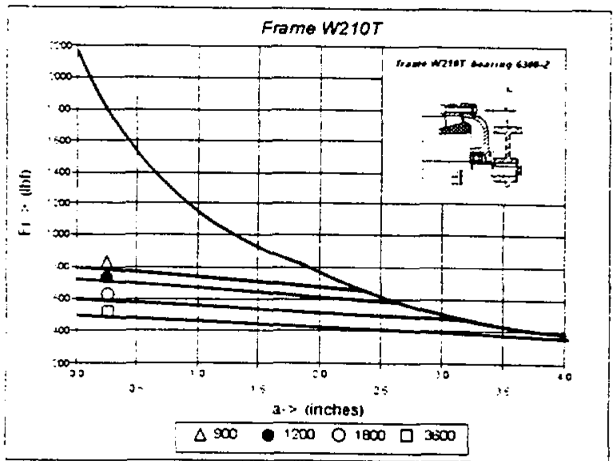
Where: X - Half of pulley width (inches)
Fr - Maximum radial load in relation to the diameter and pulley width.

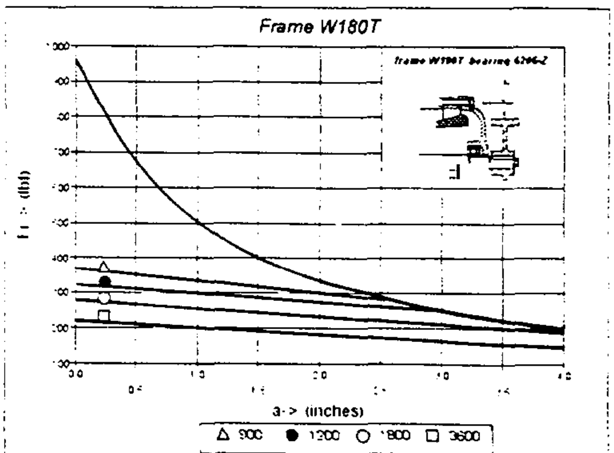
Example:
Verify whether a 2HP motor, II Pole, 60Hz, withstands a radial load of 110Lb, considering a pulley width of 4 inches.

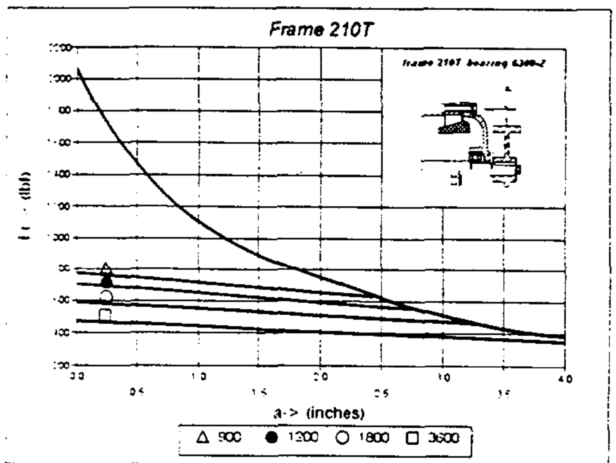
Frame : 145T
Fr : 110Lb
X : 2 inches

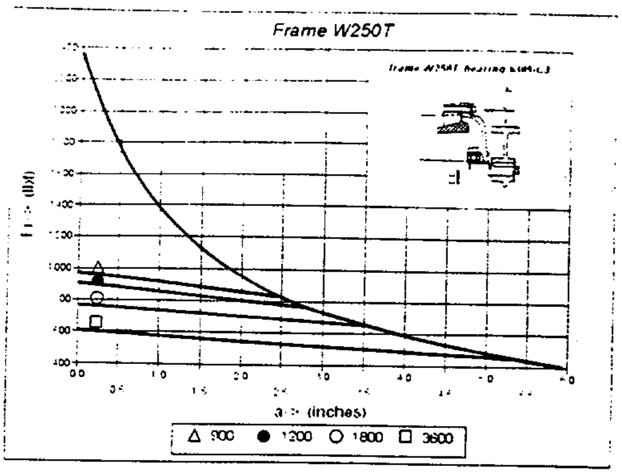
1 - Mark the distance X
2 - Find out line N = 3600 for bearing

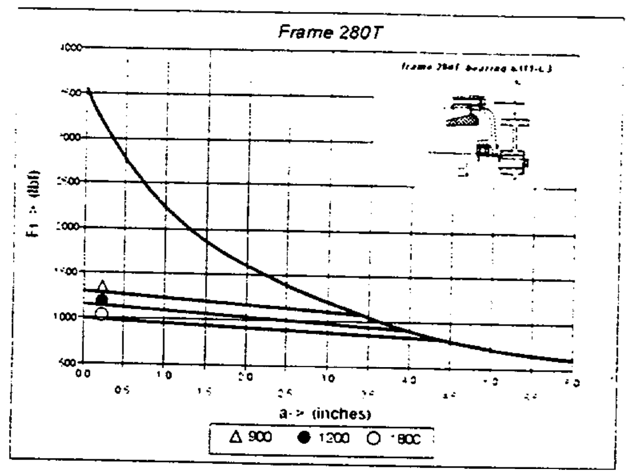
Based on the above, this bearing withstands a radial load of 130Lb.








Frame W250T
a-> (inches)
△ 900 ● 1200 ○ 1800 □ 3600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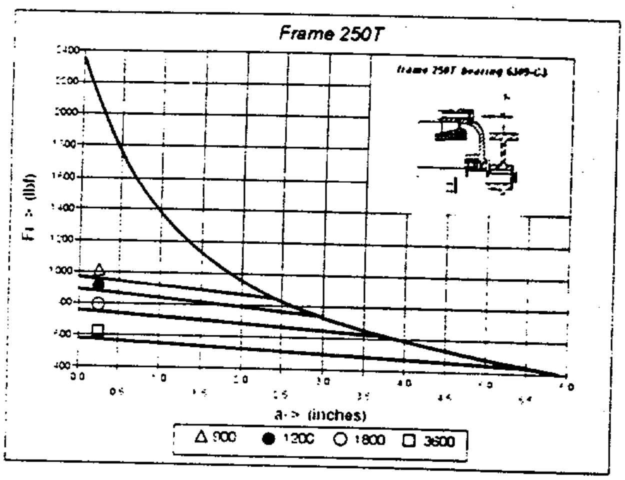
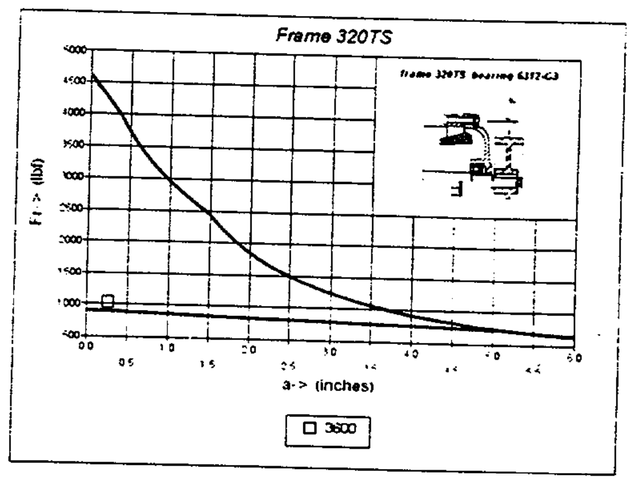
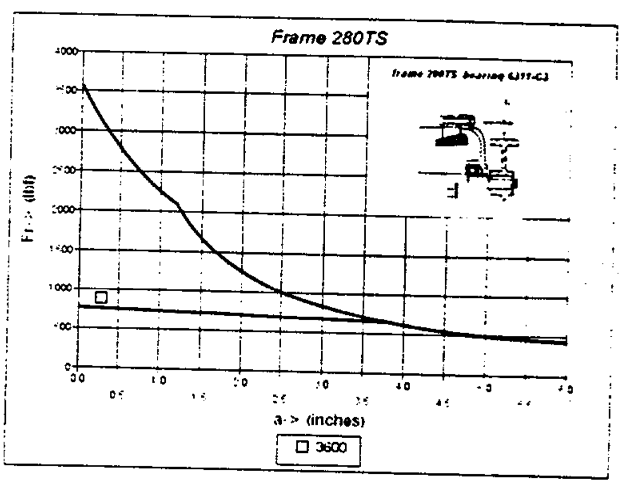
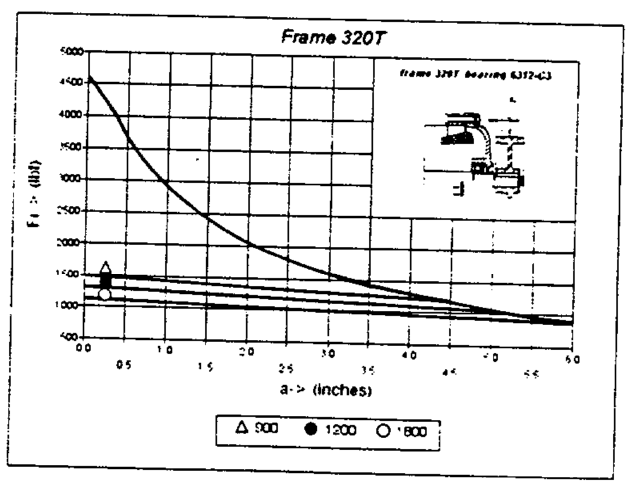
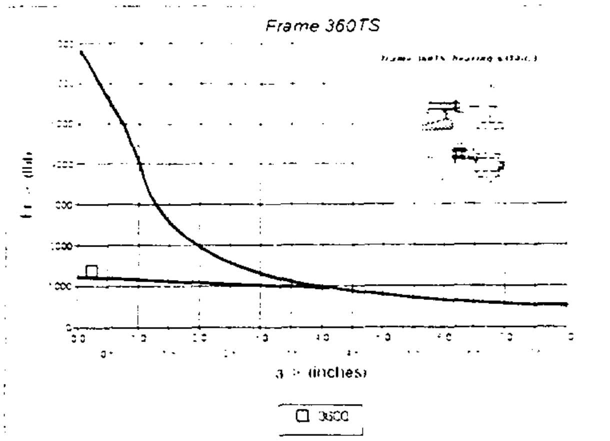
a-> (inches)
△ 900 ● 1200 ○ 1800

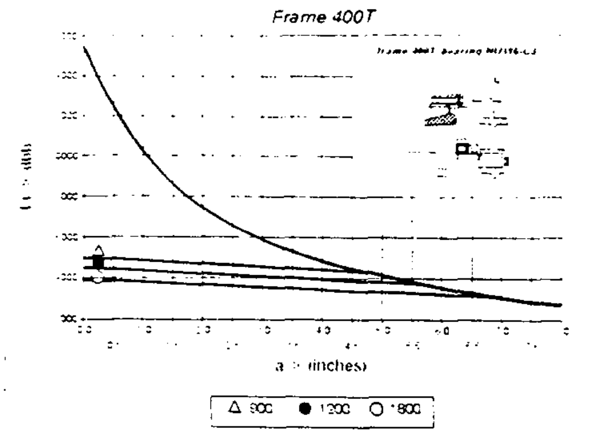

Frame 250T
Fr -> (lbf)
a-> (inches)
△ 900 ● 1200 ○ 1800 □ 3600

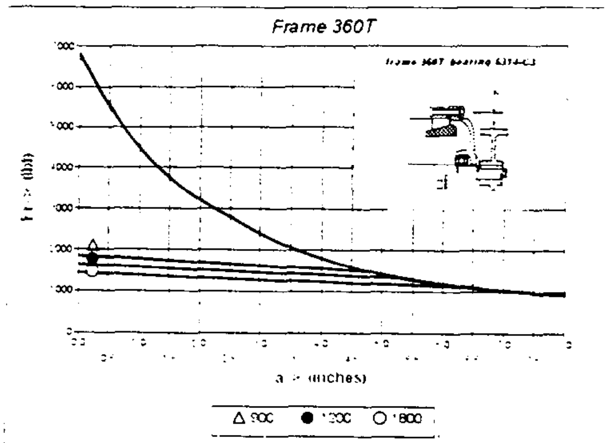

Frame 320TS
Fr -> (lbf)
a-> (inches)
□ 3600

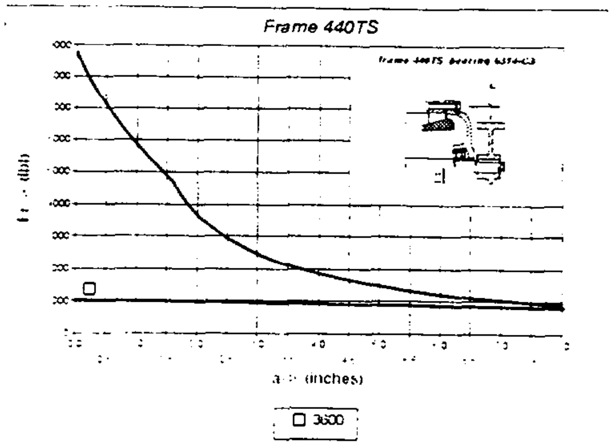

Frame 280TS
a-> (inches)
□ 3600

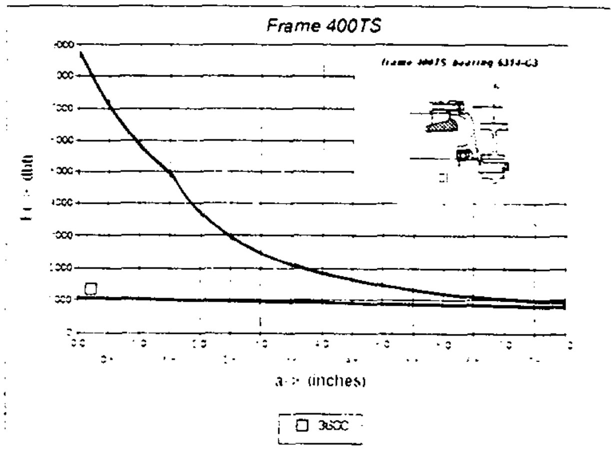

Frame 320T
a-> (inches)
△ 900 ● 1200 ○ 1800

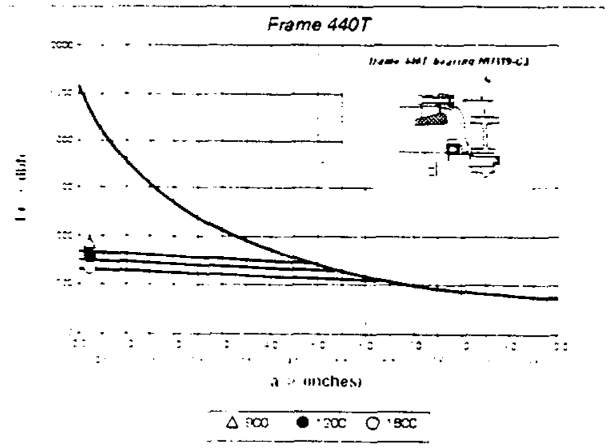

Frame 360TS
(inches)
3600

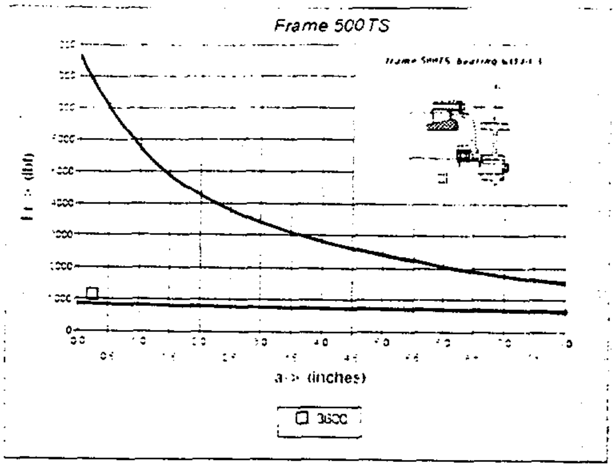

Frame 400T
(inches)
900
1200
1800

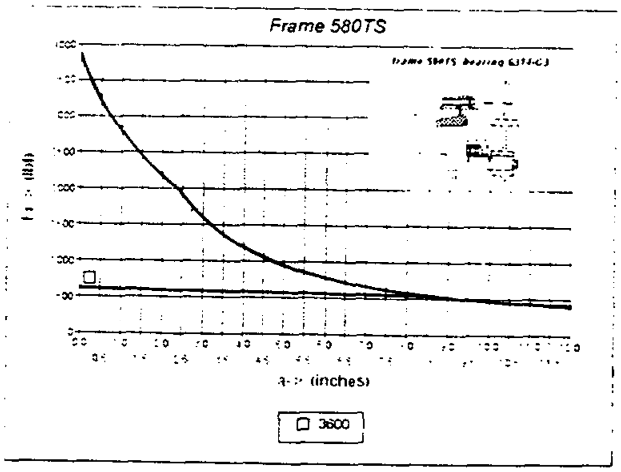

Frame 360T
(inches)
900
1200
1800

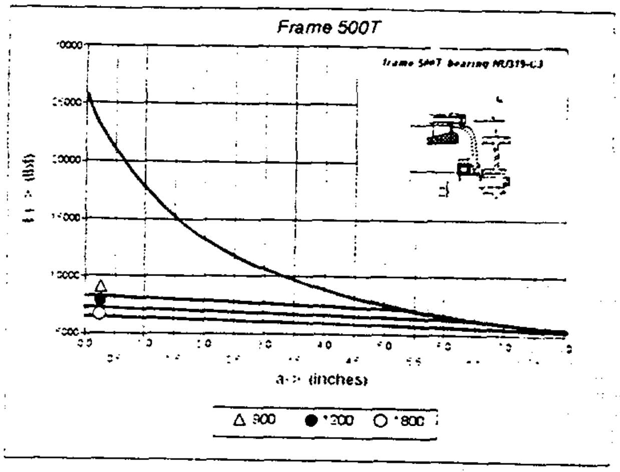

Frame 440TS
(inches)
3600

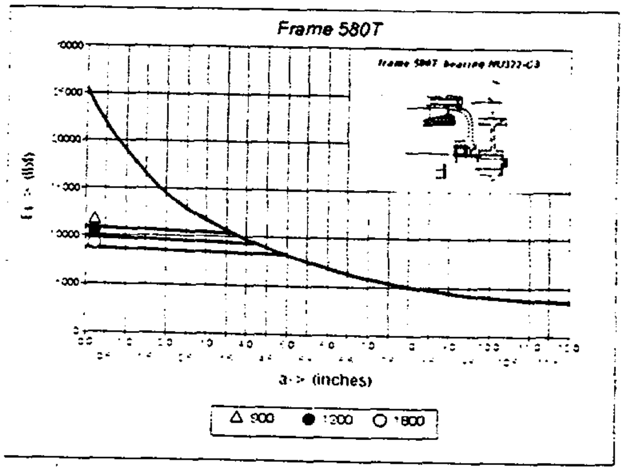

Frame 400TS
(inches)
3600


Frame 440T
(inches)
900
1200
1800









Note: For frames 600 and above, consult your engineering representative.

3.2 - Electrical Aspects

3.2.1 - Feed System

Proper electric power supply is very important. The choice of motor feed conductors, whether branch or distribution circuits, should be based on the rated current of the motors as per NFPA-70 Standard article 430.
Tables 4, 5 and 6 show minimum conductor gauges sized according to maximum current capacity and maximum voltage drop in relation to the distance from the distribution center to the motor, and to the type of installation (Overhead or in ducts).

To determine the conductor gauge proceed as follows:

a) Determine the current by multiplying the current indicated on the motor nameplate by 1.25 and then locate the resulting value on the corresponding table.
If the conductor feeds more than one motor, the value to be sought on the table should be equal 1.25 times the rated current of the largest motor plus the rated current of the other motors.
In the case of variable speed motors, the highest value among the rated currents should be considered.
When motor operation is intermittent, the conductors should have a current carrying capacity equal or greater, to the product of the motor rated current times the running cycle factor shown on Table 7.

TABLE 7
Running cycle factor

Duty classification \ Motor short time rating	5 minutes	15 minutes	30 at 60 minutes	conti-nuous
Short (operating valves, activating contacts etc).	1.10	1.20	1.50	-
Intermittent (passenger or freight elevators, tools, pumps, rolling bridges etc).	0.85	0.85	0.90	1.40
Cyclic (rolling mills, mining machines etc).	0.85	0.90	0.95	1.40
Variable	1.10	1.20	1.50	2.00

b) Locate the rated voltage of the motor and the feed network distance in the upper part of the corresponding table. The point of intersection of the distance column and the line referring to current will indicate the minimum required gauge of the conductor.

Example:
Size the conductors for a 15 HP, three-phase, 230V, 42A, motor located 200 feet from the main supply with cables laid in conduits.

a) - Current to be located: 1,25 x 42A = 52,5A
b) - Closest value on table 6:55A
c) - Minimum gauge: 6 AWG

3.2.2 - Starting of Electric Motors

Induction motors can be started by the following methods:

Direct Starting
Whenever possible a three-phase motor with a squirrel cage rotor should be started directly at full supply voltage by means of a contactor (Connection diagram a). This method is called Direct-on-Line (DoL) starting.

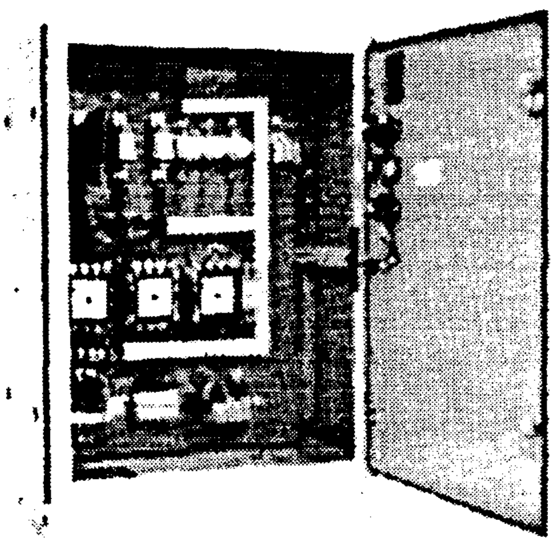


TABLE 4 - WIRE AND CABLE GAUGES FOR SINGLE-PHASE MOTOR INSTALLATION (VOLTAGE DROP < 5%) (IN CONDUITS)

Supply Voltage	Distance of motor from distribution centre (feet)													
115	34	51	69	85	102	137	171	205	240	273	308	342	428	514
230	69	102	138	170	204	274	342	410	480	546	616	684	856	1028
460	138	204	276	340	408	548	684	820	960	1092	1232	1368	1712	2056
575	170	250	338	420	501	670	840	1010	1181	1342	1515	1680	2105	2530
Current (Amperes)	**Cable gauge (Conductor)**													
5	14	14	14	14	14	14	14	12	12	12	12	10	10	8
10	14	14	14	14	12	12	10	10	10	8	8	8	6	6
15	12	12	12	12	12	10	8	8	6	6	6	6	4	2
20	12	12	12	10	10	8	8	6	6	6	4	4	4	2
30	10	10	10	8	8	6	6	6	4	4	2	2	2	1/0
40	8	8	8	8	6	6	4	4	2	2	2	2	1/0	2/0
55	6	6	6	6	6	4	4	2	2	1/0	1/0	1/0	1/0	2/0
70	4	4	4	4	4	2	2	2	1/0	1/0	2/0	2/0	2/0	3/0
95	2	2	2	2	2	2	1/0	1/0	1/0	2/0	3/0	3/0	4/0	250M

TABLE 5 - WIRE AND CABLE GAUGES FOR THREE-PHASE MOTOR INSTALLATION AERIAL CONDUCTORS WITH 25cm SPACING (VOLTAGE DROP < 5%)

Supply Voltage	Distance of motor from distribution centre (feet)													
115	51	69	85	102	137	171	205	240	273	308	342	428	514	685
230	102	138	170	204	274	342	410	480	546	616	684	856	1028	1370
460	204	276	340	408	548	684	820	960	1092	1232	1368	1712	2056	2740
575	250	338	420	501	670	840	1010	1181	1342	1515	1680	2105	2530	3350
Current (Amperes)	**Cable gauge (Conductor)**													
15	14	14	14	12	12	10	10	10	8	8	8	6	6	4
20	14	14	12	12	10	10	8	8	8	6	6	4	4	2
30	14	12	10	8	8	8	6	6	4	4	4	2	2	1/0
40	12	10	10	8	8	6	4	4	4	2	2	2	1/0	2/0
55	10	10	8	8	6	4	4	2	2	2	1/0	2/0	3/0	–
70	8	8	6	6	4	2	2	2	1/0	1/0	2/0	3/0	–	–
100	6	6	4	4	2	2	1/0	2/0	3/0	4/0	4/0	–	–	–
130	4	4	4	2	1/0	1/0	2/0	4/0	–	–	–	–	–	–
175	2	2	2	1/0	2/0	3/0	–	–	–	–	–	–	–	–
225	1/0	1/0	1/0	2/0	3/0	–	–	–	–	–	–	–	–	–
275	2/0	2/0	2/0	4/0	–	–	–	–	–	–	–	–	–	–
320	3/0	3/0	3/0	4/0	–	–	–	–	–	–	–	–	–	–

TABLE 6 - WIRE AND CABLE GAUGES FOR THREE-PHASE MOTOR INSTALLATION (VOLTAGE DROP < 5%) (IN CONDUITS)

Supply Voltage	Distance of motor from distribution centre (feet)											
115	85	102	120	137	171	205	240	273	308	342	428	514
230	170	204	240	274	342	410	480	546	616	684	856	1028
460	340	408	480	548	684	820	960	1092	1232	1368	1712	2056
575	420	501	590	670	840	1010	1181	1342	1515	1680	2105	2530
Current (Amperes)	**Cable gauge (Conductor)**											
15	12	12	12	10	10	8	8	8	6	6	6	4
20	12	10	10	10	8	8	6	6	6	6	4	4
30	10	8	8	8	6	6	6	4	4	4	2	2
40	8	8	6	6	6	4	4	4	2	2	2	1/0
55	6	6	6	4	4	4	2	2	2	1/0	1/0	1/0
70	4	4	4	4	2	2	2	1/0	1/0	1/0	2/0	2/0
95	2	2	2	2	2	1/0	1/0	1/0	1/0	2/0	3/0	4/0
125	1/0	1/0	1/0	1/0	1/0	1/0	2/0	2/0	3/0	3/0	4/0	250 M
145	2/0	2/0	2/0	2/0	2/0	2/0	2/0	3/0	3/0	4/0	250 M	300 M
165	3/0	3/0	3/0	3/0	3/0	3/0	3/0	3/0	4/0	4/0	250 M	350 M
195	4/0	4/0	4/0	4/0	4/0	4/0	4/0	4/0	250 M	250 M	300 M	350 M
215	250 M	250 M	250 M	250 M	250 M	250 M	250 M	250 M	250 M	300 M	350 M	400 M
240	300 M	300 M	300 M	300 M	300 M	300 M	300 M	300 M	300 M	300 M	400 M	500 M
265	350 M	350 M	350 M	350 M	350 M	350 M	350 M	350 M	350 M	350 M	500 M	500 M
280	400 M	400 M	400 M	400 M	400 M	400 M	400 M	400 M	400 M	400 M	400 M	–
320	500 M	500 M	500 M	500 M	500 M	500 M	500 M	500 M	500 M	500 M	500 M	–

Note: The above indicated values are orientative. For guaranteed values, contact the Local Power Company.

There are DOL starter assemblies available combining a three-pole contactor, a bimetal relay (overload protection device), and a fuse (short circuit protection on branch circuit).
DOL starting is the simplest method, only feasible however, when the locked rotor current (LRC) does not influence the main electric supply lines.
Initial locked rotor current (LRC) in induction motors reach values six to eight times the value of the full load current. During starting by the DOL method, starting current can reach these high levels. The main electrical supply should be rated sufficiently, such that during the starting cycle no supply disturbance to others on the power network is caused by the voltage drop in the main supply.
This can be achieved under one of the following situations:

a) The rated main supply current is high enough for the locked rotor current not to be proportionally high;
b) Motor locked rotor current is low with no effect on the networks.
c) The motor is started under no-load conditions with a short starting cycle and, consequently, a low locked rotor current with a transient voltage drop tolerable to other consumers.

Starting with a compensating switch (auto-transformer starting)

Should direct on line starting not be possible, either due to restrictions imposed by the power supply authority or due to the installation itself, reduced voltage indirect starting methods can be employed to lower the locked rotor current. The single line connection diagram (C) shows the basic components of a compensating switch featuring a transformer (usually an auto-transfomer) with a series of taps corresponding to the different values of the reduced voltage. Only three terminals of the motor are connected to the switch, the other being interconnected as per diagram.for the indicated voltage.

Star-Delta starting

It is fundamental to star-delta starting that the three-phase motor has the necessary numbers of leads for both connections:

6 leads for Y/Δ
or 12 leads for YY/ΔΔ

All the connections for the various voltages are made through terminals in the terminal box in accordance with the wiring diagram that accompanies the motor. This diagram may be shown on the nameplate or in the terminal box.
The star-delta connection is usually used only in low-voltage motors due to normally available control and protection devices in this method of starting the locked rotor current is approximately 30% of the original LRC, as well as the locked rotor torque is reduced proporcionally. For this reason, is very important before the decision to use star-delta starting, to verify if the reduced locked rotor torque in "STAR" connection is enought to acelerate the load.

Three-Phase slip ring motors with rheostat starting

On starting slip ring motors an external rheostat is connected to the rotor circuit by means of a set of brushes and sliding rings (connection diagram d). The extra rotor resistance is held in the circuit during the starting cycle to reduce the starting current and increase torque. Furthermore, it is possible to regulate external resistance so as to have a starting torque equal to, or close to the maximum motor torque value.

3.2.3 - Motor Protection

Motor circuits have, in principle, two types of protection: motor overload, locked rotor and protection of branch circuit from short circuits. Motors in continuous use should be protected from overloading by means of a device incorporated into the motor, or by an independent device, usually a fixed or adjustable thermal relay equal or less than to the value derived from mutiplying the rated feed current at full load by:
- 1.25 for motors with a service factor equal or superior to 1.15; or
- 1.15 for motors with service factor equal to 1.0.

Some motors are optionally fitted with overheating protective detectors (in the event of overload, locked rotor, low voltage, inadequate motor ventilation) such as a thermostat (thermal probe), thermistor (PTC), RTD type resistance which dispense with independent devices.

THERMOSTAT (THERMAL PROBE): bimetallic thermal detectors with normally closed silver contacts. These open at pre-determined temperatures. Thermostats are series connected directly to the contactor coil circuit by two conductors.

THERMISTORS: Semi-conductor heat detectors positive temperature coeficient (PTC) that sharply change their resistance upon reaching a set temperature. Thermistors, depending upon the type, are series or parallel-connected to a control unit that cuts out the motor feed, or actuates an alarm system, in response to the thermistors reaction.

Resistance temperature detectors (RTD) - PT 100

The resistance type heat detector (RTD) is a resistance element usually manufactured of copper or platinum.
The RTD operates on the principle that the electrical resistance of a metallic conductor varies linearly with the temperature. The detector terminals are connected to a control panel, usually fitted with a temperature gauge, a test resistance and a terminal changeover switch.
Subject to the desired degree of safety and the client's specification, three (one per phase) or six (two per phase) protective devices can be fitted to a motor for the alarm systems, circuit breaker or combined alarm and circuit breaker, with two leads from the terminal box to the alarm or circuit breaker system and four for the combined system (alarm and circuit breaker).
Table 9 compares the two methods of protection.

3.3 - Start-up

3.3.1 - Preliminary inspection

Before starting a motor for the first time, it will be necessary to:

a) Remove all locking devices and blocks used in transit and check that the motor rotates freely;

b) Check that the motor is firmly secured and that coupling elements are correctly mounted and aligned.;

c) Ascertain that voltage and frequency correspond to those indicated on the nameplate. Motor performance will be satisfactory with mains supply voltage fluctuation within ten per cent of the value indicated on the nameplate or a frequency fluctuation within five per cent or, yet, with a combined voltage and frequency variance within ten per cent;

d) Check that connections are in accordance with the connection diagram shown on the nameplate and be sure that all terminal screws and nuts are tight;

e) Check the motor for proper grounding . Providing that there are no specifications calling for ground-insulated installation, the motor must be grounded in accordance with prevalent standard for grounding electrical machines. The screw identified by the symbol ⏚ should be used for this purpose. This screw is generally to be found in the terminal box or on one foot of the frame;

f) Check that motor leads connecting with the mains, as well as the control wires and the overload protection device, are in accordance with Nema Standards;

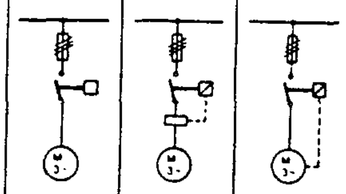
g) If the motor has been stored in a damp place, or has been stopped for some time, measure the insulating resistance as recommended under the item covering storage instructions;

h) Start the motor uncoupled to ascertain that it is turning in the desired direction. To reverse the rotation of a three-phase motor, invert two terminal leads of the mains supply.
High voltage motors bearing an arrow on the frame indicating rotation direction can only turn in the direction shown;

i) Prior to slip ring motors entering into service the brush holder assembly screws require tightening.

The gap between brush holders and slip ring surfaces should be between 0.8 inches and 1.6 inches.

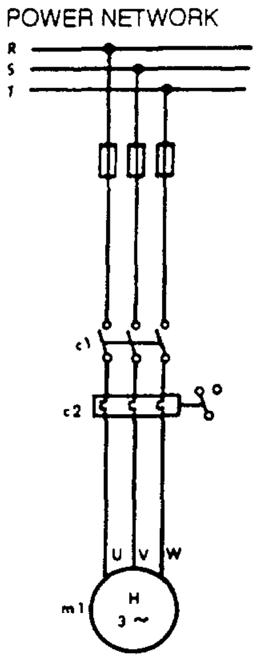
TABLE 9
Comparison between motor protection systems

Causes of overheating	Current-based protection		Protection with probe thermistor in motor
	Fuse only	Fuse and thermal protector	
			
1. Overload with 1.2 times rated current	○	●	●
2. Duty cycles S1 to S 8 IEC 34, EB 120	○	◐	●
3. Brakings, reversals and frequent starts	○	◐	●
4. Operating with more than 15 starts p/hour	○	◐	●
5. Locked rotor	◐	◐	●
6. Fault on one phase	○	◐	●
7. Excessive voltage fluctuation	○	●	●
8. Frequency fluctuation on main supply	○	●	●
9. Excessive ambient temperature	○	●	●
10. External heating caused by bearings, belts, pulleys etc.	○	○	●
11. Obstructed ventilation	○	○	●

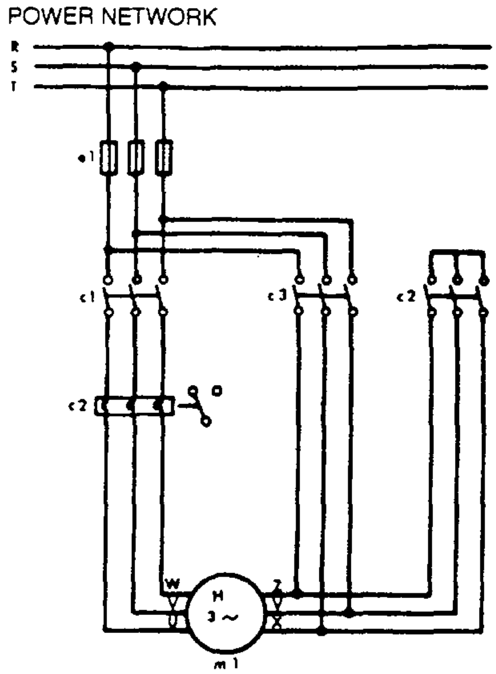
CAPTION
○ unprotected
◐ partially protected
● totally protected

CONNECTION DIAGRAMS

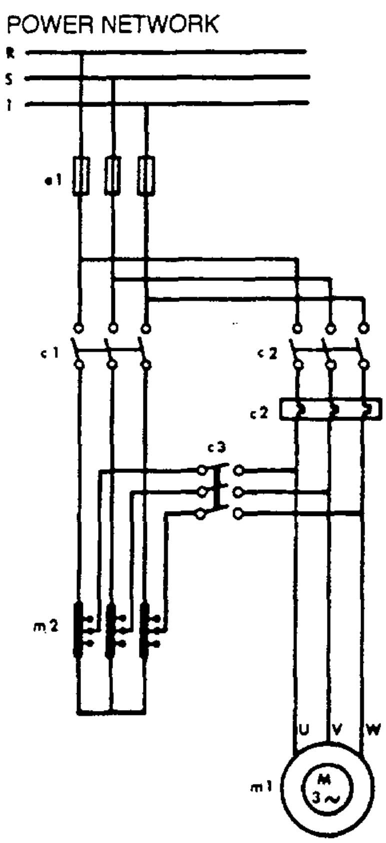
a) Direct starting



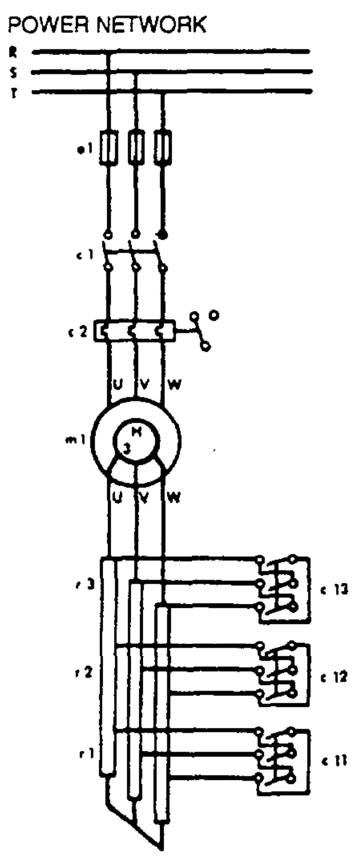
b) Star-Delta starting



c) Auto-transformer starting



d) Multi-stage automatic starting of slip ring motors



Brush pressure on the slip ring should be in accordance with Table 10.
For radial type, brushes, incidence to the contact surface should be perpendicular;

j) Bronze slip rings are often supplied with a protective coating of varnish. Prior to entering into service this coating should be removed. It is advisable to make sure that all surfaces are smooth and clean.

TABLE 10
Brush Characteristics

Brush Type	Brush Characteristics	Pressure Lb/Inc²
EGO	High conductivity, applicable to low voltage and high current machines	2.6
CM 1S	Copper and graphite alloy	2.0
CM 3H	Bronze graphite alloy	3.0

3.3.2 - The First Start-up

Three-Phase Motor with Cage Rotor

After careful examination of the motor, follow the normal sequence of starting operations listed in the control instructions for the initial start-up.

Three-Phase Slip Ring Motor

Before running the motor verify that the starter rheostat is in the "start" position, and that the brushes are correctly set against the slip rings.

If the rheostat tap positions are numbered, the lowest usually corresponds to the "start" position, and the highest to the normal running position.
Next, close the stator circuit switch. The ammeter needle should deflect sharply and then returning to a fixed lower value after motor start.
When the needle is almost stationary, the rheostat should be quickly moved to the next tapping position.
Coincident with speed increases, the rheostat should be moved to each successive position until normal running position is reached, stopping at each tapping stage until the current indication shows no visible current drop.
On motors with brushes in permanent contact, the starter rheostat remains in the "run" position while the motor is running.
Special speed control rheostats designed for permanent connection to resistance contacts within a given range of settings are an exception to the above.

3.3.3 - Operation

Drive the motor coupled to the load for a period of at least one hour while watching for abnormal noises or signs of overheating.
Compare the line current with the value shown on the nameplate.
Under continuous running conditions without load fluctuations this should not exceed the rated current times the service factor, also shown on the nameplate.
All measuring and control instruments and apparatus should be continuously checked for anomalies, and any irregularities corrected.

3.3.4 - Stopping

Warning:

To touch any moving part of a running motor, even though disconnected, is a danger to life and limb.

a) Three-phase motor with cage rotor:
Open the stator circuit switch. With the motor at a complete stop, reset the auto-transformer, if any, to the "start" position;

b) Three-phase slip ring motor:
Open the stator circuit switch. When the motor is at a complete stop reset the rheostat to the "start" position.

TABLE 11 - BEARING SPECIFICATIONS BY TYPE OF MOTOR

NEMA Frames	Mounting	Bearings Front (DE)	Bearings Rear (ODE)
Open Drip Proof Motors			
B48 and C48	All Forms	6203 Z	6202 Z
56 and A56		6203 Z	6202 Z
B56 and C56		6203 Z	6202 Z
D56 and F56H/G56H		6204 Z	6202 Z/6203 Z
Totally Enclosed Fan Cooled Motors			
143 T	All Forms	6205 Z	6204 Z
145 T		6205 Z	6204 Z
182 T		6307 Z	6206 Z
184 T		6307 Z	6206 Z
W 182 T		6206 Z	6205 Z
W 184 T		6206 Z	6205 Z
213 T		6308 Z	6207 Z
215 T		6308 Z	6207 Z
W 213 T		6308 Z	6207 Z
W 215 T		6308 Z	6207 Z
254 T		6309-C3	6209 Z - C3
256 T		6309-C3	6209 Z - C3
W 254 T		6309-C3	6209 Z - C3
W 256 T		6309-C3	6209 Z - C3
284 T and TS		6311-C3	6211 Z - C3
286 T and TS		6311-C3	6211 Z - C3
324 T and TS		6312-C3	6212 Z - C3
326 T and TS		6312-C3	6212 Z - C3
364 T and TS		6314-C3	6314-C3
365 T and TS		6314-C3	6314-C3
404 T		NU 316-C3	6314-C3
404 TS		6314-C3	6314-C3
405 T		NU 316-C3	6314-C3
405 TS		6314-C3	6414-C3
444 T		NU 319-C3	6316-C3
444 TS		6314-C3	6314-C3
445 T		NU 319-C3	6316-C3
445 TS		6314-C3	6314-C3
447 T		NU 319-C3	6316-C3
447 TS		6314-C3	6314-C3
504 T		NU 319-C3	6316-C3
504 TS		6314-C3	6314-C3
505 T		NU 319-C3	6316-C3
505 TS		6314-C3	6314-C3
586 T		NU 322-C3	6319-C3
586 TS		6314-C3	6314-C3
587 T		NU 322-C3	6319-C3
587 TS		6314-C3	6314-C3

Saw Arbor Motor Frame	Mounting	Bearings Front (DE)	Bearings Rear (ODE)
80 S MS	B 3	6307 Z	6207 Z
80 M MS		6307 Z	6207 Z
80 L MS		6307 Z	6207 Z
90 L MS		6308	6208 Z

ODP Motors Nema-T Frames	Mounting	Bearings Front (DE)	Bearings Rear (ODE)
254 T	Horizontal Mounting Only	6309-Z C3	6209-Z C3
256 T		6309-Z C3	6209-Z C3
284 T		6311-Z C3	6211-Z C3
284 TS		6311-Z C3	6211-Z C3
286 T		6311-Z C3	6211-Z C3
286 TS		6311-Z C3	6211-Z C3
324 T		6312-Z C3	6212-Z C3
324 TS		6312-Z C3	6212-Z C3
326 T		6312-Z C3	6212-Z C3
326 TS		6312-Z C3	6212-Z C3
364 T		6314 C3	6314 C3
364 TS		6314 C3	6314 C3
365 T		6314 C3	6314 C3
365 TS		6314 C3	6314 C3
404 T		NU 316 C3	6314 C3
404 TS		6314 C3	6314 C3
405 T		NU 316 C3	6314 C3
405 TS		6314 C3	6314 C3
444 T		NU 319 C3	6316 C3
444 TS		6314 C3	6314 C3
445 T		NU 319 C3	6316 C3
445 TS		6314 C3	6314 C3
447 T		NU 318 C3	6318 C3
447 TS		6314 C3	6314 C3
449 T		NU 318 C3	6318 C3
449 TS		6314 C3	6314 C3
508 T		NU 320M/C3	6318 C3
508 TS		6314 C3	6314 C3
509 T		NU 320M/C3	6318 C3
509 TS		6314 C3	6314 C3
588 T		NU 322M/C3	6320M/C3
588 TS		6315 C3	6315 C3
589 T		NU 322M/C3	6320M/C3
589 TS		6315 C3	6315 C3

IEC Frames	Mounting	Bearings Front (DE)	Bearings Rear (ODE)
Totally Enclosed Fan Cooled Motors			
63	B 3	6201 Z	6201 Z
71		6203 Z	6202 Z
80		6204 Z	6203 Z
90 S - L		6205 Z	6204 Z
100 L		6206 Z	6205 Z
112 M		6307 Z	6206 Z
132 S - M		6308 Z	6207 Z
160 M - L		6309 C3	6209 Z C3
180 M - L		6311 C3	6211 Z C3
200 M - L		6312 C3	6212 Z C3
225 S/M		6314 C3	6314 C3
250 S/M		6314 C3	6314 C3
280 S/M		6314 C3	6314 C3
		6316 C3	6316 C3
315 S/M		6314 C3	6314 C3
		6319 C3	6316 C3
355 M/L		6314 C3	6314 C3
		6322 C3	6319 C3

TABLE 12 - BEARING LUBRICATION INTERVALS AND AMOUNT OF GREASE

1 - SINGLE-ROW FIXED BALL BEARING

Series	Bearing Characteristics Ref.	Internal diameter (inches)	Speed limit (rpm)	Lubrication Intervals (Running hours) II Pole 60 Hz 3600 rpm	II Pole 50 Hz 3000 rpm	IV Pole 60 Hz 1800 rpm	IV Pole 50 Hz 1500 rpm	VI Pole 60 Hz 1200 rpm	VI Pole 50 Hz 1000 rpm	VIII Pole 60 Hz 900 rpm	VIII Pole 50 Hz 750 rpm	X Pole 60 Hz 720 rpm	X Pole 50 Hz 600 rpm	XII Pole 60 Hz 600 rpm	XII Pole 50 Hz 500 rpm	Amount of grease (oz)
62 SERIES	6200	0.4	24000	13000	14000											0.18
	6201	0.5	22000	12000	13000											0.18
	6202	0.6	19000	10000	12000											0.18
	6203	0.7	17000	9500	11000											0.18
	6204	0.8	15000	9000	10000	18000										0.18
	6205	1.0	12000	8000	9000	16000	19000									0.18
	6206	1.2	10000	7000	8000	14000	17000					> 20,000				0.18
	6207	1.4	9000	6000	7000	13000	15500									0.18
	6208	1.6	8500	5000	6500	12000	14500	18500								0.35
	6209	1.8	7500	4500	6000	11000	13500	17000								0.35
	6210	2.0	7000	4000	5500	10000	12500	16000	19500							0.35
	6211	2.2	6300	3500	5000	9500	11500	15000	18500							0.53
	6212	2.4	6000	3000	4500	8500	11000	14000	17500							0.53
	6213	2.6	5300	2500	4000	8000	10000	13000	16500	19500						0.53
	6214	2.8	5000	2000	3500	7500	9500	12500	15500	18500						0.53
	6215	3.0	4800	1500	3000	7000	9000	12000	14500	17500						0.53
	6216	3.1	4500	1000	2500	6500	8500	11000	14000	17000	19500					0.70
	6218	3.5	3800	–	550	1750	3250	4250	5500	6250	9250					0.85
63 SERIES	6304	0.8	13000	8000	9000	15000	18500									0.18
	6305	1.0	11000	7000	7500	13500	16000									0.18
	6306	1.2	9000	6000	6500	12000	14500	18500								0.35
	6307	1.4	8500	5000	6000	11000	13000	17000								0.35
	6308	1.6	7500	4500	5500	10000	12000	15500	19000			> 20,000				0.35
	6309	1.8	6700	4000	5000	9000	11000	14500	17500							0.53
	6310	2.0	6300	3800	4500	8500	10500	13500	16000	19500						0.53
	6311	2.2	5600	3500	4000	7500	9500	12500	15500	18000						0.70
	6312	2.4	5000	3000	3500	7000	9000	11500	14500	17000						0.70
	6313	2.6	4800	2800	3000	6500	8500	11000	13500	16000	19000					0.88
	6314	2.8	4500	1150	1250	3000	4000	5000	6250	7500	9000	9500				0.88
	6315	3.0	4300	2000	2300	5500	7500	9500	12000	14500	17000	18000				1.06
	6316	3.1	3800	750	1000	2500	3500	4500	5750	6750	8000	8500				1.23
	6317	3.3	3600	1000	1500	4500	6500	8500	11000	13000	15500	16500				1.41
	6318	3.5	3400	–	1300	4300	6000	8000	10500	12500	14500	15500	19000	19000		1.41
	6319	3.7	3200	–	500	1900	2750	3750	5000	6000	7000	7500	9250	9250		1.59
	6320	3.9	3000	–	–	3500	5000	7000	9500	11500	13500	14500	17500	17500		1.76
	6321	4.1	2800	–	–	3300	4500	6500	9000	11000	13000	14000	17000	17000		1.94
	6322	4.3	2600	–	–	2800	4000	6000	8500	10500	12500	13500	16500	16500		2.12
	6324	4.7	2400	–	–	2300	3500	5500	7500	9500	11500	12500	15000	15000	19000	2.65
	6326	5.1	2200	–	–	1500	3000	5000	6500	8500	10500	11500	14000	14000	18000	3.00
	6328	5.5	2000	–	–	1000	2500	4000	6000	7500	9500	10500	13000	13000	17000	3.35
	6330	5.9	1900	–	–	–	1500	3500	5000	6500	8500	9500	12000	12000	16000	3.70
	6332	6.3	1800	–	–	–	1000	3000	4500	6000	8000	8500	11000	11000	15000	4.05
	6334	6.7	1700	–	–	–	–	2000	4000	5500	7000	8000	10500	10500	14000	4.60
	6336	7.1	1600	–	–	–	–	1500	3000	4500	6000	7000	9500	9500	13000	4.95

1) Lubrication periodicity valid for NLG 1 and 2 lithium based bearing lubricant

TABLE 13 - BEARING LUBRICATION INTERVALS AND AMOUNT OF GREASE

2 - CYLINDRICAL ROLLER BEARINGS

Series	Ref.	Internal diameter (inches)	Speed limit (rpm)	II Pole 60 Hz	II Pole 50 Hz	IV Pole 60 Hz	IV Pole 50 Hz	VI Pole 60 Hz	VI Pole 50 Hz	VIII Pole 60 Hz	VIII Pole 50 Hz	X Pole 60 Hz	X Pole 50 Hz	XII Pole 60 Hz	XII Pole 50 Hz	Amount of grease (oz)
NU 2 SERIES	NU214	2.8	5000	1900	2400	3800	4800	6500	7500	9000	11000	12000	13500	13500	16500	0.53
	NU215	3.0	4800	1600	2000	3500	4500	6000	7300	8800	10500	11500	13000	13000	16000	0.53
	NU216	3.1	4500	1400	1800	3300	4300	5500	7000	8500	10000	11000	12500	12500	15500	0.70
	NU217	3.3	4300	650	800	1500	2000	2650	3250	4000	4750	10500	12000	12000	14500	0.70
	NU218	3.5	3800	1200	1500	2900	3800	5100	6300	7500	9000	10000	11500	11500	14000	0.88
	NU219	3.7	3600	550	700	1400	1750	2500	3000	3500	4250	9500	11000	11000	13500	1.06
	NU220	3.9	3400	–	1300	2700	3300	4500	5500	6500	8000	9000	10500	10500	13000	1.06
NU 3 SERIES	NU309	1.8	6300	2300	3000	5600	6000	7000	8500	9500	12000	13000	15000	15000	18500	0.53
	NU310	2.0	5600	2100	2800	5000	5500	6500	8000	9000	11000	12000	14000	14000	17000	0.53
	NU311	2.2	5000	2000	2600	4500	5000	6000	7500	8500	10500	11500	13500	13500	16500	0.70
	NU312	2.4	4800	1800	2400	4300	4800	5800	7000	8000	10000	10000	12500	12500	15500	0.70
	NU313	2.6	4500	1500	2000	4000	4500	5500	6800	7800	9500	10500	12000	12000	14500	0.88
	NU314	2.8	4000	600	800	1750	2000	2500	3250	3750	4500	10000	11500	11500	14000	0.88
	NU315	3.0	3800	1100	1500	3300	3800	4800	6000	7000	8500	9500	11000	11000	13500	1.06
	NU316	3.1	3600	500	700	1500	1750	2250	2900	3400	4000	9000	10500	10500	13000	1.23
	NU317	3.3	3400	–	1300	2800	3300	4300	5500	6500	7500	8800	10000	10000	12500	1.41
	NU318	3.5	3200	–	1200	2500	3100	4000	5000	6300	7300	8300	95	9500	12000	1.41
	NU319	3.7	3000	–	500	1150	1500	1900	2400	3000	3500	8000	9000	9000	11500	1.59
	NU320	3.9	2800	–	–	2100	2800	3500	4500	5800	6800	7800	8500	8500	11000	1.76
	NU321	4.1	2600	–	–	2000	2600	3300	4300	5500	6500	7300	8300	8300	10500	1.94
	NU322	4.3	2400	–	–	450	1250	1550	2000	2500	3000	7000	8000	8000	10000	2.12
	NU324	4.7	2200	–	–	1700	2300	3000	3800	4800	5500	6500	7500	7500	9500	2.65
	NU326	5.1	2000	–	–	1500	2000	2800	3500	4300	5000	6000	7300	7300	9000	3.00
	NU328	5.5	1900	–	–	1300	1800	2600	3300	4000	4800	5800	7000	7000	8500	3.35
	NU330	5.9	1700	–	–	–	1600	2500	3000	3800	4500	5500	6500	6500	8000	3.70

3 - ANGULAR BALL BEARINGS

Series	Ref.	Internal diameter (inches)	Speed limit (rpm)	II Pole 60 Hz	II Pole 50 Hz	IV Pole 60 Hz	IV Pole 50 Hz	VI Pole 60 Hz	VI Pole 50 Hz	VIII Pole 60 Hz	VIII Pole 50 Hz	X Pole 60 Hz	X Pole 50 Hz	XII Pole 60 Hz	XII Pole 50 Hz	Amount of grease (oz)
72 B SERIES	7206B	1.2	8500	7000	8000	14000	17000									0.18
	7207B	1.4	7500	6000	7000	13000	15500									0.18
	7208B	1.6	6700	5000	6500	12000	14500	18500				> 20,000				0.35
	7209B	1.8	6300	4500	6000	11000	13500	17000								0.35
	7210B	2.0	5600	4000	5500	10000	12500	16000	19500							0.35
	7211B	2.2	5300	3500	5000	9500	11500	15000	18500							0.53
	7212B	2.4	4800	3000	4500	8500	11000	14000	17500							0.53
73 B SERIES	7314B	2.8	3600	2300	2500	6000	8000	10000	12500	15000	18000	19000				0.88
	7315B	3.0	3400	–	2300	5500	7500	9500	12000	14500	17000	18000				1.06
	7316B	3.1	3200	–	2000	5000	7000	9000	11500	13500	16000	17000	> 20,000			1.23
	7317B	3.3	3000	–	1500	4500	6500	8500	11000	13000	15500	16500				1.41
	7318B	3.5	2800	–	–	4300	6000	8000	10500	12500	14500	15500	19000	19000		1.41
	7319B	3.7	2600	–	–	3800	5500	7500	10000	12000	14000	15000	18500	18500		1.59
	7320B	3.9	2400	–	–	3500	5000	7000	9500	11500	13500	14500	17500	17500		1.76
	7322B	4.3	2000	–	–	2800	4000	6000	8500	10500	12500	13500	16500	16500		2.12
	7324B	4.7	1900	–	–	2300	3500	5500	7500	9500	11500	12500	15000	15000	19000	2.65
	7326B	5.1	1800	–	–	1500	3000	5000	6500	8500	10500	11500	14000	14000	18000	3.00
	7328B	5.5	1700	–	–	–	2500	4000	6000	7500	9500	10500	13000	13000	17000	3.35

1) Lubrication periodicity valid for NLG 1 and 2 lithium based bearing lubricant

4 - Maintenance

A well-designed maintenance program for electric motors can be summed up as: periodical inspection of insulation levels, temperature rise, wear, bearing lubrication and the occasional checking of fan air flow.
Inspection cycles depend upon the type of motor and the conditions under which it operates.

4.1 - Cleanliness

Motors should be kept clean, free of dust, debris and oil. Soft brushes or clean cotton rags should be used for cleaning. A jet of compressed air should be used to remove non-abrasive dust from the fan cover and any accumulated grime from the fan and cooling fins.
Oil or damp impregnated impurities can be removed with rags soaked in a suitable solvent.
Terminal boxes fitted to motors with IP-54 protection should be cleaned; their terminals should be free of oxidation, in perfect mechanical condition, and all unused space dust-free.
Motors with IP(W) 55 protection are recommended for use under unfavourable ambient conditions.

4.2 - Lubrication

Proper Lubrication extends bearing life.

Lubrication Maintenance Includes:

a) Attention to the overall state of the bearings;
b) Cleaning and lubrication;
c) Critical inspection of the bearings.

Motor noise should be measured at regular intervals of one to four months. A well-tuned ear is perfectly capable of distinguishing unusual noises, even with rudimentary tools such as a screw driver, etc., without recourse to sophisticated listening aids or stethescopes that are available on the market.
A uniform hum is a sign that a bearing is running perfectly.
Bearing temperature control is also part of routine maintenance. The temperature of bearings lubricated as recommended under item 4.2.2 should not exceed 60°C.
Constant temperature control is possible with the aid of external thermometers or by embedded thermal elements. WEG motors are normally equipped with grease lubricated ball or roller bearings.
Bearings should be lubricated to avoid the metallic contact of the moving parts, and also for protection against corrosion and wear. Lubricant properties deteriorate in the course of time and mechanical operation and, furthermore, all lubricants are subject to contamination under working conditions.
For this reason lubricants must be renewed and any lubricant consumed needs replacing from time to time.

4.2.1 - Periodical Lubrication

WEG motors are supplied with sufficient grease for a long running period. Lubrication intervals, the amount of grease and the type of bearing used in frames 140T to 580T are to be found in Tables 11, 12 and 13.
Lubrication intervals depend upon the size of the motor, speed, working conditions and the type of grease used.

4.2.2 - Quality and Quantity of Grease

Correct lubrication is important!
Grease must be applied correctly and in sufficient quantity as both insufficient or excessive greasing are harmful.
Excessive greasing causes overheating brought about by the greater resistance encountered by the rotating parts and, in particular, by the compacting of the lubricant and its eventual loss of lubricating qualities.
This can cause seepage with the grease penetrating the motor and dripping on the coils.
A lithium based grease is commonly used for the lubrication of electric motor bearings as it has good mechanical stability, insoluble in water and has a drip point of approximately 200°C.
This grease should never be mixed with sodium or calcium based greases.

GREASES FOR MOTOR BEARINGS			
For operating temperatures from - 20 to 130°C			
Supplier	**Grease F**	**Supplier**	**Grease**
Esso	Beacon 2	Atlantic	Litholine 2
Shell	Alvania R2	Texaco	Multifak 2

For use in freezing chambers		
Supplier	**Grease**	**Temperature range**
Esso	Unirex N2	– 40 to 200°C
Molikote	Dow Corning 44	– 40 to 200°C
Molikote	Dow Corning 33	– 73 to 200°C
Molikote	TTF 52	– 52 to 100°C

4.2.3 - Lubricating Instructions

a) Frame 140T to 320T motors

Frame 140T to 210T size motors are not fitted with grease nipples. Lubrication is carried out during periodical overhauls when the motor is taken apart.

NOTE: Frame 250T, 280T and 320T are common supplied with regreasable bearing system as optional.
If these motors have this system please follow the instructions in item "B".

Cleaning and Lubrication of Bearings

With the motor dismantled and without extracting the bearings from the shaft, all existing grease should be removed and the

bearings cleansed with Diesel oil, kerosene or other solvent, until thoroughly clean.
Refill the spaces between the balls or rollers and the bearing cages with grease immediately after washing. Never rotate bearings in their dry state after washing.
For inspection purposes apply a few drops of machine oil. During these operations maximum care and cleanliness is recommended to avoid the penetration of any impurities or dust that could harm the bearings. Clean all external parts prior to reassembly.

b) Frame 360T to 580T Motors

Motors above: 360T frame size are fitted with regreasable bearing system.
The lubrication system from this frame size upwards was designed to allow the removal of all grease from the bearing races through a bleeder outlet which at the same time impedes the entry of dust or other contaminants harmful to the bearing.
This outlet also avoids injury to the bearings from the well-known problem of over-greasing.
It is advisable to lubricate while the motor is running, to allow the renewal of grease in the bearing case.
Should this procedure not be possible because of rotating parts in the proximity of the nipple (pulleys, coupling sleeves, etc.) that are hazardous to the maintainer the following procedure should be followed:
- Inject about half the estimated amount of grease and run the motor at full speed for approximately a minute; switch off the motor and inject the remaining grease.
The injection of all the grease with the motor at rest could cause penetration of a portion of the lubricant through the internal seal of the bearing case and hence into the motor.

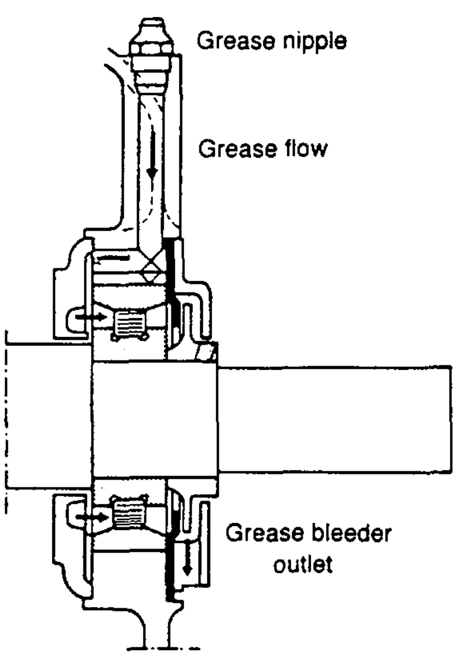


Fig. 4.1 - Bearings and lubrication system

Nipples must be clean prior to introduction of grease to avoid entry of any alien bodies into the bearing.
For lubricating use only a manual grease gun.

Bearing Lubrication Steps

1. Cleanse the area around the grease nipples with clean cotton fabric.
2. With the motor running, add grease with a manual grease gun until the lubricant commences to be expelled from the bleeder outlet, or until the quantity of grease recommended in Tables 12 or 13 has been applied.
3. Allow the motor to run long enough to eject all excess of grease.

4.2.4 - Replacement of Bearings

The opening of a motor to replace a bearing should only be carried out by qualified personnel.
Damage to the core after the removal of the bearing cover is avoided by filling the gap between the rotor and the stator with stiff paper of a proper thickness.
Providing suitable tooling is employed, disassembly of a bearing is not difficult.
The extractor grips should be applied to the sidewall of the inner ring to be stripped, or to an adjacent part.
To ensure perfect functioning and no injury to the bearing parts, it is essential that the assembly be undertaken under conditions of complete cleanliness and by competent personnel.
New bearings should not be removed from their packages until the moment of assembly.
Prior to fitting a new bearing, ascertain that the shaft has no rough edges or signs of hammering.

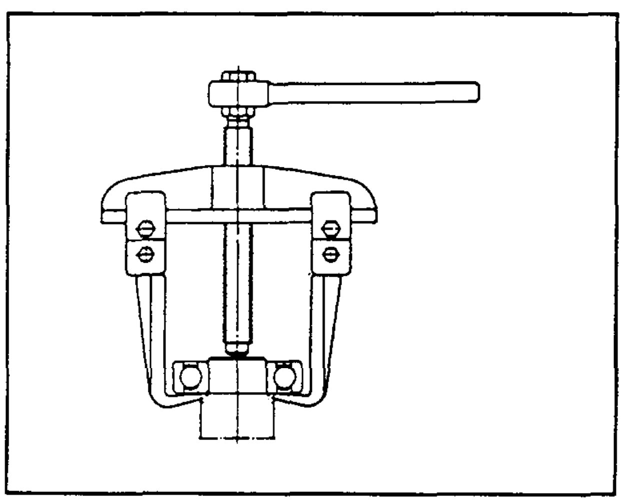


Fig. 4.2 - A Bearing Extractor

During assembly bearings cannot be subjected to direct blows. The aid used to press or strike the bearing should be applied to the inner ring.

4.3 - Air Gap Checking (Large Rating Open Motors)

Upon the completion of any work on the bearings check of the gap measurement between the stator and the rotor using the appropriate gazes.
The gap variation at any two vertically opposite points must be less than 10% of the average gap measurement.

4.4 - Explosion Proof Motor Repair Steps

4.4.1 - Objective

In view of the heavy liability associated with burning of motors of this type, this product has been designed and manufactured to high technical standards, under rigid controls. In addition, in many areas it is required that explosion proof motors ONLY be repaired by licensed personnel or in licensed facilities recognized to do this type of work.

The following general procedures, safeguards, and guidelines must be followed in order to ensure repaired explosion proof motors operate as intended.

4.4.2 - Repair Procedure and Precautions

Dismantle the damaged motor with appropriate tooling without hammering and/or pitting machined surfaces such as enclosure joints, fastening holes and all joints in general.
The position of the fan cover should be suitably marked prior to removal so as to facilitate reassembly later on.
Examine the motor's general condition and, if necessary, disassemble all parts and clean them with kerosene. Under no circumstances should scrapers, emery papers or tools be used that could affect the dimensions of any part during cleaning.

Protect all machined parts against oxidation by applying a coating of vaseline or oil immediately after cleaning.

STRIPPING OF WINDINGS - This step requires great care to avoid knocking and/or denting of enclosure joints and, when removing the sealing compound from the terminal box, damage or cracking of the frame.

IMPREGNATION - Protect all frame threads by inserting corresponding bolts, and the joint between terminal box and frame, by coating it with a non-adhesive varnish (ISO 287 - ISOLASIL).
Protective varnish on machined parts should be removed soon after treating with impregnating varnish. This operation should be carried out manually without using tools.

ASSEMBLY - Inspect all parts for defects, such as cracks, joint incrustations, damaged threads and other potential problems.
Assemble using a rubber headed mallet and a bronze bushing after ascertaining that all parts are perfect by fitted.
Bolts should be positioned with corresponding spring washers and evenly tightened.

TESTING - Rotate the shaft by hand while examining for any drag problems on covers or fastening rings.
Carry out running tests as for standard motors.

MOUNTING THE TERMINAL BOX - Prior to fitting the terminal box all cable outled on the frame should be sealed with a sealing compound (Ist layer) and an Epoxy resin (ISO 340) mixed with ground quartz (2nd layer) in the following proportions:

340A resin	50 parts
340B resin	50 parts
Ground quartz	100 parts

Drying time for this mixture is two hours during which the frame should not be handled and cable outlets should be upwards.
When dry, see that the outlets and areas around the cables are perfectly sealed.
Mount the terminal box and paint the motor.

4.4.3 - Miscellaneous Recommendations

- Any damaged parts (cracks, pittings in machined surfaces, defective threads) must be replaced and under no circumstances should attempts be made to recover them.

- Upon reassembling explosion proof motors IP(W) 55 the substitution of all seals is mandatory.

- Should any doubts arise, consult WEG.

5 - Malfunctioning

The greater part of the malfunctions affecting the normal running of electric motors can be avoided by maintenance and precautions of a preventive nature.
Wide ventilation, cleanliness and careful maintenance are the main factors ensuring long motor life. A further essential factor is the prompt attention to any malfunctioning as signalled by vibrations, shaft knock, declining insulation resistance, smoke or fire, sparking or unusual slip ring or brush wear, sudden changes of bearing temperatures.
When failures of an electric or mechanical nature arise, the first step to be taken is to stop the motor and subsequent examination of all mechanical and electrical parts of the installation.
In the event of fire, the installation should be isolated from the mains supply, which is normally done by turning off the respective switches.
In the event of fire within the motor itself, steps should be taken to restrain and suffocate it by covering the ventilation vents.
To extinguish a fire, dry chemical or CO2 extinguishers should be used - never water.

5.1 - Standard Three-Phase Motor Failures

Owing to the widespread usage of asynchronous three-phase motors in industry which are more often repaired in the plant workshops, there follows a summary of possible failures and their probable causes, detection and repairs.
Motors are generally designed to Class B or F insulation and for ambient temperatures up to 40°C.
Most winding defects arise when temperature limits, due to current overload, are surpassed throughout the winding or even in only portions thereof. These defects are identified by the darkening or carbonizing of wire insulation.

5.1.1 - Short Circuits Between Turns

A short circuit between turns can be a consequent of two coincident insulation defects, or the result of defects arising simultaneously on two adjacent wires.As wires are randomly tested, even the best quality wires can have weak spots. Weak spots can, on occasion, tolerate a voltage surge of 30% at the time of testing for shorting between turns, and later fail due to humidity, dust or vibration.
Depending on the intensity of the short, a magnetic hum becomes audible.
In some cases, the three-phase current imbalance can be so insignificant that the motor protective device fails to react.A short circuit between turns, and phases to ground due to insulation failure is rare, and even so, it nearly always occurs during the early stages of operation.

5.1.2 - Winding Failures

a) One burnt winding phase

This failure arises when a motor runs wired in delta and current fails in one main conductor.
Current rises from 2 to 2.5 times in the remaining winding with a simultaneous marked fall in speed. If the motor stops, the current will increase from 3.5 to 4 times its rated value.
In most instances, this defect is due to the absence of a protective switch, or else, the switch has been set too high.

b) Two burnt winding phases

This failure arises when current fails in one main conductor and the motor winding is star-connected. One of the winding phases remains currentless while the others absorb the full voltage and carry an excessive current.
The slip almost doubles.

c) Three burnt winding phases

Probable cause 1: Motor only protected by fuses; an overload on the motor will be the cause of the trouble.
Consequently, progressive carbonizing of the wires and insulation culminate in a short circuit between turns, or a short against the frame occurs.
A protective switch placed before the motor would easily solve this problem.

Probable cause 2: Motor incorrectly connected.
For example: A motor with windings designed for 230/400V is connected through a star-delta switch to 400V connection.
The absorbed current will be so high that the winding will burn out in a few seconds if the fuses or a wrongly set protective switch fail to react promptly.

Probable cause 3: The star-delta switch is not commutated and the motor continues to run for a time connected to the star under overload conditions.
As it only develops 1/3 of its torque, the motor cannot reach rated speed. The increased slip results in higher ohmic losses arising from the Joule effect. As the stator current, consistent with the load, may not exceed the rated value for the delta connection, the protective switch will not react.
Consequent to increased winding and rotor losses the motor will overheat and the winding burn out.

Probable cause 4: Failures from this cause arise from thermal overload, due to too many starts under intermittent operation or to an overly long starting cycle.
The perfect functioning of motor operating under these conditions is only assured when the following values are heeded:

a) number of starts per hour;
b) starting with or without load;
c) mechanical brake or current inversion;
d) acceleration of rotating masses connected to motor shaft
e) load torque vs. speed during acceleration and braking.

The continuous effort exerted by the rotor during intermittent starting brings about heavier losses which provoke overheating. Under certain circumstances with the motor idle there is a possibility that the stator winding is subjected to damage as a result of the heating of the motor. In such a case, a slip ring motor is recommended as a large portion of the heat (due to rotor losses) is dissipated in the rheostat.

5.1.3 - Rotor Failures

If a motor running under load conditions produces a noise of varying intensity and decreasing frequency while the load is increased, the reason, in most cases, will be an unsymmetrical rotor winding.
In squirrel-cage motors the cause will nearly always be a break in one or more of the rotor bars; simultaneously, periodical stator current fluctuations may be recorded. As a rule, this defect appears only in molded or die cast aluminum cages.
Failures due to spot heating in one or another of the bars in the rotor stack are identified by the blue coloration at the affected points.
Should there be failures in various contiguous bars, vibrations and shuddering can occur as if due to an unbalance, and are often interpreted as such. When the rotor stack acquires a blue or violet coloration, it is a sign of overloading.
This can be caused by overly high slip, by too many starts or overlong starting cycles. This failure can also arise from insufficient main voltage.

5.1.4 - Bearing Failures

Bearing damage is a result of overloading brought about by an overly taut belt or axial impacts and stresses.
Underestimating the distance between the drive pulley and the driven pulley is a common occurrence.
The arc of contact of the belt on the drive pulley thus becomes inadmissibly small and thereby belt tension is insufficient for torque transmission.
In spite of this it is quite usual to increase belt tension in order to attain sufficient drive.
Admittably, this is feasible with the latest belt types reinforced by synthetic materials.
However, this practice fails to consider the load on the bearing and the result is bearing failure within a short time.

Additionally there is the possibility of the shaft being subjected to unacceptably high loads when the motor is fitted with a pulley that is too wide.

5.1.5 - Shaft Fractures

Although bearings traditionally constitute the weaker part, and the shafts are designed with wide safety margins, it is not beyond the realms of possibility that a shatf may fracture by fatigue from bending stress brought about by excessive belt tension.
In most cases, fractures occur right behind the drive end bearing.
As a consequence of alternating bending stress induced by a rotating shaft, fractures travel inwards from the outside of the shaft until the point of rupture is reached when resistance of the remaining shaft cross-section no longer suffices.
Avoid additional drilling the shaft (fastening screw holes) as such operations tend to cause stress concentration.

5.1.6 - Unbalanced V-Belt Drives

The substitution of only one or other of various parallel belts of a drive is frequently the cause of shaft fractures, as well as being malpractice.
Any used, and consequently stretched belts retained on the drive, especially those closest to the motor, while new and unstretched belts are placed on the same drive turning farther from the bearing can augment shaft stress.

5.1.7 - Damage Arising from Poorly Fitted Transmission Parts or Improper Motor Alignment

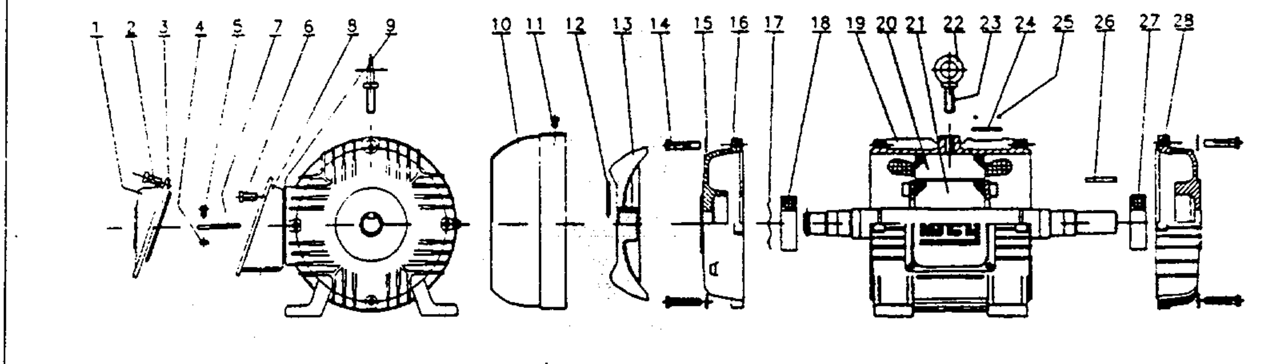
Damage to bearing and fracture in shafts often ensue from inadequate fitting of pulleys, couplings or pinions. There parts "knock" when rotating. The defect is recognized by the scratches that appear on the shaft or the eventual scalelike flaking of the shaft end.

Keyways with edges pitted by loosely fitted keys can also bring about shaft failures.
Poorly aligned couplings cause knocks and radial and axial shaking to shaft and bearings.
Within a short while these malpractices cause the deterioration of the bearings and the enlargement of the bearing cover bracket located on the drive end side.
Shaft fracture can occur in more serious cases.

5.2 - TROUBLESHOOTING CHART

FAILURE	PROBABLE CAUSE	CORRECTIVE MEASURES
Motor fails to start	1. No voltage supply	• Check feed connections to control system and from this to motor.
	2. Low voltage supply	• Check voltage supply and ascertain that voltage remains within 10% of the rated voltage shown on the motor nameplate.
	3. Wrong control connections	• Compare connections with the wiring diagram on the motor nameplate.
	4. Loose connection at some terminal lug	• Tighten all connections.
	5. Overload	• Try to start motor under no-load conditions. If it starts, there may be an overload condition or a blocking of the starting mechanism. Reduce load to rated load level and increase torque.
High noise level	1. Unbalance	• Vibrations can be eliminated by balancing rotor. If load is coupled directly to motor shaft, the load can be unbalanced.
	2. Distorted shaft	• Shaft cae bent; check rotor balance and eccentricity.
	3. Incorrect alignment	• Check motor alignment with machine running.
	4. Uneven air gap	• Check shaft for warping or bearing wear.
	5. Dirt in the air gap	• Dismantle motor and remove dirt or dust with jet of dry air.
	6. Extraneous matter stuck between fan and motor casing	• Dismantle motor and clean. Remove trash or debris from motor vicinity.
	7. Loose motor foundation	• Tighten all foundation studs. If necessary, realign motor.
	8. Worn bearings	• Check lubrication. Replace bearing if noise is excessive and continuous.
Overheating of bearings	1. Excessive grease	• Remove grease bleeder plug and run motor until excess grease is expelled.
	2. Excessive axial or radial strain on belt	• Reduce belt tension.
	3. Deformed shaft	• Have shaft straightened and check rotor balance.
	4. Rough bearing surface	• Replace bearings before they damage shaft.
	5. Loose or poorly fitted motor end shields	• Check end shields for close fit around circumference and tightness.
	6. Lack of grease	• Add grease to bearing.
	7. Hardened grease cause locking of balls	• Replace bearings.
	8. Foreign material in grease	• Flush out housings and relubricate.
Intense bearing vibration	1. Unbalanced rotor	• Balance rotor statically and dynamically.
	2. Dirty or worn bearing	• If bearing rings are in perfect condition, clean and relubricate the bearing, otherwise, replace bearing.
	3. Bearing rings too tight on shaft and/or bearing housing	• Before altering shaft or housing dimensions, it is advisable to ascertain that bearing dimensions correspond to manufacturer's specifications.
	4. Extraneous solid particles in bearing	• Take bearing apart and clean. Reassemble only if rotating and support surfaces are unharmed.
Overheating of motor	1. Obstructed cooling system	• Clean and dry motor; inspect air vents and windings periodically.
	2. Overload	• Check application, measuring voltage and current under normal running conditions.
	3. Incorret voltages and frequencies	• Compare values on motor nameplate with those of mains supply. Also check voltage at motor terminals under full load.
	4. Frequent inversions	• Exchange motor for another that meets needs.
	5. Rotor dragging on stator	• Check bearing wear and shaft curvature.
	6. Unbalanced electrical load (burnt fuse, incorrect control)	• Check for unbalanced voltages or operation under single-phase condition.

THREE-PHASE MOTORS IP54 NEMA - FRAMES 140T - W180T - 180 T - 210T AND W210 T

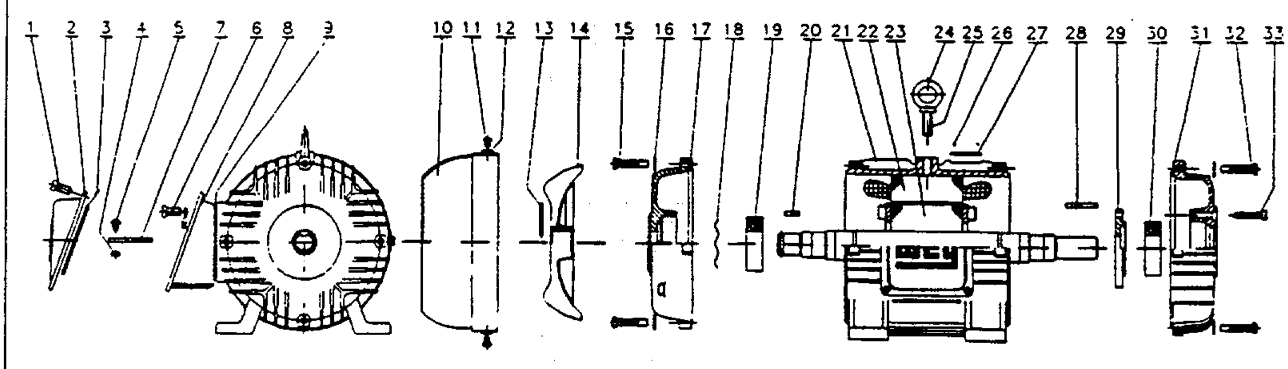


Part. Nr.	Description
1	Terminal box cover
2	Fastening bolt terminal box cover
3	Rubber gasket for terminal box cover
* 4	Terminal nut
* 5	Terminal bolt
6	Fastening bolt for terminal cover
* 7	Terminal
8	Terminal box
9	Rubber gasket for terminal box
10	Fan cover
11	Fastening bolt for fan cover
12	Pin
13	Fan
14	Fastening bolt for drive endshield and non-drive endshield
15	Spring washer

Part. Nr.	Description
16	Non-drive endshield
17	Spring washer for bearing
18	Non-drive end bearing
19	Frame
20	Stator assembly
21	Rotor assembly
** 22	Eyebolt
** 23	Grub screw
24	Nameplate
25	Rivet
26	Key
27	Drive end bearing
28	Drive endshield

* Part nrs. 4, 5 and 7 for frame W180T and above only
** Part nrs. 22 and 23 for frame 180T and above

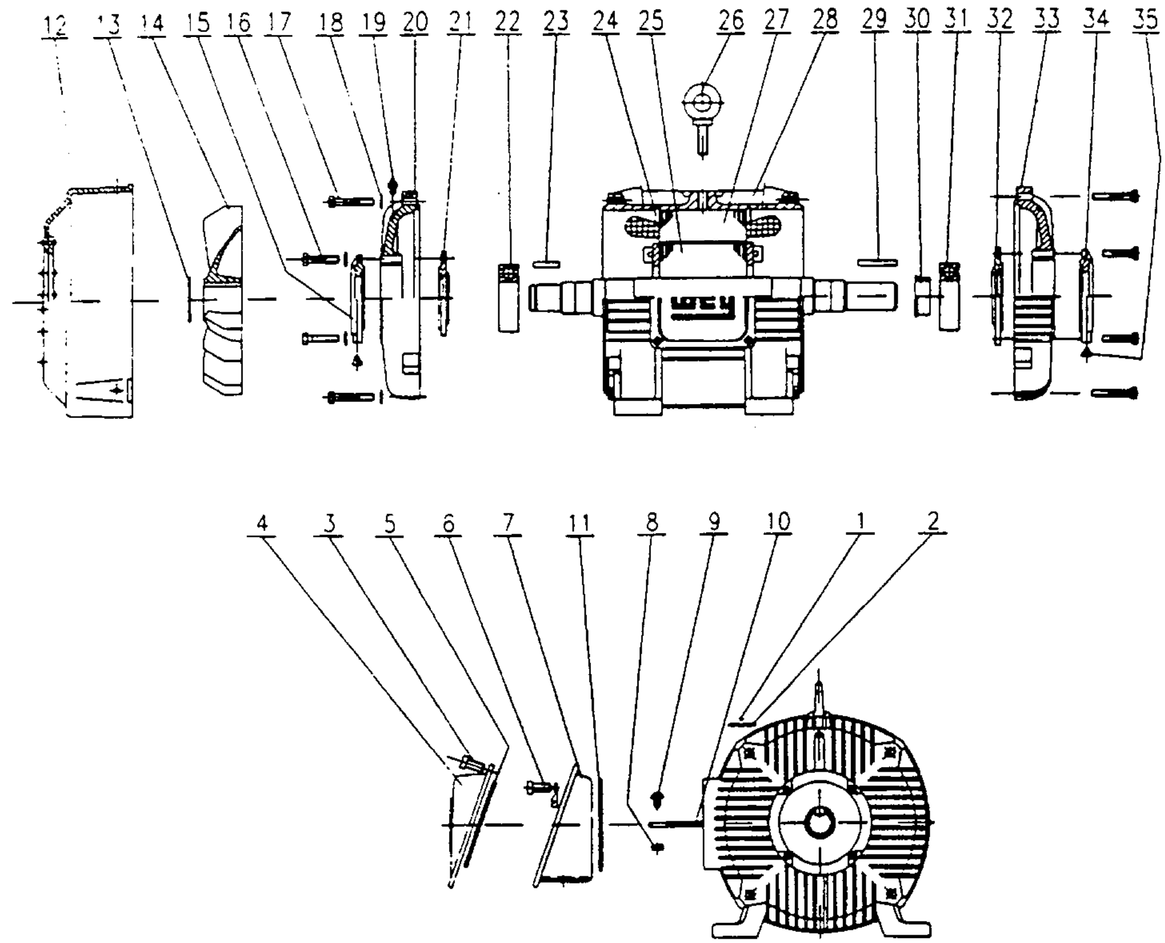
THREE-PHASE MOTORS IP54 NEMA - FRAMES 250T - W250T - 280T AND 320T



Part. nr.	Description
1	Fastening bolt for terminal box cover
2	Terminal box cover
3	Rubber gasket for terminal box cover
4	Terminal nut
5	Terminal bolt
6	Fastening bolt for terminal cover
7	Terminal
8	Terminal box
9	Rubber gasket for terminal box
10	Fan cover
11	Fastening bolt for fan cover
12	Spring washer
13	Circlip
14	Fan
15	Fastening bolt for non-drive endshield
16	Spring washer
17	Non-drive endshield

Pat. nr.	Description
18	Spring washer for bearing
19	Non-drive end bearing
20	Key for fan
21	Frame
22	Stator assembly
23	Rotor assembly
24	Eyebolt
25	Grub screw
26	Rivet
27	Nameplate
28	Key
29	Fastening ring
30	Drive end bearing
31	Drive endshield
32	Fastening bolt for drive endshield
33	Fastening bolt for fastening ring

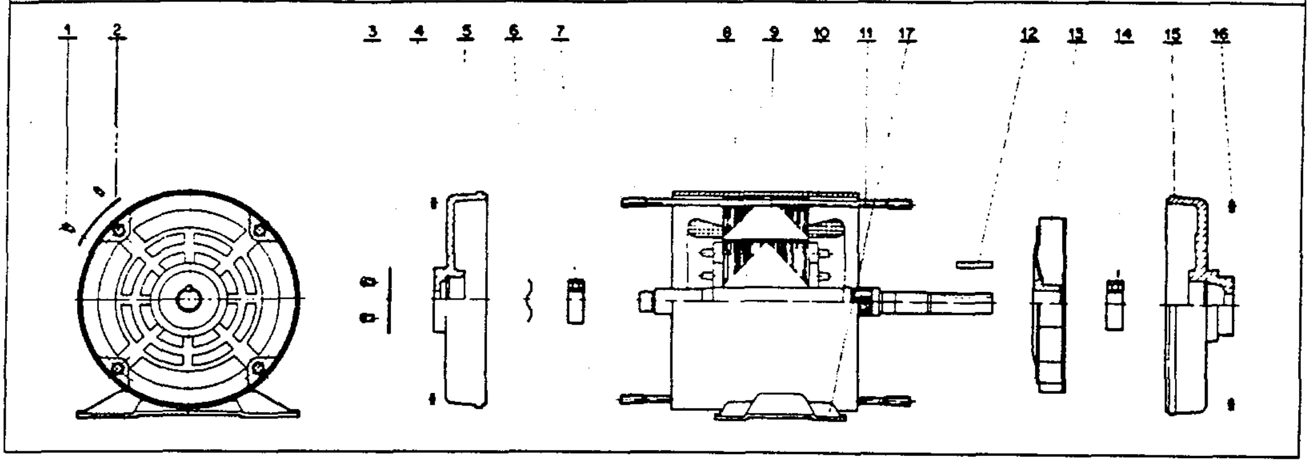
THREE-PHASE MOTORS IP55 NEMA T - FRAMES 360T, 400T, 440T, 500T AND 580T



Prt. nr.	Description
1	"U" type rivet
2	Nameplate
3	Hexagonal bolt for terminal box cover
4	Terminal box cover
5	Rubber gasket for terminal box cover
6	Hexagonal bolt for terminal box
7	Terminal box
8	Terminal nut
9	Terminal bolt
10	Terminal
11	Rubber gasket for terminal box
12	Fan cover
13	Circlip
14	Fan
15	External non-drive end bearing cap
16	Hexagonal bolt for non-drive end bearing cap
17	Hexagonal bolt for endshield
18	Spring washer

Part. nr	Description
19	Grease nipple
20	Non-drive endshield
21	Internal non-drive end bearing cap
22	Non-drive end bearing
23	Fan key
24	Fastening ring for stator
25	Rotor assembly
26	Eyebolt
27	Stator assembly
28	Frame
29	Key
30	Supporting ring
31	Drive end bearing
32	Internal drive end bearing cap
33	Drive endshield
34	External drive end bearing cap
35	Grease relief plug

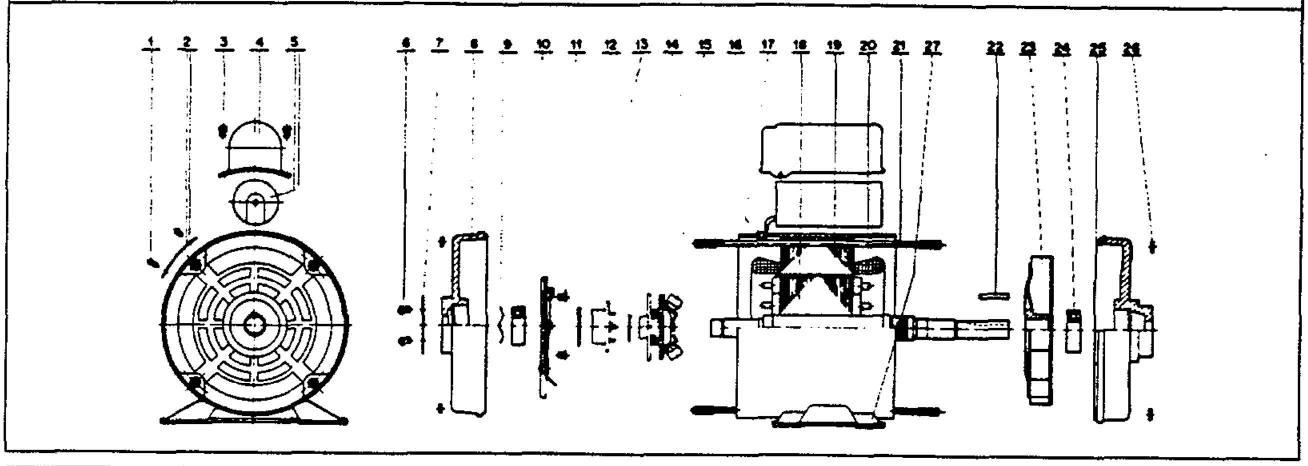
THREE-PHASE MOTORS NEMA 56 - FRAMES A56 - B56 - D56 - F56H - G56H



Part. Nr.	Description
1	Rivet
2	Nameplate
3	Fastening bolt for terminal box cover
4	Terminal box cover
5	Non-drive endshield
6	Spring washer for bearing
7	Non-drive end bearing
8	Rotor assembly
9	Stator assembly

Part. Nr.	Description
10	Frame
11	Connecting rods
12	Key
13	Fan
14	Drive end bearing
15	Drive endshield
16	Fastening nut for endshields
17	Foot

SINGLE-PHASE MOTORS NEMA 56 - FRAMES B48 - C48 - C56 - A56 - B56 - D56 - F56H - G56H



Part. nr.	Description
1	Rivet
2	Nameplate
3	Fastening bolt for terminal box cover
4	Capacitor cover
5	Electrolytic capacitor
6	Fastening bolt for terminal box cover
7	Terminal box cover
8	Non-drive endshield
9	Spring washer for bearing
10	Non-drive end bearing
11	Stationary switch
12	Fastening bolt for stationary switch
13	Fastening ring for thermal protector
14	Thermal protector
15	Flat washer

Part. nr.	Description
16	Centrifugal mechanism
17	Rubber gasket
18	Rotor assembly
19	Stator assembly
20	Frame
21	Connecting rods
22	Key
23	Fan
24	Drive end bearing
25	Drive endshield
26	Fastening nut for endshields
27	Foot

Note: For F56H and G56H frame motors –
Part nr. 3 = 3 pieces
Part nr. 4 and 5 = 2 pieces

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Controls

for Bulk Material Handling

CONVEYOR COMPONENTS COMPANY

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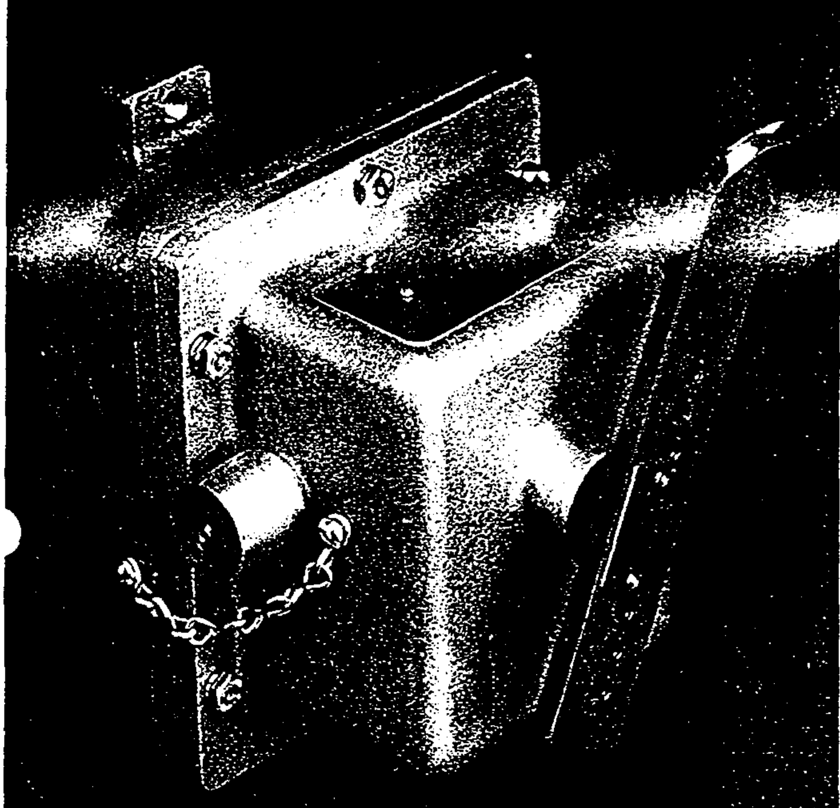
MODEL RS

CABLE OPERATED SAFETY STOP SWITCH FOR CONVEYORS



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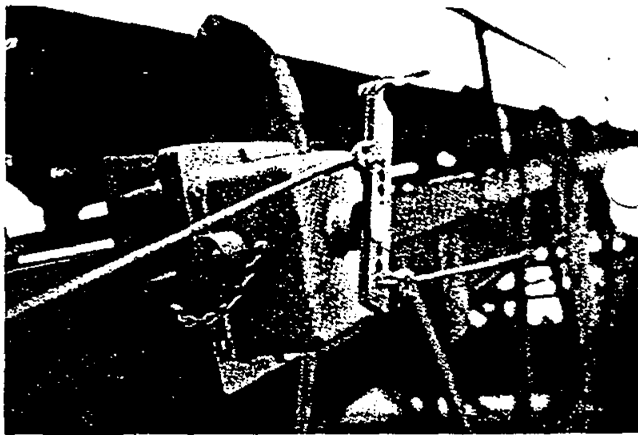
WHAT IT IS AND DOES:

The Model RS is a rugged compact safety switch that provides a quick positive shut off of dangerous equipment in emergencies or normal operation. It is actuated by a cable pulled by endangered personnel. The output contacts of the Model RS can control up to two separate circuits, one for machinery shutdown and one for alarm.

WHY IS IT NECESSARY?

Safety minded operators of conveyors, production lines, elevator equipment, assembly lines, material handling systems, cranes, etc. consider it a must for employee protection. Most states have safety statutes that require these switches on conveyors and related equipment. American National Standard Institute recommends their use in ANSI standard No. ASME B20.1 - 1993-5.11. This ANSI standard will probably soon become part of the Williams-Steiger Act of 1970 - the OSHA Act.

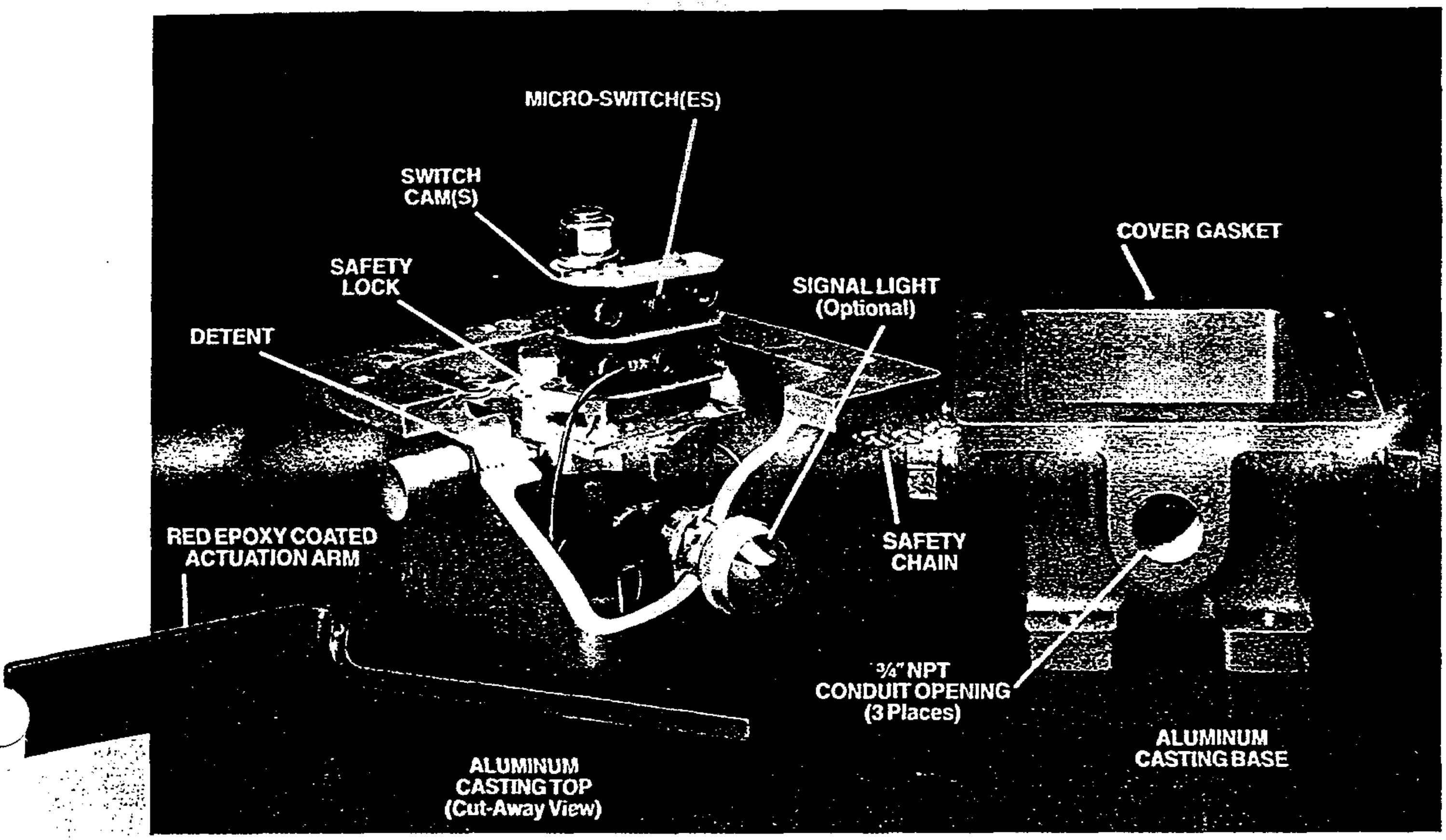


The model RS Safety Stop Switch in operation for immediate shutdown of conveyor system at a sand and gravel company.

EXCLUSIVE FEATURES

1. The Model RS is equipped with a positive safety lock. Having once beenactuated, it cannot be accidentally reset causing dangerous equipment to restart. In order to reset the switch, the actuation arm must be pushed in and turned. It takes no longer and it makes this a true "safety" switch.
2. The Model RS is installed with cable extending in both directions from the actuating handle. There is one electrical connection inside. This simple arrangement eliminates the double electrical connections required in two ended units employing a separate micro switch for cable in each direction.
3. The actuation force required is simply adjusted in the field by a change in the position of the cable in holes provided in the actuation arm. One of our units will handle as much cable length as a double ended competitive unit and there is no longer a need to specify actuating force or right or left handed units.
4. The standard construction of the unit is a corrosion resistant aluminum housing complete with stainless steel hardware and red epoxy coated actuation handle. The actuation shaft is of stainless steel. Painted cast iron construction is available if necessary. Epoxy coating of either casting is also available if required.
5. The Model RS controls are listed by Underwriters Laboratories, Inc. and Canadian Standards Association. The general purpose models are listed for non hazardous atmospheres. Explosion proof models are listed for use in hazardous atmospheres as defined by the National Electric Code handbook and the National Electrical Manufacturers Association Standards for NEMA 7 and 9 hazardous locations. Specifically, they are listed for Class I, Groups C and D; and Class II, Groups E, F, and G.
6. Model RS offers the lowest cost per foot of protection because it incorporates fewer switches and less wiring is required. Cable may be extended in either or both directions with no changes required in the internal mechanism of the unit and the wiring is still of a simple uncomplicated nature.
7. The switch is available with a warning light that may be wired to indicate actuation. This permits easy identification of actuated switches in areas where visual identification is difficult.
8. A special version of the unit is available for the mining industry. This unit is listed by the Mining Safety and Health administration as complying with Schedule 2G. Our Listing No. is X/P-2140.

UL Listed for General Purpose and EXPLOSION PROOF Environments . . . the only switch of its kind to meet these requirements



OPERATION OF THE UNIT:

The unit is usually installed with cable running in both directions from the crank type actuating arm. Each of the two sections of cable runs to a fixed point through eye-bolts spaced at regular intervals.

A pull on the cable at any point along its run will rotate the red actuation arm 60°. The actuation arm will end in a position that is easily seen from a distance, thus identifying the actuated unit. Two spring loaded detents riding on a hardened steel cam provide resistance to arm rotation. When the actuation force overcomes this resistance the assembly rotates the 60° and is locked in place by the detents. Affixed to the rotating shaft is a cam mechanism which actuates up to two micro switches during rotation. The micro switches are held in the actuated position by the detents.

To reset the unit and deactuate the micro switches. the actuation arm is pushed in and rotated backwards.

DETERMINATION OF NUMBER OF UNITS REQUIRED:

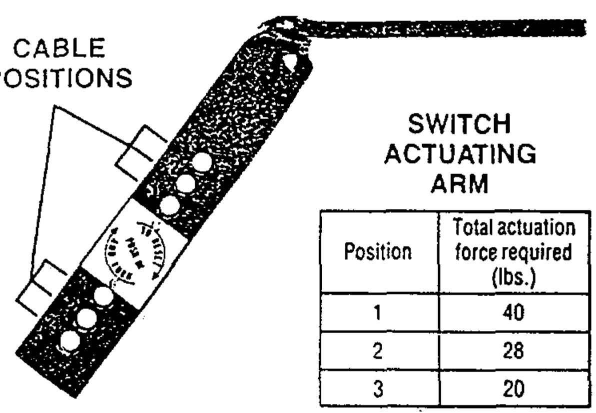
The Model RS control is designed so that a maximum of 100′ of cable can be used on each side of the unit. A single switch can therefore cover a maximum of 200′ of conveyor belt or other machinery. Of course, if necessary, cable can be extended in only one direction from either side of the unit. The electrical characteristics of the application will determine the numbers of micro switches to be specified in the unit: either one, or two. The environmental considerations will determine whether or not the unit is to be explosion proof or to have special paint or coatings. The possibility of a light to aid in identification of actuated units should be considered.

We recommend that high quality cable be used with the switch to assure proper actuation with no stretching. We recommend our own galvanized aircraft cable which is available with either vinyl or nylon coating. It is orange in color and weighs .0273 lbs. per foot and has an outside diameter of 3/16".

As shown in the chart and picture of the actuating arm, the actuation force can be varied by attaching the cable at any one of the three positions.

The cable should be supported by eyebolts every 8-10′. These supports ensure that the weight of the cable alone will not actuate the switch.

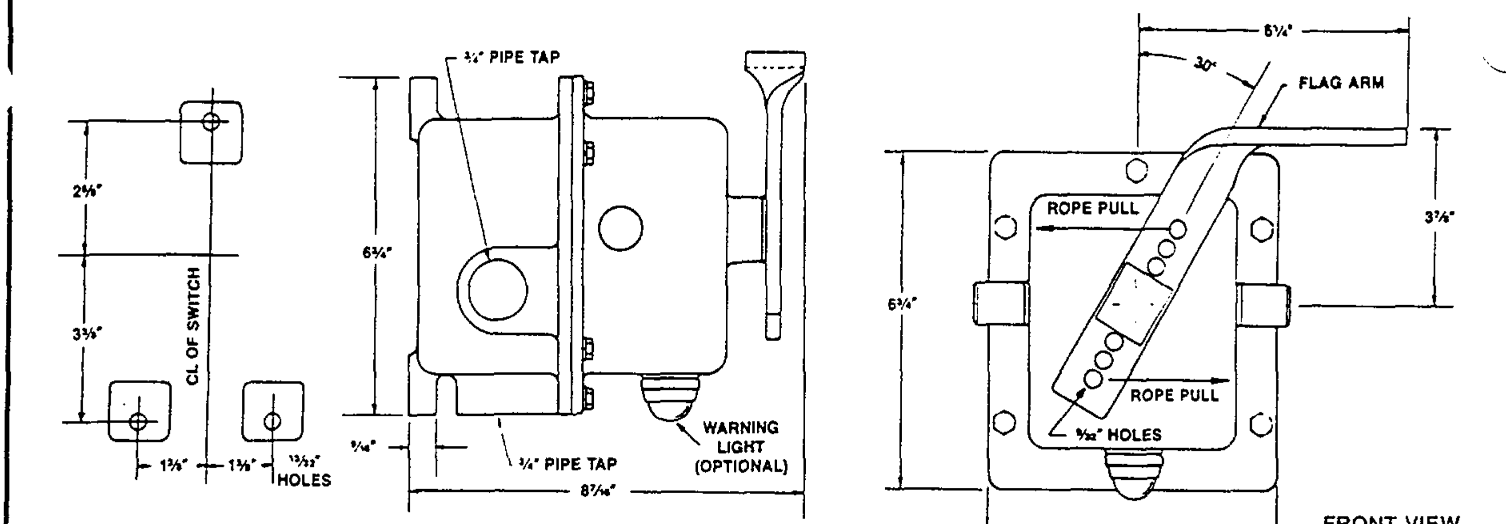
CABLE POSITIONS



SWITCH ACTUATING ARM

Position	Total actuation force required (lbs.)
1	40
2	28
3	20

MODEL RS DIMENSIONAL INFORMATION



MOUNTING PLAN SIDE VIEW FRONT VIEW

TECHNICAL INFORMATION

MODEL	DESCRIPTION
RS-1	One sp/dt micro switch UL LISTED CSA
RS-2	Two sp/dt micro switches UL LISTED CSA
RS-2L	Two sp/dt micro switches with external signal light includes 110V lamp UL LISTED CSA
RS-1X	Explosion proof with one sp/dt micro switch for NEMA 7 and 9. UL LISTED CSA
RS-2X	Explosion proof with two sp/dt micro switches for NEMA 7 and 9. UL LISTED CSA
RS-1MX	MSHA listed explosion proof with one sp/dt micro switch
RS-2MX	MSHA listed explosion proof with two sp/dt micro switches

Standard Construction - rubber gaskets seal unit for outside applications listed by Underwriters Laboratories for NEMA 4 dust-tight and raintight construction. Applies to units RS-1, RS-2, and RS-2L.

Housing - aluminum or cast iron. Epoxy coating available.

Conduit Opening - ¾" NPT standard. 1" NPT optional. Standard units have three conduit openings, explosion proof have one at the bottom.

Actuating Arm - Red epoxy coated steel handle with stainless steel shaft.

Internal Cam and Wear Plate - hardened steel.

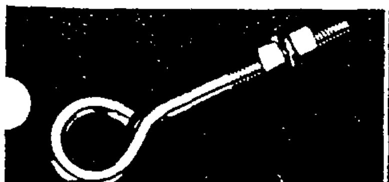
External Hardware - stainless steel.

Switches - sp/dt micro switch. Rated 20 amp at 125, 250 or 480 V AC. Switches may be wired for single throw operation, either normally open or normally closed as required.

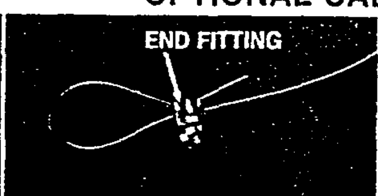
INSTALLATION INSTRUCTIONS

1. The controls should be mounted on a flat surface using the three mounting holes on the bottom half of the housing. The holes are designed for ⅜" bolts.
2. Each switch can cover a maximum of 200' of conveyor — 100' in each direction. Safety considerations dictate that not more than 100' of cable be attached on each side. More cable might result in too much slack, delaying actuation.
3. The eyebolts supporting the cable should be placed at intervals from 8-10'. Care must be taken that the cable does not become too slack. However, if the cable is too tight, false actuation of the switch might occur.
4. The Model RS control is designed for pilot duty. The control circuit should be wired through the motor starter circuit of the conveyor or other equipment to be controlled. Do not wire the unit directly into a heavy duty motor circuit.
5. The unit should be tested after installation by actuation of the cable. The protected equipment should stop and alarms should sound as required with a minimum of effort on the cable. Cable tension can be adjusted if necessary by changing the location of the cable on the handle.

OPTIONAL CABLE AND FITTINGS

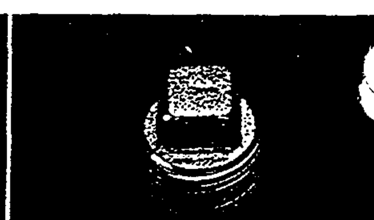


CABLE SUPPORT EYE BOLT
½" x 6" plated, 2½" long N.C. thread, 1" eye, two nuts and one lockwasher.



CABLE END FITTING
Secures protective cable to switch handle and supports.

SAFETY CABLE
³⁄₃₂" 7 x 7 preformed, galvanized aircraft cable. Protective coating in either orange coated vinyl or nylon. ³⁄₁₆" O.D.



CONDUIT PLUG
¾" metal, socket head conduit plug.

ROPE SAFETY SWITCH
INSTALLATION INSTRUCTIONS

TECHNICAL INFORMATION

Raintight units (standard):

- Gasket sealed for indoor/outdoor applications.
- Aluminum or cast iron housing with 3 conduit openings in base casting.

Explosion Proof units:

- Aluminum or cast iron housing with 1 conduit opening in base casting.

All units:

- Red powder coated epoxy flag arm made of steel.
- Stainless steel shaft.
- Hardened steel internal cam and wear plate.
- External Hardware is stainless steel.
- **Switches**

  SPDT switch(es) rated 20 Amp at 125, 250, or 480 VAC. Switch(es) may be wired for single throw operation, either normally open or normally closed as required. See figure 1.

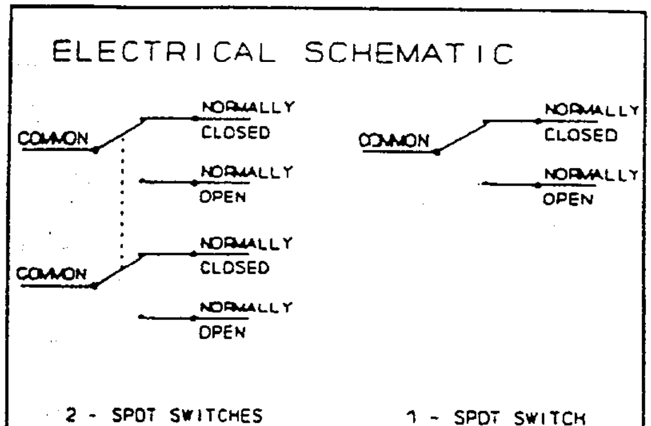


Figure 1

Raintight units:	Meets NEMA 4 dust-tight and raintight construction.
Explosion Proof:	Meets NEMA 7 - Class I, Groups C & D; and NEMA 9 - Class II, Groups E, F, and G for hazardous locations.
MESA Explosion Proof:	Complies with requirements of MESA schedule 2G.

INSTALLATION INSTRUCTIONS

1. The base should be mounted on a flat surface using the three (3) mounting holes in the base casting (see figure 2). The holes in the base are manufactured for 3/8" bolts.

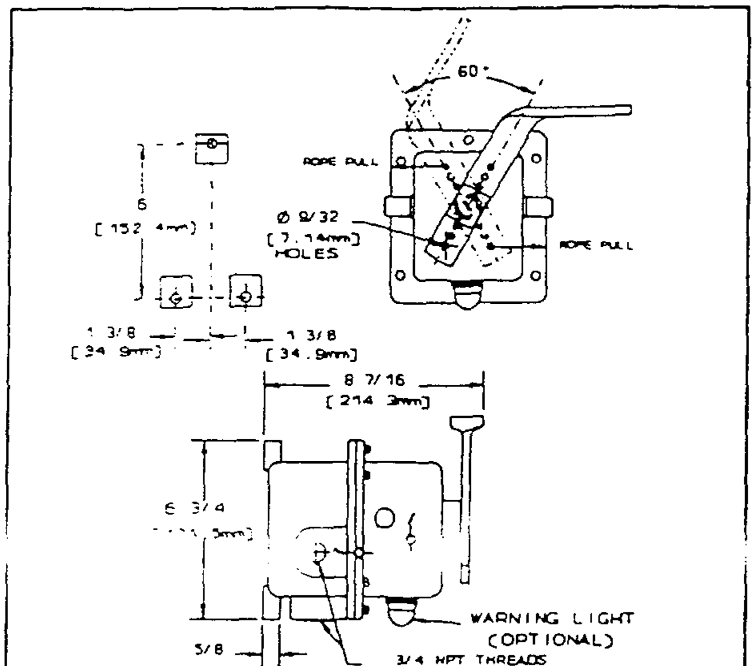


Figure 2

2. Each unit can cover a maximum of 200 feet of conveyor - 100 feet in each direction. Safety considerations dictate that not more than 100 feet of cable can be attached to each side.

3. The eyebolts supporting the cable should be placed at intervals from 8' - 10'. Care must be taken that the cable does not become too slack. However, if the cable is too tight, false actuation of the unit may occur.

4. This unit is designed for pilot duty. The control circuit should be wired through the motor starter circuit of the conveyor or other equipment to be controlled. Do not wire the unit directly into a heavy duty motor circuit. See "Switch" information on front page.

5. The unit should be tested after installation by actuation of the cable. The protected equipment should stop and alarms should sound as required with a minimum effort on the cable. Cable tension can be adjusted as necessary by changing the location of the cable on the handle (see figure 3).

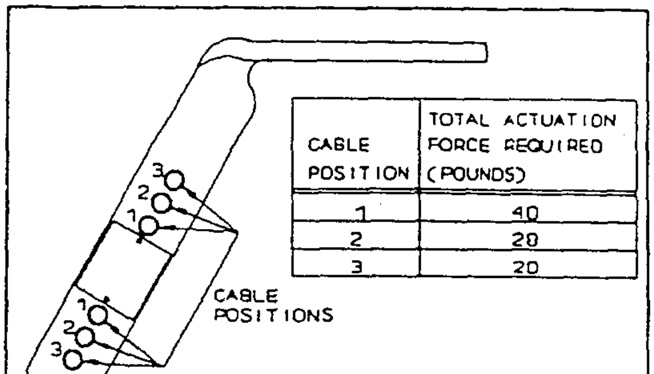


Figure 3

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VARIMOT®

OPERATING INSTRUCTIONS

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GENERAL

These operating instructions are intended to help you install and operate the drive. For trouble free service, proper installation and operation are essential. Additionally, these instructions contain important recommendations on maintenance.

Before shipment every SEW-Eurodrive gear unit is thoroughly tested, checked, and properly packed. However, please check the drive immediately upon arrival for shortage or transit damage. Note the damage or shortage on the freight bill of lading and file a claim with the carrier. Additionally, notify SEW-Eurodrive of the shortage or damage.

INSTALLATION

VARIMOT® units may be foot mounted, flange mounted or attached to a gear unit. The drive installation site should be selected to ensure:

- Ambient temperature below 40°C (104°F).
- Unimpeded flow of air to the motor and variable speed unit.
- Accessibility to the drain, level and breather plugs.
- Adequate space for removal of brakemotor fanguard for brake adjustment and maintenance.

The drive unit should be mounted on a flat, vibration damping, and torsionally rigid structure. Careful alignment is critical. Mounting to an uneven surface will cause housing distortion. The flatness tolerance of the supporting surface should not exceed 0.004 inch.

INSTALLATION OF COUPLINGS, SPROCKETS, SHEAVES, ETC.

Do not hammer on the shafts. Hammering can cause brinelling of the bearings and a reduction in bearing life.

We recommend heating the components to approximately 175°F and sliding them on. This will reduce possible damage to the bearings.

The VARIMOT® shaft diameters have tolerance of +.0000" - .0005". Tolerance for metric shafts are listed in SEW-Eurodrive catalogs.

Shaft couplings should be properly aligned to prevent vibration, coupling wear and premature failure of the shaft bearings.

Maximum Parallel Offset	0.003 inch
Maximum Angular Offset	0.030°

To prevent the output shaft and bearings from being subjected to excessive loads, the maximum overhung load, as shown in SEW-Eurodrive catalogs, should not be exceeded. Please consult our engineering department if the load may exceed the recommended figure given or where there are combined radial and axial loads. In such cases, the exact operating conditions must be stated including speed, direction of rotation, position, magnitude, and direction of the external radial and axial loads being applied.

SEVERE DUTY UNITS

Severe Duty units include drain holes in the traction housing at the lowest points allowing condensation to drain out of the variable speed housings.

CAUTION: ***The drain holes are installed for the mounting position listed on the nameplate. Installing a unit in a mounting position other than what is shown on the nameplate will reposition the condensation drain holes. As a result, the drain holes may not be located at the lowest point and may not allow water to drain. This can cause premature drive failure.***

OPERATION

VARIMOT®'s are shipped with the speed setting adjusted for minimum output rpm. For manually controlled units, the speed is increased by turning the handwheel (sprocket, spindle, etc.) counter-clockwise. The VARIMOT® is supplied with permanent stops at minimum and maximum speeds. Relative speed may be determined by referring to the speed scale on the side of the unit.

For Electric Remote Control units, see electrical connections and speed stop setting on pages 3 and 4.

Please refer also to the motors' operating instructions.

MAINTENANCE AND LUBRICATION

VARIMOT® variable speed units are largely maintenance-free. The VARIMOT® drive case itself does not require oil since it is a dry traction drive. However, for units which are flange mounted to a gear reducer, there is an oil plug located in the VARIMOT® flange. Depending on the drive mounting position, this plug may be used as a breather or oil level plug for the reducer. This plug does not connect to the VARIMOT® housing. Refer to the Operating Instructions for Gear Reducers for proper gearcase oil level.

The traction ring wear can be checked by the torsional play on the output shaft. If the torsional play is approximately 45°, the traction ring needs to be replaced. In the case of gear reducer fitted with variable speed drive, the torsional play can be checked at the motor fan. For this purpose the drive unit should be set at 80% speed (the pointer on the scale should be at 80). If there is torsional play of 45° on the fan, the traction ring needs to be replaced.

SEW EURODRIVE

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SOUTHWEST ASSEMBLY CENTER
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MIDWEST ASSEMBLY CENTER
2001 West Main Street/Troy OH 45373
(513) 335-0036

EAST COAST ASSEMBLY CENTER
200 High Hill Road/Bridgeport NJ 08014
(609) 467-2277

WEST COAST ASSEMBLY CENTER
30599 San Antonio Road/Hayward CA 94544
(510) 487-3560

To replace the traction ring:

- Remove four (4) hex head screws - [2].
- Split the traction housings.
- Mark the traction ring/hollowshaft assembly so the cam lobes at the end of the shaft assembly can later be engaged at the same place.
- Remove the complete hollowshaft [9] from the housing [8].
- Carefully pry out the friction ring from the hollowshaft.
- Place new friction ring on a clean, even surface.
- Center the hollowshaft over the friction ring shoulder.
- Press the hollowshaft and friction ring together.
- Before assembling the housing, clean the driving cone surface [6] so it is completely free from oil and grease.

When the traction ring is checked or replaced, perform the following regreasing of the bearings and cam lobes:

- Remove the hollowshaft assembly [9] if it is still in the housing [8].
- Regrease the needle roller bearings [7] with Molilux EP2 or equivalent. When regreasing, do not overfill cavity. Too muc' grease generates an excessive amount of heat.
- Grease the cam lobes [11] with Lubriplate grease GR-132 o: bearing grease.

If the cam lobes are worn excessively (approximately 0.04in/1mm) and cannot function properly by sliding over each other, replace both the hollowshaft, output shaft and cam washer.

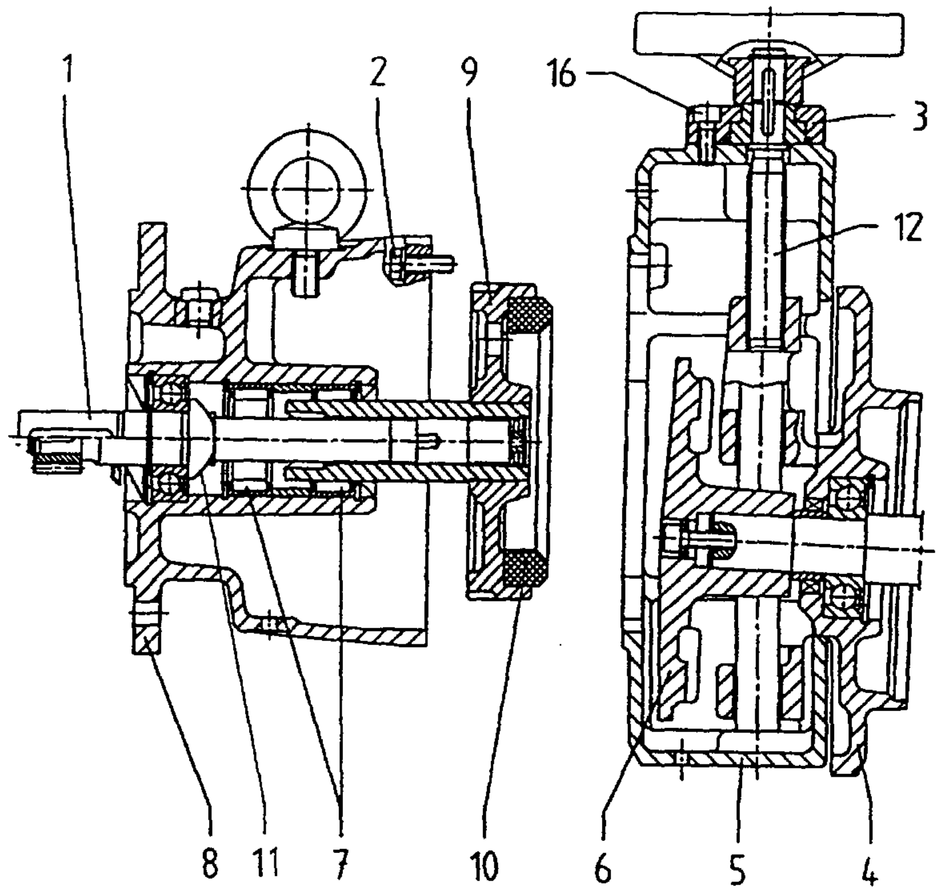
Periodically, the threaded speed adjusting spindle [12] should be relubricated with a suitable grease such as Never-Seez®.

Grease-packed bearings should be cleaned and regreased every 10,000 hours with Mobilux EP2 or equivalent. Care must be taken that only 1/3 of the free volume of the bearing space is filled with grease in order to avoid overheating of the bearing.

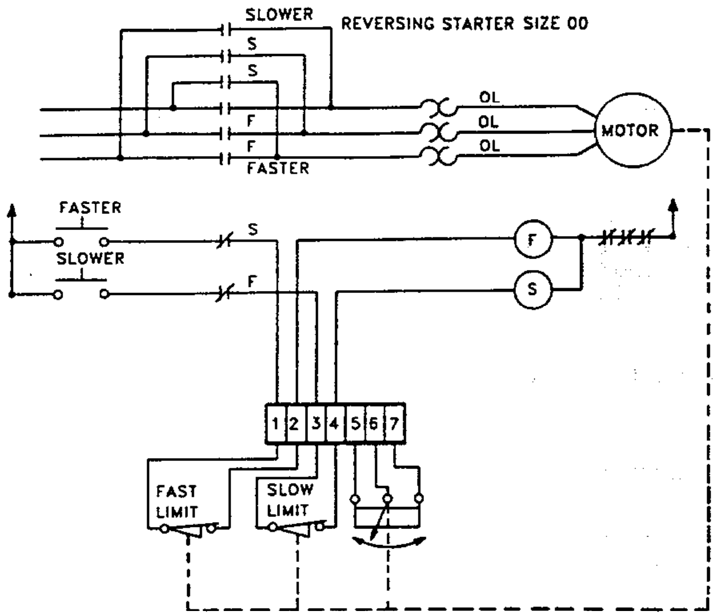
Check coupling alignment, chain or belt tension and mounting bolt torque periodically.

To ensure adequate cooling, deposits of dirt and dust on the surfaces of the units must be removed at frequent intervals. Particular attention should be paid to the motor by removing all deposits from between the motor cooling fins and also from the air intake on the fan guard.

1 Input shaft
2 Hex head screw
3 Plate
4 Motor mounting plate
5 Mounting plate
6 Driving cone
7 Needle roller bearing
8 Housing
9 Hollow shaft
10 Friction ring
11 Cam lobe
12 Speed adjusting spindle
16 Socket head screw

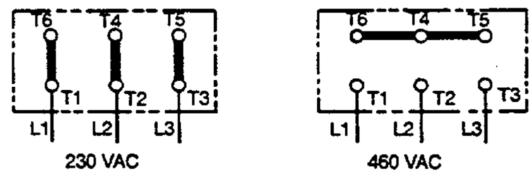


WIRING DIAGRAM FOR 3 PHASE REMOTE SPEED CONTROL MOTORS - OPTION EF



NOTE:

Pushbutton and motor starter are not supplied by SEW-Eurodrive.
See Page 4 for adjusting the limit switches.

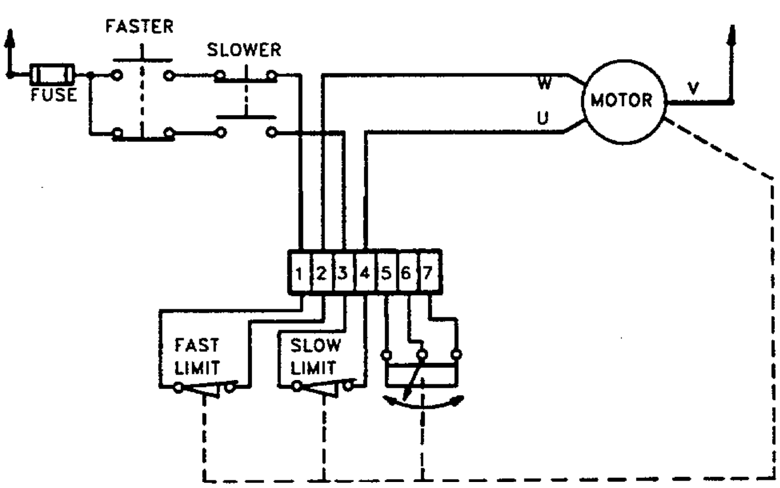


MOTOR TERMINAL CONNECTIONS

EF Motor Current for VARIMOT® Sizes:
D/DF 16-26 @ 230V/460V: 0.4A/0.2A
D/DF 36-46 @ 230V/460V: .55A/.32A

The speed control motor is rated for 15% ED (cyclic duration factor) and a maximum starting frequency of 20 per hour.

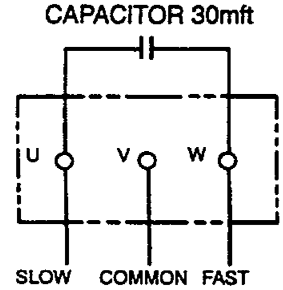
WIRING DIAGRAM FOR SINGLE PHASE REMOTE SPEED CONTROL MOTORS - OPTION EF



NOTE:

Fuse and pushbuttons are not supplied by SEW-Eurodrive.
See page 4 for adjusting the limit switches

CAPACITOR 30mft

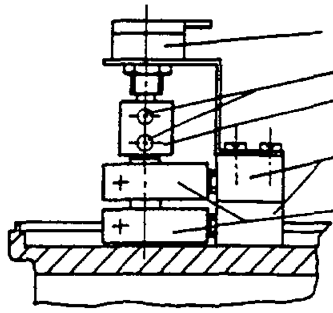


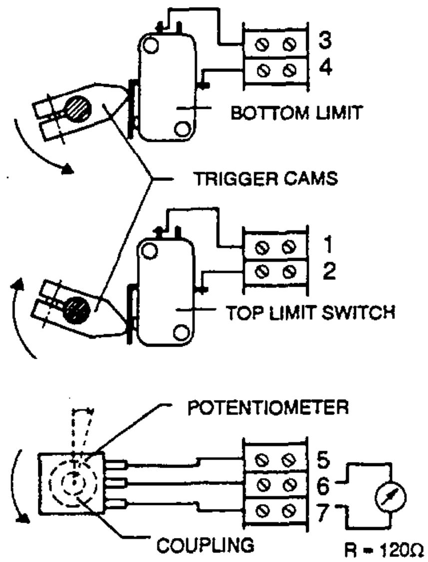
MOTOR TERMINAL CONNECTION

Motor Current for all VARIMOT®
Sizes @ 115V: 2.1 Amps

The speed control motor is rated for 15% ED (cyclic duration factor) and a maximum starting frequency of 20 per hour.

SETTING OF THE SPEED RANGE LIMITS - OPTION EF





The Limit Switches and Potentiometers are factory preset for maximum speed range. To modify the speed range, the limit switches may be field adjusted. The switches and potentiometers are located under the cover of the speed control motor.

Limit Switch Adjusting Instructions:

1. Remove cover.
2. Run the Speed Control Motor to obtain the maximum drive output speed.
3. Rotate the CAM for the Top Limit Switch clockwise until it trips the Limit Switch. Tighten the locking screw.
4. Run the Speed Control Motor to obtain the minimum drive output speed.
5. Rotate the CAM for the Bottom Limit Switch counter-clockwise until it trips the Limit Switch. Tighten the locking screw.

Potentiometer Adjusting Instructions (used for closed loop system control):

1. Turn the potentiometer counter-clockwise until it runs against the stop (Variable Speed Unit must be at minimum speed). Turn the potentiometer approximately 15° clockwise. Between terminals 6 & 7 there must be a resistance of 120 ohms.
2. Tighten the coupling set screws.

Gearmotors and Gear Reducers

OPERATING INSTRUCTIONS

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GENERAL

These operating instructions are intended to help you install and operate the drive. For trouble free service, proper installation and operation are essential. Additionally, these instructions contain important recommendations on maintenance.

Before shipment every SEW-Eurodrive gear unit is thoroughly tested, checked and properly packed. However, please inspect the drive immediately upon arrival for shortage or transit damage. Note the damage or shortage on the freight bill of lading and file a claim with the carrier. Also, notify SEW-Eurodrive of the shortage or damage.

LUBRICANTS

All gearmotors and gear reducers are supplied with the correct grade and quantity of lubricating oil for the specified mounting position. Exceptions include reducers shipped without input assemblies. The recommended lubricants are found on page 5.

LONG TERM STORAGE

If the drive is not installed immediately, it should be stored in a dry, protected area. If the drive is to be stored for an extended period of time and was not ordered from SEW for long term storage, contact your nearest SEW assembly plant for information on Long Term Storage.

Drives which are used for standby service should be stored as a sealed gearcase.

INSTALLATION OF COMPONENTS ON DRIVE SHAFTS

Do not hammer on the shafts. Hammering can cause brinelling of the reducer's bearings shortening the bearing life. We recommend heating the components to approximately 175°F (when possible) and sliding them on the shaft . This will reduce possible damage to the reducer's bearings.

Table 1. Standard Shaft Tolerances

Diameter (inch)	Solid Shaft Tolerances (inch)	Hollowshaft Tolerance (inch)
1.500 and smaller	+0.0000/-0.0005	+0.0005/-0.0000
Larger than 1.500	+0.000/-0.001	+0.001/-0.000
For metric shafts consult our catalogs		

Shaft couplings should be properly aligned to prevent vibration, coupling wear, and premature failure of the shaft bearings.

To prevent the output shaft and bearings from being subjected to excessive loads, the maximum overhung load, as shown in SEW-Eurodrive catalogs, should not be exceeded. Please consult our engineering department if the load may exceed the recommended figure given or where there are combined radial and axial loads. In such cases, the exact operating conditions must be stated including speed, direction of rotation, position, magnitude and direction of the external radial and axial loads being applied.

SHAFT MOUNTED REDUCERS

SEW-Eurodrive recommends the use of a light coating of Never-Seez® (or equivalent) on the keyed output shaft. The Never-Seez® lubricant may prevent rusting and fretting corrosion between the reducer hollowshaft and the shaft of the driven machine. The lubricant will aid in shaft removal when necessary.

For additional information on shaft mounted reducers, drive shaft configuration and tolerances, ask for SEW-Eurodrive Tech Sheets K-003-01, K-003-02, K-003-03.

INSTALLATION AND OPERATION

The drive installation site should be selected to ensure:

- Ambient temperatures below 40°C (104°F).
- Unimpeded flow of air to the motor and variable speed units.
- Accessibility to the drain, level and breather plugs.
- Adequate space for removal of brakemotor fanguard for brake adjustment and maintenance.

The drive unit should be mounted on a flat, vibration damping, and torsionally rigid structure. Careful alignment is critical. Mounting to an uneven surface will cause housing distortion. The flatness tolerance of the supporting surface should not exceed:

- For gear units size 80 and smaller — 0.004 inch.
- For gear units above size 80 — 0.008 inch.

For transportation the units are supplied as sealed gearcases, i.e., in place of the breather plug, a plastic capped socket head plug is installed. The breather plug accompanies the unit in a poly bag. After final installation, install the breather plug in place of the plastic capped plug. In addition, the oil level should be checked. Remove the red painted oil level plug. The oil level is correct when the surface of the oil is level with the lowest point of that tapped hole. The exceptions are the units R30/32 and S30/31 which remain sealed in any position.

After installation, the actual mounting position should be confirmed (with the diagrams on pages 2 - 4) against the mounting position shown on the gear reducer nameplate. The locations of the breather plug and oil level plug must agree with these diagrams for the specified mounting position. Adequate lubrication is only guaranteed if the unit is mounted in the specific nameplated mounting position and it agrees with the pictures on Pages 2 - 4.

Please refer to the Motors and Brakemotors; VARIMOT®; or VARIGEAR® operating instructions for additional information on those units.

MAINTENANCE

Oil levels and oil quality should be checked at regular intervals, determined by usage and the environment. Grease and oil should be changed per the recommendations on page 5.

Check coupling alignment, chain or belt tension, and mounting bolt torque periodically. Keep the drive relatively free of dust and dirt.

SEW EURODRIVE

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(513) 335-0036 Fax: (513) 222-4104

EAST COAST ASSEMBLY CENTER
200 High Hill Road/Bridgeport NJ 08014
(609) 467-2277 Fax: (609) 845-3179

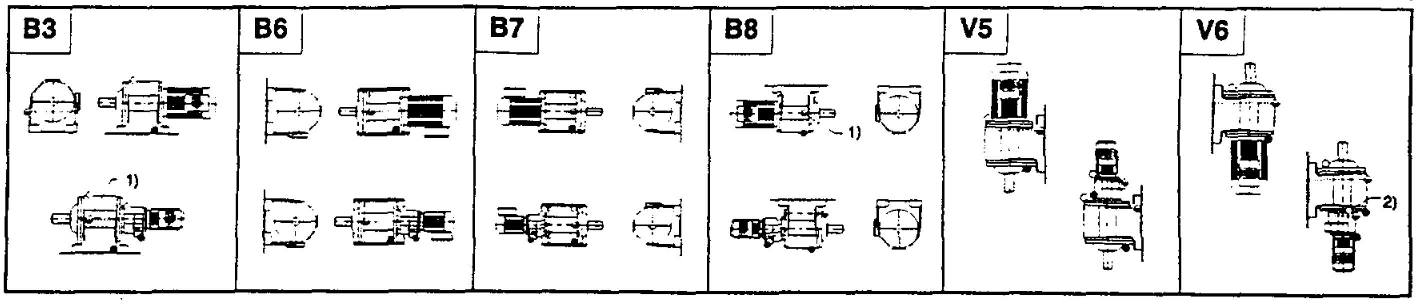
WEST COAST ASSEMBLY CENTER
30599 San Antonio Road/Hayward CA 94544
(510) 487-3560 Fax: (510) 487-6381

MOUNTING POSITIONS

For proper lubrication, be sure that the orientation of the gear reducer, as installed, matches the diagram shown for the mounting positions as specified on the gear reducer's nameplate.

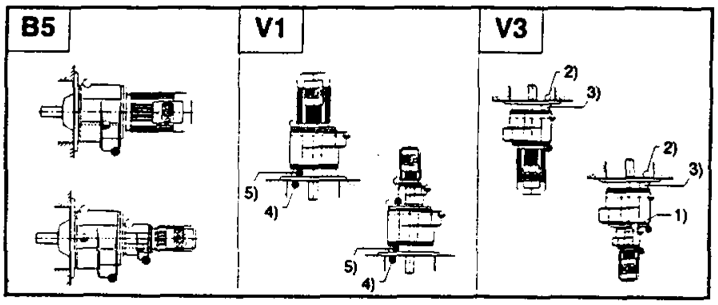
- Mounting Surface
- Mounting Surface of the Torque Arm
- Breather Plug
- Oil Level Plug
- Oil Drain Plug

R40 - R163, R63R42 - R163R102



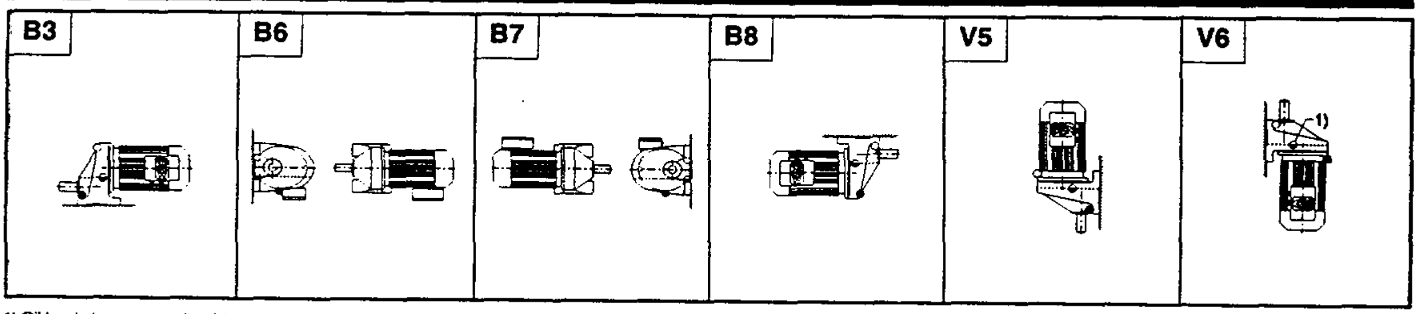
1) Oil level plug on opposite side for R60, R80
2) Breather plug provided only on R62/63R42/43, R133R82

RF40 - RF163, RF63R42 - RF163R102



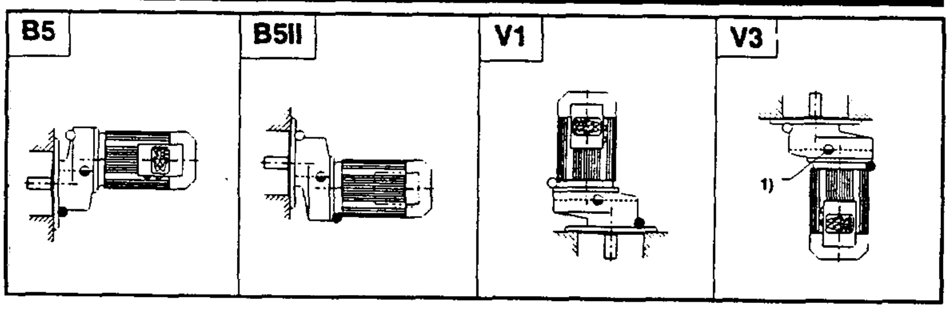
1) Breather plug provided only on RF62/63R42/43, RF133R82
2) Fig. I Flange breather plug
3) Fig. II Flange breather plug
4) Fig. I Flange drain plug
5) Fig. II Flange drain plug

RX61 - RX101



1) Oil level plug on opposite side

RXF61 - RXF101



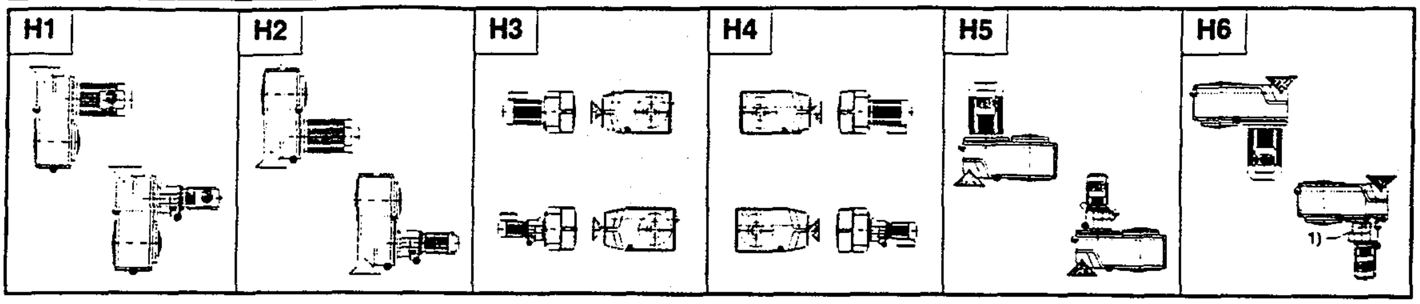
1) Oil level plug on opposite side

MOUNTING POSITIONS

For proper lubrication, be sure that the orientation of the gear reducer, as installed, matches the diagram shown for the mounting positions as specified on the gear reducer's nameplate.

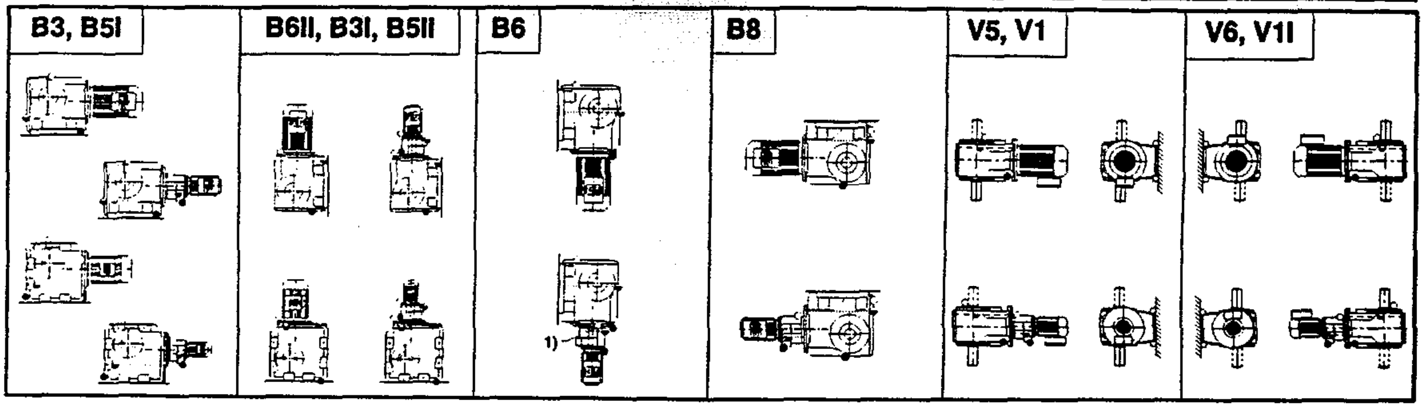
- Mounting Surface
- Mounting Surface of the Torque Arm
- Breather Plug
- Oil Level Plug
- Oil Drain Plug

FA40 - FA100, FA60R42 - FA100R73, FAF40 - FAF100, FAF60R42 - FAF100R73



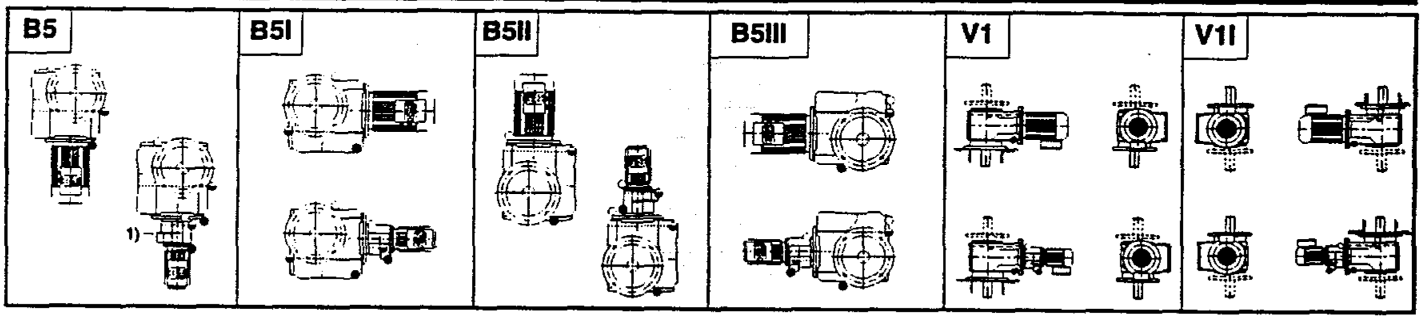
1) Breather plug provided only on FA60R42/43

K46 - 186, K66R42 - K186R102



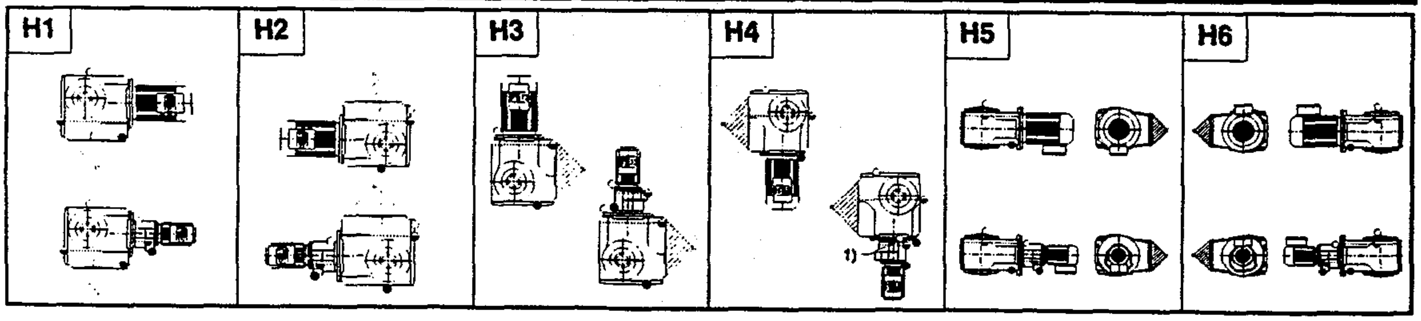
1) Breather plug provided only on K66R42/43

KF46 - KF156, KF66R42 - KF156R102



1) Breather plug provided only on KF66R42/43

KA46 - KA156, KA66R42 - KA156R102, KAF46 - KAF156, KAF66R42 - KAF156R102



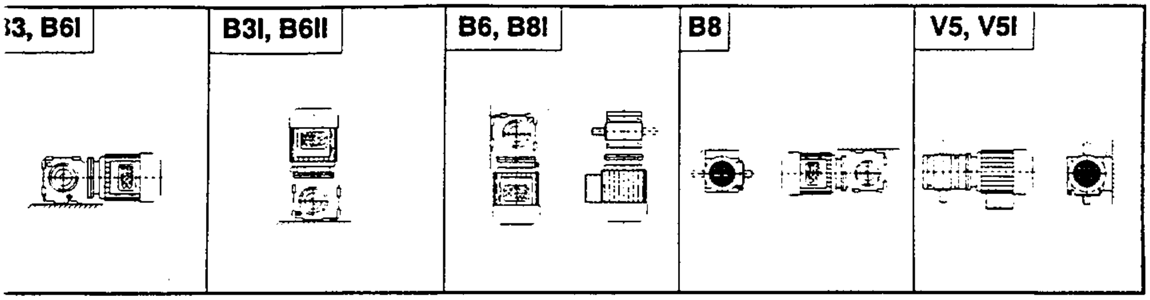
1) Breather plug provided only on KA66R42/43

MOUNTING POSITIONS

r proper lubrication, be sure that the orientation of the gear reducer, as installed, matches
: diagram shown for the mounting positions as specified on the gear reducer's nameplate.

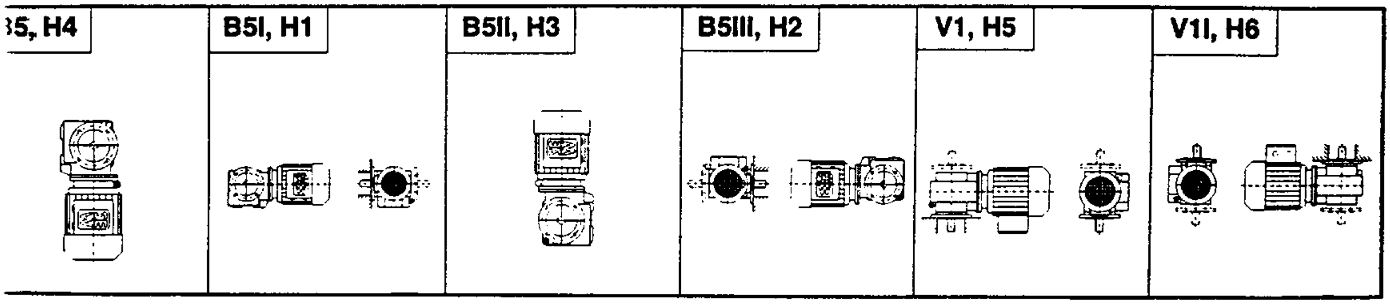
- Mounting Surface
- Mounting Surface of the Torque Arm
- Breather Plug
- Oil Level Plug
- Oil Drain Plug

32

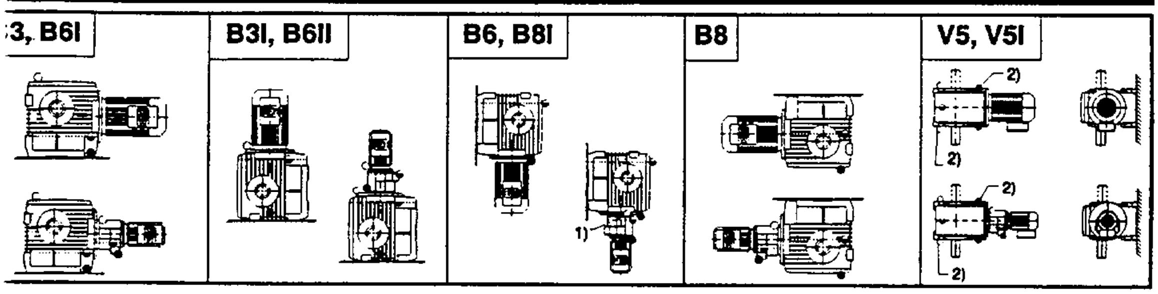


F32

Note: Only SF units are shown. Location of plugs in SA/SAF units are the same as in SF



42 - S92, S62R42 - S92R63

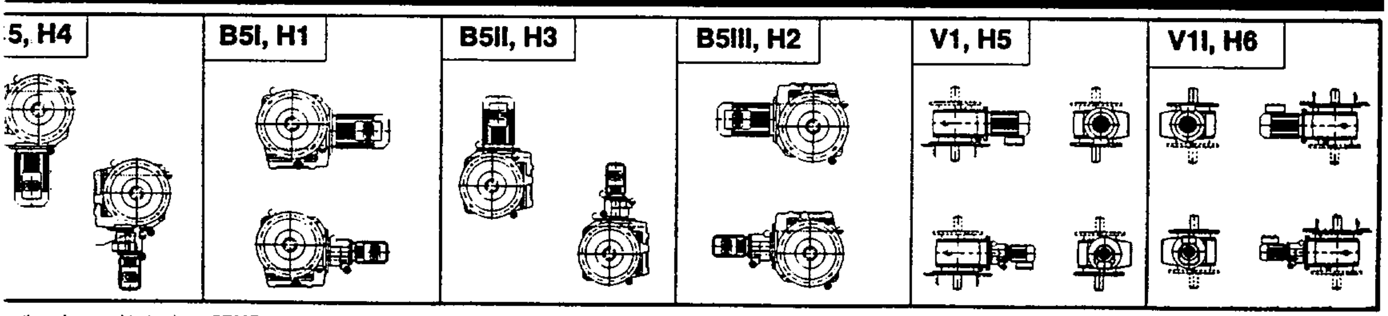


eather plug provided only on S62R42/43

2) Breather and drain location with A side up

F42 - SF92, SF62R42 - SF92R63

Note: Only SF units are shown. Location of plugs in SA/SAF units are the same as in SF



eather plug provided only on SF62R42/43

LUBRICANTS

LUBRICATION SCHEDULE FOR SEW-EURODRIVE GEAR UNITS									
1)Gear Reducer Type	Lubri-cation Type	Ambient air tempera-ture range ° F	kin viscosity at 40°C (cSt) approx.	GULF Oil Co.	CHEVRON Oil Co.	AMERICAN Oil Co.	MOBIL Oil Co.	SHELL Oil Co.	TEXACO Oil Co.
R40 - R163 FA K	Oil	+104 to +32	220	Gulf EP. Lubricant S100	Chevron Non- Leaded Gear Compound 220	Permagear EP220	Mobilgear 630	Shell Omala Oil 220	Meropa 220
		+77 to +5	155	Gulf EP. Lubricant S60	Chevron Non- Leaded Gear Compound 150	Permagear EP150	Mobilgear 629	Shell Omala Oil 100	Meropa 150
S32	Oil	+140 to +32	430				SHC 634 (Synthetic)		
S42 - S92	Oil	+104 to +32	680	Gulf EP. Lubricant HD 680	Chevron Non- Leaded Gear Compound 680	Permagear EP680	Mobilgear 636	Shell Omala Oil 680	Meropa 680
		+77 to +5	220	Gulf EP. Lubricant HD 220	Chevron Non- Leaded Gear Compound 220	Permagear EP 220	Mobilgear 630	Shell Omala Oil 220	Meropa 220
General	Synth. Oil	+176 to +5	Consult Factory For Use of Synthetic Oils						
	Synth. Grease	+200 to -40	Consult Factory For Use of Grease Filled Reducers						
Ball & Roller Bearings	Grease Used for normal application Temp. range—20°F to 250°F			Gulfcrown Grease EP. No.2	Chevron Dura-Lith EP2	Amolith Grease No. 2 EP	Mobilux EP2	Alvania Grease R3	Multifak EP2

1)Applies to all reducers with or without motor and input shaft.

Oil levels and oil quality should be checked at frequent intervals, depending on usage. Oil changes are required at intervals of 10,000 operating hours or every two years, whichever comes first. If a synthetic oil lubricant is used then this period can be extended to 20,000 operating hours or every four years, whichever comes first. In applications where hostile operating conditions exist, such as high humidity, corrosive environment, or large temperature changes, the lubricant should be changed at more frequent intervals.

The gear units R30/32, S30/31, W20 and W30 are supplied with a synthetic oil which is good for the life of the reducer.

Grease packed bearings should be cleaned and regreased every 10,000 hours or 20,000 hours for synthetic grease. Input (high speed) bearings *should not be overgreased.* They should be filled with grease not to exceed 1/3 of the bearing's free volume. For output bearings and bearings with replaceable grease shields, fill to 2/3 of their free volume.

ATTENTION

When the recommended lubricant is not available, it is permissible to use a lubricant having equivalent characteristics but we do not recommend that lubricants of different brands be mixed. Under no circumstances should synthetic lubricants be mixed with one another, or with one having a mineral base.

LUBRICANTS

Oil Capacities in (US) Gallons

Parallel Helical Gear Units "R"

Gear Unit	Mounting Position B3 1)	B5 1)	B5II	B6 2)	B7 2)	B8 2), 3)	V1	V3	V5	V6
RX/RXF61	0.21	0.11	0.18	0.11	0.13	0.18	0.16	0.13	0.24	0.13
RX/RXF71	0.42	0.21	0.37	0.26	0.26	0.42	0.32	0.24	0.53	0.26
RX/RXF81	0.66	0.34	0.66	0.42	0.42	0.71	0.58	0.40	0.82	0.48
RX/RXF101	1.6	0.92	1.6	1.1	1.0	2.0	1.2	0.95	2.3	1.1
RUF63	—	0.13	—	—	—	—	0.53	—	—	—
RUF73	—	0.32	—	—	—	—	0.98	—	—	—
RUF83	—	0.69	—	—	—	—	2.1	—	—	—
RUF92/93	—	1.1	—	—	—	—	3.4	—	—	—
RUF102/103	—	1.1	—	—	—	—	5.4	—	—	—
RUF132/133	—	2.5	—	—	—	—	8.3	—	—	—
RUF142/143	—	3.3	—	—	—	—	13	—	—	—
RUF152	—	4.2	—	—	—	—	16	—	—	—
RUF163	—	4.8	—	—	—	—	21	—	—	—
R/RF32	0.29 gallon									
R/RF40	0.08	0.08	—	0.16	0.18	0.16	0.26	0.26	0.26	0.26
R/RF42/43	0.08	0.08	—	0.16	0.16	0.16	0.26	0.24	0.29	0.24
R/RF60	0.16	0.16	—	0.42	0.40	0.29	0.53	0.50	0.53	0.55
R/RF62/63	0.16	0.13	—	0.32	0.34	0.29	0.53	0.50	0.58	0.50
R/RF70	0.34	0.32	—	0.55	0.61	0.55	0.98	0.92	0.98	0.95
R/RF72/73	0.34	0.32	—	0.55	0.61	0.55	0.98	0.92	0.98	0.95
R/RF80	0.74	0.69	—	1.2	1.3	1.1	2.1	2.0	2.1	2.0
R/RF82/83	0.74	0.69	—	1.2	1.3	1.1	2.1	2.0	2.1	2.0
R/RF92/93	1.3	1.1	—	2.0	2.2	2.0	3.4	3.3	3.6	3.4
R/RF102/103	1.8	1.6	—	3.1	3.3	3.0	5.4	5.0	5.7	5.3
R/RF132/133	2.7	2.5	—	5.0	5.3	5.0	8.3	8.5	8.6	8.7
R/RF142/143	4.0	3.3	—	7.7	8.2	7.5	13	13	14	14
R/RF152	5.2	4.2	—	12	13	11	16	16	20	21
R/RF163	5.7	4.8	—	13	14	13	21	22	23	23

1) On compound gear units having mounting position B3 or B5, the larger gear unit is to be provided with the oil filling of the B7 mounting position.
2) On compound gear units having mounting positions B6, B7, or B8 the smaller gear unit is to be provided with the oil filling of the B5 mounting position.
3) On compound gear units having mounting position B8, consult SEW Engineering for oil capacity of the larger (output) gear unit.

theSNUGGLER® Shaft Mounted Helical Gear Units "FA"

Gear Unit	Mounting Position H1	H2	H3	H4	H5	H6
FA/FAF40	0.40	0.26	0.45	0.37	0.50	0.55
FA/FAF60	0.82	0.58	0.95	0.82	1.2	1.0
FA/FAF70	1.9	1.2	1.8	1.6	2.2	2.0
FA/FAF80	3.0	1.9	3.2	2.7	3.7	3.6
FA/FAF90	5.0	3.4	5.9	4.6	6.3	6.9
FA/FAF100	9.3	5.6	8.9	7.8	12	11.8

Right Angle Helical-Bevel Gear Units "K"

Gear Unit 1)	Mounting Position B3, H1, B5I	B3I, B6II	B5	B5II	B5III	B6	B8	V1, V1I	V5	V6	H2	H3	H4	H5, H6
K46	0.16	0.53	0.32	0.48	0.37	0.32	0.40	0.34	0.40	0.40	0.37	0.48	0.32	0.34
K66	0.24	0.85	0.63	0.87	0.74	0.61	0.69	0.82	0.79	0.82	0.66	0.79	0.58	0.79
K76	0.50	1.5	1.1	1.6	1.3	1.1	1.3	1.7	1.6	1.6	1.2	1.5	1.1	1.6
K86	0.69	2.4	1.9	2.6	2.3	1.9	2.2	2.6	2.5	2.5	2.1	2.4	1.9	2.5
K96	1.4	4.9	3.8	5.2	4.3	3.7	4.2	5.3	5.2	5.2	4.1	4.9	3.7	5.2
K106	2.4	8.5	6.2	8.9	7.4	6.1	7.1	8.7	8.5	8.5	6.9	8.3	6.1	8.5
K126	3.6	14	10	14	13	11	13	15	15	15	13	14	11	15
K156	7.0	24	18	25	22	17	21	26	26	26	21	24	18	26
K/KH166	8.2	31	—	31	—	—	—	25	—	—	—	—	—	—
K/KH186	15	51	—	51	—	—	—	41	—	—	—	—	—	—

1) Gear unit size 46-156 also applies for KF, KA and KAF

Right Angle Helical-Worm Gear Units "S"

Gear Unit 1)	Mounting Position B3, B6I	B3I, B6II	B5	B5I	B5II	B5III	B6, B8I	B8	V1A, V1IB	V1B, VIA	V5, V5I	H1	H2	H3	H4	H5, H6
S31	0.07	0.07	0.09	0.09	0.09	0.09	0.07	0.07	0.09	0.09	0.07	0.07	0.07	0.07	0.07	0.07
S32	0.07	0.16	0.11	0.07	0.16	0.14	0.11	0.14	0.11	0.11	0.11	0.07	0.14	0.16	0.11	0.11
S42	0.05	0.26	0.21	0.11	0.32	0.21	0.29	0.16	0.21	0.16	0.16	0.11	0.21	0.29	0.20	0.18
S52	0.08	0.40	0.26	0.12	0.45	0.32	0.42	0.29	0.29	0.21	0.24	0.12	0.29	0.40	0.26	0.24
S62	0.16	0.74	0.61	0.24	1.0	0.61	0.66	0.42	0.61	0.55	0.42	0.24	0.61	0.92	0.55	0.53
S72	0.29	1.3	1.1	0.40	2.0	1.3	1.4	0.87	1.2	1.1	0.82	0.40	1.1	1.6	0.92	0.95
S82	0.55	2.6	1.7	0.87	2.9	1.6	2.9	1.6	1.8	1.5	1.5	0.87	1.5	2.7	1.6	1.6
S92	1.0	5.2	3.3	1.5	5.9	3.6	5.4	2.9	3.1	2.8	2.8	1.5	3.3	5.4	3.1	3.2

1) Gear Unit sizes 31-92 also applies for SF, SA and SAF

Motors and Brakemotors
Type BM (G) Brakes

OPERATING INSTRUCTIONS

09 793 67 US

GENERAL

Every SEW-Eurodrive motor is thoroughly tested, checked, and properly packed prior to shipment. However, please check immediately upon arrival for shortage of parts or transit damage. Note the damage or shortage on the freight bill of lading and file a claim with the carrier. Also, notify SEW-Eurodrive of the shortage or damage.

INSTALLATION

For motors mounted integrally to a gear unit, please refer to the Operating Instructions for Gearmotors and Gear Reducers for proper installation of the drive. The drive installation site should be selected to ensure:

- Ambient temperatures below 40°C (104°F).
- Unimpeded flow of air to the motor and variable speed units.
- Accessibility to gear unit, oil plugs.
- Adequate space for the removal of the brakemotor fanguard for brake adjustment and maintenance.

The drive unit should be mounted on a flat, vibration damping, and torsionally rigid structure. The flatness tolerance of the supporting surface should not exceed:

For motor size 180 and smaller — 0.004 inch
For motor size above 180 — 0.008 inch

Do not hammer on the shafts to install couplings, sheaves, etc. Hammering can cause brinelling of the bearings and a reduction in bearing life. We recommend heating the components to approximately 175°F and sliding them on. This will reduce possible damage to the bearings. In addition, there is a metric tapped hole in the center of the motor shaft that can be utilized with a tool to press on or remove the coupling, sheaves, etc.

The motor shaft diameters are metric and have tolerances as listed in the SEW-Eurodrive catalogs. Shaft couplings should be properly aligned to prevent vibration, coupling wear and premature failure of the shaft bearings.

Maximum Parallel Offset — 0.003 inch
Maximum Angular Offset — 0.030°

To prevent the output shaft and bearings from being subjected to excessive loads, the maximum overhung loads, as shown in SEW-Eurodrive catalogs, should not be exceeded. Please consult our engineering department if the load may exceed the recommended figure given or where there are combined radial and axial loads. In such cases, the exact operating conditions must be stated including speed, direction of rotation, position, magnitude and direction of the external radial and axial loads being applied.

LONG TERM STORAGE

If the motor must be stored for a long period of time without operating, the motor must be stored in a dry, protected area, and in the mounting position indicated on the unit nameplate.

In order to ensure that the motor has not been damaged by moisture after a prolonged storage, the insulation resistance should be checked. An insulation tester with a measurement voltage of at least 500V (e.g. magneto generator) should be used for this purpose. The insulation resistance is sufficient if it has an ohmic value of at least 1000 x V_N (e.g. at V_N = 230VAC: $R_{insul} \geq 230000$ ohms = 0.23M ohms. If the measured value is smaller, the motor should be dried before use (for example, with hot air up to a maximum of 90°C or by resistance heating with an auxiliary AC voltage of 10% of V_N via an isolating transformer). Care should be taken to ensure that the motor is heated with not more than 20% of its rated current and that the rise in temperature is not more than 90°C. The drying procedure can be stopped when the insulation resistance has reached 500000 = 0.5M ohms.

SEVERE DUTY UNITS

Severe Duty Units are indicated with the letters "-KS" at the end of the motor type on the motor nameplate. Severe Duty units include drain holes in the motor end bells and conduit box at the lowest points allowing condensation to drain out of the motor.

CAUTION! The drain holes are installed for the mounting position listed on the gearbox nameplate. Installing a unit in a mounting position other than what is shown on the nameplate will reposition the condensation drain holes. As a result, the drain holes may not be located at the lowest point and may not allow water to drain. This can cause premature drive failure.

ELECTRICAL CONNECTION

The motor must be installed and connected by a qualified electrician who is knowledgeable with the NEC article 430 and local regulations. He must make sure that the voltage and frequency of the electrical supply correspond with the data stamped on the motor nameplate before connecting the motor in accordance with the wiring diagram, which can be found in the terminal box. For brake connections, see the following pages.

At installation the electrician must make sure that the terminal block jumpers are positioned correctly and that all electrical connections including the ground connection are secure. In order to effectively protect the motor from overloads, appropriate motor protection must be provided. Fuses do not always provide adequate motor protection. For motors which are required to operate with a very high start-stop frequency, the overload heater type motor protection is insufficient. It is advisable in such applications to provide the motor with temperature sensors (thermistors) in the windings. Monitor the thermistors by means of an external trip device. In this way, the motor will be fully protected against practically all possible overloads.

When using motors outdoors or in washdown applications the cable entries into the terminal box must be directed downward to prevent water from entering the conduit box. The unused cable entries must be closed off properly.

LUBRICATION AND MAINTENANCE

The motor bearings are sealed and the grease content is adequate for the life of the bearing.

BRAKE COIL RESISTANCE

Motor Frame / Brake Size / Brake Torque (lb-ft)		DT71-80 BM(G)05 0.89 - 3.7	DT80 BM(G)1 4.4 - 7.4	DT90-100 BM(G)2 3.7 - 14.8	DT100 BM(G)4 17.7 - 29.5	DV112-132S BM(G)8 7.00 - 55.3	DV132M-160M BM15 18.4 - 110.6	DV160L-225 BM30/31/32/62 36.9 - 442.5
BRAKE VOLTAGE AC (to rectifier V_B)	DC	$R_B(\Omega)$ $R_T(\Omega)$	$R_B(\Omega)$ $R_T(\Omega)$	$R_B(\Omega)$ $R_T(\Omega)$	$R_B(\Omega)$ $R_T(\Omega)$	$R_B(\Omega)$ $R_T(\Omega)$	$R_B(\Omega)$ $R_T(\Omega)$	$R_B(\Omega)$ $R_T(\Omega)$
—	24	4.3 13.2	3.8 11.8	3.3 10.3	2.7 8.2	1.6 8.2	0.8 5.0	0.7 5.3
105-116	48	17.1 52.5	15.2 47.0	13.3 40.9	10.7 32.7	6.2 32.7	3.1 20.1	2.8 21.1
186-207	80	54.0 166	48.1 149	42.1 129	33.8 103	19.6 103	9.8 63.5	8.9 66.7
208-233	96	68.0 209	60.5 187	53.0 163	42.5 130	24.7 130	12.4 80.8	11.2 84.0
330-369	147	171 525	152 470	133 409	107 327	62 327	31.1 201	28.1 211
370-414	167	215 661	191 591	168 515	134 411	78.1 411	39.2 253	35.4 266
415-464	185	271 832	241 744	211 649	169 518	98.3 518	49.3 318	44.6 334

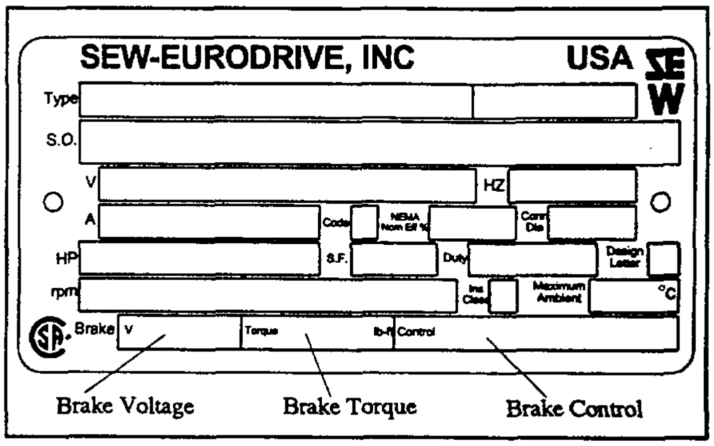
Voltage AC - The voltage shown is the nameplate AC brake voltage supplied to the brake rectifier.
DC - The voltage shown is the effective DC voltage required by the brake coil. The measured voltage from the rectifier will be 10-20% lower than that shown.

Brake Coil Resistance - values must be measured with the brake coil disconnected from the rectifier.
R_B - Accelerator coil resistance in Ω, measured from the red to the white brake coil wire.
R_T - Fractional coil resistance in Ω, measured from the white to the blue brake coil wire.

BRAKE CONNECTION (AC VOLTAGE)

SEW-Eurodrive motor brakes can be connected in a number of different ways. In order to connect the brake for each application, it is important to refer to the data on the motor nameplate that describes the brake system. The brake fields are: brake voltage, brake torque and brake control.

This operating instruction covers AC brake voltages with the following brake control components. If the brake voltage is DC, or if the brake control components differ from those listed below, an additional operating instruction must be consulted for connection information.



Brake Control (Rectifier)
BG1.5
BG3.0
BGE1.5
BGE3.0

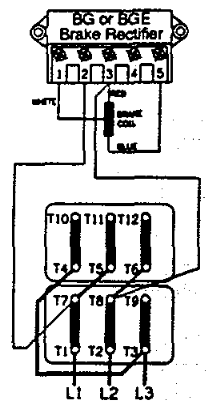
SEW-Eurodrive fail-safe mechanical brakes are DC controlled. Standardly, a brake rectifier (halfwave) is provided to convert the AC line voltage to the DC voltage required to drive the brake. 24VDC brakes do not include a rectifier. When voltage (V_B) is applied to the brake, it will release. When voltage (V_B) is removed from the brake, it will set. The brake rectifier can be wired either for normal brake reaction time (setting, stopping) or fast brake reaction time. The fast brake reaction will set the brake more quickly which will provide a shorter and more repeatable stopping distance. There are two basic types of brake rectifiers, BG and BGE. The BG brake rectifier is standard on motor sizes DT71- DT100. The BGE rectifier is standard on motor sizes DV112-DV225. The BGE rectifier can be ordered with motor sizes DT71-DT100 and will provide faster brake release times allowing the motor to cycle more frequently.

The wiring diagrams for brake connections are located on the inside of the motor conduit box lid. The brake will release and allow the motor to rotate when the nameplate AC brake voltage V_B is supplied to the brake rectifier terminals. There are certain cases where the brake rectifier can receive its voltage from the motor's terminal block, meaning that when power is applied to the motor it will simultaneously release the brake and start the motor. See Page 3 for this description.

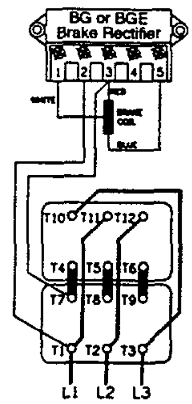
BRAKE VOLTAGE SUPPLIED FROM THE MOTOR

There are specific instances when the brake voltage can be tapped from the motor's terminal block. The advantage of brake systems wired in this way is when power is applied to the motor, the brake releases, (requiring no additional brake supply power wiring). The brake can be wired to the motor terminal block under the following conditions: a single speed motor; the motor is started and run across the line (i.e., no inverter or electronic soft start). The connections shown on this page are for normal brake reaction time. For rapid brake reaction time, incorporate the contact as shown on the brake diagram located on the inside of the motor conduit box lid.

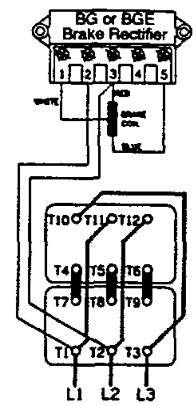
Brake Motor Connection
Single Speed Dual Voltage -ΔΔ/Δ
Connection Diagram DT72
Example Motor Voltages:
230ΔΔ/460Δ Volts - 60 Hz



Motor wired for low voltage.
Brake voltage matches low motor voltage.
Example: 230/460V Motor
Motor wired 230V
Brake voltage 230V

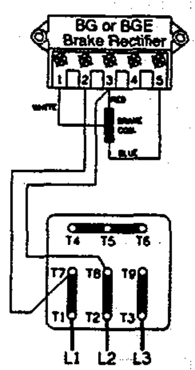


Motor wired for high voltage.
Brake voltage matches low motor voltage.
Example: 230/460V Motor
Motor wired 460V
Brake voltage 230V

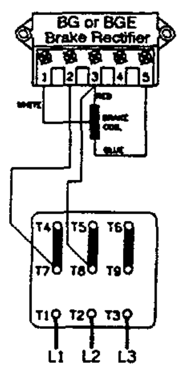


Motor wired for high voltage.
Brake voltage matches high motor voltage.
Example: 230/460V Motor
Motor wired 460V
Brake voltage 460V

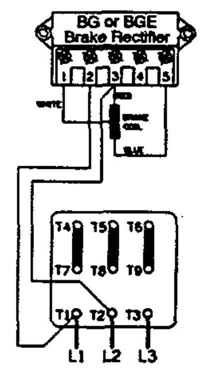
Brake Motor Connection
Single Speed Dual Voltage - YY/Y
Connection Diagram DT79
Example Motor Voltages:
230YY/460Y Volts - 60 Hz
200YY/400Y Volts - 60 Hz



Motor wired for low voltage.
Brake voltage matches low motor voltage.
Example: 230/460V Motor
Motor wired 230V
Brake voltage 230V

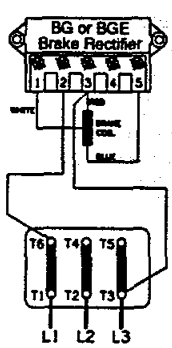


Motor wired for high voltage.
Brake voltage matches low motor voltage.
Example: 230/460V Motor
Motor wired 460V
Brake voltage 230V

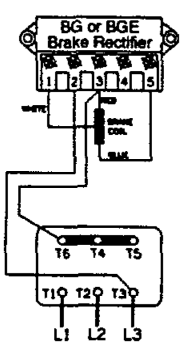


Motor wired for high voltage.
Brake voltage matches high motor voltage.
Example: 230/460V Motor
Motor wired 460V
Brake voltage 460V

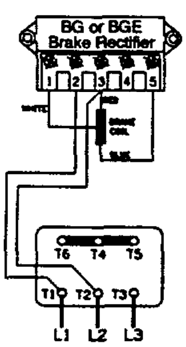
Brake Motor Connection
Single Speed Dual Voltage - Δ/Y
Connection Diagram DT13
Examples Motor Voltages:
200Δ/346Y Volts - 60 Hz
330Δ/575Y Volts - 60 Hz
220Δ/380Y Volts - 50 Hz



Motor wired for low voltage.
Brake voltage matches low motor voltage
Example: 200/346V Motor
Motor wired 200V
Brake voltage 200V



Motor wired for high voltage.
Brake voltage matches low motor voltage.
Example: 220/380V Motor
Motor wired 380V
Brake voltage 220V



Motor wired for high voltage.
Brake voltage matches high motor voltage.
Example: 220/380V Motor
Motor wired 380V
Brake voltage 380V

RE-ADJUSTING THE BRAKE AIR GAP

A properly adjusted brake air gap is critical for correct operation. The following table indicates the required air gap measurement.

Motor Size	Brake Size	Air Gap
DT71 - DT100	BM(G)05 - BM(G)4	0.010"-0.024" (0.25-0.6 mm)
DV112 - DV225	BM(G)8 - BM31	0.012"-0.047" (0.3-1.2 mm)
DV180-DV225	BM32-BM62 Double Disc	0.016"-0.047" (0.4-1.2 mm)

Prolonged use of the brake will wear the brake disc lining. This wear increases the air gap. When the air gap approaches its maximum value, the brake must be re-adjusted. To re-adjust the brake, follow the procedure below.

1. Remove the fan cover (14), fan snapring, fan (17), rubber seal (2), and any accessories at the fan end.
2. Insert a feeler gauge between the brake coil body (21) and the stationary disc (22), tighten the adjusting nuts (19) until the minimum value for the air gap is reached equally around the brake. With motor size 160L and up (brakes BM30 to BM62) first screw the threaded bushings (24) into the endshield. After setting the air gap, lock the bushings (24) against the coil body.
3. Ensure a play of 0.06" to 0.08" (1.5 to 2 mm) in the releasing arm. See "THE HAND RELEASE MECHANISM."

REPLACEMENT OF THE BRAKE DISC (26)

Extended operation of the brake may wear the brake disc (26) beyond acceptable limits. The thickness of the brake disc can be measured to determine if this has occurred.

Motor Size	Brake Size	Min. Disc (26) Thickness
DT71 - DT100	BM(G)05 - BM(G)4	0.354" (9mm)
DV112 - DV225	BM(G)8 - BM62	0.394" (10mm)

If the brake disc (26) is worn below the measurement given, it must be replaced. If the thickness is greater than the specification above, the brake disc is still usable and the brake can be re-adjusted.

THE HAND RELEASE MECHANISM

Most of our brakes are supplied with a hand-operated release lever. This allows opening of the brake without applying power, allowing for adjustments on the driven machinery.

There are two brake release mechanisms available:

The "BM(G)HR" (4) type requires a lever to be inserted into the release arm. To open the brake, pull the lever away from the motor. It will re-engage automatically, once the lever is released. The lever, when not used, is attached to the motor's cooling fins with clamps.

The screw-type "BM(G)HF" (5) arrangement requires a hexagon key which, when turned clockwise, opens the brake.

Since the stationary disc (22) will move away from the coil body during the brake's operation, it is vital that there is free play (floating clearance) on the release arm of 0.060"-0.080" (1.5-2.0 mm). The springs (11) should be placed between the arm (7) and the nuts (12) to eliminate noise.

The brake release mechanism is not used to change the brake's torque setting. There must always be clearance on the lever.

TROUBLESHOOTING

Fault: Motor does not run

1. Check the motor and brake wiring for damage and proper connection.
2. At the motor, measure the line voltage, line current and motor resistance of all three phases.
3. If all three phases read a similar current value the following conditions may exist:
   - The motor may be blocked by either an excessive external load, or problems in the reducer or the brake. In both cases, the motor should draw locked rotor (in-rush) current. Consult SEW-Eurodrive catalogs for these values. Release the brake mechanically, reset the air gap if needed, or disconnect the load from the output shaft.
   - If the brake is at fault electrically see #4 below.
   - If the current differs significantly from the rated locked rotor current, the motor is either an incorrect voltage, or it is jumpered for the wrong voltage.
4. If the brake can be released mechanically, but does not respond to voltage, check the brake for electrical problems.
   - Make sure the wiring is according to the instructions. Pay special attention to the brake voltage.
   - Energize the brake circuit and measure the AC voltage on the rectifier terminals 2 and 3 (BG/BGE rectifiers). The measured voltage should correspond to the nameplate inscription: "Brake V."
   - Measure the DC voltage across terminals 3 and 5 of the brake rectifier which should be about 35% to 45% of the previously measured AC voltage.
   - If there is no fault found to this point, measure the resistance of the brake coils. Disconnect the coil from the rectifier for this measurement. See the table on Page 2 for the brake coil resistance values.
   - Measure the resistance of each brake coil lead to the brake coil body. This test should show an open circuit. If a short is found, the brake coil is damaged.

If the results of all these checks (electrical connection, mechanical checks and adjustments, and electrical tests) indicate that the brake should work, then the most likely cause of the brake's failure to release is a damaged brake rectifier.

Fault: Brake stopping time is too slow

If the brake has been operating well for some time and a gradual increase in stopping time has occurred, the release arm may have come in contact with the coil body. Verify that the brake release arm end play is correct, and check for excessive brake disc wear, (see previous instructions).

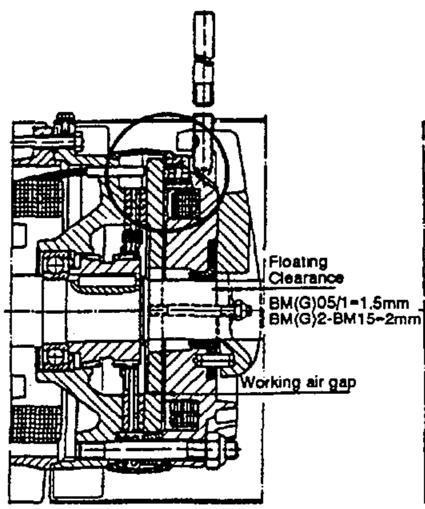
If the brake has been in operation for some time, and the stopping has become erratic, dust accumulation around the stationary disc guides may be the cause. Remove the brake's rubber sealing collar and clean with an air hose.

If the application is new, check the brake's wiring and air gap. If the brake is not wired for fast response, then changing the brake wiring to fast response will decrease the stopping time. Vertical motion and indexing applications may also require the fast response connection. Increasing the brake's torque may remedy the situation, but will also increase stress on the transmission.

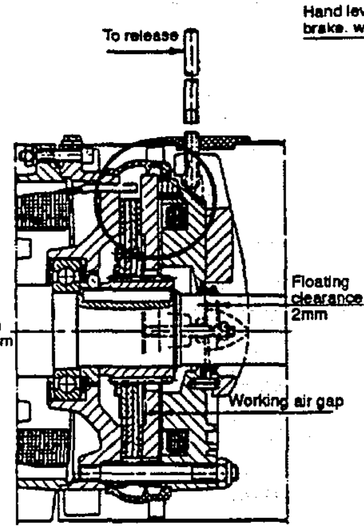
On applications requiring excessive brake work, the lining's surface may become glazed due to extreme heat. The application of a BGE rectifier will improve this situation dramatically. BGE rectifiers are standard equipment on motors size DV 112 - DV225, but optional on the smaller sizes DT71-DT100. Contact SEW-Eurodrive for more information.

BM(G) Brake Cross Section and Exploded Views

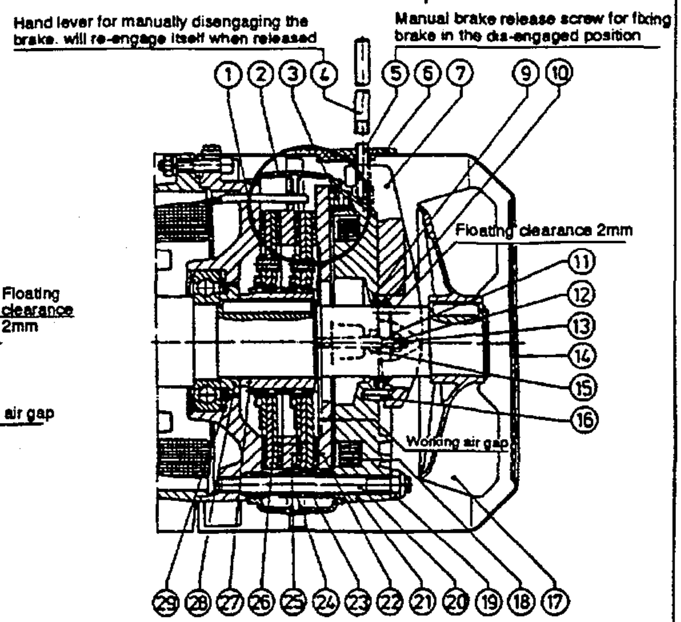
BM(G) 05 - BM 15

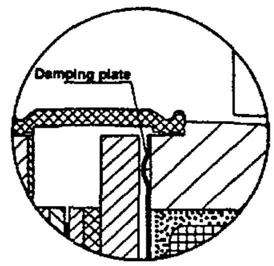


BM 30/31



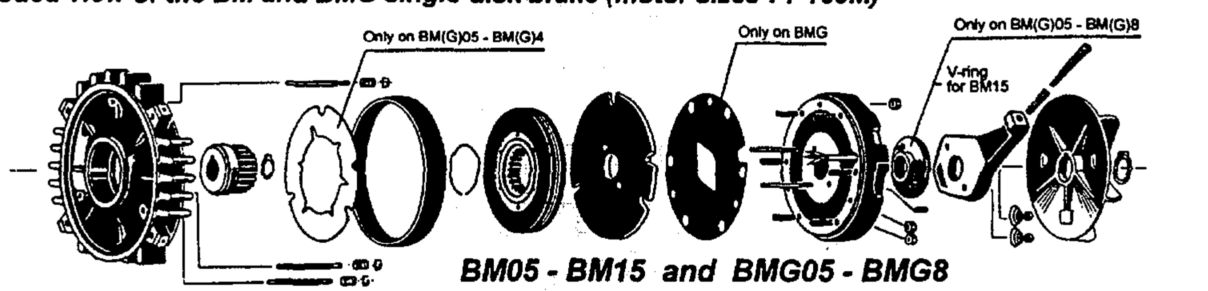
BM 32/62





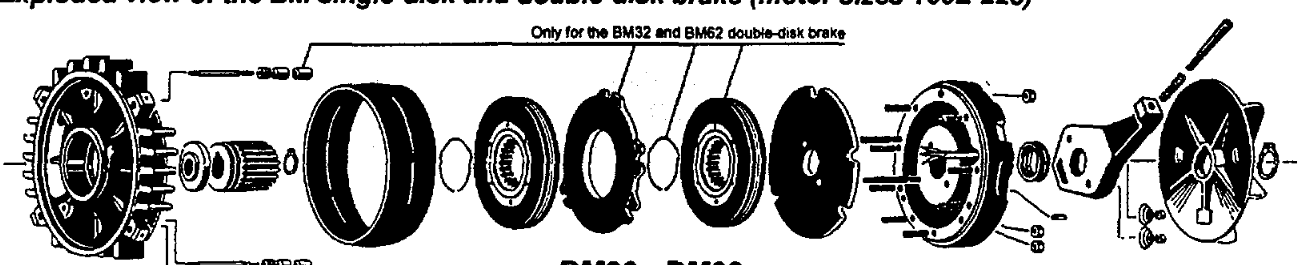
(1) Brake end shield
(2) Rubber sealing collar
(3) Braking springs
(4) Hand release lever
(5) Releasing screw
(6) Closing plate
(7) Release arm
(9) Sealing ring
(10) V-ring
(11) Conical spring
(12) Release
(13) Stud
(14) Fanguard
(15) Grommet
(16) Dowel pin
(17) Fan
(18) N/A
(19) Brake adjustment nut
(20) Retaining stud
(21) Brake coil body
(22) Stationary disc
(23) Pressure ring
(24) Setting sleeve
(25) Dual brake pad stationary disc
(26) Brake disc complete
(27) Carrier
(28) Spacer bushing
(29) Cup Spring

Exploded view of the BM and BMG single-disk brake (motor sizes 71-160M)



BM05 - BM15 and BMG05 - BMG8

Exploded view of the BM single-disk and double-disk brake (motor sizes 160L-225)



BM30 - BM62

Troubleshooting Chart

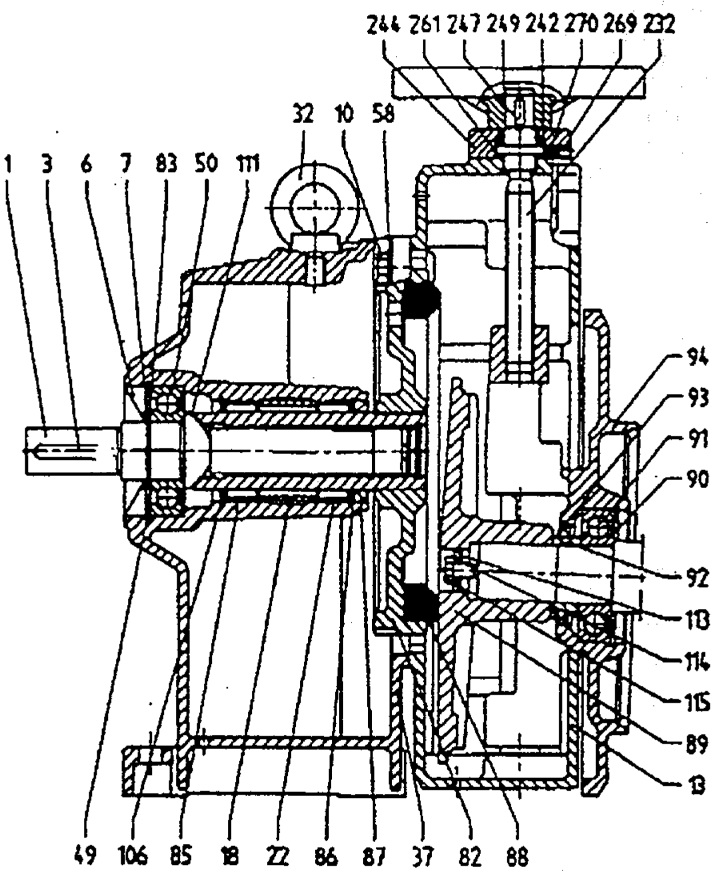
PROBLEM	CAUSE	REMEDY
Motor Overheats (Check temperature with instrumentation)	Motor not connected for proper supply voltage.	Check connection diagram on conduit box cover and correct the wiring.
	Supply voltage varies outside the allowable tolerance causing an undervoltage or over-voltage condition.	Assure correct supply voltage.
	Insufficient cooling air volume due to: a. Low frequency operation on variable frequency drive. b. Obstructed air flow.	Increase air flow: a. Continuous running auxiliary fan. b. Ensure unobstructed air flow.
	Ambient temperature is too high.	Ensure cool air gets to the motor. Ducting may be required.
	Overload at rated voltage. Unit will draw current in excess of nameplate rating and run below rated speed.	Select a larger unit.
	Motor's allowable duty cycle is exceeded (too many starts per hour required).	The problem may or may not be solved with a larger motor. Contact SEW-Eurodrive.
	Single phasing due to break or loose connection in supply line or blown fuse.	Repair supply lines. Replace fuses.
Motor does not run.	Blown fuse.	Determine and correct cause of failure and re-place fuse.
	Motor protection device activated.	Reset protective device. Identify and correct cause for device activation.
	Motor protection device faulty or will not reset.	Check protection device for faults.
Motor will not start or starts sluggishly	Motor not connected for proper voltage.	Check connection diagram in conduit box cover and correct the wiring.
	Large voltage and/or frequency fluctuation at starting.	Ensure stable power supply.
For reduced voltage start-ing, motor will not start in Star Connection but will start in Delta connection.	Insufficient torque in Star Connection.	Start motor directly in Delta Connection if possi-ble. Otherwise use a larger motor.
	Faulty contact in Star/Delta starter.	Correct fault condition.
Motor hums and draws high current.	Faulty or defective winding.	Have motor repaired by qualified service shop.
	Rotor dragging.	
Fuses blow or motor over-current protection trips im-mediately.	Short circuit in power supply conductors or in the motor.	Correct the fault condition.
	Motor has ground fault or winding to winding short circuit.	Have motor repaired by qualified service shop.
	Motor improperly connected.	Check connection diagram in conduit box cover and correct the wiring.
Motor runs in wrong direction	Motor supply leads misconnected.	Switch two supply leads.

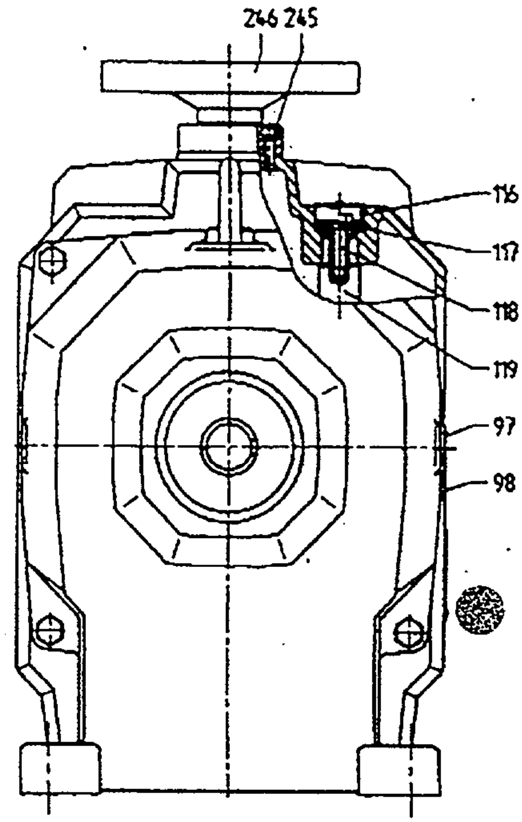
Note: If after proceeding through the Troubleshooting Chart the motor is found to be defective, contact your nearest SEW-Eurodrive Assembly Plant for warranty assistance or replacement parts.

Variable Speed Unit VARIMOT®

D36

PARTS LIST
15 255 13 US





When ordering parts, please supply nameplate data with serial number or S.O. number, model number, description of part and part number.

Ⓑ - Option B - Severe Duty Feature
X - as required
Shaded items denote recommended spare parts.

Item	Part Name	Description	Part No	Qty
1	Output Shaft Complete	28mm Diameter	154 010 6	1
1	Output Shaft Complete	1.125 inch Diameter	154 011 4	1
3	Key	A8x7x50mm	010 023 4	1
3	Key	1/4x1/4x1-11/16 in.	92001004	1
6	Oil Seal	A35x80x13mm	012 080 4	1
7	Retaining Ring	35x1.5mm External	010 280 6	1
10	Hex Head Screw	M10x30mm	010 117 6	4
13	Mounting Plate		150 782 6	1
18	Spacer		150 572 6	1
22	Needle Roller Bearing	RNA4908	010 579 1	1
32	Eyebolt	M12mm	010 230 X	1
37	Housing		150 541 6	1
49	Retaining Ring	80x2.5mm Internal	010 324 1	1

Item	Part Name	Description	Part No	Qty
50	Ball Bearing	6307-2Z-J	90000517	1
58	Lockwasher	B10mm	010 992 4	4
82	Hollowshaft Complete	With Friction Ring	154 032 7	1
83	Shim	35x45x0.5mm	010 426 4	1
85	Needle Roller Bearing	RNA4908	010 579 1	1
86	Retaining Ring	62x2mm Internal	010 321 7	1
87	Oil Seal	A48x62x8mm	011 554 1	1
88	Friction Ring		150 758 7	1
89	Driving Cone		150 776 1	1
89	Driving Cone Ⓑ	Chrome Plated	150 8[illegible]	1
90	Retaining Ring	80x2.5mm Internal	010 32[illegible]7	[illegible]
91	Ball Bearing	6307-2RS-J	90006307	[illegible]
92	Wear Sleeve		150 298 0	[illegible]

Variable Speed Unit VARIMOT®

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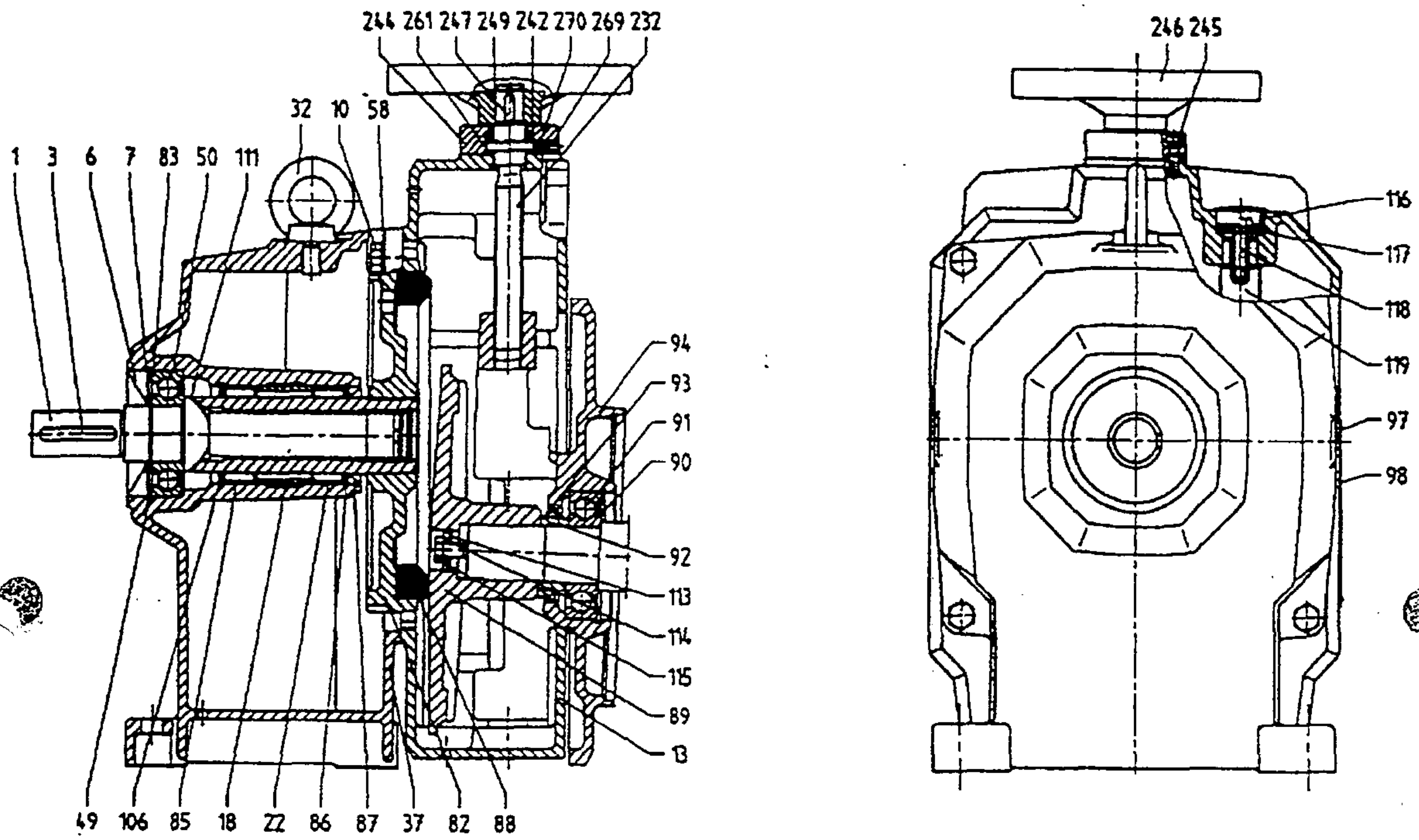


When ordering parts, please supply nameplate data with serial number or S.O. number, model number, description of part and part number.

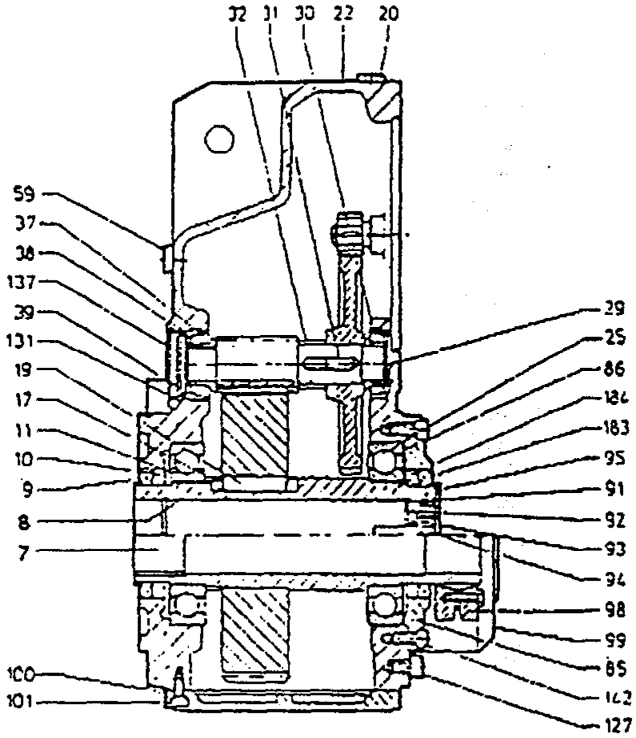
Ⓑ - Option B - Severe Duty Feature
X - as required
Shaded items denote recommended spare parts.

Item	Part Name	Description	Part No	Qty
93	Oil Seal	AS45x60x7/9mm	010 658 5	1
94	Motor Mounting Plate	DT100	154 044 0	1
94	Motor Mounting Plate	DV112-132S	154 047 5	1
97	Round Head Groove Pin	2x4mm	010 764 6	2
98	Scale		150 124 0	1
106	Retaining Ring	62x2mm Internal	010 321 7	1
111	Cam Washer		150 786 9	1
113	Retaining Ring	25x1.2mm Internal	013 005 2	1
[illegible]	Washer	8.4x24.8x4mm	011 231 3	1
[illegible]	Hex Head Screw	M8x35mm	011 692 0	1
[illegible]	Closing Plug	30.9mm	013 614 X	2
[illegible]7	Disc	8.4x29.8x4mm	011 232 1	2
118	Hex Head Screw	M8x25mm	010 112 5	2
119	Guide Pillar		150 798 2	2
119	Guide Pillar Ⓑ		150 789 3	2
232	Spindle		149 987 4	1
242	Sleeve		150 057 0	1
244	Plate		149 983 1	1
245	Socket Head Screw	M6x18mm	010 157 5	4
246	Handwheel	160x18mm	013 728 6	1
246	Handwheel-HS Complete	160x18mm	111 842 0	1
247	Key-Hardened	A6x6x18mm	010 012 9	
249	Retaining Ring	18x1.2mm External	010 270 9	
261	Washer		149 991 2	1
269	Set Screw	M6x8mm	010 459 0	1
270	Friction Pad	4.5 x 6mm	104 127 4	1

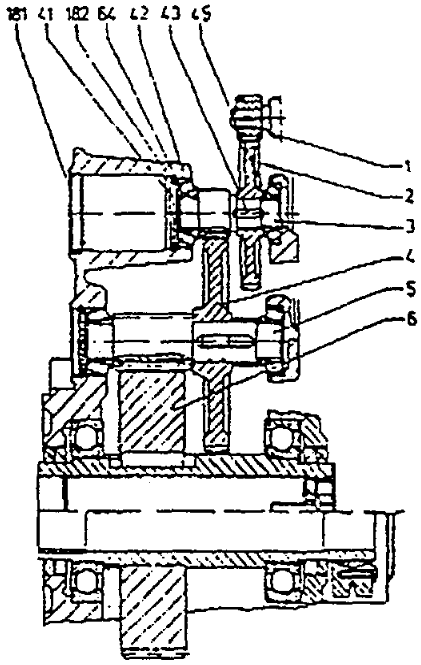
Parallel (Helical) Shaft Mounted Reducer
FA 90A

PARTS LIST
42 255 22 US

(1) FA 90A 2.750 in. Dia. Bore
(2) FA 90A 2.9375 in. Dia. Bore
(3) FA 90A 70mm Dia. Bore
(4) FA 90A with Shrink Disc



2–Gear Stages



3–Gear Stages

When ordering parts, please supply nameplate data with serial number or S.O. number, model number, description of part and part number. All gears are stamped with a part number.

Use Loctite® 574 to seal mating surfaces of flanges, cover, etc.

For motors, input covers, variable speed units, housings and adapters attached to the input side, refer to the respective parts lists.

X = As required

Item	Part Name		Description	Part No.	Qty
11	Ball Bearing		6220-Z	011 726 9	1
10	Oil Seal	(1)(3)(4)	A95x125x12mm	011 318 6	1
9	Oil Seal	(1)(3)(4)	AS95x125x12mm	010 674 7	1
9	Oil Seal	(2)	AS100x125x13mm	038 129 2	1
8	Key	(3)	A20x12x110mm	010 045 5	1
8	Key	(2)	$^3/_4$x$^1/_2$x3$^1/_2$ in.	90000824	1
8	Key	(1)	$^5/_8$x$^5/_8$x3$^1/_4$ in.	92001010	1
7	Hollowshaft	(4)		122 637 1	1
7	Hollowshaft	(3)	70mm Dia.	120 860 8	1
7	Hollowshaft	(2)	2.9375 in. Dia.	038 102 0	1
7	Hollowshaft	(1)	2.750 in. Dia.	122 683 5	1
6	Gear				1
5	Pinion Shaft				1
4	Gear				1
3	Pinion Shaft				1
2	Gear				1
1	Pinion				1

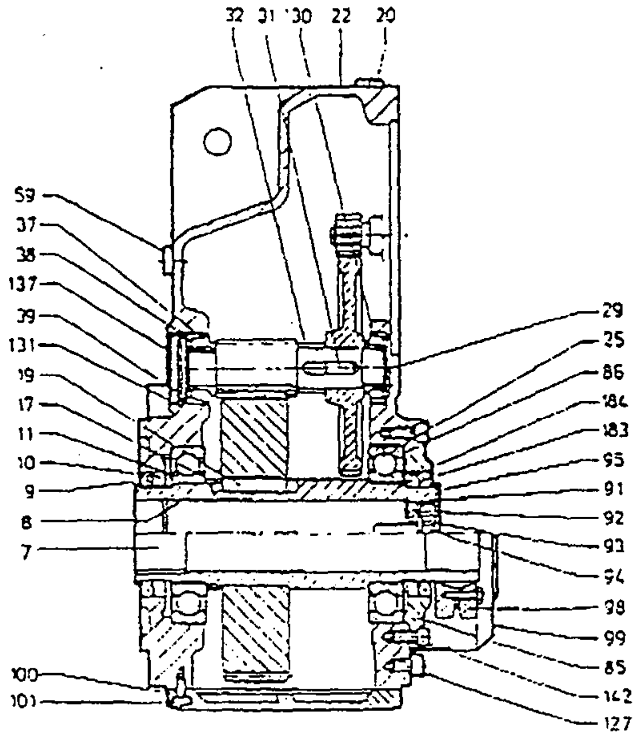
Item	Part Name	Description	Part No.	Qty
43	Key	B8x7x20mm	011 599 1	1
42	Taper Roller Bearing	31306	012 482 6	1
41	Snapring	72x2.5mm	010 322 5	1
39	Snapring	72x2.5mm	010 322 5	1
38	Shim	63x72x0.5mm	012 053 7	X
38	Shim	63x72x0.3mm	012 052 9	X
38	Shim	63x72x0.1mm	012 051 0	X
37	Taper Roller Bearing	33207	012 483 4	1
32	Spacer		114 058 2	1
31	Key	B12x8x28mm	011 487 1	1
30	Taper Roller Bearing	30207	012 480 X	1
29	Gasket		100 700 9	1
25	Ball Bearing	6220-Z	011 726 9	1
22	Gearcase		114 653 X	1
20	Breather Plug	AM22x1.5mm	010 468 X	1
19	Key	B22x14x63mm	011 493 6	1
17	Spacer		120 867 5	1

Parallel (Helical) Shaft Mounted Reducer FA 90A

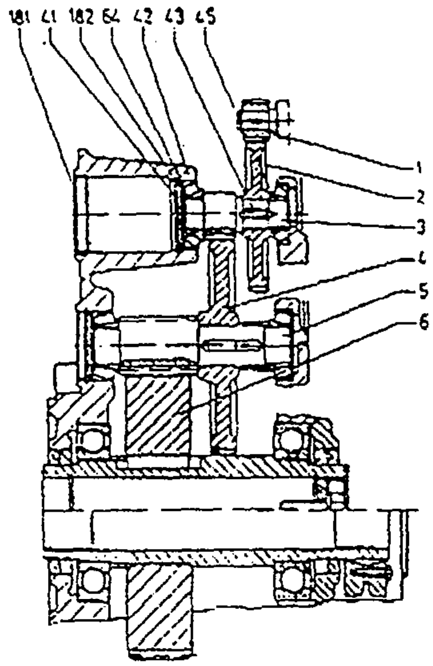
PARTS LIST
42 255 22 US

(1) FA 90A 2.750 in. Dia. Bore
(2) FA 90A 2.9375 in. Dia. Bore
(3) FA 90A 70mm Dia. Bore
(4) FA 90A with Shrink Disc

Post-it® Fax Note 7671 | Date 10/15 | # of pages ▸ 2
To DON SHAAUB | From TOM SIEGFRIED
Co./Dept. ACE | Co. BUSH MILLER
Phone # | Phone # 393-3901
Fax # | Fax # 393-6264



2–Gear Stages



3–Gear Stages

When ordering parts, please supply nameplate data with serial number or S.O number, model number, description of part and part number. All gears are stamped with a part number.

Use Loctite® 574 to seal mating surfaces of flanges, cover, etc.

For motors, input covers, variable speed units, housings and adapters attached to the input side, refer to the respective parts lists.

X = As required

Item	Part Name	Description	Part No.	Qty
94	Hex Head Screw (3)	M20x50mm	010 128 1	1
93	Lockwasher (1)(2)(3)	B20mm	010 996 7	1
92	Disc (3)		103 465 0	1
92	Disc (2)		90000623	1
92	Disc (1)		92000005	1
91	Snapring (2)	75x2.5mm	010 323 3	1
91	Snapring (1)(3)	70x2.5mm	010 337 3	1
86	Shim	150x180x0.5mm	011 352 2	X
86	Shim	150x180x0.3mm	011 348 8	X
86	Shim	150x180x0.1mm	011 331 X	X
85	Sealing Flange		122 887 0	1
64	Shim	63x72x0.5mm	012 053 7	X
64	Shim	63x72x0.3mm	012 052 9	X
64	Shim	63x72x0.1mm	012 051 0	X
59	Drain Plug	M22x1.5mm	011 431 6	6
45	Taper Roller Bearing	31305	012 481 8	1

Item	Part Name	Description	Part No.	Qty
184	Oil Seal (1)(3)(4)	A95x125x12mm	011 316 6	1
183	Oil Seal (2)	AS100x125x13mm	038 129 2	1
183	Oil Seal (1)(3)(4)	AS95x125x12mm	010 674 7	1
182	Thrust Washer	S63x72x3mm	012 033 2	1
181	Closing Cap	30x12mm	010 693 3	1
142	Socket Head Screw	M16x35mm	010 167 2	6
137	Thrust Washer	S63x72x3mm	012 033 2	1
131	Closing Cap	72x9mm	010 692 5	1
127	Socket Head Screw (4)	M12x20mm	010 162 1	2
101	Socket Head Screw	M10x20mm	012 316 1	10
100	Cover		120 849 7	1
99	Cover (4)		122 640 1	1
98	Shrink Disc (4)	95-72	122 641 X	1
95	Closing Cap (1)(3)		114 081 7	1
94	Hex Head Screw (1)(2)	3/4-10x2 in.	92000010	1

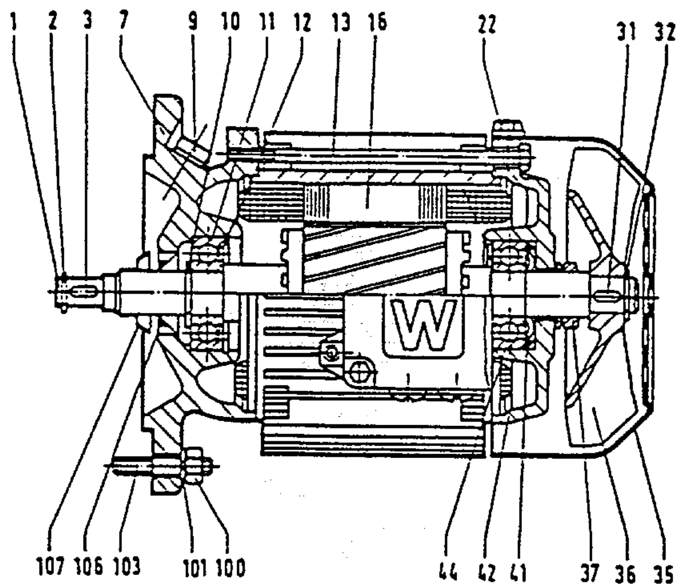
EW-EURODRIVE, INC.

Motor

DFT90L & S; DFT100L & LS
For Mounting to Gear Reduers:

PARTS LIST
08 830 37 US

(1) Size 40 & 50 (2) Size 60 (3) Size 70
(4) Size 80 (5) Size 90 (6) Size 100



When ordering parts, please supply nameplate data with serial number or S.O. number, model number, description of part and part number. For terminal box parts, refer to respective parts list.

[ ] Parts for Severe Duty motor feature
X As required
a) For Size 40 & 50 footmounted gear units

Item	Part Name	Description	Part No.	Qty
7	Flange (2)		135 178 8	1
7	Flange (1)	DFT100	181 406 0	1
7	Flange (1)	DFT90	135 176 1	1
3	Key DFT100	A4x4x18mm	011 438 3	1
3	Key DFT90	A3x3x14mm	010 069 2	1
2	Snapring DFT100	16x1mm	010 268 7	1
2	Snapring DFT90	14x1mm	010 266 0	1
1	Rotor	DFT100LS-8/2	135 474 4	1
1	Rotor	DFT100L-8/2	135 364 0	1
1	Rotor	DFT100LS-4	135 473 6	1
1	Rotor	DFT100L-4	135 363 2	1
1	Rotor	DFT90S-8/2	135 466 3	1
1	Rotor	DFT90L-8/2	135 352 7	1
1	Rotor	DFT90S-4	135 465 5	1
1	Rotor	DFT90L-4	135 351 9	1

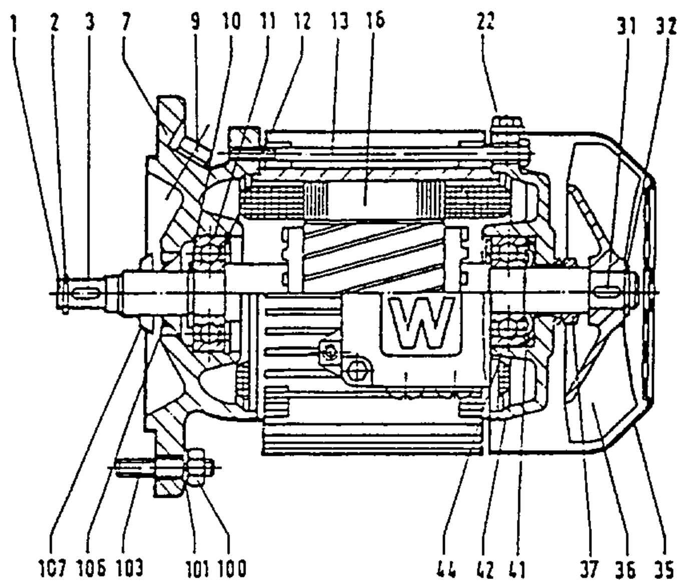
Item	Part Name	Description	Part No.	Qty
22	Hex Head Screw	M5x7mm Z1	013 630 1	4
16	Stator a)	Flattened		1
16	Stator			1
13	Hex Hd Screw DFT100	M6x205mm	011 871 0	4
13	Hex Hd Screw DFT90	M6x155mm	011 870 2	4
12	Snapring	72x2.5mm	010 322 5	1
11	Ball Bearing	6306C3-2RS	90000528	1
10	Snapring	30x1.5mm	011 462 6	1
9	Plug (5) (6)	M22x1.5mm	011 431 6	1
9	Plug (3) (4)	M12x1.5mm	011 430 8	1
9	Plug (1) (2)	M10x1mm	011 426 X	1
7	Flange (6)	DFT100	135 301 2	1
7	Flange (5)		135 184 2	1
7	Flange (4)		135 182 6	1
7	Flange (3)		135 180 X	1

Motor

DFT90L & S; DFT100L & LS
For Mounting to Gear Reduers:

PARTS LIST
08 830 37 US

(1) Size 40 & 50 (2) Size 60 (3) Size 70
(4) Size 70 (5) Size 80 (6) Size 100



When ordering parts, please supply nameplate data with serial number or S.O. number, model number, description of part and part number. For terminal box parts, refer to respective parts list.

[ ] Parts for Severe Duty motor feature
X As required
a) For Size 40 & 50 footmounted gear units

Item	Part Name	Description	Part No.	Qty
100	Hex Nut (3)	M10mm	010 200 8	4
100	Hex Nut (2)	M8mm	010 199 0	4
100	Hex Nut (1)	M6mm	010 198 2	4
44	Ball Bearing	6205C3-2RS	90000522	1
42	B-Side Endshield		135 192 3	1
41	Spring Washer	44x51x0.4mm	011 583 5	1
37	V-Ring	V25	011 769 2	1
36	Fan		135 482 5	1
35	Fan Guard	Flattened	135 199 0	1
35	Fan Guard	St 1403m-gal Zn3	135 198 2	1
32	Snapring	22x1.2mm	010 272 5	1
31	Key	A6x6x22mm	010 013 7	1
[22]	Washer	B5.3mm St E2E	012 917 8	4
[22]	Hex Head Screw	M5x8mm A2-70	011 853 2	4

Item	Part Name	Description	Part No.	Qty
107	Oil Slinger	30mm	011 663 7	1
106	Oil Seal	A30x47x7mm	010 617 8	1
103	Stud (6)	M16x35mm	010 085 4	4
103	Stud (4) (5)	M12x30mm	010 081 1	4
103	Stud (3)	M10x25mm	010 079 X	4
103	Stud (2)	M8x20mm	010 074 9	4
103	Stud (1)	M6x16mm	010 071 4	4
101	Lockwasher (6)	B16mm	010 995 9	4
101	Lockwasher (4) (5)	B12mm	010 993 2	4
101	Lockwasher (3)	B10mm	010 992 4	4
101	Lockwasher (2)	B8mm	010 991 6	4
101	Lockwasher (1)	B6mm	010 990 8	4
100	Hex Nut (6)	M16mm	010 203 2	4
100	Hex Nut (4) (5)	M12mm	010 201 6	4

INSTALLATION & TROUBLESHOOTING INSTRUCTIONS

FOR

HYDRAULIC POWER UNITS

INTRODUCTION

This manual provides descriptive information, operation and maintenance instructions for standard Hydraulic Power Units. Additional information may be obtained by referencing your companies purchase order number, or by contacting Weaver Fluid Power, Inc.

****************************** NOTE ********************************

Some of the information in this manual may not apply to your power unit, and information on more custom units may require obtaining service and application information from other sources.

****

WARNING

It is imperative that persons involved in the installation, service, and operation of the power unit be familiar with how the equipment is to be used, the limitation of the system and its component parts, and have knowledge of good hydraulic practices in terms of safety, installation, and maintenance.

DESCRIPTION

The standard Hydraulic Power Unit usually consists of a hydraulic reservoir that incorporates a baffle, clean-out opening drain, oil level gage, filter/breather assembly, and spare return connections.

The pump will be coupled to the motor using a flexible shaft coupling and will be mounted using a bell housing (requires NEMA "C" Motor) or will be foot mounted requiring a pump foot bracket coupling guard. Also included on most standard units is a Pump Suction Filter (or Suction Strainer), Relief Valve, and a Pressure Gauge with Shut-Off Valve.

More custom type power units may have heat exchangers for oil cooling, pressure or return filters, oil immersion heaters, directional valves, and other pressure and flow control valves, or system monitoring instrumentation.

PREPARATION FOR USE

Unpacking and Checking

The Power Unit is mounted on skids and carefully packed for shipment. Do not remove it from skid until it has been carefully checked for damage that may have occurred in transit. Report all damage immediately to the carrier and send a copy to Weaver Fluid Power. All open ports on the Power Unit were plugged at assembly to prevent the entry of contamination. These plugs must not be removed until just before piping connections are made to the unit.

STORAGE

If the Power Unit is not going to be installed immediately, it

CLEANLINESS

Experience has shown that most dirt enters a hydraulic system during installation. We recommend the following rules be followed:

A) All open ports on the power unit, cylinders, etc. must remain plugged with tape or plastic plugs until just before the hydraulic connections are made.

B) All interconnecting tubing, pipe, or hose should be clean and free of rust, scale, and dirt. The ends of all connectors should be plugged until just before they are to be installed in the system.

C) All openings in the reservoir such as the filler breather or access end covers holes must remain closed during installation.

D) If Teflon tape or pipe dope is used, be sure it doesn't extend beyond the first thread of the pipe fitting.

RESERVOIR INSPECTION

The reservoir has been thoroughly cleaned and oiled at our plant prior to shipping. It is suggested, however, to remove the reservoir access covers and re-inspect the tank for cleanliness. JIC reservoirs are provided with a removable baffle for greater access for cleaning.

RESERVOIR FILLING

The reservoir must be filled with clean fluid through the filler cap on the reservoir. The type of fluid must be compatible with the seals used on the power unit and must comply with the recommendations of the manufacturers of the component parts. Refer to the component manufacturer's catalog for fluid requirements. The cleanliness of the fluid going into the reservoir is very important, and in some cases, even new oil out of the drum is not adequate. We recommend that any fluid being transferred into the reservoir be done with a transfer pump with a 10 micron filter installed. A filter cart is available for this purpose.

COUPLING ALIGNMENT

It is possible for pump/motor shaft alignment to be incorrect because of shock incurred during shipping. The alignment should be re-checked before start-up.

If the pump/motor assembly has been mounted with a bell housing, the only check required is to verify that the coupling halves have adequate clearance and that the coupling set-screws are tight. A slot is provided in the bell housing for this purpose.

START UP PROCEDURE

1) Open any ball or gate valve (if applicable) located in the pump suction line.

2) Back the system relief valve and/or pump pressure compensator adjustment knob out, so that the pressure will be near zero during the initial start.

should be stored indoors, covered with plastic sheet, and all open ports plugged. If long term storage is expected (6 months or more), we recommend filling the reservoir completely with clean hydraulic fluid to prevent the entry of moisture.

REMOVING FROM SHIPPING SKIDS

Small JIC style Power Units should be moved with a fork-lift truck with 2 x 4 boards under the reservoir belly to distribute and steady the load. Larger JIC style Power Units have lifting holes in the reservoir end plates. Steel pipes can be inserted into the lifting holes for handling with a fork-lift truck. L-shaped reservoirs are provided with clearance under the base plate for movement with a fork-lift truck.

INSTALLATION

LOCATING POWER UNIT

The unit should be installed indoors, and preferably in a clean dry environment with an ambient temperature of 60 to 100 degrees F. The unit can be installed outdoors if the reservoir was provided with optional weatherproof construction, and provisions were made for extreme temperature conditions. The reservoir can be secured to the floor or base using the floor mounting holes located on the reservoir legs.

SERVICE CONNECTIONS

Water- (If water cooled heat exchanger has been provided)- Connect the water supply to the inlet of the heat exchanger with a shut-off valve and strainer. If a Temperature Control Valve has been provided, it also should be installed on the outlet side. Flow from the temperature control valve should be connected directly to the facility drain system.

Electrical- Connect the pump motor to the facility power source following good practices as outlined in the National Electric Code and any local codes which may apply. Verify that the available voltage is the same as the voltage identified on the motor nameplate. Most motors have dual voltage rating, so verify that the leads in the conduit box have been connected together as defined on the motor nameplate to match the facility power source available.

If Solenoid valves, pressure/temperature switches, or oil immersion heaters have been provided on the power unit, refer to the component name tag or other service information in this manual for operating voltage and ratings.

SUPPLY AND RETURN CONNECTIONS

Complete all necessary interconnecting piping between the power unit and hydraulic actuators. The line sizes should be determined based on oil flow, operating pressure, and allowable pressure drop between the power unit and actuator.

WARNING

Check to insure that all hose, pipe and fittings match the pressure rating of the power unit.

GENERAL MAINTENANCE

Electric Motors- Lubricate as recommended by the motor manufacturer.

Filters- Change or clean as required or as indicated on filters supplied with visual indicators.

Suction Strainers- Should be cleaned after 10 hours operation and 200 hours thereafter.

Reservoirs- Maintain oil level at all times. The oil should be checked after the first 100 hours and verify that the class of oil meet the requirements of the pump being used. Have the oil tested annually and replace when indicated by the analysis results.

RECOMMENDED SPARE PARTS

Spare filter elements should be purchased with the power unit and be available during the start-up operation. Other spare parts may be required and are a function of the duty cycle of the hydraulic system, operation environment, and the acceptable down time of the equipment. Common spare parts include pumps, directional valves, filter elements, strainers, cylinders and hydraulic motors.

PREVENTIVE MAINTENANCE

Filter Service

The key to good filtration is filter maintenance. If the filters are not taken care of and cleaned when dirty, the money spent for the filters and their installation has been wasted. A filter which gets dirty after one day of service and is cleaned 29 days later gives 29 days of non-filtered fluid. A filter can be no better than the maintenance afforded it.

MAINTENANCE SUGGESTIONS

1) Set up a filter maintenace schedule and follow it diligently.
2) Inspect filter elements that have been removed from the system for signs of failure which may indicate that the service interval should be shortened and of impending system problems.
3) Do not return to the system any fluid which has leaked out.
4) Always keep the supply of fresh fluid covered tightly.
5) Use clean container hoses and funnels when filling the reservoir. Use of a filter cart when adding oil is highly recommended.
6) Use common sense precautions to prevent entry of dirt into components that have been temporarily removed from the circuit.
7) Make sure that all clean-out holes, filter caps, and breather cap filters on the reservoir are properly fastened.

NOTE

If the power unit has been provided with a variable displacement pump or any piston pump, the pump case should be filled with clean oil prior to start-up. In most cases this can be accomplished by disconnecting the pump case drain line and pouring oil into the pump case drain port.

3) If the system has been provided with an open center directional valve, the oil during start-up will flow directly back to tank. If the system has a closed centered valve, it may be necessary to loosen a fitting momentarily at the pump discharge to bleed any air in the pump during the priming operation.

4) Jog the pump motor once, and verify that the pump is rotating in the same direction as the arrow tag on the pump case. If the direction is incorrect, reverse two of the three (3) motor leads and recheck the rotation.

5) Jog the pump motor (3) to (6) times to prime the pump and allow the pump to run for several minutes at zero pressure. Check the piping for any leaks and correct immediately. (Leaks in fittings and tubing can be the result of vibration during shipping.)

6) Begin adjusting the relief valve and/or pump compensator to increase the pressure gradually. Note: In systems with open center directional valves, it will be necessary to actuate the valve to build pressure.

7) Continue increasing pressure until normal operating pressure is obtained and recheck system for leaks. Lock adjustment screws in place.

NOTE

If the system has been provided with a pressure compensated pump and a relief valve, adjust the relief valve approximately 15% higher than the compensator so that excessive heat is not generated by the relief valve.

8) During the start-up sequence, all filters should be monitored closely. Replace any filter element immediately, as soon as they begin to go into by-pass as indicated on the visual indicator.

9) After the entire system has been wetted with fluid, refill the reservoir to the normal operating level.

10) Verify that the cooling water to the heat exchanger (if applicable) is flowing. If the power unit has been provided with a water control valve, and the oil temperature is exceeding 135 degrees F., adjust the valve to increase the water flow.

SPECIAL TOOLS

All normal service and maintenance on standard power units can be accomplished with standard hand tools. No special tools are required.

return promptly to the neutral position, the pump flow will be dumped continuously. This builds up heat rapidly.

If a relief valve is set too low, part of the oil will be dumped across the valve with every cycle. This, too, generates excessive heat.

Even when all valves are set properly, they may not be operating well because of worn orifices or seals.

Always remove and check the hot components first, before the others.

LOOK, SMELL, AND FEEL

Checking oil temperature periodically is good preventive maintenance. So, too, is the practice of periodically siphoning an oil sample from the reservoir and comparing it with a sample of clean, new oil.

Oil that has been running too hot will look darker and feel thinner than new oil. It will also smell burned. Chances are, it will contain more contaminants, because hot oil leads to accelerated wear of component parts.

PREVENTIVE MEASURES

How can you keep your equipment's hydraulic system from running too hot?

1) Set up a regular schedule for checking the oil temperature, appearance and smell. Change oil as recommended by the equipment manufacturer.

2) Be prompt about removing, checking, and repairing or replacing valves, pumps, or other components that are running hot.

3) If relief or flow-control valves are running hot, check and adjust their settings. Follow your equipment owner's manual.

4) Break in new components gradually. New, close-fitting parts expand at different rates and are especially prone to seize when they get too hot.

5) Start a cold pump or motor on hot oil by jogging just enough to draw the hot oil into the component. Then wait a few minutes to allow the temperature to equalize in all the pump's parts. Repeat until the temperature on the outside of the pump is the same as that on the piping.

6) Keep your equipment clean. A thick layer of dirt acts as insulation. It will prevent the hydraulic system from radiating heat.

7) On hot days and in hot climates, check and change the oil more frequently. Be sure to use an oil recommended for hot-weather operation by the equipment manufacturer or oil supplier.

8) Do not run the system unless all normally provided filtration devices are in place.

9) Make certain that the fluid used in the system is of a type recommended by the manufacturers of the system or components.

10) Before changing from one type of fluid to another (i.e., from petroleum base oil to a fire resistant fluid), consult component and filter manufacturers in selection of the fluid and the filters that should be used. Also consult the publication "Recommended Practice for the use of Fire Resistant Fluids for Fluid Power Systems" published by the National Fluid Power Association.

MAINTAINING PROPER OIL TEMPERATURE

Hot oil in your equipment's hydraulic system is one of the primary causes of poor operation, component failure, and downtime. Here are some pointers on maintaining proper oil temperature.

The oil in your hydraulic system was designed for operation within a specified temperature range. You may be able to run it at hotter temperatures for short periods of time, intermittently, without harmful effects. If you run continuously with oil that's too hot, however, your equipment will operate poorly, and eventually key components will fail and stop your machine.

HOW HOT IS "TOO HOT"?

"Hot Oil" is a relative term. In most cases, 120 degrees F at the reservoir is considered an ideal operating temperature. Always take an oil temperature reading at the reservoir.

Some hydraulic systems are designed to operate at 130 degrees F and above. If you don't know the maximum operating temperature for your equipment, check your component manual for temperature and viscosity limitations.

MEASURING OIL TEMPERATURE

There are several ways to check the temperature of the oil. The best, most accurate method is by means of thermometer. On some machines, this is mounted on the reservoir. Make it a habit to check the thermometer periodically after the equipment has been running for more than an hour.

If your machine doesn't have a reservoir thermometer, use the "palm test." First check the tank with your fingertip, if it's not too hot to touch, place your palm on the tank. You'll be able to hold it there without discomfort if the oil temperature is about 120 degrees F or below.

ISOLATING TROUBLE-SPOTS

To determine which components are "running hot" and overheating the oil, feel the outlet fittings and lines at the valves, pumps, and hydraulic motors. If the oil is normal going into a component but not coming out, that could be one of the trouble-makers.

A sticking valve can cause excessive heat. If a spool does not

3) Wash down water directed into poorly gasketed tanks or fill pipes left open.

4) Moisture in cans used to replace fluid in tanks.

5) Extreme temperature differential in certain geographical locations.

6) Drain not provided at lowest point in tank to remove water collected over possibly long operating periods.

OVERHEATING OF SYSTEM

1) Water shut off or heat exchanger clogged.

2) Continuous operation at relief setting.
   a. Stalling under load, etc.
   b. Fluid viscosity too high or too low.

3) Excessive slippage or internal leakage.
   a. Check stall leakage past pump, motors, and cylinders.
   b. Fluid viscosity too low.

4) Reservoir sized too small.

5) Reservoir assembled without baffling or sufficient baffling.

6) Case drain line from pressure compensated pump returning oil too close to suction line.
   a. Repipe case drain line to opposite side of reservoir baffling.

7) Pipe, tube, or hose I.D. too small causing high velocity.

8) Valving too small causing high velocity.

9) Improper air circulation around reservor.

10) System relief valve set too high.

11) Power unit operating in direct sunlight or ambient temperature is too high.

FOREIGN MATTER SOURCES IN THE CIRCUIT

1) Pipe scale not properly removed.

2) Sealing compound (pipe dope, teflon tape allowed to get inside fittings).

3) Improperly screened fill pipes and air breathers.

4) Burrs inside piping.

5) Tag ends of packing coming loose.

6) Seal extrusions from pressure higher than compatible with the seal or gasket.

7) Human element...not protecting components while being repaired and open lines left unprotected.

8) Wipers or boots not provided on cylinders or rams where necessary.

9) Repair part and replacement components not properly protected while stored in repair depot. (Rust and other contaminants.)

TROUBLESHOOTING

TROUBLESHOOTING AREAS

DIRTY OIL

1) Components not properly cleaned after servicing.
2) Inadequate screening in fill pipe.
3) Air breather left off. (no air breather provided... inadequate unit provided ... insufficient protection of air breather.)
4) Tank not properly gasketed.
5) Pipe lines not properly covered while servicing machine.
6) Improper tank baffles not providing settling basin for heavy materials.
7) Filter dirty or ruptured.

FIRE RESISTANT FLUIDS

1) Incorrect seals cause binding spools.
2) Paint, varnish, or enamel in contact with fluids can cause sludge deposits on filters and around seal areas.
3) Electrolytic action is possible with some metals; usually zinc or caduium.
4) Improper mixtures can cause heavy sludge formations.
5) High temperatures adversely affect some of the fluids, particularly the water base fluids.
6) Adequate identification of tanks containing these fluids should be provided so that they will be refilled with the proper media.
7) As with mineral base oils, nuisance leaks should be remedied at once.
8) Make certain replacement parts are compatible with fluid media.

FOAMING OIL

1) Return of tank line not below fluid level. Broken pipe, line left out between a bulkhead coupling and the bottom of the tank after cleaning tank.
2) Inadequate baffles in reservoir.
3) Fluid contaminated with incompatible foreign matter.
4) Suction leak to pump aerating oil.
5) Lack of anti-foaming additives.

MOISTURE IN OILS

1) Water leak in oil cooler or cooling coils.
2) Cold water lines fastened directly against hot tank causing condensation within tank.

PUMP FAILURE TO DELIVER FLUID

1) Low fluid level in reservoir.
2) Oil intake pipe suction strainer plugged.
3) Air leak in suction line and preventing priming.
4) Pump shaft turning too slowly.
5) Oil viscosity too high.
6) Oil lift too high.
7) Wrong shaft rotation.
8) Pump shaft or parts broken.
9) Dirt in pump.
10) Variable delivery pumps, incorrect volume adjustment.

OIL LEAKAGE AROUND PUMP

1) Shaft seal worn.
2) Head of oil on suction pipe connection--connection leaking.
3) Pump housing bolts loose or improperly torqued.
4) Case drain line too small or restricted. (Shaft seal leaking.)

EXCESSIVE PUMP WEAR

1) Abrasive dirt in the hydraulic oil being circulated through the system.
2) Oil viscosity too low.
3) System pressure requirement above pump rating.
4) Pump misalignment or belt drive too tight.
5) Air being drawn in through inlet of pump.

PUMP PARTS INSIDE HOUSING BROKEN

1) Seizure due to lack of oil.
2) Excessive system pressure above maximum pump rating.
3) Excessive torquing of housing bolts.
4) Solid matter being drawn in from reservoir and wedged in pump.

TROUBLESHOOTING SOLENOID VALVES

SOLENOID FAILURES

1) Voltage too low. If voltage will not complete the stroke of alternating current (AC) solenoid, it will burn out the coil.
2) Signal to both solenoids of a double solenoid valve simultaneously. One or both of the solenoids will be unable to complete their stroke and will burn out. (Make certain the electrical signal is interlocked so that this condition cannot exist.)

TROUBLESHOOTING PUMPS

PUMP MAKES EXCESSIVE NOISE

1) Check for vacuum leaks in the suction line. (Such as leak in fitting or damaged suction line.)
2) Check for vacuum leaks in the pump shaft seal if the pump is internally drained. Flooding connections with the fluid being pumped may cause the noise to stop or abate momentarily. This will locate the point of air entry.
3) Check alignment with drive mechanism. Misalignment will cause wear and subsequent high noise level in operation.
4) Check manufacturers specifications relative to wear possibilities and identification of indications of wear as high operating noise level, etc.
5) Check compatibility of fluid being pumped against manufacturers recommendations.
6) Relief or unloading valve set too high. Use reliable gauge to check operating pressure. Relief valve may have been set too high with a damaged pressure gauge. Check various unloading devices to see that they are properly controlling the pump delivery.
7) Aeration of fluid in reservoir (return lines above fluid level).
8) Worn or sticking vanes (vane type pump).
9) Worn cam ring (vane type pump).
10) Worn or damaged gears and housing (gear pump).
11) Worn or faulty bearing.
12) Reversed rotation.
13) Cartridge installed backwards or improperly.
14) Plugged or restricted suction line or suction strainer.
15) Plugged reservoir filter breather.
16) Oil viscosity too high or operating temperature too low.
17) Oil pour point too high.
18) Air leak in suction line or fittings also causing irregular movement of control circuit.
19) Loose or worn pump parts.
20) Pump being driven in excess of rated speed.
21) Air leak at pump shaft seal.
22) Oil level too low and drawing air in through inlet pipe opening.
23) Air bubbles in intake oil.
24) Suction filter too small or dirty.
25) Suction line too small or too long.
26) Pump housing bolts loose or not properly torqued.

probably burns out more solenoids than any other factor.)

8) Has mounting pad been warped from mechanical stress or heat? (Loosen mounting bolts slightly and see if valve functions. End caps can also be removed and check for tight spool.)

9) Is fluid media excessively hot? (Check for localized heating which may indicate an internal leak...check reservoir temperature and see if it is within machine specifications.)

10) Is there foreign matter in the fluid media causing gummy deposit? (Check for contamination...make certain seals and plumbing are compatible with the type of fluid being used.)

11) Is an adequate supply of fluid being delivered to actuate the load? (Many times there is sufficient pressure to shift the valve but not enough to actuate the work load. Check pump supply pressure and volume if necessary... physical measurement of flow through relief valve with units blocked may be necessary.)

12) Check circuit for possible interlocks on pressure sources to valve or to pilot.

WEAVER FLUID POWER, INC.
2904 WILLOW STREET PIKE
WILLOW STREET, PA 17584

3) Mechanical damage to leads. (short circuit, open connections, etc.)

4) Tight spool or mechanical interference can prevent the solenoid from completing its stroke and subsequently burning out.

5) Replacement springs too heavy in valve. Overloads solenoid and shortens life.

6) Wrong voltage or frequency will either prevent operation because of inadequate capacity to handle the load with the lower voltage or burn out the coil because of improper winding and excessive voltage.

7) Dirty contact may not supply sufficient current to solenoid to satisfy inrush demands.

8) Low voltage direct current solenoids may be effected by low battery capacity on cold mornings directly after starting cold engine.

9) Long feed lines to low voltage solenoids may cause sufficient voltage drop to cause erratic operation.

SOLENOID VALVE FAILS TO OPERATE

1) Is there an electrical signal to the solenoid or operating device? Is the voltage too low? (check with voltmeter...test light in emergency.)

2) If the supply to the valve pilot section is orificed, is the orifice blocked? (Remove orifice and check for foreign matter. Clean and re-assemble.

3) Has foreign matter jammed the main spool? (Remove end caps and see that main spool is free in its movement... remember that there will be a quantity of fluid escaping when the cap is removed and provide a container to catch it.)

4) Is pilot pressure available? Is the pilot pressure adequate? (Check with gauge on main pressure input port for internally piloted types and in the supply line to the externally piloted type.)

5) Is pilot drain restricted? (Remove pilot drain and let the fluid pour into an open container while the machine is again tried for normal operation. Small lines are easily damaged causing a subsequent restriction to fluid flow.)

6) Is pilot tank port connected to main tank port where pressures are high enough to neutralize pilot input pressure? (Combine pilot drain and pilot tank port and check for operation with the combined flow draining into an open constrainer...block line to main tank from pilot valve..if this corrects the situation, reroute pilot drain and tank line.)

7) Are solenoids improperly interlocked so that a signal is provided to both units simultaneously? (Put test light on each solenoid lead in parallel and watch for simultaneous lighting..check electrical interlock. This condition

Aggregates
Tandem Axle Kit

16" mounting height
49" axle centers
66-1/2" axle track

Dana Axle Assembly
66 1\2" Track
Fully Dressed
2- Part #D22FC-167W-310A-5-665
Parts List
Dana Q-Shoe 4515 lining
Camshafts 28 spline
Auto Slacks 6" 28 spline
Maxi- Brakes 3430051\ (3030)
Webb Outboard Drums (Hub Piloted)
Webb Hub Assembly
HM 2121011 - HM218210 - HM212048 - HM218248 Bearings
307-0743 Wheel Seal
340-4009 6 hole oil cap

Reyco Suspension

Model 86 Transpro

16" Mounting kits

Suspension Kits

1- Hanger Kit 86-UM-N-2

1- Axle Kit 2-5R-15-I-3H

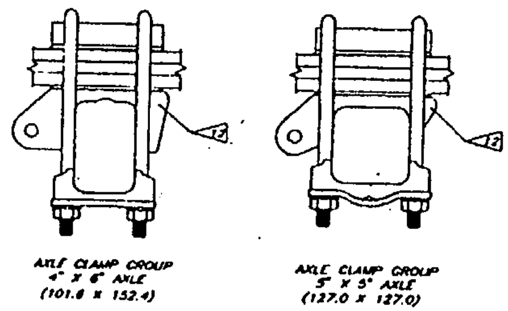
4- High Arch 3 leaf spings - 0079-01

SPRING TYPE	AXLE	5" (127.0) ROUND & 5" x 5" (127.0 x 127.0)							DIMENSION "A" UNLOADED
	SEAT HEIGHT	1.00 (25.4)	1.50 (38.1)	2.00 (50.8)	2.50 (63.5)	3.00 (76.2)	3.50 (88.9)	4.00 (101.6)	
THREE LEAF LOW ARCH PART NO 0079-02		12.75 (324)	13.25 (337)	13.75 (349)	14.25 (362)	14.75 (375)	15.25 (387)	15.75 (400)	19.50 (495)
THREE LEAF HIGH ARCH PART NO 0079-01		15.75 (400)	16.25 (413)	16.75 (425)	17.25 (438)	17.75 (451)	18.25 (464)	18.75 (476)	18.75 (476)
THREE LEAF MED ARCH PART NO 0883-00		14.25 (362)	14.75 (375)	15.25 (387)	15.75 (400)	16.25 (413)	16.75 (425)	17.25 (438)	19.13 (486)
THREE LEAF LOW ARCH PART NO. 0954-00		12.75 (324)	13.25 (337)	13.75 (349)	14.25 (362)	14.75 (375)	15.25 (387)	15.75 (400)	19.50 (495)
THREE LEAF HIGH ARCH PART NO. 0724-00		15.75 (400)	16.25 (413)	16.75 (425)	17.25 (438)	17.75 (451)	18.25 (464)	18.75 (476)	18.75 (476)

MOUNTING HEIGHT CHART

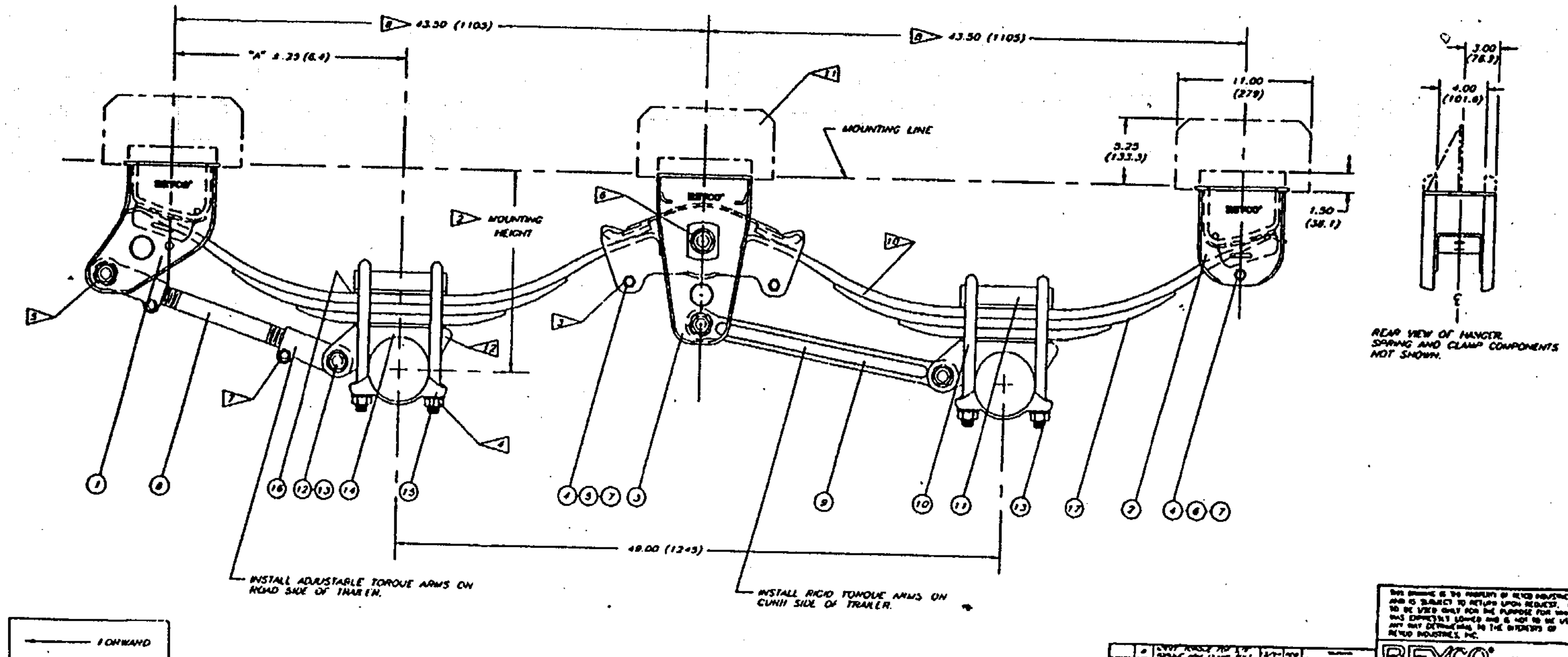
WHEN USING 4" X 6" (101.6 X 152.4) AXLES, ADD .50" (12.7) TO ABOVE MOUNTING HEIGHTS.

MOUNTING HEIGHTS SHOWN ARE WITH STRADDLEMOUNT HANGERS. FOR UNDERMOUNT, SIDEMOUNT, OR FLANGEMOUNT HANGERS, ADD .25" (6.4) TO ABOVE MOUNTING HEIGHTS.



NOTES:

1. DIMENSIONS ARE SHOWN IN INCHES AND MILLIMETERS.
2. MOUNTING HEIGHT SHOWN NOMINAL AND UNLOADED. TOLERANCE ±.25" (6.4)
3. TIGHTEN 5/8" (15.9) SPRING RETAINER NUTS TO 25-30 FT. LBS. (35-41 NM) SPRING RETAINER ROLLERS SHOULD ROLL FREELY ON RETAINER BOLT.
4. TIGHTEN 7/8" (22.2) U-BOLT NUTS TO 300-325 FT. LBS. (410-440 NM). CHECK PERIODICALLY.
5. TIGHTEN 7/8" (22.2) TORQUE ARM BOLT NUTS TO 325-350 FT. LBS. (440-475 NM). CHECK PERIODICALLY.
6. 1" (25.4) EQUALIZER BOLT NUTS ARE PRE-ASSEMBLED AND TORQUED TO 480-500 FT. LBS (650-680 NM). CHECK PERIODICALLY.
7. TIGHTEN 3/4" (19.1) TORQUE ARM CLAMP BOLT NUTS TO 175-200 FT. LBS. (240-275 NM). TIGHTEN 5/8" (15.9) TORQUE ARM CLAMP BOLT NUTS TO 125-150 FT. LBS. (170-205 NM). CHECK PERIODICALLY.
8. HANGER SPACING TOLERANCE TO BE HELD TO ±.06" (1.6).
9. REFER TO 1000 SERIES INSTALLATION INSTRUCTIONS FOR RECOMMENDED WELDING AND INSTALLATION PRACTICES.
10. INSTALL THREE LEAF SPRINGS WITH FULL HOOK END IN EQUALIZER BEAM.
11. UNDERMOUNT/SIDEMOUNT HANGERS SHOWN. STRADDLEMOUNT AND FLANGEMOUNT HANGERS DRAWN IN PHANTOM.
12. STANDARD 1" (25.4) HIGH AXLE SEATS ARE SHOWN. AXLE SEAT HEIGHTS TO 4" (101.6) IN .50" (12.7) INCREMENTS ARE AVAILABLE.



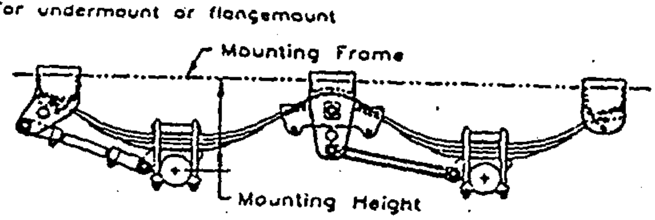
REYCO® MT. VERNON

MODEL 86/88 MOUNTING HEIGHT CHART FOR TANDEM AXLE SUSPENSIONS

TYPE SPRING	Spring Weight	AXLE SEAT HEIGHT	5" DIAMETER & 5"x 5" SQUARE						
		1" US	1"	1.5"	2"	2.5"	3"	3.5"	4"
Single Leaf, Low Arch Spring No. 0179-02 11,000 Lbs. Capacity	37 Lbs.	4.50"	13.00"	13.50"	14.00"	14.50"	15.00"	15.50"	16.00"
Single Leaf, High Arch Spring No. 0179-01 11,000 Lbs. Capacity	38 Lbs.	7.25"	15.75"	16.25"	16.75"	17.25"	17.75"	18.25"	18.75"
Single Leaf, High Arch Spring No. 0714-00 12,500 Lbs. Capacity	45 Lbs.	7.25"	15.75"	16.25"	16.75"	17.25"	17.75"	18.25"	18.75"
Three Leaf, Low Arch Spring No. 0079-02 11,000 Lbs. Capacity	53 Lbs.	3.25"	12.75"	13.25"	13.75"	14.25"	14.75"	15.25"	15.75"
Three Leaf, Low Arch Spring No. 0954-00 12,500 Lbs. Capacity	64 Lbs.	2.75"	12.75"	13.25"	13.75"	14.25"	14.75"	15.25"	15.75"
Three Leaf, Medium Arch Spring No. 0693-00 11,000 Lbs. Capacity	55 Lbs.	4.75"	14.25"	14.75"	15.25"	15.75"	16.25"	16.75"	17.25"
Three Leaf, High Arch Spring No. 0079-01 11,000 Lbs. Capacity	55 Lbs.	6.00"	15.75"	16.25"	16.75"	17.25"	17.75"	18.25"	18.75"
Three Leaf, High Arch Spring No. 0724-00 12,500 Lbs. Capacity	66 Lbs.	5.75"	15.75"	16.25"	16.75"	17.25"	17.75"	18.25"	18.75"
Six Leaf, High Arch Spring No. 1033-01** 10,000 Lbs. Capacity	64 Lbs.	5.25"	15.25"	15.75"	16.25"	16.75"	17.25"	17.75"	18.25"
Eight Leaf, Medium Arch Spring No. 0178-03 11,000 Lbs. Capacity	95 Lbs.	3.75"	14.75"	15.25"	15.75"	16.25"	16.75"	17.25"	17.75"
Eight Leaf, High Arch Spring No. 0178-01 11,000 Lbs. Capacity	95 Lbs.	4.75"	15.75"	16.25"	16.75"	17.25"	17.75"	18.25"	18.75"
Nine Leaf, Medium Arch Spring No. 0723-00 12,500 Lbs. Capacity	108 Lbs.	3.00"	14.50"	15.00"	15.50"	16.00"	16.50"	17.00"	17.50"
LITEFLEX Composite Spring No. 20016-01 12,000 Lbs. Capacity	22 Lbs.	---	14.00"	14.50"	15.00"	15.50"	16.00"	16.50"	17.00"
Two Leaf, Low Arch Spring No. 1600-02 11,000 Lbs. Capacity	52 Lbs.	4.25"	13.50"	14.00"	14.50"	15.00"	15.50"	16.00"	16.50"

1. Mounting heights shown are nominal, free and not loaded, variations of ± 0.25" can be expected.
2. Mounting heights shown are with straddle mount hangers. For undermount or flangemount hangers, add 0.25" to above figures.
3. 4x6 Axles: Underslung – Not available
   Overslung – Add 0.50" to above.
4. Mounting heights on No-Hop units must not exceed 17.50".

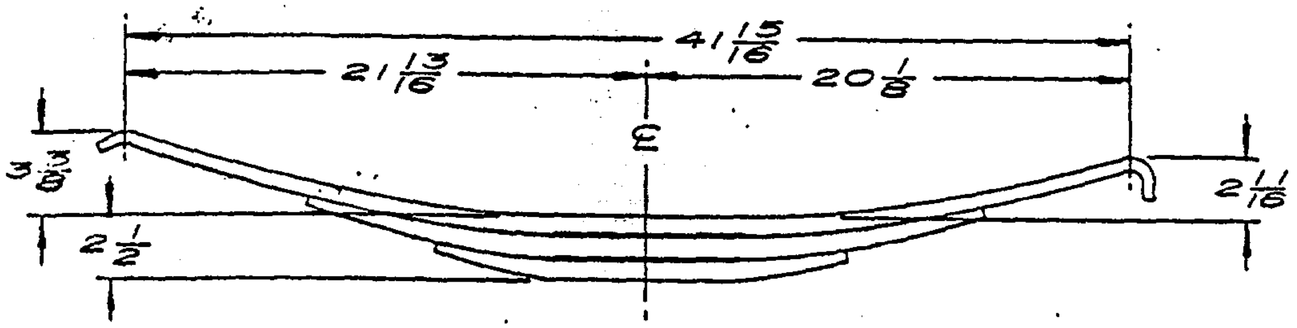
** Spring for 44" axle spacing.

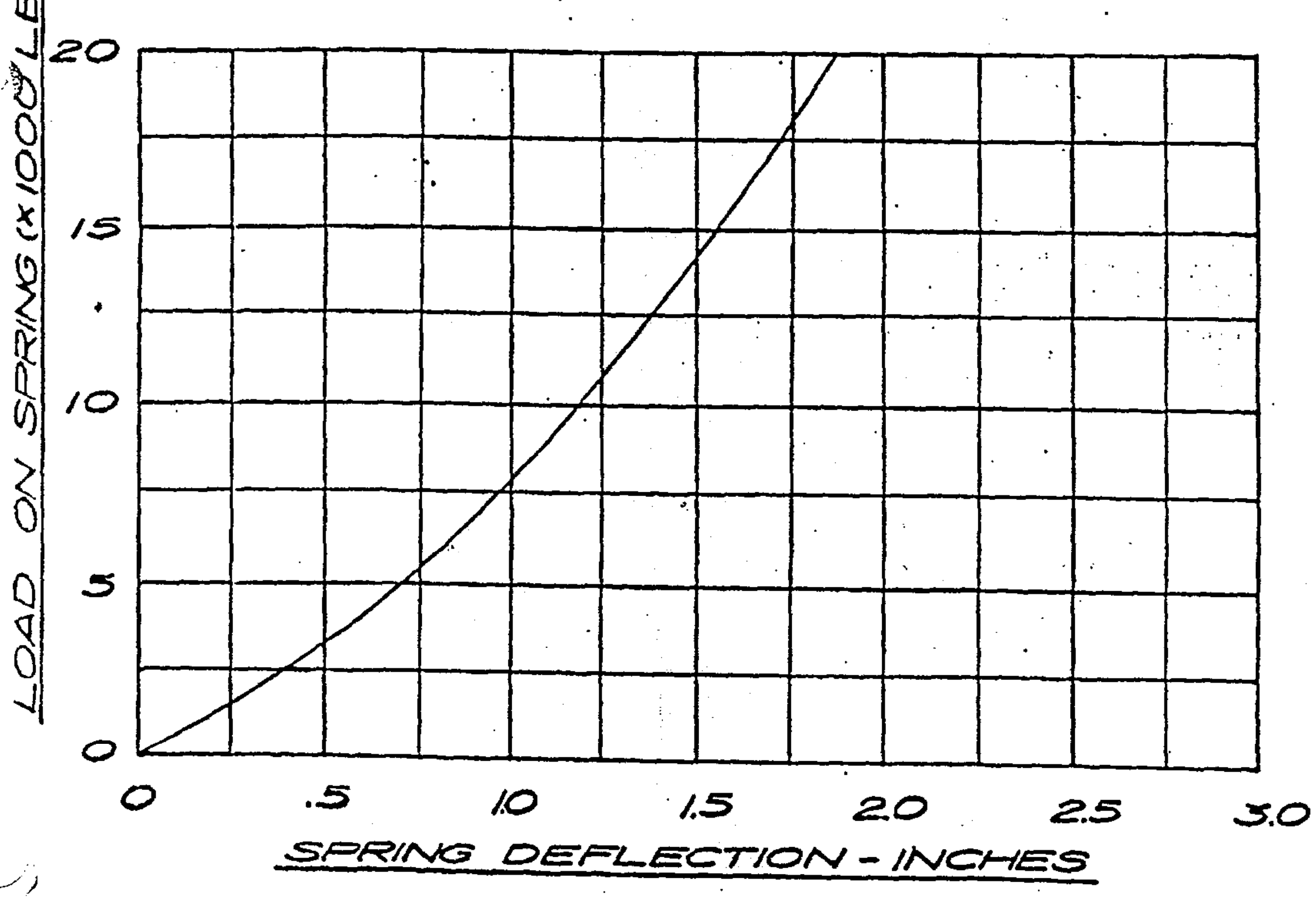


REYCO®
INDUSTRIES INC.

SPRING NO. 0079-02

DESCRIPTION: HEAVYWEIGHT 3 LEAF LOW-CAMBER SPRING, 11000 LB. RATING, 49" AXLE SPACING

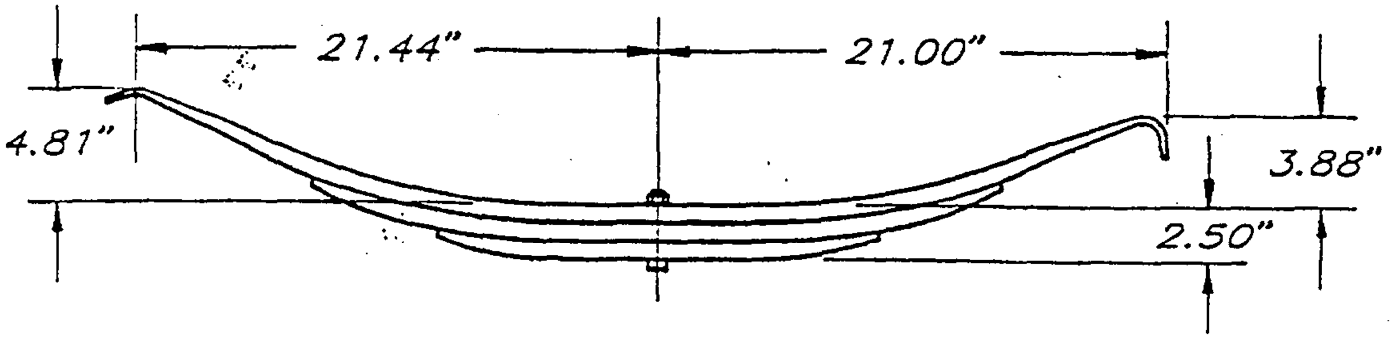


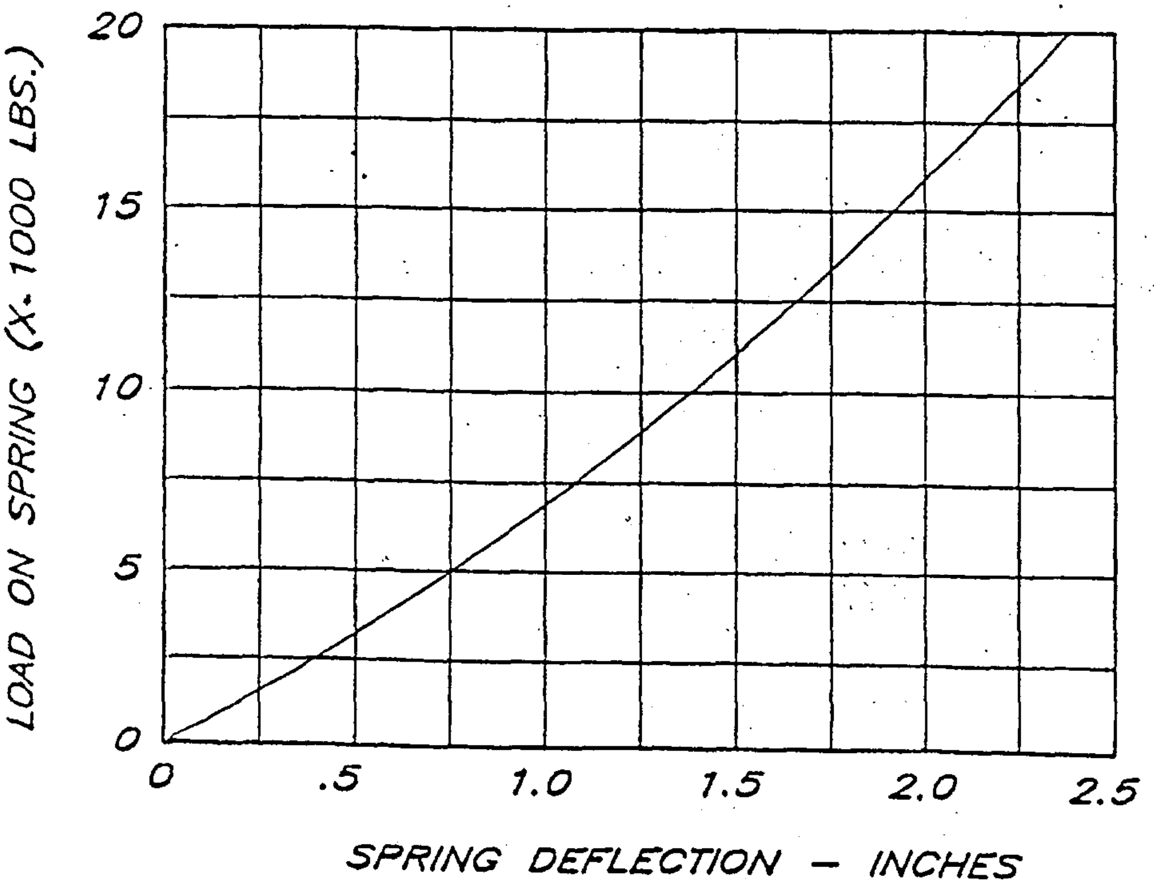


REYCO®
INDUSTRIES INC.

SPRING NUMBER 0693-00

THREE LEAF MED. ARCH, 11,000 LB. LOAD RATING

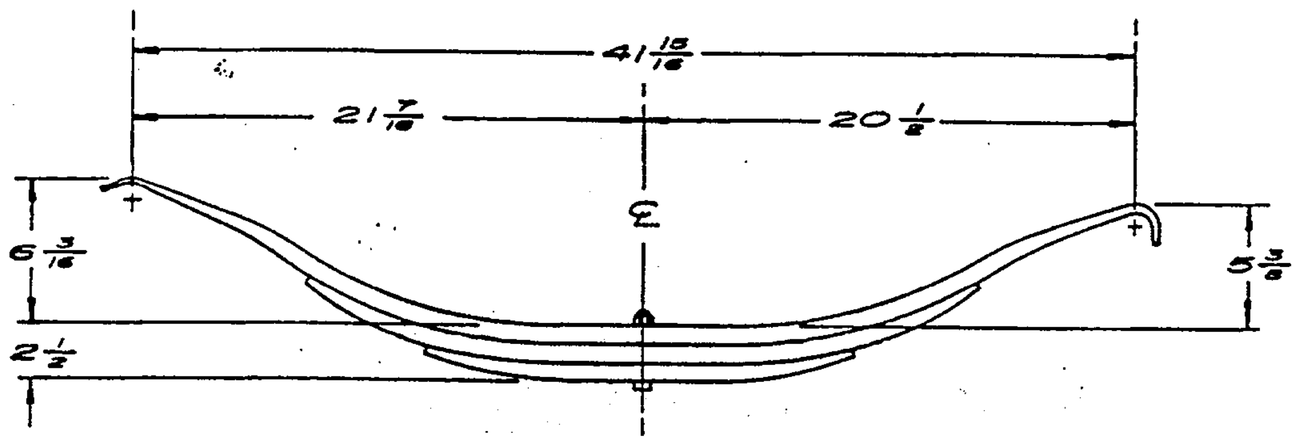


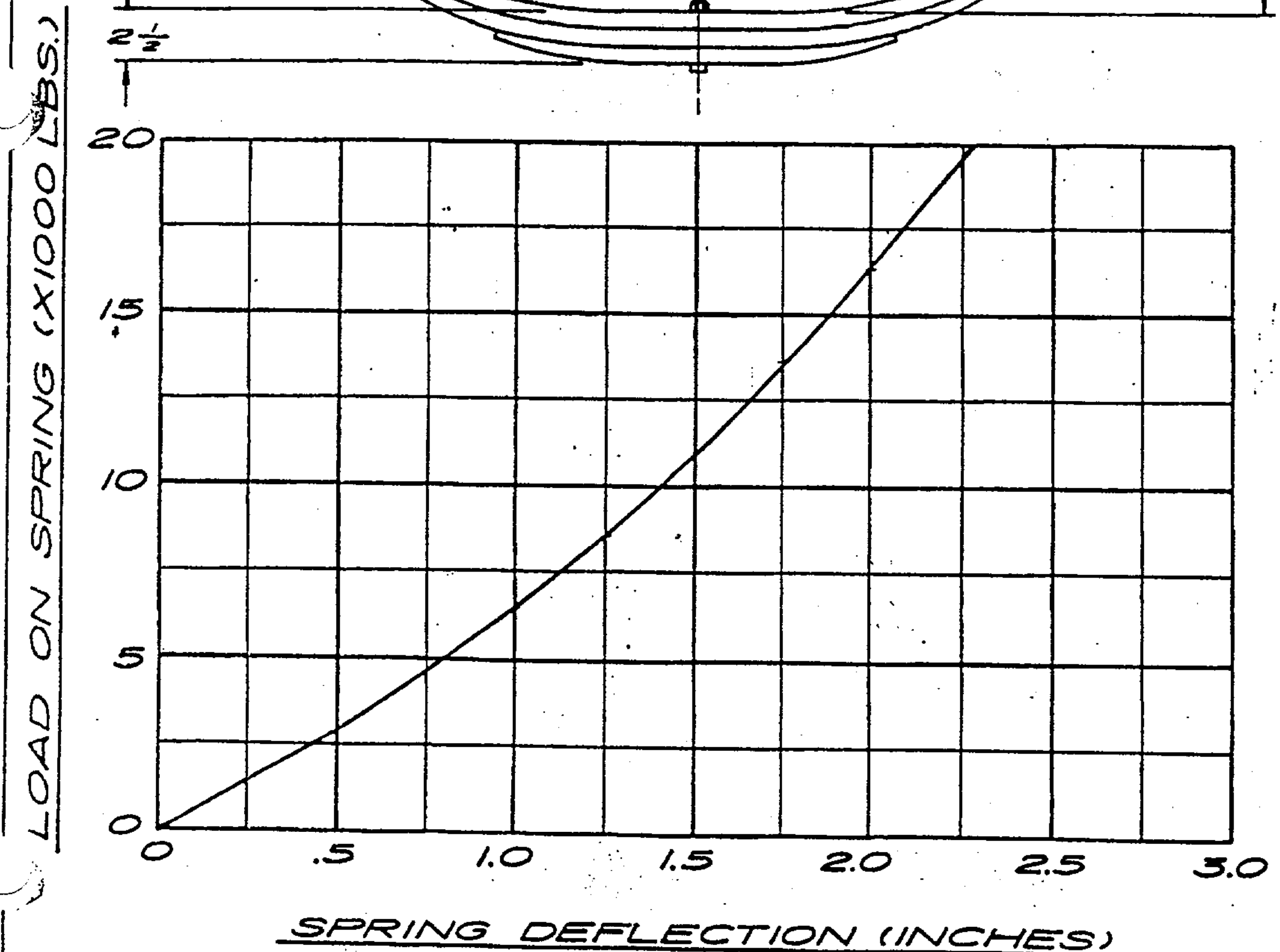


REYCO®
INDUSTRIES INC.

SPRING PART NUMBER: 0079-01

DESCRIPTION: 3-LEAF, HIGH CAMBER,
11,000 LB. CAP. 49" AXLE SPACING

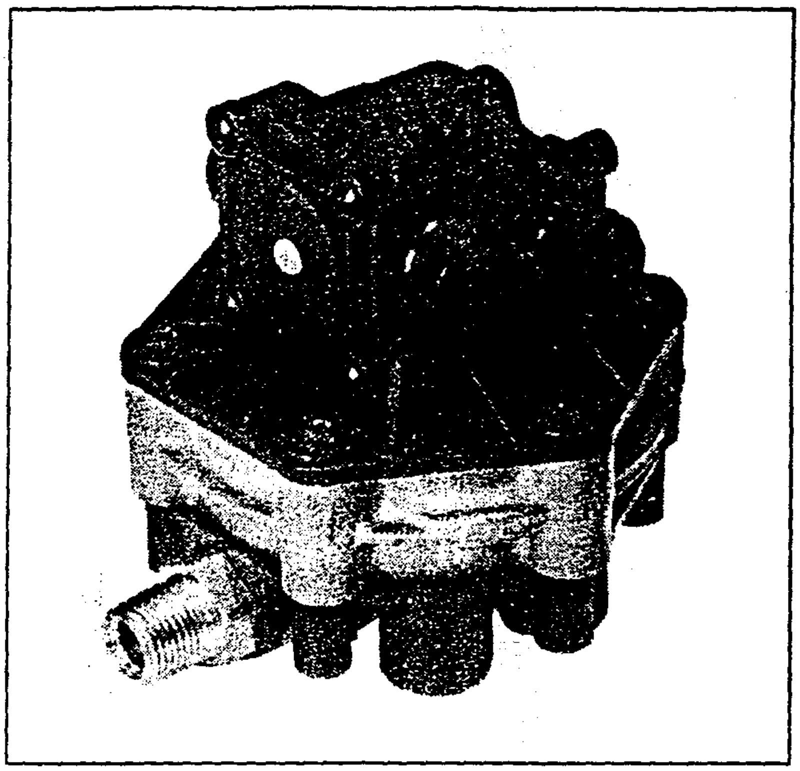




Tandem Air Brake System

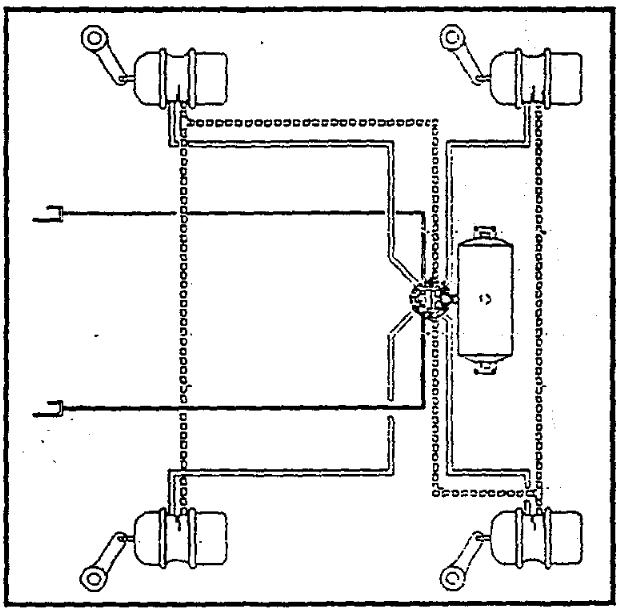
1- FFV Multi Function Brake Valve KN28600
2- 19840 Air tanks
1- 11451 Gladhand E.
1- 11451 Gladhand S.

"FF2" FULL FUNCTION TRAILER VALVE

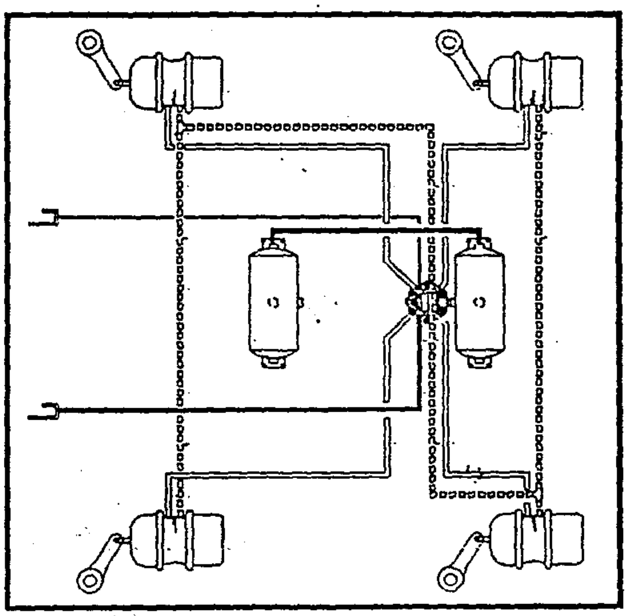


"FF2" FULL FUNCTION TRAILER VALVE

- Fully complies with FMVSS 121 trailer regulations, for spring brake control and other requirements.
- Single Valve for Tandem Axle:
  - One or two Reservoir systems.
  - Protects Supply Line to 70 psi.
  - No dragging Spring Brakes with 70 psi or higher in Supply Line.
  - 3.0 second Spring Brake Apply.
  - Service Brake functions.
- Suitable for easy retrofit of multi-valve systems.



CH-26017
Tandem Axle
(One Tank/One Valve)



CH-26012
Tandem Axle
(Two Tanks/One Valve)

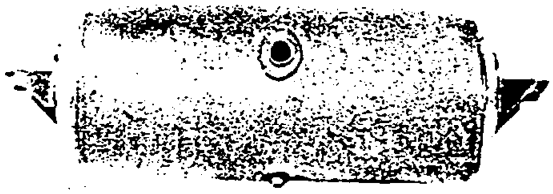
O.E.M. PART NO.	FOR SERVICE USE	RESERVOIR PORT	CRACK PRESSURE	ANTI-COMPOUNDING
N4304AB	KN28601	1/2"*	3 PSI	YES
N4304AC	KN28600	3/4"*	3 PSI	YES
N4304AD	KN28603	1/2"*	5 PSI	YES
N4304AE	KN28602	3/4"*	5 PSI	YES

*For mounting to Reservoir, each valve includes a Heavy Walled Steel Pipe Thread Nipple, conforming to NFPA/T3.8.3 R2-1977 Standard.

RESERVOIRS (Saddle-Mounted, Single Compartment)

- Conform to SAE J10B specifications.
- Certified to 150 psi working pressure.
- All threaded ports are standard pipe thread size.
- Designed to allow service coverage for most original equipment reservoirs and special field installations.
- Units listed are considered standard.
- Ports
  - Side 3/4 NPTF
  - Bottom 1/4 NPTF
  - Ends 3/8 NPTF

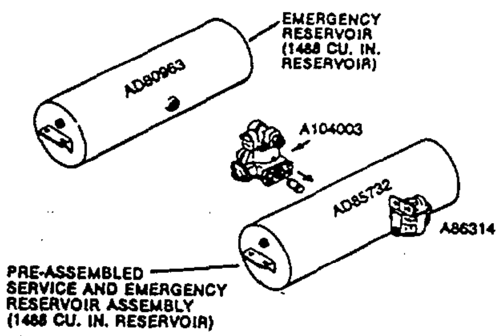
SERVICE	O.E.M.	CAP. CU. IN.	LENGTH	DIA.	MTG. HOLE CENTERS
19810	1981	1423	29-5/8"	8-3/16"	32"
19820	—	2800	24-1/2"	12"	29-1/2"
19840	1984	1488	22-1/2"	9-11/16"	27-1/2"
19850	—	1425	29-5/8"	8".	32"



TWO RESERVOIR SINGLE AXLE TRAILER KIT WITHOUT SKID CONTROL

A97440 Service

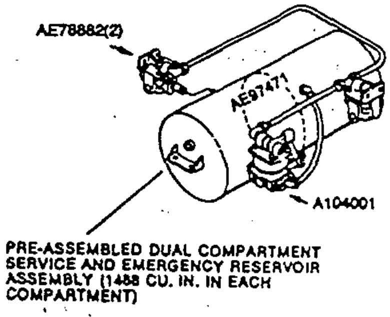
Includes: 1 Service & Emergency Reservoir Assembly (includes valves)
1 Emergency Reservoir
2 Drain Cocks



SINGLE RESERVOIR TANDEM AXLE TRAILER KIT WITHOUT SKID CONTROL

A97441 Service

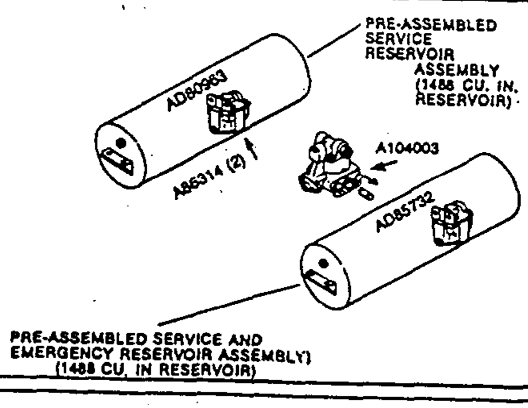
Includes: 1 Dual Compartment Service & Emergency (includes valves) Reservoir Assembly
2 Drain Cocks



TWO RESERVOIR TANDEM AXLE TRAILER KIT WITHOUT SKID CONTROL

A97442 Service

Includes: 1 Service & Emergency Reservoir Assembly (includes valves)
1 Service Reservoir Assembly
2 Drain Cocks



Misc. Parts

8- 22.5\7.5 Hub Piloted Rimes
40- E6000 Wheel Nuts
1- KP809-T Holland King Pin
1- LGS-3A-105 LANDING GEAR

DISC WHEEL SERVICE ORMATION

INSTALLATION TIPS

1. Never mix hub-piloted and stud-piloted wheels, hubs and nuts. The result could be loss of torque, a cracked wheel or possible wheel loss.

2. For nuts used on hub-piloted wheels, apply two drops of oil to a point between the nuts and flanges and two drops to the last 2 or 3 threads at the end of each stud. Also, lightly lubricate the pilots on the hub to ease wheel installation and removal. Do not get lubricant on the mounting face of the drum or wheel.

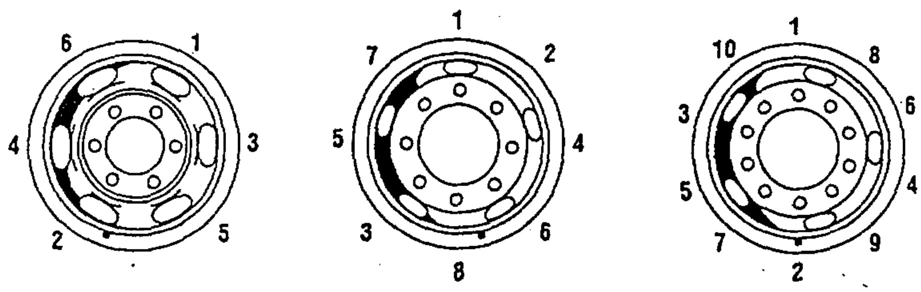
3. For nuts used on stud-piloted wheels, do not use lubrication. Never lubricate wheel or nut ball seats or mounting faces. If lubrication is used, consult the wheel manufacturer for torque recommendations.

4. Install nuts using proper installation sequence as shown below. Snug up nuts to about 50 ft.lbs. torque. Do not tighten fully until all have been seated; then torque to specs as shown below using the same installation sequence.

5. After a wheel assembly has been installed, recheck the torque level between 50 and 100 miles of operation and retighten if necessary to the recommended torque using the proper sequence.

   a. To check and retorque an inner cap nut, it is necessary to loosen the outer cap nut first; then tighten the inner cap nut. Outer cap nuts then must be retightened to the proper level.

   b. It is recommended that a torque check be made as part of a vehicle's scheduled maintenance program or at 10,000 mile intervals, whichever comes first.



TORQUE CHART

MOUNTING TYPE	NUT THREAD	TORQUE LEVEL
Hub-piloted with flange nut	11/16" - 16 M20 x 1.5 M22 x 1.5	300-400 ft. lbs. (oiled)* 280-330 ft. lbs. (oiled)* 450-500 ft. lbs. (oiled)*
Stud-piloted, double cap nut - standard type (7/8" ball seat radius)	3/4" - 16 1 1/8" - 16	450-500 ft. lbs. (dry) 450-500 ft. lbs. (dry)
Stud-piloted, double cap nut- heavy-duty type (1 3/16" ball seat radius) *See Installation Tip #2 (above)	15/16" - 12 1 1/8" - 16 1 5/16" - 12	750-900 ft. lbs. (dry) 750-900 ft. lbs. (dry) 750-900 ft. lbs. (dry)

Information courtesy of TMC (The Maintenance Council of The American Trucking Association). For complete wheel service guidelines see TMC RP-222, "User's Guide to Wheels and Rims".

AEI
AGGREGATES EQUIPMENT, INC.
9 HORSESHOE ROAD, P.O. BOX 39, LEOLA, PA 17540-0039, 717-656-2131 FAX: 717-656-6686

INSTRUCTION MANUAL AND PARTS LIST

bivi-TEC KRL/ED 1300 X 4M

PATENTED OSCILLATION INCLINED SCREEN

SALES ORDER NO. E96-4231

SERIAL NO. 1524

SOLD TO: AEI SALES PORTABLE

DATE: SEPTEMBER 1996

bivi-TEC SCREEN TECHNICAL DATA
DRAWING C-12762-15

SCREEN MODEL:	bivi-TEC KRL/ED 1300 X 4M
LENGTH:	4 meters
WIDTH:	1300 mm
HEIGHT:	2300 mm
INCLINE ANGLE:	15°
SCREEN SURFACE AREA:	5.2 m^2
WEIGHT:	6,400# (approx.)
MOTOR TYPE:	TEFC
HORSEPOWER:	10
RPM:	1800
VOLTAGE/HERTZ/PHASE:	440/60/3
SCREEN DRIVE RPM:	806.9
V-BELT SPECIFICATION:	BX x 70 (2 Required)
DRIVE SHEAVE DIAMETER:	6.0" P.D., 2B Groove, SDS Bushing @ 1-3/8" Bore
DRIVEN SHEAVE DIAMETER:	13.6" P.D., 2B Groove, SK Bushing @ 2-3/16" Bore
AMPLITUDE:	SCREEN BOX - Vertical Motion = 7.0 mm - Horizontal Motion = 4.0 mm FLOATING FRAME - Vertical Motion = 7.0 mm - Horizontal Motion = 15.5 mm
MATERIAL:	bivi-TEC Screen Elements - Polyurethane (12) 328 mm x 1307 4 mm thick 7 mm x 24 mm Slots (1) 246 mm x 1307 3 mm thick Blank End Panel
RUBBER SPRING BLOCKS:	24

bivi-TEC Screen

Assembly Drawing C-12762-15

Ref. No.	Drawing	Description	Quantity
100	XOAU 1026	Unbalance Exciter	1
001	XUWU 1026-04	Exciter Shaft	1
002	XHMS 1088	Disc - Drive Side	1
003	XUXU 1032-03	Unbalance Disc	1
004	XULD 1088	Labyrinth Ring	1
005	XULD 1089-02	Bearing Cover	1
006	XULD 1093	Labyrinth Ring	1
007	XULG 1030	Bearing Housing	2
008	XUSO 1044-04	Joint Pipe	1
009	XUOR 1029	Thrust Ring	2
010	SK-5114	Fitting Key	1
011	SK-5269	Fitting Key	1
012	XHMS 1060	Disc - Non-Drive Side	1
018		Self Aligned Roller Bearing 22319ES TVPB C4 F80-FAG	2
019	MD0 19626	O-Ring (PRP-NR-.170)	4
020	MLN 22319-JV	Nilos Ring	2
026	XULD 1098	Bearing Cover	1
035	XUXU 1023-03	Unbalance Disc	1
	XOEM 1008	Mounting Device	4
200	XURW 1460	Side Plate - Lower	1R/1L
201	XURC 1179-NS	Side Plate - Upper	1R/1L
202	XUYS 1196-04-A	Anti-Wear Blinding	1R/1L

bivi-TEC Screen

Assembly Drawing C-12762-15

Ref. No.	**Drawing**	**Description**	**Quantity**
206	C-12819-13	Feed Hopper	1
207	XUJK 1047-04	Clamping Piece	7
208	XUJK 1045-4	Clamping Piece	7
220	M4408	Bracket, Feed Box End	1
221	XUSG 1248	Rubber Curtain, Feed End	1
225	XUVP 1092	Connecting Channel	1R/1L
264	XUSG 1249	Rubber Curtain, Discharge End	1
265	SK-5251	Bracket, Discharge End	1
266	XUSG 1289	Rubber Curtain, Side	2
270	C-12750-P	Spring Bracket	4
271	XUSO 1047-06	Joint Pipe	2
340	XEFG 0016-03	Rubber Block	28
350	XEFG 1004 W22-358-0172	Rubber Spring	4
400/401	C-13035-01	Screen Support - Upper	1
	C-13035-01	Screen Support - Lower	1
500	XOAK 1037-10L	Drive Unit Assembly	1
1	XOAK 1037-10L	Motor Base	1
2	XOAK-1037-05-A	Drive Guard	1
3	XOAK-1037-05-B	Counterweight Guard - Drive	1
4	XOAK-1037-05-C	Coupling Guard	1

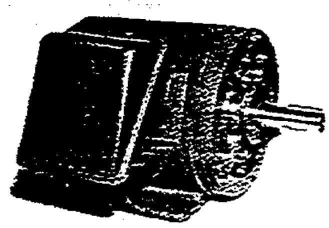
bivi-TEC Screen

Assembly Drawing C-12762-15

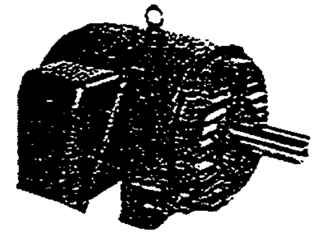
Ref. No.	Drawing	Description	Quantity
5	SK-5012	Shaft, with Key	1
6	XUSV 1129	Guard, Counterweight/Non-Drive	1
7	C-13035-10A	Drive Pedestal	1
501		Motor 10 HP, 1800 RPM 230/460 volt, 3 phase, 215T Frame	
1		Shaft, Drive, Splicer	
		330-X U-Joints 3-2-439 Flange Yokes 3-3-508KX Slip Yoke 3-82-286KX Yoke Shaft	2 2 1 1
2		Bearing Dodge P.B. Double Interlock, 2-3/16" Bore, 2 Bolt Base, Non-Expansion Type	1
3		Bearing Dodge P.B. Double Interlock, 2-3/16" Bore, 2 Bolt Base, Expansion Type	1
4		Driver Sheave, 6.0" P.D. 2B Groove, SDS Bushing @ 1-3/8" Bore	1
5		Driven Sheave, 13.6" P.D. 2B Groove, SK Bushing @ 2-3/16" Bore	1
6		V-Belt BX x 70	2

TOSHIBA

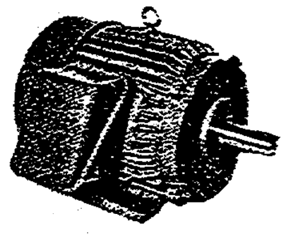
A Quality Product for World Energy



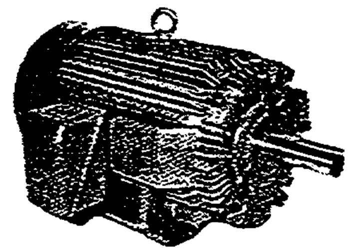
ODP Frames 143T-256T



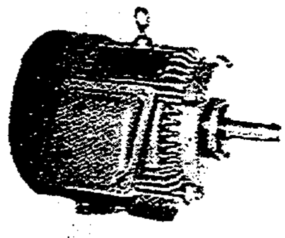
ODP Frames 404T-507UZ



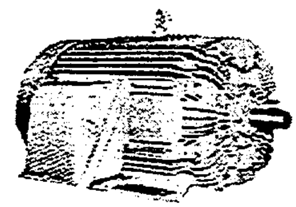
TEFC Frames 143T-256T



TEFC Frames 444T-N587UZ



XP Frames 143T-256T



XP Frames 404T-447TZ

INSTRUCTIONS:

Installation and Maintenance

Toshiba World Energy Motors
Polyphase motors

- Frames 143T through 507UZ Dripproof
- Frames 143T through N587UZ Totally-Enclosed Fan-Cooled
- Frames 143T through 447TZ Explosion-Proof

STORAGE

(1) Store motor in a clean, dry location and cover completely with plastic. (Leave opening for ventilation)
(2) Motor must be thoroughly dry before applying power.
(3) Every six months, give winding a megger test. A minimum of 10 megohms are recommended.
(4) Also, every six months, rotate shaft and add grease as needed.

READ CAREFULLY BEFORE INSTALLING AND STARTING MOTOR

RECEIVING

(1) Check nameplate data.
(2) Check whether any damage has occurred during transportation. (Motors are normally shipped F.O.B. factory. Freight claims must be submitted by the consignee to the carrier.)
(3) When supplied—Be sure to remove bearing lock plate before start-up.
(4) Turn shaft by hand to check that it turns freely.

LOCATION

(1) All motors should be located in an area where ventilation is not restricted and affects the operation of the motor.
(2) Dripproof Motors are designed for installation in a well ventilated place where the atmosphere is reasonably free of dirt and moisture.
(3) Totally enclosed motors may be installed where dirt, moisture (not running water) and corrosion are present, or in outdoor locations.
(4) Explosion Proof motors are designed and built for hazardous duty.
Listed by U L for Class I, Group D; and Class II, Groups E, F and G. Also listed by C S A.

MOUNTING

(1) Mount motor securely on a firm, flat base. All ball and roller bearing normal thrust motors may be mounted in any position.
(2) Align motor accurately, using a flexible coupling if possible. For drive recommendations consult with drive or equipment manufacturer, or Toshiba. See additional information on pages 3 and 4.
(3) V-belt Sheave Pitch Diameters should not be less than the following Table 1, values (NEMA recommended values).
(4) Tighten belts only enough to prevent slippage. Belt speed should not exceed 5000 ft. per min.
(5) Motors must not be subjected to vibration exceeding 0.5 G force.
(Motors should not be mounted to shaker screens)

POWER SUPPLY & CONNECTIONS

(1) Nameplate voltage and frequency should agree with power supply. Motor will operate satisfactorily on line voltage within 10% of nameplate value; or frequency within 5%; combined variation not to exceed 10%. 230 Volt motors can be used on 208-volt network systems, but with slightly modified performance characteristics.
(2) Dual voltage and single voltage motors can be connected for the desired voltage by following connection diagram shown on nameplate. Alternate starting connections are shown in the conduit box or connection diagrams on pages 5 and 6.
(3) Explosion Proof motors have Temperature Limiting Devices in the motor enclosure to prevent excessive external surface temperature of the motor in accordance with U L standards. Terminals of thermal protectors (P1, P2) should be connected to the motor control equipment.
(4) Wiring of motor and control, overload protection and grounding should be in accordance with National Electrical Code and local building codes.
(5) Disconnect motor from power supply before opening conduit box or working on motor.

Table 1. V-belt Sheave Pitch Diameters (MG1-14.42)

Frame No.	Horsepower at Sync. Speed RPM			V-belt Sheave (Inches)			
				Conventional		Narrow	
				A, B, C, D and E		3V, 5V and 8V	
	3600	1800	1200	Min. Pitch Diameter	*Max. Width	Min. Outside Diameter	**Max. Width
143T	1½	1	¾	2.2	4.250	2.2	2.250
145T	2-3	1½-2	1	2.4	4.250	2.4	2.250
182T	3	3	1½	2.4	5.250	2.4	2.750
182T	5	–	–	2.6	5.250	2.4	2.750
184T	–	–	2	2.4	5.250	2.4	2.750
184T	5	–	–	2.6	5.250	2.4	2.750
184T	7½	5	–	3.0	5.250	3.0	2.750
213T	7½-10	7½	3	3.0	6.500	3.0	3.750
215T	10	–	5	3.0	6.500	3.0	3.750
215T	15	10	–	3.8	6.500	3.8	3.750
254T	15	–	7½	3.8	7.750	3.8	4.000
254T	20	15	–	4.4	7.750	4.4	4.000
256T	20-25	–	10	4.4	7.750	4.4	4.000
256T	–	20	–	4.6	7.750	4.4	4.000
284T	–	–	15	4.6	9.000	4.4	4.250
284T	–	25	–	5.0	9.000	4.4	4.250
286T	–	30	20	5.4	9.000	5.2	4.250
324T	–	40	25	6.0	10.250	6.0	5.250
326T	–	50	30	6.8	10.250	6.8	5.250
364T	–	–	40	6.8	11.500	6.8	5.250
364T	–	60	–	7.4	11.500	7.4	5.250
365T	–	–	50	8.2	11.500	8.2	5.500
365T	–	75	–	9.0	11.500	8.6	5.500
404T	–	–	60	9.0	14.250	8.0	7.250
404T	–	100	–	10.0	14.250	8.6	7.250
405T	–	–	75	10.0	14.250	10.0	7.250
405T	–	100	–	10.0	14.250	8.6	7.250
405T	–	125	–	11.5	14.250	10.5	7.250
444T	–	–	100	11.0	16.750	10.0	8.500
444T	–	125	–	11.0	16.750	9.5	8.500
444T	–	150	–	–	–	10.5	8.500
445T	–	–	125	12.5	16.750	12.0	8.500
445T	–	150	–	–	–	10.5	8.500
445T	–	200	–	–	–	13.2	8.500

*Max. sheave width = 2 (N-W)-¼". **Max. sheave width = N-W.

Sheave ratios greater than 8:1 and center-to-center distance less than the diameter of the large sheave should be referred to the company.
Sheaves must be mounted close to the shaft shoulder.

Fig. 1 SHAFT EXTENSION LOADS DUE TO TRANSMISSION OF POWER

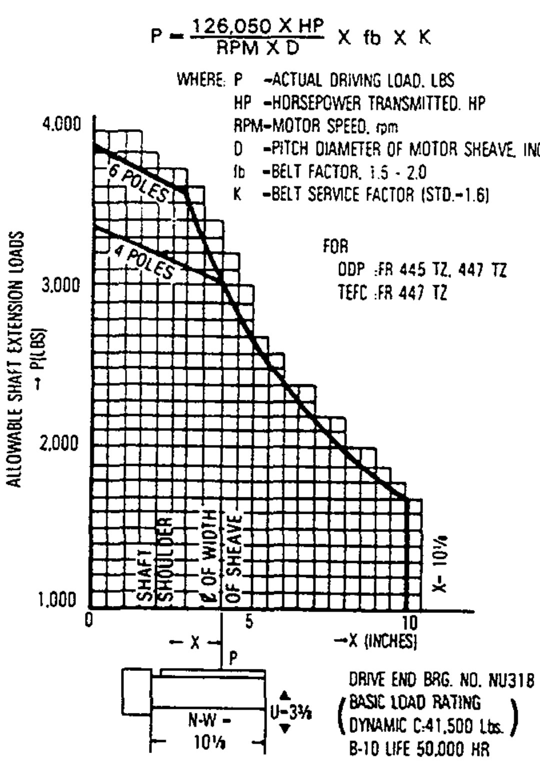
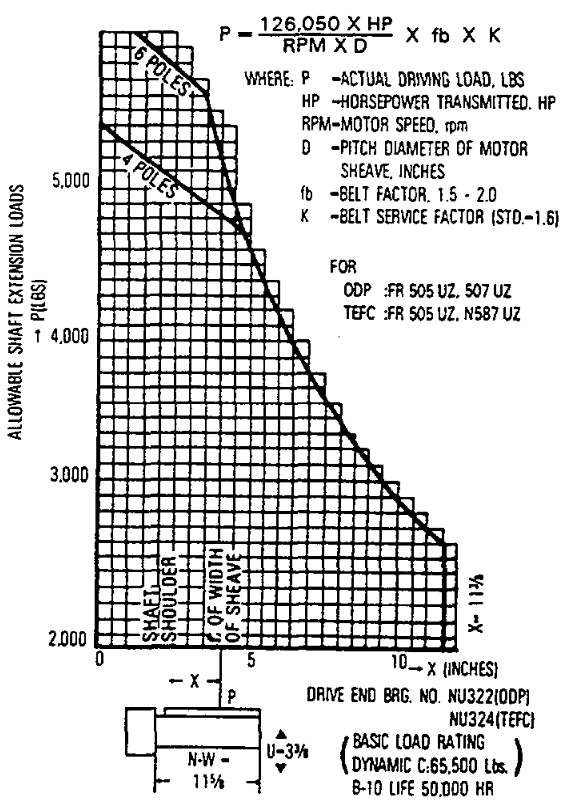


Fig. 2 SHAFT EXTENSION LOADS DUE TO TRANSMISSION OF POWER



ALIGNMENT PROCEDURES

MOTOR LEVELING & COUPLING ALIGNMENT

When the base has been adjusted, leveled, and grouted, the correct motor leveling and coupling alignment are obtained with the aid of shims between the motor and the base. To give the motor proper support, it is important that the base and shims extend under the motor.

RIGID COUPLING

Extreme care must be taken to obtain correct alignment when using rigid couplings. Circular concentric peripheral surfaces of the two coupling halves must indicate correct alignment within 0.0005 in. to 0.001 in. when the two coupling halves are rotated together. The separation between the faces of the two coupling halves must also be maintained within the same tolerance.

The alignment may be checked by utilizing a dial indicator as shown in Fig. 3 or with the aid of a straight-edge and thickness gauge or feelers as shown in Fig. 4.

The preferred method of checking alignment is with the dial indicator. Bolt the indicator to one of the coupling halves and indicate the position of the dial button on the opposite coupling half with a chalk mark. Set the indicator dial to zero at the first position and then rotate both halves of the coupling to a new position where a check reading is to be made. All readings must be made with the dial button located at the chalk mark, and not less than six different sets of readings should be taken. A variation in the dial reading at different positions of coupling rotation will indicate whether the machine has to be raised, lowered, or moved to one side or another to obtain alignment of the circular concentric peripheral surfaces of the two coupling halves within the specified tolerance.

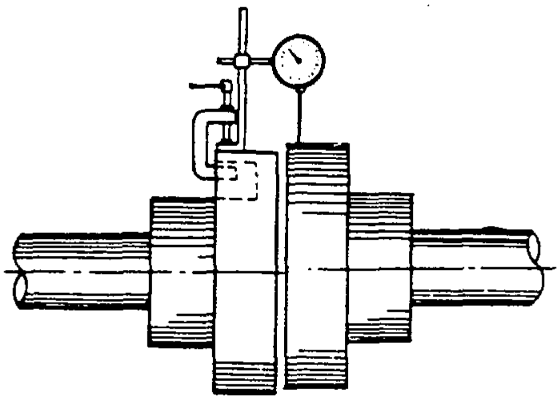
In addition to the above check, a check of the separation of the coupling faces must be made to establish correct alignment. The separation between the faces of the coupling may be checked with a dial indicator fastened to one coupling half and a reference surface fastened to the other coupling half. Mark the location of the dial button on the reference surface and make all readings with the indicator in this position. Set the dial of the indicator to zero for the first reading and use this as the reference. Be sure to rotate both halves of the coupling the same amount, aligning the button of the indicator and the mark on the reference surface for each of six readings. A variation of the readings at different positions will indicate how the machine has to be adjusted to obtain correct alignment. After each adjustment of the motor, repeat the above procedure to be certain that correct alignment and leveling have been obtained.

FLEXIBLE COUPLING

Units coupled through flexible couplings should be aligned as accurately as possible. As a suggested limit, the two halves should indicate correct alignment within 0.002 in. on both the circular concentric peripheral surfaces and the separation between faces. Although most flexible couplings will withstand greater misalignment than rigid couplings, extreme misalignment can cause vibration possibly resulting in failure of motor bearings and/or shaft.

If the method shown in Fig. 4 is used to check alignment of the machines, correct alignment exists — if the peripheries of the coupling halves are true circles of the same diameter and if the faces are flat — when the separation between the faces is held to within the specified tolerance at all points and a straight-edge lies squarely across the rims at any point. Non-parallel faces will be indicated by a variation in separation of the coupling halves as they are rotated, and a difference in height of the coupling halves will be indicated by the straight-edge and feeler gauge test.

When the coupling halves have been correctly aligned with the motor feet bolted in position, place temporary bolts in two coupling holes for clamping the halves together. Then, ream for a light drive fit through bolt halves for regular coupling bolts.



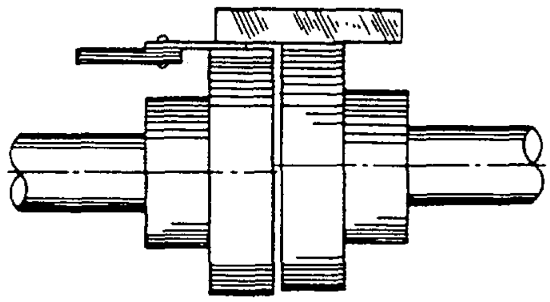


Fig. 3. The preferred method of measuring coupling alignment is with a dial indicator.

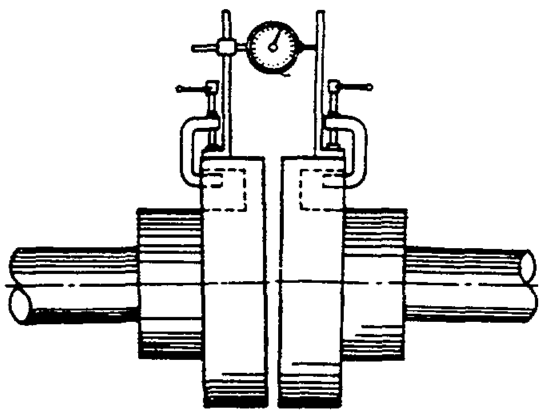
A. Clamp the dial indicator to the coupling as indicated above to measure the circular concentric peripheral surfaces of the coupling halves for parallel alignment.

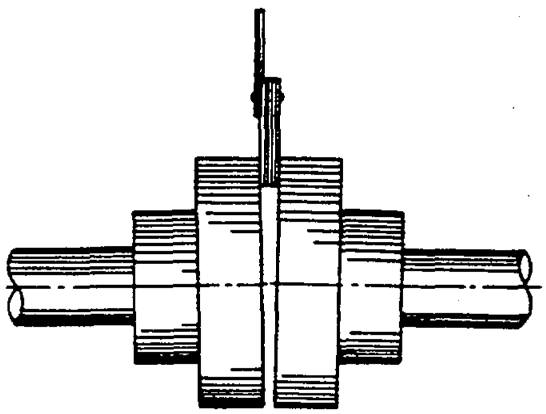
B. Clamping a reference surface to the opposite coupling half allows the dial indicator to be used for measuring the separation of the coupling halves for axial alignment as shown below.

Fig. 4. The straight-edge or thickness gauge or feeler gauge is an alternative method of measuring coupling adjustment.

A. Use a straight-edge and thickness gauge or feeler gauge to check the alignment of the circular concentric peripheral surfaces of the coupling halves as shown above.

B. The separation between the faces of the coupling halves can be measured as shown below.





Rigid Coupling tolerances 0.0005 in. to 0.001 in.
Flexible Coupling tolerance: 0.0015 in.

BALANCE (DIRECT COUPLED UNITS)

TOSHIBA motors are balanced at the factory to standard NEMA commercial tolerances. However, if direct coupling units have been disassembled in the field, an apparent unbalance may occur if the units are not reassembled with the shafts in the same relative position as they were originally. Should this occur, disconnect the coupling halves and rotate one shaft 90° with respect to the other shaft. Re-connect the coupling and run the unit.

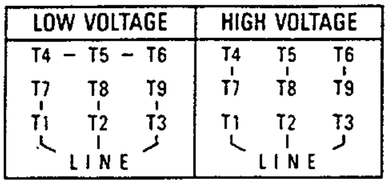
If the unbalance has not disappeared, repeat the above procedure until it does.

CONNECTION DIAGRAMS

A. Wye-connected Dual Voltage (230/460 V)
(9 Leads)

POLE	ODP	TEFC & EXP
2 P	1½HP-7½HP	1½HP-5HP
4 P	1HP-5HP	1HP-5HP
6 P	¾HP-5HP	¾HP-5HP
8 P	¾HP-5HP	¾HP-5HP

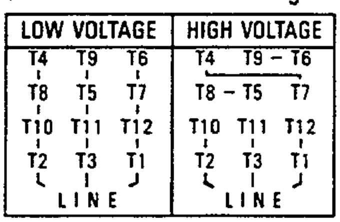
A-1 Across the Line Starting



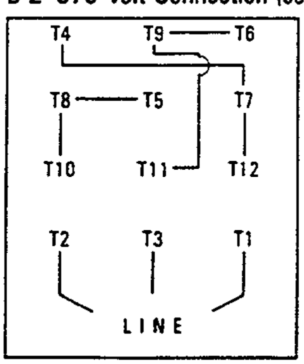
B. Delta-connected Dual Voltage (230/460 V)
(12 Leads)

POLE	ODP	TEFC & EXP
2 P	10HP-250HP	7½HP-150HP
4 P	7½HP-200HP	7½HP-150HP
6 P	7½HP-125HP	7½HP-125HP
8 P	7½HP-100HP	7½HP-100HP

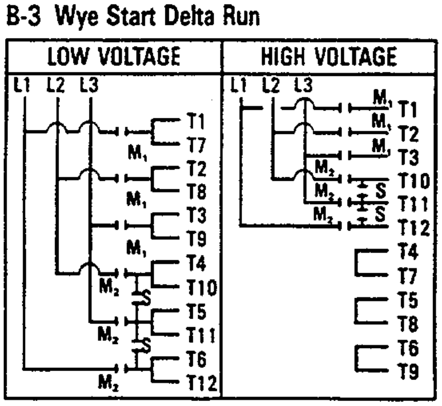
B-1 Across the Line Starting



B-2 575 Volt Connection (see Note 1)

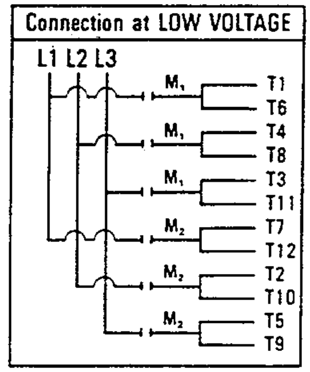


B-3 Wye Start Delta Run



	Start	Run
M_1	Close	Close
M_2	Open	Close
S	Close	Open

B-4 Part Winding Starting (see Note 2)



	Start	Run
M_1	Close	Close
M_2	Open	Close

M_2 should be energized within 2 seconds after M_1 is energized.

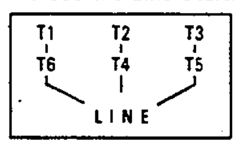
NOTES:
1) Motors can be used on 575-Volt network in accordance with B-2 connection.

2) 4 pole and 6 pole motors are satisfactory for Part Winding starting at low voltage (230 V).

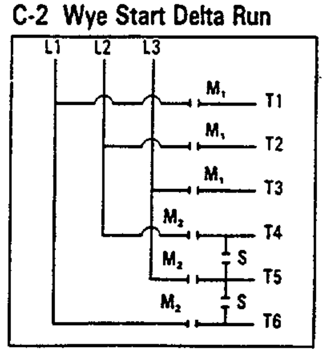
C. Delta-connected Single Voltage (460 V)
(6 Leads)

POLE	ODP	TEFC & EXP
2 P	300HP-350HP	200HP-300HP
8 P	125HP-250HP	125HP-250HP

C-1 Across the Line Starting



C-2 Wye Start Delta Run



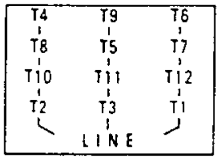
	Start	Run
M_1	Close	Close
M_2	Open	Close
S	Close	Open

CONNECTION DIAGRAMS CONT.

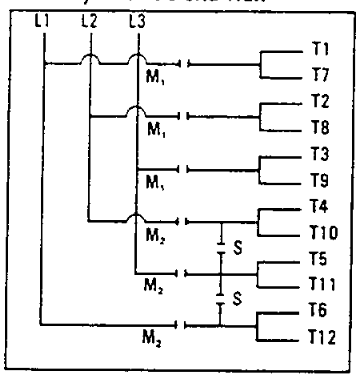
D. Delta-connected Single Voltage (460 V) (12 Leads)

POLE	ODP	TEFC & EXP
2 P	400HP-600HP	———
4 P	250HP-400HP	200HP-400HP
6 P	150HP-300HP	150HP-300HP

D-1 Across the Line Starting

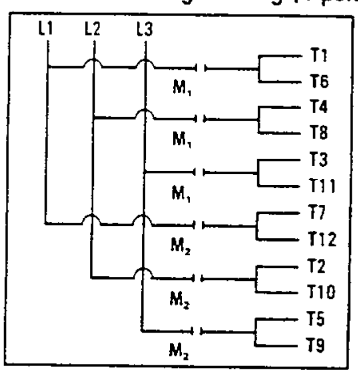


D-2 Wye Start Delta Run



	Start	Run
M_1	Close	Close
M_2	Open	Close
S	Close	Open

D-3 Part Winding Starting (4 pole and 6 pole motors)



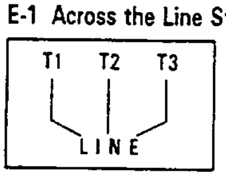
	Start	Run
M_1	Close	Close
M_2	Open	Close

M_2 should be energized within 2 seconds after M_1 is energized.

E. Wye-connected 575 Volt Motors (3 Leads)

POLE	ODP	TEFC & EXP
2 P	1½HP-7½HP	1½HP-5HP
4 P	1HP-5HP	1HP-5HP
6 P	¾HP-5HP	¾HP-5HP
8 P	¾HP-5HP	¾HP-5HP

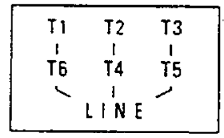
E-1 Across the Line Starting



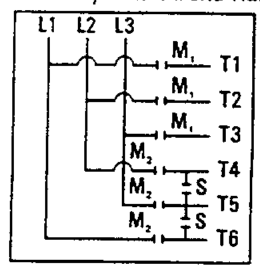
F. Delta-connected 575 Volt Motors (6 Leads)

POLE	ODP	TEFC & EXP
2 P	10HP-500HP	7½HP-300HP
4 P	7½HP-400HP	7½HP-400HP
6 P	7½HP-300HP	7½HP-300HP
8 P	7½HP-250HP	7½HP-250HP

F-1 Across the Line Starting



F-2 Wye Start Delta Run

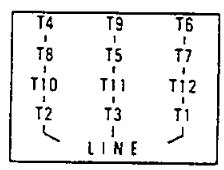


	Start	Run
M_1	Close	Close
M_2	Open	Close
S	Close	Open

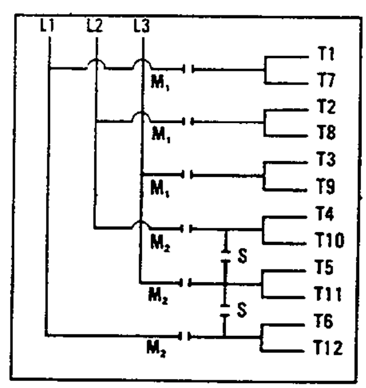
G. Delta-connected 575 Volt Motors (12 Leads)

POLE	ODP
2 P	600HP

G-1 Across the Line Starting



G-2 Wye Start Delta Run



	Start	Run
M_1	Close	Close
M_2	Open	Close
S	Close	Open

WARNINGS

Motors built F-1 Assembly will be standard counter clockwise rotation facing non drive end of motor. Motors built F-2 Assembly will have clockwise rotation facing non drive end of motor. With the exception of low voltage TEFC 400T through N587UZ Frame motors, whose rotation will remain counter clockwise.

WARNING
BEFORE STARTING MOTOR, REMOVE ALL UNUSED SHAFT KEYS AND LOOSE ROTATING PARTS TO PREVENT THEM FROM FLYING OFF.

CAUTION: Check direction of motor rotation before coupling motor to load.

WARNING
ROTATING PARTS, SUCH AS COUPLINGS, PULLEYS, EXTERNAL FANS, AND UNUSED SHAFT EXTENSIONS, SHOULD BE PERMANENTLY GUARDED AGAINST ACCIDENTAL CONTACT WITH HANDS OR CLOTHING. THIS IS PARTICULARLY IMPORTANT WHERE THE PARTS HAVE SURFACE IRREGULARITIES SUCH AS KEYS, KEYWAYS OR SET SCREWS.

WARNING
WHEN A LIFTING MEANS IS PROVIDED FOR HANDLING THE MOTOR OR GENERATOR, IT SHOULD NOT BE USED TO LIFT THE MOTOR OR GENERATOR PLUS ADDITIONAL EQUIPMENT SUCH AS GEARS, PUMPS, COMPRESSORS, OR OTHER DRIVEN EQUIPMENT.

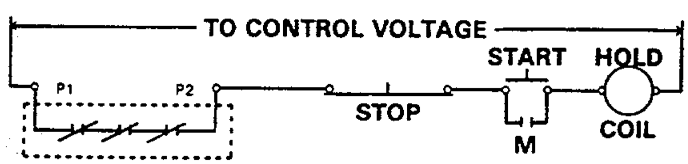
WARNING
THE FRAMES AND OTHER METAL EXTERIORS OF MOTORS AND GENERATORS (EXCEPT FOR INSULATED PEDESTAL BEARINGS) USUALLY SHOULD BE GROUNDED TO LIMIT THEIR POTENTIAL TO GROUND IN THE EVENT OF ACCIDENTAL CONNECTION OR CONTACT BETWEEN LIVE ELECTRICAL PARTS AND THE METAL EXTERIORS.

WARNING
WHEN CAREFUL CONSIDERATION OF THE HAZARDS INVOLVED IN A PARTICULAR APPLICATION INDICATE THE MACHINE FRAMES SHOULD NOT BE GROUNDED OR WHEN UNUSUAL OPERATING CONDITIONS DICTATE THAT A GROUNDED FRAME CANNOT BE USED, THE INSTALLER SHOULD MAKE SURE THE MACHINE IS PERMANENTLY AND EFFECTIVELY INSULATED FROM GROUND. IN THOSE INSTALLATIONS WHERE THE MACHINE FRAME IS INSULATED FROM GROUND, IT IS RECOMMENDED THAT APPROPRIATE WARNING LABELS OR SIGNS BE PLACED ON OR IN THE AREA OF THE EQUIPMENT BY THE INSTALLER.

WARNING FOR EXPLOSION-PROOF MOTOR

Disconnect power before working on motor driven equipment. This motor is equipped with an automatic temperature-limiting device. The National Electrical Code and Underwriter's Laboratories require connection of leads P1 and P2 into the control circuit of a manual reset starter per following diagram.

KLIXON TYPE	AC VOLT	VOLT AMP RATING
9700K	120-600V	720 VA



(NC) MOTOR THERMOSTATS

NOTE:
Frame 256T and smaller has two thermostats.

MAINTENANCE

1. **INSPECTION**
   Inspect motor at regular intervals. Keep motor clean and vent openings clear.
2. **LUBRICATION**
   a. **Frames 143T thru 256T** are furnished with double sealed or shielded ball bearings, prelubricated prior to installation. Grease fittings are not supplied and bearings are designed for average 100,000 hours operation under standard conditions. (See table 2 below.)
   b. **Frames 284T thru N587UZ** are furnished with double shielded or open ball or roller bearings. (Depending on HP size and/or speed.) It is necessary to relubricate anti-friction bearing motors periodically. (See table 2 below.)
   These motors are supplied with provision for greasing and have been lubricated prior to test, however before start-up it is recommended to apply approximately 30 grams (1 oz.) of grease because of possible settling of grease during storage and handling. However, oil leakage around bearing caps indicate overpacking and excess grease should be purged out by operating motor temporarily with relief open.

Table 2. Frequency of Relubrication

SYNC. RPM RANGE	FRAME RANGE	TYPE OF SERVICE	
		STANDARD DUTY	SEVERE DUTY
3600	143T-256T	* 5 Years	* 3 Years
	284TS-286TS	12 Mos.	4 Mos.
	324TS-N587USS	9 Mos.	3 Mos.
1800	143T-256T	* 7 Years	* 3 Years
	284T-326T	4 Years	1.5 Years
	364T-365T	2.5 Years	10 Mos.
	404T-447TZ	2 Years	8 Mos.
	505US-N587UZ	1.5 Years	6 Mos.
1200 AND SLOWER	143T-256T	* 7 Years	* 3 Years
	284T-326T	4 Years	1.5 Years
	364T-447TZ	3 Years	1 Year
	505US-N587UZ	2 Years	8 Mos.

* The above table shows typical regreasing schedules to be used unless otherwise specified by the motors grease nameplate.

SERVICE CONDITIONS	
STANDARD DUTY	Eight hours per day, light to normal loading, clean condition free from dust.
SEVERE DUTY	Twenty-four hours per day, or light to normal shock loading vibration, exposure to dirt or dusty conditions. **For very severe conditions where the motor is subject to high vibration or heavy shock loading and vibration use 1/3 of the value shown in the severe duty table.**

Remark * : It is recommended to change bearings after the time shown in Table 2.

3. **INSTRUCTIONS FOR LUBRICATING**
   Toshiba motors (284T–N587UZ) are furnished with grease fittings. Before greasing, be sure fittings are clean and free from dirt. Remove grease relief plug or plate and using a low pressure grease gun, pump in the required grease. Do not overgrease. Relubrication intervals are specified in table 2 above. After relubricating, allow motor to run for 10 minutes before replacing relief hardware.
4. **RECOMMENDED GREASES FOR STANDARD APPLICATIONS**
   Use the following greases listed for the given temperature range, unless otherwise shown by the motors grease nameplate.

OPERATING AMBIENT TEMP. -30°C to 50°C	
CHEVRON SRI	CHEVRON
EXXON UNIREX #2	EXXON CORP.
EXXON POLYREX	EXXON CORP.
SHELL DOLIUM R	SHELL OIL CO.

5. **RECOMMENDED GREASES FOR SPECIAL APPLICATIONS**
   The following greases are recommended for special applications only and should be used only for motors specifically built for such conditions.

MIN. AMBIENT TEMP. -60°C	
BEACON 325	EXXON CORP.
MAX. AMBIENT TEMP. 90°C	
DOW CORNING 44	DOW CORNING CORP.
EXXON UNIREX S2	EXXON CORP.

WARNING: In general it is not recommended to mix greases of different brands. The mixing of different types of thickeners may destroy the composition and physical properties of the grease. In the event that a different grease is required by the end user, the following steps can be taken. Using the instructions for lubrication, open grease outlet and purge the system as much as possible of the old or unwanted grease. Repeat this same operation after 1 week of service. Consult TOSHIBA/HOUSTON Engineering for further recommendations on grease compatibility.

WARRANTY

Generally, TOSHIBA will correct at it's option, by repair or replacement (f.o.b. a TOSHIBA-AUTHORIZED SERVICE SHOP), any defect in material and workmanship when properly used for a period of one year after installation or 18 months after shipment, whichever comes first. TOSHIBA is not responsible for apparatus returned without proper authorization and identification, improper handling or storage, misapplication of the motor or the driven equipment, defects in the driven equipment or device, or improper circuit protection. The amount of liability shall not exceed the purchase price of the product. In no event shall TOSHIBA have any liability for commercial loss, claims for labor, removal and installation charges or consequential damages of any type. It is expressly agreed that Buyer's remedies expressed in this paragraph are Buyer's exclusive remedies.

RENEWAL PARTS

(1) Use only genuine TOSHIBA renewal parts.
(2) When ordering, specify complete information (at least **Model Number** and **Serial Number**) of the motor. Specify quantity and describe part.
(3) For information and service refer to the nearest TOSHIBA INTERNATIONAL CORPORATION office.

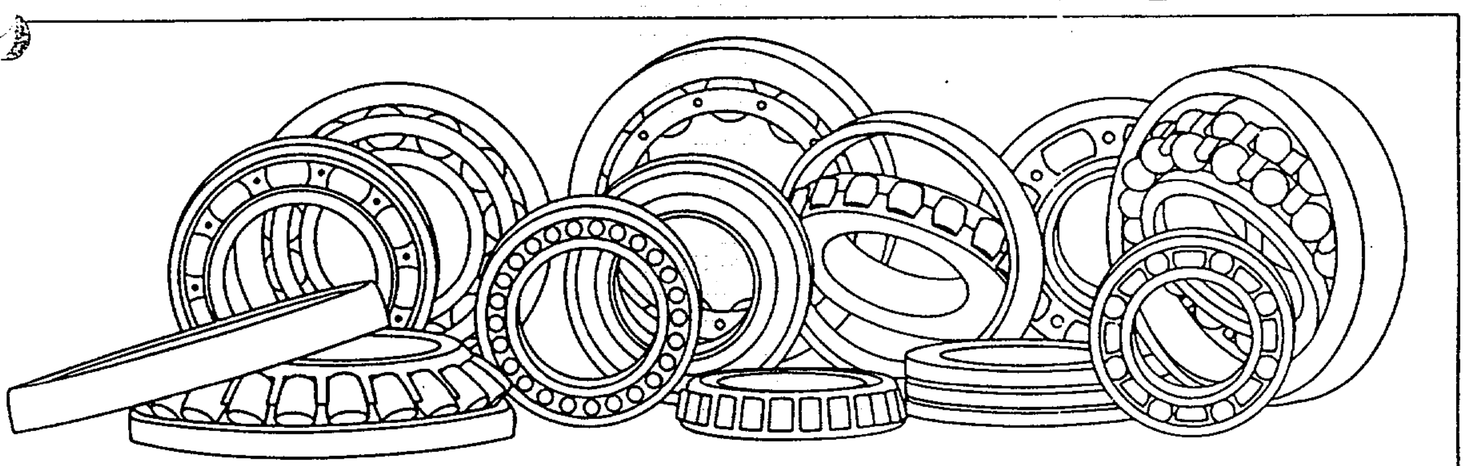
WARNING

EXPLOSION-PROOF MOTORS are constructed to comply with the U L Label Service Procedure Manual. Repairs of EXPLOSION-PROOF MOTORS must be made by the manufacturer or U L listed service center to maintain the U L Listing.

FOR FURTHER INFORMATION CONTACT:
TOSHIBA INTERNATIONAL CORPORATION
Industrial Equipment Division
13131 W. LITTLE YORK RD., P.O. BOX 40906, HOUSTON, TEXAS 77041

195-0014 (06/92)

BEARING MAINTENANCE MANUAL



FAG BEARINGS CORPORATION

FACT: PREVENTIVE MAINTENANCE BEGINS WITH RECOGNIZING OPERATING PROBLEMS.

The following tabulation lists some of the more common types of bearing operating troubles, the probable causes, and suggested corrective measures. If these suggestions do not correct the trouble, contact the FAG Engineering Department for assistance.

Trouble	Observed Characteristic	Probable Cause	Corrective Action
NOISE	High pitch, steady tone	Excessive axial load	Correct outer ring fit in housing and/or shoulder location to allow thermal expansion.
		Excessive radial load	Use correct fit of inner ring on shaft. For radial bearings, use bearing with greater internal clearance. For preloaded paired bearings, use lighter preload.
		Misalignment	Correct alignment.
	Low pitch, continuous or intermittent	Too much clearance in bearing	Use correct shaft fit. For radial bearings use bearing with less internal clearance. For preloaded paired bearings, use heavier preload.
		Bearing brinelled	Replace bearing, avoid brinelling.
		Raceways pitted due to dirt	Wash all parts, replace with new bearing, use clean lubricant, improve seals.
		Resonant vibration of machine structure	Stiffen or sound-deaden thin panels and large flat surfaces.
	Intermittent squeal or high pitch noise	Balls skidding	Provide thrust preload spring. Use thinner grease. For radial bearings, use bearing with less internal clearance. For preloaded paired bearings, check for correct preload.
		Shaft rubbing housing	Correct seals and machine parts.
	Intermittent rumbles, rattles clicks, etc.	Too much clearance in bearing	Correct shaft fit. For radial bearings use adjusting spring or bearing with less internal clearance. For preloaded paired bearings, check for correct preload.
		Dirt in bearing	Wash all parts, replace with new bearing if necessary, use clean lubricant, improve seals.
		Loose machine parts	Tighten all fans, pulleys, closures, spacers, slingers etc.
TEMPERATURE	High after first start	Grease redistribution	Allow machine to cool. Restart.
	Continuously high during operation	Churning of lubricant	Use lower oil level; less grease; stiffer grease.
		No lubricant	Add lubricant.
		Excessive axial load	Check outer ring fit in housing and/or shoulder location to allow thermal expansion.
		Excessive radial load	Use correct fit of inner ring on shaft. For radial bearings, use bearing with greater internal clearance. For preloaded paired bearings, use lighter preload.
		Bearing misaligned	Correct machine parts and alignment procedures.
		Excessive seal drag	Use different type of seal.

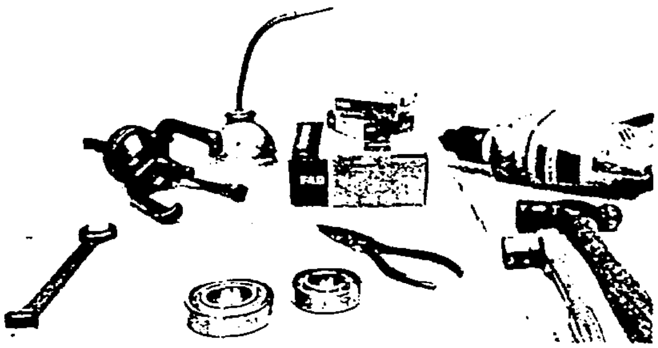
Trouble	Observed Characteristic	Probable Cause	Corrective Action
EXCESSIVE VIBRATION	During acceleration or deceleration periods	Critical speeds of machine components	Stiffen shaft or other machine components to avoid critical speeds.
	During operation at fixed speeds	Unbalanced rotating parts	Dynamically balance rotating parts.
		Shaft bent	Straighten and re-balance.
		Cams, gears, linkage	Adjust, improve or redesign.
		Misalignment	Correct machine parts.
		Bearing brinelled	Replace bearing, avoid brinelling.
RUNOUT	Shaft does not run true. Shaft binds when rotated by hand.	Shaft bent	Straighten shaft and re-balance.
		Bearing misaligned	Correct machine parts and alignment procedures.
		Bearing rings out of square	Check squareness of shaft and housing shoulders, spacers and flingers, etc.
		Dirt	Wash all parts, replace with new bearing if necessary, use clean lubricant, improve seals.
		Machine deflection	Stiffen machine members.
INNER RING WEARS LOOSE ON SHAFT	Wear of the shaft seat	Incorrect shaft fit	Use recommended shaft fit.
		Poor shaft finish	Smooth turn or grind shaft to size after metalspraying or chrome plating.
OUTER RING WEARS ~~OSE~~ ~~USING~~	Wear in housing bore	Housing fit too loose	Use recommended housing fit.
		Unbalanced forces	Dynamically balance rotating parts. Clamp outer ring faces. Use cylindrical roller bearing and press fit outer and inner rings.
		Poor finish	Bore or grind housing I.D. oversize, press in a bushing and finish bore or grind to size.
		Soft housing material	Use steel liners. Work-harden bore.

FACT: PROPER INSTALLATION AND MAINTENANCE PROLONG BEARING LIFE.

These notes on the care and handling of ball and roller bearings apply to initial installation of bearings in a product as well as to removal and reassembly for maintenance and inspection. Proper precautions during installation and maintenance can greatly prolong the life of a bearing, avoiding premature failure and costly replacement. Where bearings are installed improperly, the resulting damage may often involve parts of the machine other than the bearings themselves. Hence extra care is extremely important in the assembly operations.

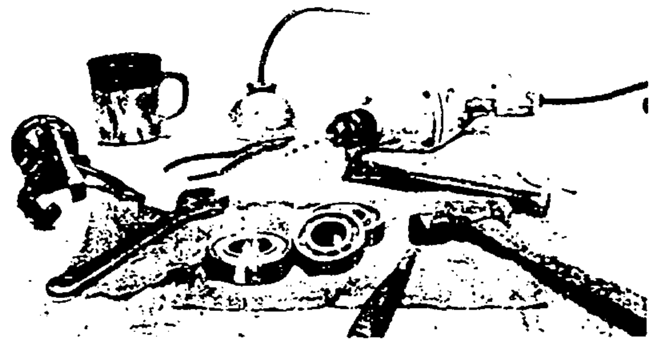
Probably the most important single factor to keep in mind is CLEANLINESS. Dust, dirt or any form of abrasive material is an anti-friction bearing's greatest enemy. All bearings are assembled under immaculate conditions, and are shipped from the factory completely free from any foreign matter that could score or damage the highly polished raceways and rolling elements. Except in the case of completely sealed bearings, dirty working conditions in the area where bearings are installed or maintained could easily lead to serious contamination and early failure. Where cleanliness conditions are difficult to control, the use of double-sealed or shielded bearings may be highly desirable. Keep bearings **clean** — dirt means damage!

The following list of "do's" and "don'ts" should be observed at all times.



DO'S

- Work with clean tools, in clean surroundings.
- Keep bearings wrapped in oil-proof paper when not in use.
- Handle bearings with clean, dry hands.
- If bearings must be laid down, use clean paper.
- Use clean, lint-free rags if bearings are wiped.
- Clean inside of housings before installing or replacing bearings.
- Treat a used bearing as carefully as a new one.
- Use only clean solvents and flushing oils when washing used bearings, or when necessary to wash corrosion preventatives from new bearings.
- Protect disassembled bearings from dirt and moisture.
- Keep bearing lubricants clean when applying, and cover containers when not in use.



DON'TS

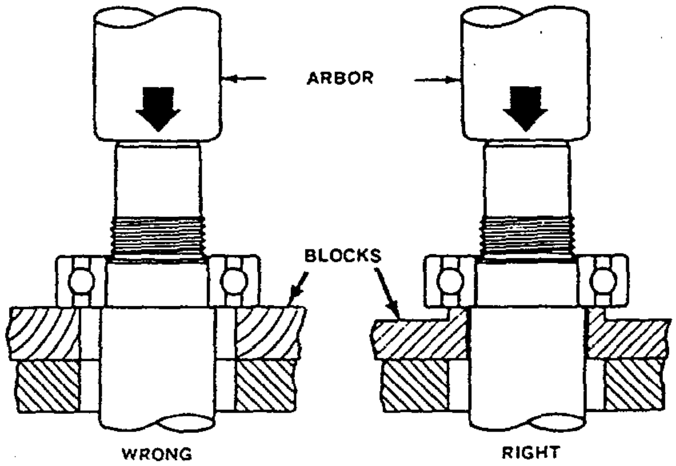
- Don't remove grease from **new** prelubricated bearings or take them apart.
- Don't expose bearings to moisture or dirt at any time.
- Don't use wooden, lead or plastic mallets or work on rough or dirty bench tops.
- Don't use dirty, brittle or chipped tools.
- Don't spin **any** bearing with compressed air.
- Don't rotate uncleaned bearings.
- Don't use same container for cleaning and final rinsing of bearings.
- Don't use cotton waste or dirty cloths to wipe bearings.
- Don't scratch or nick bearing surfaces.
- Don't use incorrect kind or amount of lubricant.

Before wrapping and packing, bearings are carefully cleaned by the manufacturer and, unless prelubricated, are thoroughly coated with a protective compound. New bearings are wrapped in greaseproof paper to keep them clean and are put in a carton or other container for further protection. Keep bearings in original cartons or wrappings until ready for use. If a package is opened and the bearings not used immediately, protect by re-wrapping. When removing bearings from stock, always use oldest bearings first.

FACT: BEARINGS SHOULD BE REMOVED WITH CARE.

REPLACING BEARINGS

The extreme caution recommended in the removal and reinspection of bearings applies only when it is economically advantageous to consider re-using the bearings. **In most instances it is economically wiser to replace with new bearings.**



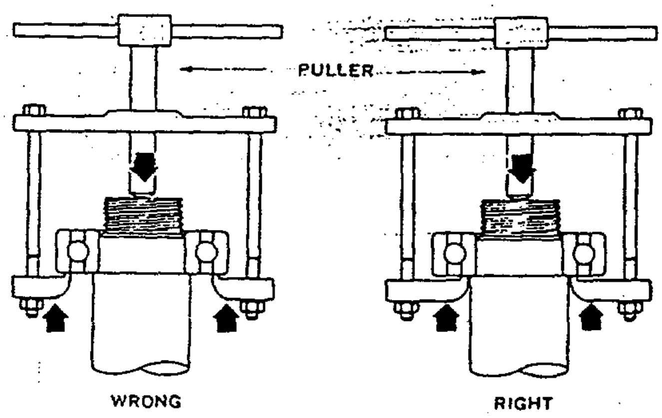
Removal of Bearings

When ball or roller bearings are removed from a piece of equipment for maintenance, inspection or cleaning, just as much care should be used as when installing new bearings. Unless known to be otherwise, it should be assumed that the bearings are still serviceable and can be re-installed after cleaning. Make sure that if a bearing is found to be damaged on inspection, the damage didn't occur during its removal. In bearing removal, as in installation, use the right tools and use them correctly.

Wash off the bearing housing, taking care to keep loose dirt from getting into the housing.

Take a few moments to study the assembly and determine the best way to undertake bearing removal.

The best tools for removing a bearing are usually an arbor press or hydraulics. Most field work, however, is done with some form of bearing puller. Remember that the bearing ring which does the turning is usually put on with a tight fit. The stationary ring, like the outer ring in an electric motor bearing, is usually a slip fit. When a piece of equipment is taken apart, the bearings stay with the member to which they are tightly fitted. In the case of separable bearings which are made with removable inner ring or outer ring, both rings may often be a tight fit.



To remove a bearing, press or pull **only** on the ring which is **tight.** Press or pull straight and square to keep the ring from cocking. A cocked ring can score the shaft or housing and possibly damage the bearing. Never press or pull against bearing shields or cages. The illustrations at the right show the right and wrong methods of removing a bearing with an arbor press. The press ram is shown pushing down against the shaft on which the bearing inner ring is tightly fitted, while the tight ring is backed up by the support blocks under the rings. Note, as shown in the wrong method, that if the support blocks are spaced too far out, the pressure will be against the outer ring or shield and damage will result. Doing it the wrong way puts a heavy stress on the balls or rollers which can damage them and cause indentation of both races.

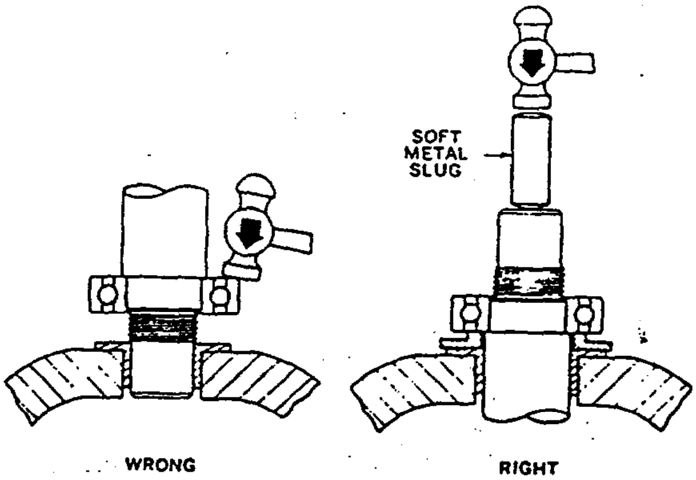
Keep the press table and blocks clean and square. Provide some means to keep the shaft from falling to the floor. If the shaft and bearing are very large and the shaft end cannot be squared up with the press ram, turn up two steel blocks to make a self-aligning fixture between the ram and the shaft. Protect the end of the shaft with a pad of lead, brass or other soft metal.

Use pullers properly. Set them so they will push or pull straight and square. Take care not to damage shaft threads, keyways, or shoulders in the process.

Using proper care, bearings can be removed quite safely with improvised methods where the right tools are not available.

A vise will do instead of an arbor press and a drift will take the place press ram. If the shaft is held in the vise, protect its surface with s sheet or by hardwood blocks.

Sometimes a separable inner ring is installed against a shoulder of equal diameter so that there is no way to get a hold of it. Leave the bearing ring on if usable. If not, apply heat with a torch to expand the ring for removal. Induction heating equipment is preferable.



FACT: CLEANED BEARINGS MUST BE CAREFULLY INSPECTED AND PROTECTED.

CLEANING THE BEARINGS

Don't try to judge the condition of a bearing until after it has been cleaned.

Don't spin dirty bearings. Rotate them slowly while washing. If dirt is present in the races, spinning can cause serious scratching. Don't spin any bearings with an air hose. When using air, rotate one ring slowly by hand to expose all parts of the bearing.

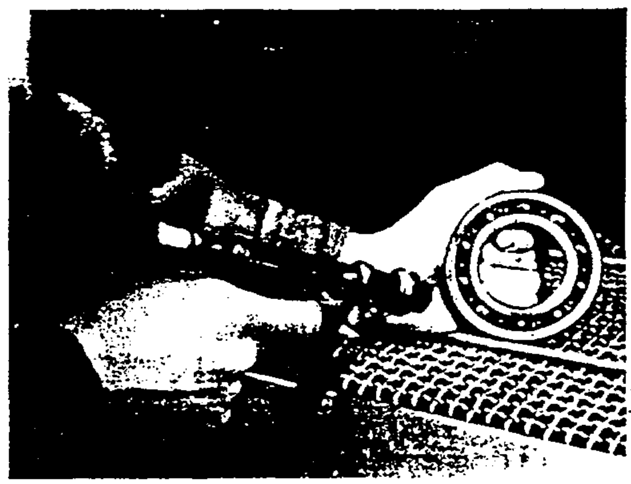
Bearings with removable seals should be washed and inspected after removal of seals, in the same manner as bearings without seals. Bearings with permanent shields or seals **on both sides** should not be washed. Wipe them off to keep dirt from working inside. Smooth turning bearings can be coated with protective lubricant and then wrapped and stored or re-used in their original application.

If bearings with two shields or seals stick or feel too rough for further use, they should be replaced. In general, replacement of standard bearings is so economical that it does not pay to re-install a bearing if there is any doubt as to its condition.

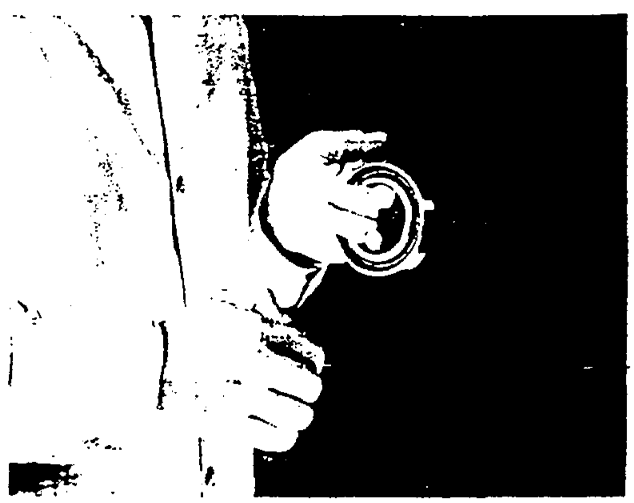
Preferably, a small tank and wire baskets should be used for soaking and washing bearings. However, if not available, a clean grease drum or bucket filled with solvent can be used. Let the bearings soak long enough to loosen the grease and dirt. This may take several hours or longer. Then slosh the bearing around near the top of the container, giving it a turn now and then until it is clean. Rinse in a clean container of **clean** solvent.

Bearing cleaning solutions such as kerosene or gasoline are often used, but petroleum solvents intended for bearing cleaning are preferred. A short, clean bristle brush from which the bristles will not come out or break off is a help in removing dirt, scale or chips.

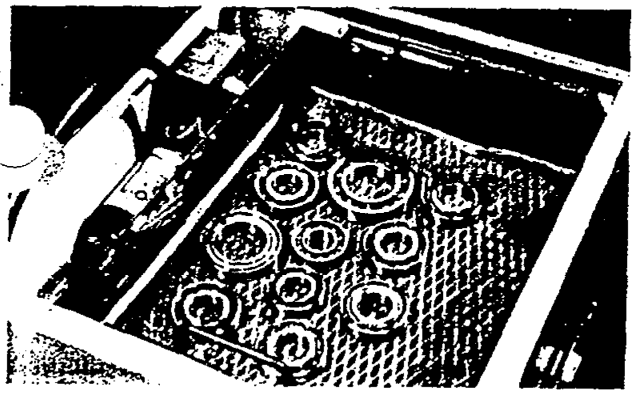
Inspected bearings which are good enough to use again, but can't be reassembled in the equipment on the same day, should be dipped in rust preventive and stored overnight in a tightly covered container. If inspected bearings are to be stored for more than a few days, dip them in a protective lubricant or thoroughly coat all surfaces with a light grease. Wrap the bearings in greaseproof paper and place in a clean box or carton. Where cartons are not obtainable, wrap them in waterproof paper and mark the package to identify the bearing.



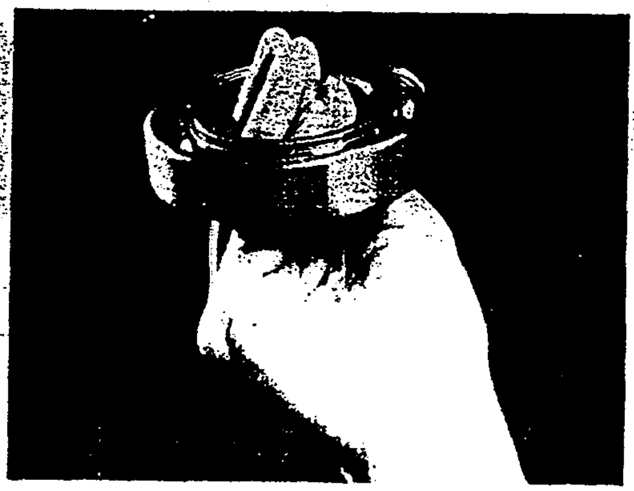
Oil spray cleaners are both fast and efficient, but should always be used with a filter in the air line to prevent blowing dirt or moisture into the bearing.



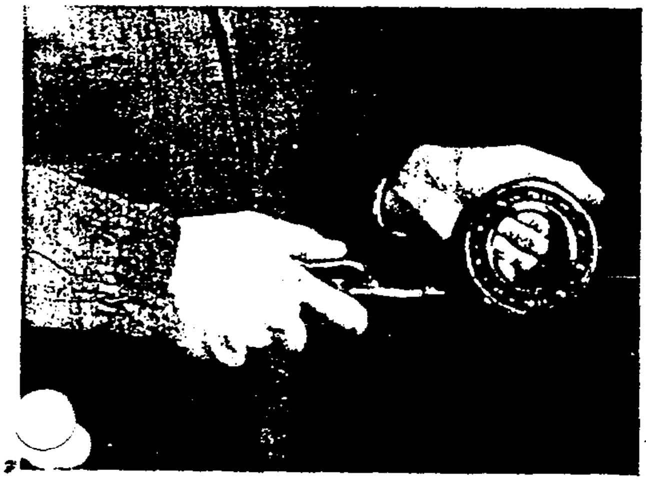
Never spin bearings before cleaning. Dirt can cause serious scratching of the polished raceway surfaces.



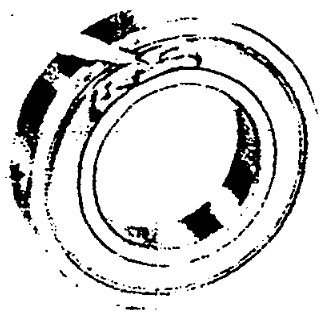
Preferred method of soaking bearings. Put in only one layer of bearings. Keep basket off bottom of tank.



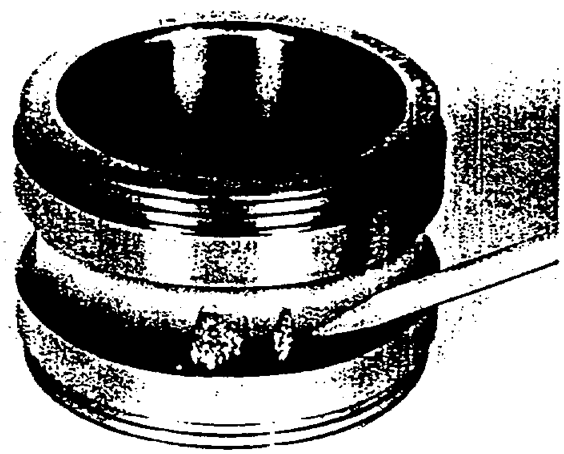
Hold cleaned bearings as shown when rotating the outer ring during inspection.



Using compressed air to remove dirt from bearings is permissable, but do not spin either ring by force of air and use only clean, dry air.



Bearing with a bent shield caused by a drift that slipped. Such a bearing should be replaced.



Inner ring of a cartridge type ball bearing showing flaked or spalled area on raceway. Bearings with such indications on either ring should be scrapped and replaced.

Bearing with broken cage, caused by dirt or metal chips. A bearing in this condition should be replaced.

Bearing Inspection

After a bearing is washed clean it should be carefully inspected to determine its serviceability.

A little tarnish, stain or corrosion on the outside surfaces of the rings. is not detrimental to the operation of the bearing and need not be removed.

Unless better equipment is available, cleaned bearings that are not separable are inspected by first holding the inner ring so its axis is vertical, and by turning the outer ring slowly. Then turn the bearing over and repeat turning the outer ring. If there is any roughness or sudden stopping of the bearing it should be recleaned immediately. Then, if the bearing still feels rough or has a catch, inspect it in greater detail for the cause of the catch or roughness.

If any of the following defects are found, or suspected, the bearing should be rejected and replaced with a new one.

1. Broken or cracked rings.
2. Dented seals or shields.
3. Broken or cracked cages.
4. Broken or cracked balls or rollers.
5. Bearings which have been overheated. These bearings are generally darkened to brownish blue or blue-black color.
6. Flaked areas on balls, rollers or raceways.
7. Bearings whose raceways are indented or "brinelled" by balls or rollers being impressed into the races.

Even if no defects are found or suspected, the age of the bearing should be taken into consideration before replacing it in the equipment. An old but seemingly perfect bearing may be nearing the end of its useful life due to fatigue. In such cases, it would be more economical to replace it with a new bearing.

FACT: INSTALLING NEW BEARINGS REQUIRES UTMOST CARE.

INSTALLING NEW BEARINGS

In most installations, either the inner or outer ring will be installed with an interference fit so that the bearing will have to be pressed or driven onto the shaft or into the housing. Particular care should always be taken to make sure that pressure is applied only to the ring with the interference fit.

Remember:

Pressure or impact should NEVER be transmitted through or imparted to the rolling elements. This will cause serious damage to the polished surfaces of the raceways, balls or rollers.

Shafts, keyways, splines, grooves and housings should be thoroughly cleaned.

Burrs and slivers should be removed.

Bearing seats should be cleaned and oiled.

Bearings should be pressed on shafts or into housings **straight** and square.

Bearings should be pressed until they are securely seated against the shaft or housing shoulder.

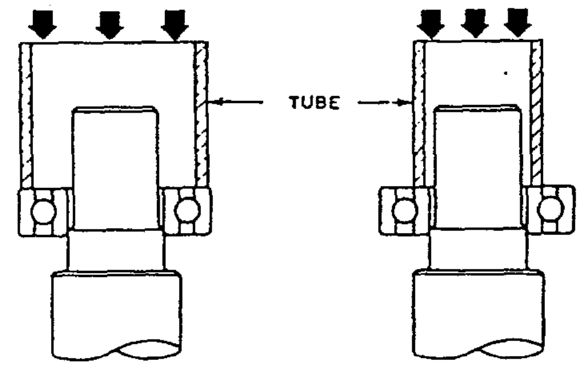
Where the interference fit is on the inner ring, use an arbor press, if available, and press the bearing onto the shaft using a tube as shown in the sketch. Also, for smaller shafts, it might be practical to press the shaft into the bearing by supporting the inner ring on the tube.

Do not leave bearings exposed in partial assemblies. Cover the bearings until ready to complete the assembly, to prevent damage by moisture, dirt or other foreign matter. Any clean lint-free cloth or paper will do, as long as the bearings are well covered.

If the interference fit is in the housing, the same precautions should be observed in press fitting the outer ring.

Inner rings of large bearings are generally shrunk on shafts. This is a very simple operation consisting of heating the bearing or inner ring in clean oil or in a temperature controlled oven to a temperature of between 200 and 250°F. This expands the inner ring sufficiently so that it should slip over the shaft to the bearing seat. Don't overheat the bearing or it will lose its hardness. Equipment and methods as discussed above are still advisable for best results. When mounting a heated bearing or ring, hold it firmly against the shaft shoulder until it is secured around the shaft.

If the end of the shaft will be flush or near flush with the bearing face after installation, use a drift or bearing installer as shown at right. Tap lightly at first to make sure the bearing or ring goes on square and does not scrape or burr the bearing seat. Be sure the bearing is tapped to a firm seat against the shaft shoulder. When using a tube or drift, be sure to have tools clean so that chips cannot be knocked off and into the bearing.



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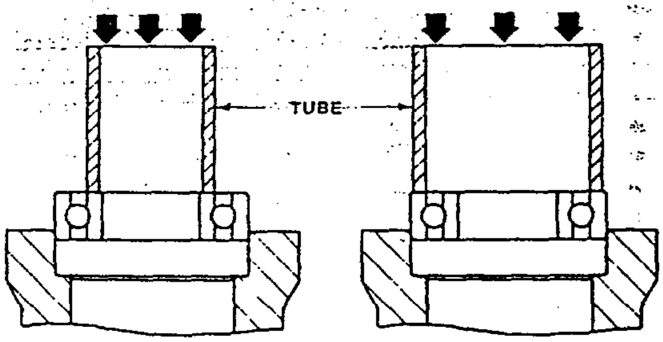

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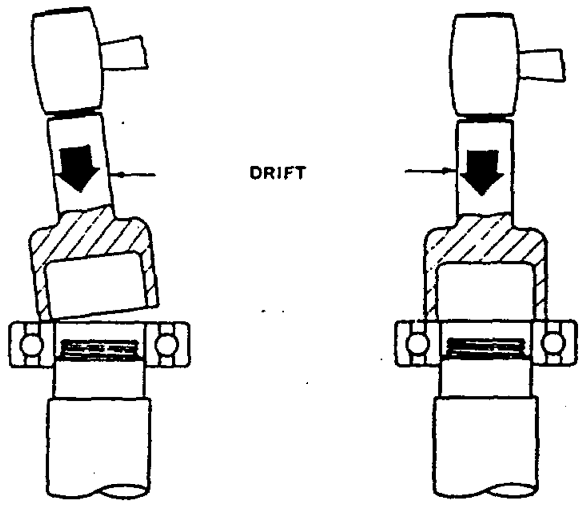


WRONG RIGHT

FACT: PROPER MOUNTING IS CRITICAL.

GENERAL — SELECTION OF TYPE OF MOUNTING

A wide variety of bearing mounting designs is required to meet the varied applications and operating conditions present in modern machine technology; however, certain basic geometric principles are common to all mounting designs.

In order to position a rigid shaft in a rigid housing with free rotation of the shaft and minimum radial or axial movement of the shaft under operating loads, we must meet two geometric requirements;

a) The shaft should be supported radially by bearings located at only two points along the shaft.

b) The shaft should be located axially by only one of the bearings. (We here consider a duplex pair of bearings to be equivalent to a single double-row bearing.)

The majority of bearing applications fall into two categories; first the "fixed and floating" mounting, and secondly, the "opposed" mounting. With the former, one bearing is fixed with respect to the shaft and housing while the opposite bearing is free to move axially, either on the shaft or in the housing, or within the bearing itself, such as with an "N" or "NU" type roller bearing. This mounting is shown in Fig. 1 using a deep groove ball bearing as the locating bearing and an "N" type roller bearing in the "floating" position.

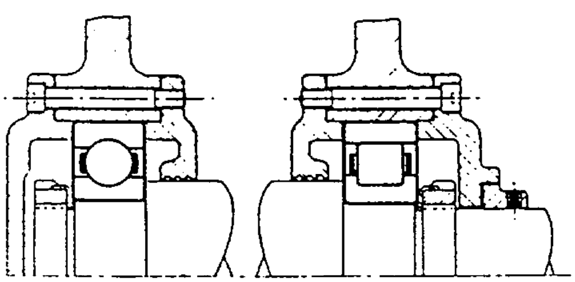


Fig. 1—"Fixed and Floating".

In the case of the "opposed" mounting, the outer races of both bearings are allowed to shift axially between opposed housing shoulders as shown on Fig. 2. The total clearance between the shoulders and outer race faces ("a" in Fig. 2) is a predetermined amount based on thermal gradients, machining variables, etc.

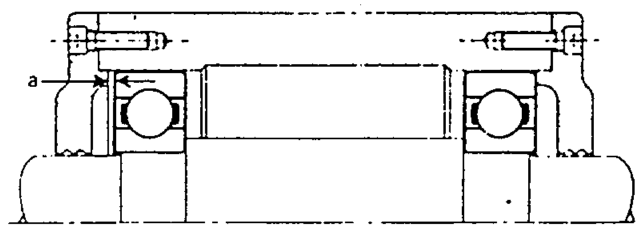


Fig. 2—"Opposed"

ASSEMBLY CONSIDERATIONS

In designing the bearing mounting, careful attention should be given to problems of assembly and removal of the bearings from the machine. The most precise bearings will be quickly ruined if handled incorrectly. The most common error is brinneling the raceways by transmitting the mounting force through the rolling elements. See page 9 for the proper procedure which must be accommodated.

Separability to Simplify Mounting

Separable bearings offer the advantage of easier mounting than non-separable types. Applications of difficult access are, therefore, frequently fitted with separable bearings. If the shaft requires frequent mounting and dismounting the decision may be in favor of a separable bearing. The inner ring remains on the shaft and the outer ring in the housing.

Tapered Bore and Sleeve Mounting

Tapered bore bearings are used for easier mounting and for the adjustment of radial clearance. They can be mounted, by simple means, on tapered shafts, and can also be assembled on cylindrical shafts with adapter or withdrawal sleeve mountings. Frequently, standard commercial shafting is adequate for sleeve mounting.

SHAFT AND HOUSING DESIGN CONSIDERATIONS

Both shaft and housing should be sufficiently rigid to limit distortion under load so as not to exceed the misalignment capability of the bearing type.

Bearing seats require a fine machine finish — especially when the bearing ring must be free to slide. Seats and shoulders should be machined during the same set-up to insure accurate, square shoulders. Bearings with snap rings in the outer ring facilitate use of through-bored housings, the most accurate procedure.

Because of different coefficient of thermal expansion, soft metal housings require special fits based on bearing operating temperatures. Also, steel sleeving may be necessary to prevent the tendency to "pound out."

MOUNTING FAG TAPERED BORE SPHERICAL ROLLER BEARINGS

1. Thoroughly clean shaft and housing, check for dimensional accuracy, and remove any burrs, etc.
2. Unwrap bearing and on larger size bearings remove the preload shim. To remove shim, rotate one ring relative to the other until shim is between rollers and slide it out.
3. Place bearing into position to be mounted before measuring clearance but do not drive onto taper. If bearing is a different temperature allow it to sit until all parts are approximately the same temperature.
4. Using feeler gages, measure the clearance between both rows of rollers and the outer ring. Use a gently sawing action to slide the feelers over or under the rollers. Do not roll over the feelers.
5. Determine the bearing bore diameter in millimeters (last 2 digits of the bearing x 5 equals the bore diameter). Look in the chart below and determine the "Reduction of Internal Clearance".
6. Subtract the value found in Step 5 from the measurement made in Step 4. This equals the mounted clearance.
7. Drive the bearing up the taper, checking the clearance frequently, until it is reduced down to the proper mounted clearance (value calculated in Step 6).
8. Secure bearing on the taper with an appropriate locking device.

REDUCTION IN RADIAL CLEARANCE OF TAPERED BORE SPHERICAL ROLLER BEARINGS

Bore d MM over	Bore d MM incl.	Reduction In Radial Clearance 0.0001 Inch		Axial Displacement On 1 : 12 Taper On The Shaft Inch	Axial Displacement On 1 : 12 Taper On The Sleeve Inch	Axial Displacement On 1 : 30 Taper On The Shaft Inch	Axial Displacement On 1 : 30 Taper On The Sleeve Inch
40	50	12	14	.020—.021	.024—.028	.049—.055	.059—.069
50	65	14	16	.021—.026	.028—.030	.055—.063	.069—.075
65	80	16	20	.026—.031	.030—.035	.063—.079	.075—.089
80	100	20	24	.031—.037	.035—.041	.079—.092	.089—.102
100	120	22	26	.033—.039	.039—.045	.083—.098	.098—.112
120	140	24	28	.037—.043	.041—.047	.092—.108	.102—.118
140	160	28	34	.043—.051	.047—.057	.108—.128	.118—.141
160	180	30	36	.045—.055	.051—.059	.112—.138	.128—.148
180	200	34	39	.051—.061	.057—.065	.128—.154	.141—.163
200	225	39	45	.061—.069	.065—.075	.154—.171	.163—.187
225	250	41	49	.062—.075	.069—.080	.157—.187	.171—.203
250	280	47	55	.073—.085	.077—.089	.183—.213	.193—.222
280	315	51	59	.079—.091	.083—.098	.197—.226	.207—.246
315	355	59	67	.087—.102	.098—.106	.217—.256	.246—.266
355	400	63	75	.096—.114	.099—.118	.242—.285	.252—.295
400	450	71	83	.104—.126	.112—.130	.256—.315	.280—.325
450	500	79	95	.120—.144	.124—.148	.299—.354	.311—.370
500	560	87	106	.130—.161	.138—.165	.325—.400	.344—.413
560	630	98	118	.150—.177	.153—.185	.374—.443	.384—.462
630	710	114	138	.173—.209	.177—.213	.433—.521	.443—.531
710	800	130	157	.197—.236	.200—.244	.492—.590	.501—.610
800	900	142	177	.216—.268	.220—.272	.531—.669	.551—.679
900	1000	157	197	.236—.295	.244—.303	.591—.738	.610—.758
1000	1120	173	217	.260—.327	.268—.331	.649—.808	.669—.827
1120	1250	189	236	.283—.354	.291—.362	.709—.886	.728—.906

GENERAL CONVERSION TABLES

Items marked * are reference SI Units.
Items marked ** are both Current Metric (c·g·s) and SI Units.
Conversion units are in alphabetical order.

AREA

To convert from	to	Multiply by
acres	sq. feet	43,560.
acres	**sq. meters	4,046.8
sq. centimeters	sq. feet	0.00108
sq. centimeters	sq. inches	0.1550
sq. feet	sq. centimeters	929.03
sq. feet	sq. inches	144.
sq. feet	**sq. meters	0.0929
sq. feet	sq. yards	0.1111
sq. inches	sq. centimeters	6.4516
sq. inches	sq. feet	0.00694
sq. inches	**sq. meters	0.000645
**sq. meters	sq. feet	10.764
**sq. meters	sq. yards	1.196
sq. yards	sq. feet	9.
sq. yards	**sq. meters	0.8361

ENERGY AND POWER

To convert from	to	Multiply by
Btu	foot-pounds	778.2
Btu	*joules	1055.87
Btu per min.	horsepower	0.02358
calories	*joules	4.1900
ergs (dyne-centimeters)	*joules	0.0000001
foot pounds	Btu	0.001285
foot pounds	*joules	1.3558
foot pounds	**kilogram-meters	0.13826
ft-lb per min.	horsepower	0.0000303
ft-lb per sec.	horsepower	0.00182
horsepower	Btu per min.	42.41
horsepower	ft-lb per min.	33,000.
horsepower	ft-lb per sec.	550.
horsepower	kilowatts	0.7457
kilogram-meters	foot-pounds	7.2330
kilowatt-hours	*joules	3,600,000.
watt-hours	*joules	3,600.00
watt-seconds	*joules	1.0000

FLOW

To convert from	to	Multiply by
cubic feet per min.	**cubic meters per sec.	0.0004719
cubic feet per sec.	**cubic meters per sec.	0.02832
cubic yards per min.	**cubic meters per sec.	0.01274
gallons/minute	**cubic meters per sec.	0.0000631
gallons/minute	**cubic meters per hr.	0.22716

FORCE

To convert from	to	Multiply by
dyne (gram-cm/sec^2)	*newton (N)	0.000010
kilogram-force	*newton (N)	9.8066
ounce-force	*newton (N)	0.2780
pound-force	*newton (N)	4.4482

LENGTH

To convert from	to	Multiply by
centimeters	inches	0.3937
centimeters	yards	0.01094
feet	inches	12.0
feet	**meters	0.30481
feet	yards	0.333
inches	centimeters	2.540
inches	feet	0.08333
inches	**meters	0.02540
inches	microns	25,400.
inches	**millimeters	25.400
inches	yards	0.02778
kilometers	feet	3,281.
kilometers	miles (nautical)	0.5336
kilometers	miles (statute)	0.6214
kilometers	yards	1,094.
**meters	feet	3.2809
**meters	yards	1.0936
microns	inches	.0000394
microns	**meters	0.000001
miles (statute)	feet	5,280.
miles (statute)	**kilometers	1.6093
miles (statute)	**meters	1,609.34
miles (statute)	yards	1,760.
miles (nautical)	feet	6,080.2
miles (nautical)	**kilometers	1.8520
miles (nautical)	**meters	1,852.0
millimeters	inches	0.03937
rods	**meters	5.0292
yards	centimeters	91.44
yards	feet	3.0
yards	inches	36.0
yards	**meters	0.9144

PRESSURE

To convert from	to	Multiply by
dynes per sq. cm.	*pascals	0.1000
grams per cu. cm.	oz. per cu. in.	0.5780
kilograms per sq. cm.	pounds per sq. in.	14.223
kilograms per sq. cm.	*pascals	98,066.5
kilograms per sq. meter	*pascals	9.8066
kilograms per sq. meter	pounds per sq. ft.	0.2048
kilograms per sq. meter	pounds per sq. yd.	1.8433
kilograms per cu. meter	pounds per cu. ft.	0.06243
ounces per cu. in.	grams per cu. cm.	1.7300
pounds per cu. ft.	**kilograms per cu. meter	16.019
pounds per sq. ft.	**kilograms per sq. meter	4.8824
pounds per sq. ft.	*pascals	47.880
pounds per sq. in.	kilograms per sq. cm.	0.0703
pounds per sq. in.	*pascals	6,894.76
pounds per sq. yd.	**kilograms per sq. meter	0.5425

VELOCITY

To convert from	to	Multiply by
feet per minute	**meters per sec.	0.00508
feet per second	**meters per sec.	0.3048
inches per second	**meters per sec.	0.0254
kilometers per hour	**meters per sec.	0.2778
knots	**meters per sec.	0.5144
miles per hour	**meters per sec.	0.4470
miles per minute	**meters per sec.	26.8224

VOLUME

To convert from	to	Multiply by
cubic centimeters	cubic inches	0.06102
cubic feet	cubic inches	1,728.0
cubic feet	**cubic meters	0.0283
cubic feet	cubic yards	0.0370
cubic feet	gallons	7.481
cubic feet	liters	28.32
cubic feet	quarts	29.9222
cubic inches	cubic centimeters	16.39
cubic inches	cubic feet	0.0005787
cubic inches	**cubic meters	0.00001639
cubic inches	liters	0.0164
cubic inches	gallons	0.004329
cubic inches	quarts	0.01732
**cubic meters	cubic feet	35.31
**cubic meters	cubic inches	61,023.
**cubic meters	cubic yards	1.3087
cubic yards	cubic feet	27.0
cubic yards	**cubic meters	0.7641
gallons	cubic feet	0.1337
gallons	cubic inches	231.0
gallons	**cubic meters	0.003785
gallons	liters	3.785
gallons	quarts	4.0
liters	cubic feet	0.03531
liters	cubic inches	61.017
liters	gallons	0.2642
liters	pints	2.1133
liters	quarts	1.057
liters	**cubic meters	0.0010
pints	**cubic meters	0.004732
pints	liters	0.4732
pints	quarts	0.50
quarts	cubic feet	0.03342
quarts	cubic inches	57.75
quarts	**cubic meters	0.0009464
quarts	gallons	0.25
quarts	liters	0.9464
quarts	pints	2.0

WEIGHT

To convert from	to	Multiply by
grams	**kilograms	0.001
grams	ounces	0.03527
grams	pounds	0.002205
**kilograms	ounces	35.274
**kilograms	pounds	2.2046
ounces	grams	28.35
ounces	**kilograms	0.02835
ounces	pounds	0.0625
pounds	grams	453.6
pounds	**kilograms	0.4536
pounds	ounces	16.0

TEMPERATURE

°Fahrenheit = 9/5 °Centigrade +32
°Centigrade = 5/9 (°Fahrenheit −32)

DECIMAL EQUIVALENTS

2, 4	8	16	32	64	DECIMAL
				1/64	.015625
			1/32		.031250
				3/64	.046875
		1/16			.062500
				5/64	.078125
			3/32		.093750
				7/64	.109375
	1/8				.125000
				9/64	.140625
			5/32		.156250
				11/64	.171875
		3/16			.187500
				13/64	203125
			7/32		.218750
				15/64	.234375
1/4					.250000
				17/64	.265625
			9/32		.281250
				19/64	.296875
		5/16			.312500
				21/64	.328125
			11/32		.343750
				23/64	.359375
	3/8				.375000
				25/64	.390625
			13/32		.406250
				27/64	.421875
		7/16			.437500
				29/64	.453125
			15/32		.468750
				31/64	.484375
1/2					.500000
				33/64	.515625
			17/32		.531250
				35/64	.556875
		9/16			.562500
				37/64	.578125
			19/32		.593750
				39/64	.609375
	5/8				.625000
				41/64	.640625
			21/32		.656250
				43/64	.671875
		11/16			.687500
				45/64	.703125
			23/32		.718750
				47/64	.734375
3/4					.750000
				49/64	.765625
			25/32		.781250
				51/64	.796875
		13/16			.812500
				53/64	.828125
			27/32		.843750
				55/64	.859375
	7/8				.875000
				57/64	.890625
			29/32		.906250
				59/64	.921875
		15/16			.937500
				61/64	.953125
			31/32		.968750
				63/64	.984376

INCHES	MM
	0.3969
	0.7938
.039370	1
	1.1900
	1.5875
	1.9844
.078740	2
	2.3812
	2.7781
.118110	3
	3.1750
	3.5719
	3.9688
.157480	4
	4.3656
	4.7625
.196850	5
	5.1594
	5.5562
	5.9531
.236220	6
	6.3500
	6.7469
.275591	7
	7.1438
	7.5406
	7.9375
.314961	8
	8.3344
	8.7312
.354331	9
	9.1281
	9.5250
	9.9219
.393701	10
	10.3188
	10.7156
.433071	11
	11.1125
	11.5094
	11.9062
.472441	12
	12.3031
	12.7000
.511811	13
	13.0969
	13.4938
	13.8906
.551181	14
	14.2875
	14.6844
.590551	15
	15.0812
	15.4781
	15.8750
.629921	16
	16.2719
	16.6688
.669291	17
	17.0656
	17.4625
	17.8594
.708661	18
	18.2562
	18.6531
.748031	19
	19.0500
	19.4469
	19.8438
.787402	20
	20.2406
	20.6375
.826772	21
	21.0344
	21.4312
	21.8281
.866142	22
	22.2250
	22.6219
.904512	23
	23.0188
	23.4156
	23.8125
.944882	24
	24.2094
	24.6062
.984252	25
	25.0031

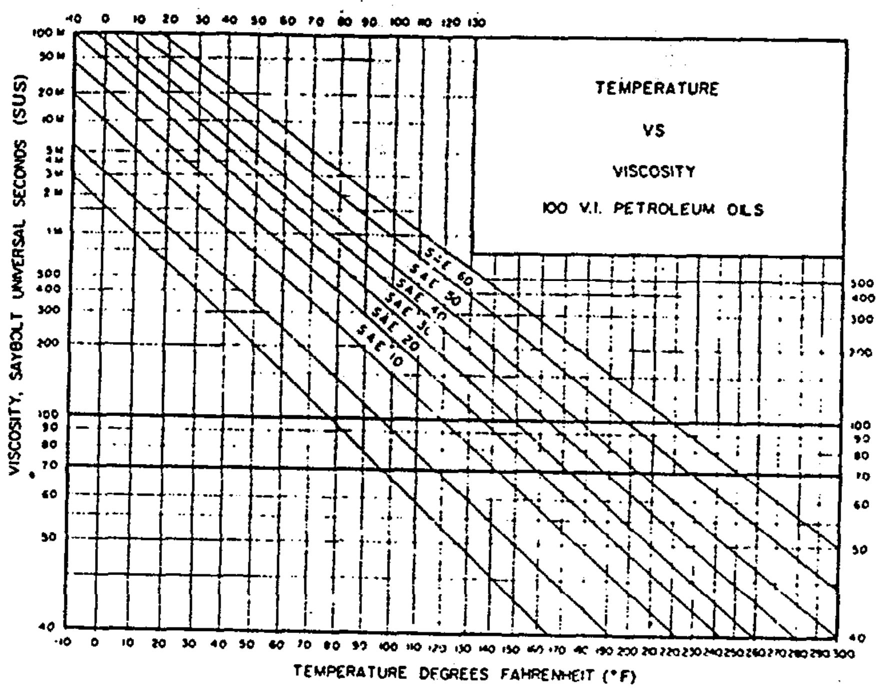
MM	INCHES
26	1.02362
27	1.06299
28	1.10236
29	1.14173
30	1.18110
31	1.22047
32	1.25984
33	1.29921
34	1.33858
35	1.37795
36	1.41732
37	1.45669
38	1.49606
39	1.53543
40	1.57480
41	1.61417
42	1.65354
43	1.69291
44	1.73228
45	1.77165
46	1.81102
47	1.85039
48	1.88976
49	1.92913
50	1.96850
51	2.00787
52	2.04724
53	2.08661
54	2.12598
55	2.16535
56	2.20472
57	2.24409
58	2.28346
59	2.32283
60	2.36220
61	2.40157
62	2.44094
63	2.48031
64	2.51969
65	2.55906
66	2.59843
67	2.63780
68	2.67717
69	2.71654
70	2.75591
71	2.79528
72	2.83465
73	2.87402
74	2.91339
75	2.95276
76	2.99213
77	3.03150
78	3.07087
79	3.11024
80	3.14961
81	3.18898
82	3.22835
83	3.26772
84	3.30708
85	3.34646
86	3.38585
87	3.42520
88	3.46457
89	3.50394
90	3.54331
91	3.58268
92	3.62205
93	3.66142
94	3.70078
95	3.74016
96	3.77953
97	3.81890
98	3.85827
99	3.89764
100	3.93701
110	4.33071
120	4.72441
130	5.11811
140	5.51181
150	5.90551
160	6.29921
170	6.69291
180	7.08661
190	7.48031
200	7.87402
210	8.26772
220	8.66142
230	9.05512

TEMPERATURE TABLES

Degrees Centigrade (°C) vs Degrees Fahrenheit (°F)

	BASE TEMP.			BASE TEMP.			BASE TEMP.			BASE TEMP.			BASE TEMP.	
°C	°F or °C	°F	°C	°F or °C	°F	°C	°F or °C	°F	°C	°F or °C	°F	°C	°F or °C	°F
− 73.33	− 100	−148.0	− 1.11	+ 30	+ 86.0	+ 40.56	+ 105	+221.0	+148.89	+ 300	+572	+357.22	+ 675	+1247
70.55	95	139.0	0.56	31	87.8	41.11	106	222.8	151.67	305	581	360.00	680	1256
67.78	90	130.0	0.00	32	89.6	41.67	107	224.6	154.44	310	590	362.78	685	1265
65.00	85	121.0	+ 0.56	33	91.4	42 22	108	226.4	157.22	315	599	365.56	690	1274
62.22	80	112.0	1.11	34	93.2	42.78	109	228.2	160.00	320	608	368.34	695	1283
− 59.44	− 75	−103.0	+ 1.67	+ 35	+ 95.0	+ 43.33	+ 110	+230.0	+162.78	+ 325	+617	+371.11	+ 700	+1292
56.67	70	94.0	2.22	36	96.8	43.89	111	231.8	165.56	330	626	373.89	705	1301
53.89	65	85.0	2.78	37	98.6	44.44	112	233.6	168.33	335	635	376.67	710	1310
51.11	60	76.0	3.33	38	100.4	45.00	113	235.4	171.11	340	644	379.44	715	1319
48.33	55	67.0	3.89	39	102.2	45.56	114	237.2	173.89	345	653	382.22	720	1328
− 45.56	− 50	− 58.0	+ 4.44	+ 40	+104.0	+ 46.11	+ 115	+239.0	+176.67	+ 350	+662	+385.00	+ 725	+1337
44.44	48	54.4	5.00	41	105.8	46.67	116	240.8	179.44	355	671	387.78	730	1346
43.33	46	50.8	5.56	42	107.6	47.22	117	242.6	182.22	360	680	390.56	735	1355
42.22	44	47.2	6.11	43	109.4	47.78	118	244.4	185.00	365	689	393.33	740	1364
41.11	42	43.6	6.67	44	111.2	48.33	119	246.2	187.78	370	698	396.11	745	1373
− 40.00	− 40	− 40.0	+ 7.22	+ 45	+113.0	+ 48.87	+ 120	+248.0	+190.56	+ 375	+707	+398.89	+ 750	+1382
38.89	38	36.4	7.78	46	114.8	49.44	121	249.8	193.33	380	716	401.67	755	1391
37.78	36	32.8	8.33	47	116.6	50.00	122	251.6	196.11	385	725	404.44	760	1400
36.67	34	29.2	8.89	48	118.4	50.56	123	253.4	198.89	390	734	407.22	765	1409
35.56	32	25.6	9.44	49	120.2	51.11	124	255.2	201.67	395	743	410.00	170	1418
− 34.44	− 30	− 22.0	+ 10.00	+ 50	+122.0	+ 51.67	+ 125	+257.0	+204.44	+ 400	+752	+412.78	+ 775	+1427
33.33	28	18.4	10.56	51	123.8	52.22	126	258.8	207.22	405	761	415.56	780	1436
32.22	26	14.8	11.11	52	125.6	52.78	127	260.6	210.00	410	770	418.33	785	1445
31.11	24	11.2	11.67	53	127.4	53.33	128	262.4	212.78	415	779	421.11	790	1454
30.00	22	7.6	12.22	54	129.2	53.89	129	264.2	215.56	420	788	423.89	795	1463
− 28.89	− 20	− 4.0	+ 12.78	+ 55	+131.0	+ 54.44	+ 130	+266.0	+218.33	+ 425	+797	+426.67	+ 800	+1472
28.33	19	2.2	13.33	56	132.8	55.00	131	267.8	221.11	430	806	429.44	805	1481
27.78	18	0.4	13.89	57	134.6	55.56	132	269.6	223.89	435	815	432.22	810	1490
27.22	17	+ 1.4	14.44	58	136.4	56.11	133	271.4	226.67	440	824	435.00	815	1499
26.67	16	3.2	15.00	59	138.2	56.67	134	273.2	229.44	445	833	437.78	820	1508
− 26.11	− 15	+ 5.0	+ 15.56	+ 60	+140.0	+ 57.22	+ 135	+275.0	+232.22	+ 450	+842	+440.56	+ 825	+1517
25.56	14	6.8	16.11	61	141.8	57.78	136	276.8	235.00	455	851	443.33	830	1526
25.00	13	8.6	16.67	62	143.6	58.33	137	278.6	237.78	460	860	446.11	835	1535
24.44	12	10.4	17.22	63	145.4	58.89	138	280.4	240.56	465	869	448.89	840	1544
23.89	11	12.2	17.78	64	147.2	63.44	139	282.2	243.33	470	878	451.67	845	1553
− 23.33	− 10	+ 14.0	+ 18.33	+ 65	+149.0	+ 60.00	+ 140	+284.0	+246.11	+ 475	+887	+454.44	+ 850	+1562
22.78	9	15.8	18.89	66	150.8	60.56	141	285.8	248.89	480	896	457.22	855	1571
22.22	8	17.6	19.44	67	152.6	61.11	142	287.6	251.67	485	905	460.00	860	1580
21.67	7	19.4	20.00	68	154.4	61.67	143	289.4	254.44	490	914	462.78	865	1589
21.11	6	21.2	20.56	69	156.2	62.22	144	291.2	257.22	495	923	465.56	870	1598
− 20.56	− 5	+ 23.0	+ 21.11	+ 70	+158.0	+ 62.78	+ 145	+293.0	+260.00	+ 500	+932	+468.33	+ 875	+1607
20.00	4	24.8	21.67	71	159.8	63.33	146	294.8	262.78	505	941	471.11	880	1616
19 44	3	26.6	22.22	72	161.6	63.89	147	296.6	265.56	510	950	473.89	885	1625
18 89	2	28.4	22.78	73	163.4	64.44	148	298.4	268.33	515	959	476.67	890	1634
18 33	1	30.2	23.33	74	165.2	65.00	149	300.2	271.11	520	968	479.44	895	1643
− 17.78	0	+ 32.0	+ 23.89	+ 75	+167.0	+ 65.56	+ 150	+302.0	+273.89	+ 525	+977	+482.22	+ 900	+1652
17.22	+ 1	33.8	24.44	76	168.8	68.33	155	311.0	276.67	530	986	485.00	905	1661
16.67	2	35.6	25.00	77	170.6	71.11	160	320.0	279.44	535	995	487.78	910	1670
16.11	3	37.4	25.56	78	172.4	73.89	165	329 0	282.22	540	1004	490.56	915	1679
15.56	4	39.2	26.11	79	174.2	76.67	170	338.0	285.00	545	1013	493.33	920	1688
− 15.00	+ 5	+ 41 0	+ 26.67	+ 80	+176.0	+ 79.44	+ 175	+347.0	+287.78	+ 550	+1022	+496.11	+ 925	+1697
14.44	6	42.8	27.22	81	177.8	82.22	180	356.0	290.56	555	1031	498.89	930	1706
13.89	7	44.6	27.78	82	179.6	85.00	185	365.0	293.33	560	1040	501.67	935	1715
13.33	8	46.4	28.33	83	181.4	87.78	190	374.0	296.11	565	1049	504.44	940	1724
12.78	9	48.2	28 89	84	183.2	90.56	195	383.0	298.89	570	1058	507.22	945	1733
− 12.22	+ 10	+ 50.0	+ 29.44	+ 85	+185.0	+ 93.33	+ 200	+392.0	+301.67	+ 575	+1067	+510.00	+ 950	+1742
11.67	11	51.8	30.00	86	186.8	96.11	205	401.0	304.44	580	1076	512.78	955	1751
11.11	12	53.6	30.56	87	188.6	98 89	210	410.0	307.22	585	1085	515.56	960	1760
10.56	13	55.4	31.11	88	190.4	101.67	215	419.0	310.00	590	1094	518.33	965	1769
10.00	14	57.2	31.67	89	192.2	104.44	220	428.0	312.78	595	1103	521.11	970	1778
− 9.44	+ 15	− 59.0	+ 32.22	+ 90	+194.0	+107.22	+ 225	+437.0	+315.56	+ 600	+1112	+523.89	+ 975	+1787
8.89	16	60.8	32.78	91	195.8	110.00	230	446.0	318.33	605	1121	526.67	980	1796
8.33	17	62.6	33.33	92	197.6	112.78	235	455.0	321.11	610	1130	529 44	985	1805
7.78	18	64.4	33.89	93	199.4	115.56	240	464.0	323.89	615	1139	532.22	990	1814
7.22	19	66.2	34 44	94	201.2	118.33	245	473.0	326.67	620	1146	535.00	995	1823
− 6.67	+ 20	+ 68.0	+ 35.00	+ 95	+203.0	+121.11	+ 250	+482.0	+329.44	+ 625	+1157	+537.78	+1000	+1832
6.11	21	69.8	35.56	96	204.8	123.89	255	491.0	332.22	630	1166	565.56	1050	1922
5.56	22	71.6	36.11	97	206.6	126.67	260	500.0	335.00	635	1175	593.33	1100	2012
5.00	23	73.4	36 67	98	208 4	129.44	265	509.0	337.78	640	1184	612.11	1150	2102
4.44	24	75.2	37.22	99	210.2	132.22	270	518.0	340.56	645	1193	648 89	1200	2192
− 3.89	+ 25	+ 77.0	+ 37.78	+ 100	+212.0	+135.00	+ 275	+527.0	+343.33	+ 650	+1202	+676.67	+1250	+2282
3.33	26	78.8	38.33	101	213.8	137.78	280	536.0	346.11	655	1211	704.44	1300	2372
2.78	27	80.6	38.89	102	215.6	140.56	285	545.0	348.89	660	1220	732.22	1350	2462
2.22	28	82.4	39.44	103	217 4	143.33	290	554.0	351.67	665	1229	760.00	1400	2552
1.67	29	84.2	40.00	104	219.2	146.11	295	563.0	354.44	670	1238	815.56	1500	2732

VISCOSITY TABLES



Degrees Engler	Saybolt-seconds	Redwood-seconds	Centi-stokes	Degrees Engler	Saybolt-seconds	Redwood-seconds	Centi-stokes
1.30	39.3	34.8	3.92	3.6	124	108	26.2
1.32	40.0	35.4	4.15	3.8	131	114	27.8
1.34	40.6	36.0	4.38	4.0	138	121	29.5
1.36	41.3	36.6	4.62	4.2	145	127	31.1
1.38	42.0	37.2	4.85	4.4	152	134	32.7
1.40	42.7	37.8	5.08	4.6	159	140	34.2
1.42	43.4	38.3	5.31	4.8	166	146	35.8
1.44	44.1	39.0	5.55	5.0	174	153	37.4
1.46	44.9	39.7	5.79	5.5	190	168	41.3
1.48	45.5	40.2	6.01	6	208	184	45.2
1.50	46.3	40.9	6.25	6.5	225	199	49.0
1.55	48.2	42.5	6.84	7	243	216	52.9
1.60	50.0	44.1	7.41	7.5	260	231	56.7
1.65	52.0	45.8	7.99	8	277	246	60.6
1.70	53.9	47.4	8.55	8.5	295	262	64.4
1.75	55.7	49.0	9.11	9	312	277	67.4
1.80	57.7	50.7	9.66	9.5	329	292	72.0
1.85	59.6	52.4	10.2	10	347	308	75.9
1.90	61.6	54.0	10.7	11	381	339	83.5
1.95	63.5	55.7	11.3	12	415	369	91.1
2.00	65.4	57.4	11.8	13	450	400	98.7
2.1	69.1	60.6	12.8	14	485	431	106
2.2	72.9	63.9	13.8	15	519	462	114
2.3	76.7	67.2	14.8	16	554	492	122
2.4	80.4	70.4	15.8	17	588	523	129
2.5	84.1	73.6	16.7	18	623	555	137
2.6	87.7	76.7	17.6	19	657	584	144
2.7	91.3	79.8	18.5	20	692	616	152
2.8	94.9	82.9	19.4	22	760	676	167
2.9	98.6	86.0	20.3	24	830	739	182
3.0	102	89.0	21.1	26	899	800	198
3.2	110	95.2	22.9	28	967	862	213
3.4	117	101	24.5	30	1037	923	228

FAG Bearings Corporation
118 Hamilton Avenue,
P.O. Box 811, Stamford, CT 06904
Phone (203) 327-1960, TWX 710-474-0891
Telex 96-5934, Cable FAG USA
Plant-Joplin, Missouri
Warehouses in Stamford, Connecticut;
Joplin, Missouri; and Los Angeles, California.

Sales Offices/Warehouses

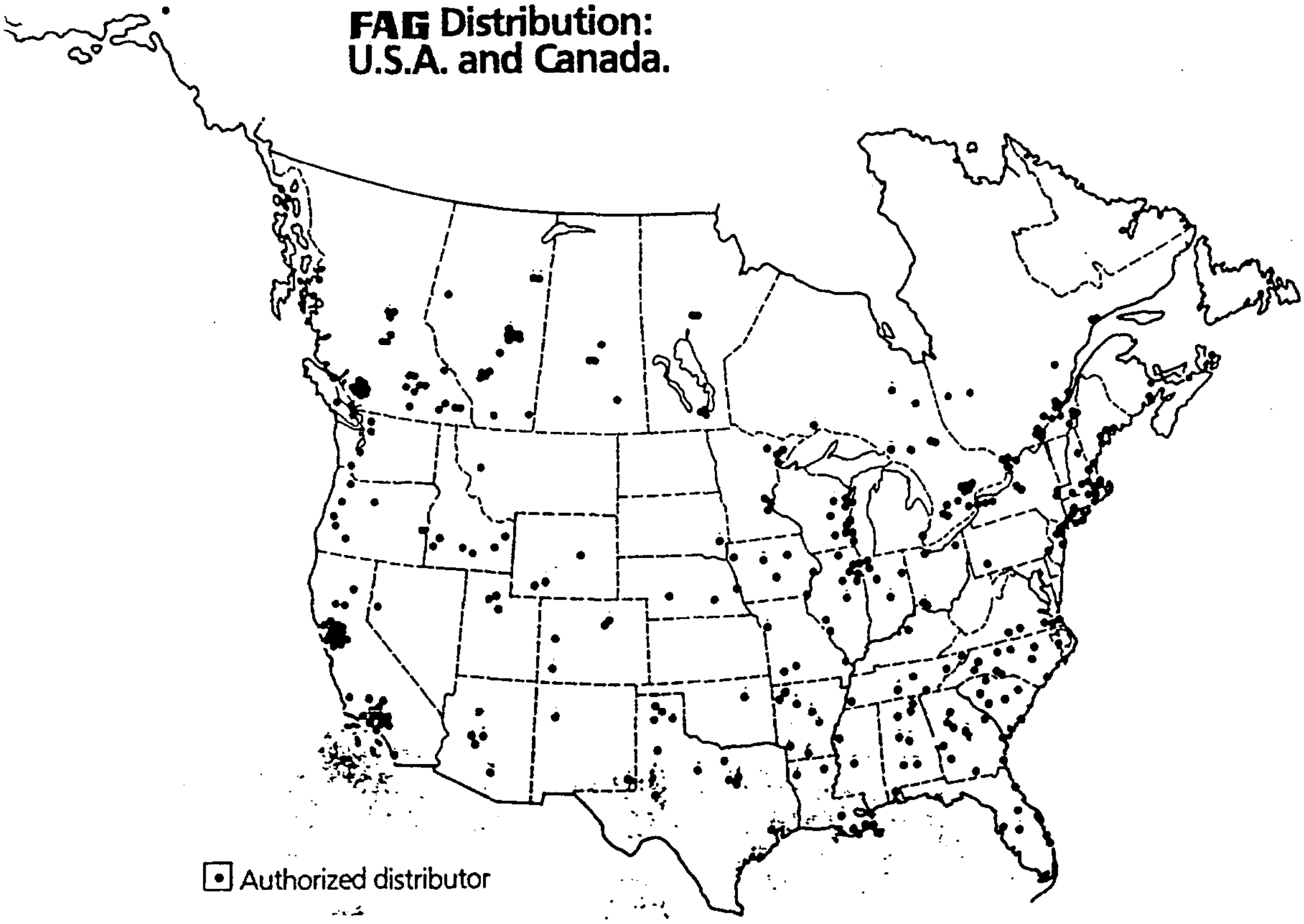
Atlanta, GA	(404) 934-9420
Charlotte, NC	(704) 542-9849
Chicago, IL	(312) 378-2011
Cleveland, OH	(216) 234-6000
Detroit, MI	(313) 967-2670
Houston, TX	(713) 240-0234
Joplin, MO	(417) 781-3600
Los Angeles, CA	(213) 268-3653
Stamford, CT	(203) 327-1960

FAG Bearings Limited
(Headquarters and Plant)
P.O. Box 640, 801 Ontario Street
Stratford, Ontario N5A6T2
Phone (519) 271-3230
Telex 069-55118 Cable CANFAG

Sales Offices/Warehouses

Edmonton, Alberta	(403) 465-0121
Hamilton, Ontario	(416) 545-4355
Montreal, Quebec	(514) 735-6326
Stratford, Ontario	(519) 271-3230
Sudbury, Ontario	(705) 560-0720
Toronto, Ontario (Don Mills)	(416) 446-1979
Truro, Nova Scotia	(902) 895-9295
Vancouver, B.C.	(604) 294-8584
Winnipeg, Manitoba	(204) 633-6970

FAG Distribution: U.S.A. and Canada.

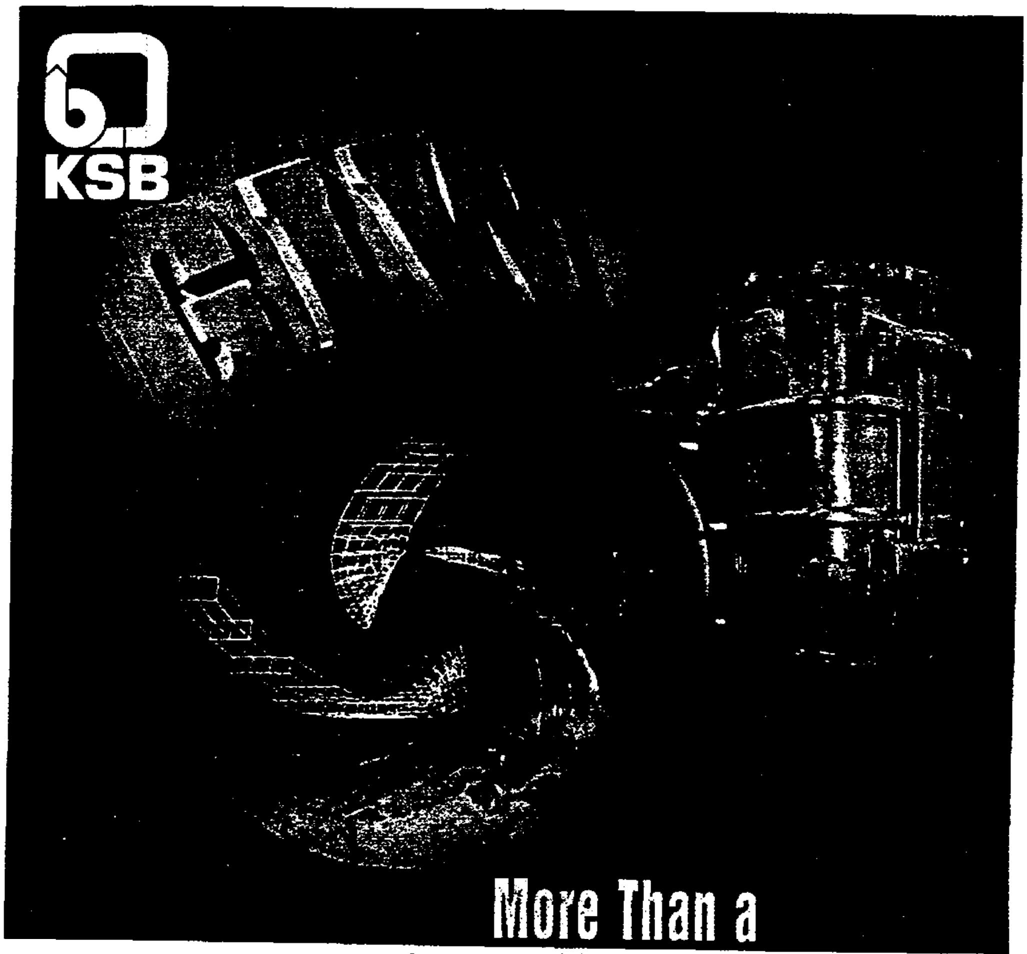


[•] Authorized distributor

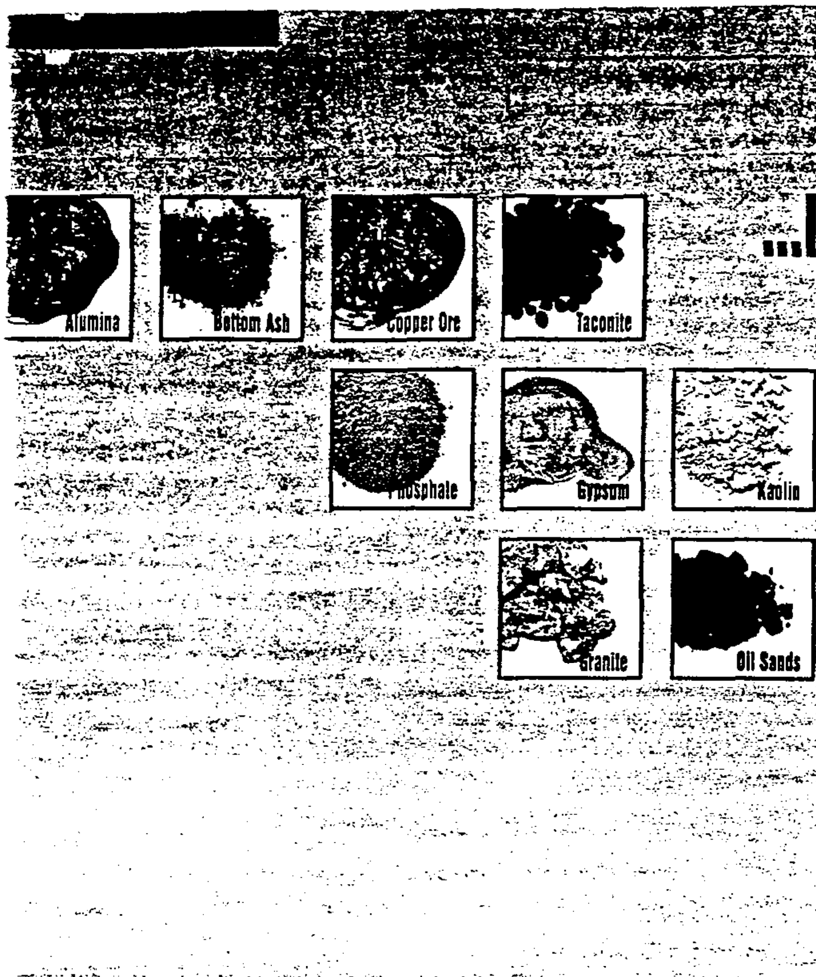
Franklin Environmental Services
Gravel Separation System

TAB 8

PUMPS



More Than a Slurry Pump Manufacturer...



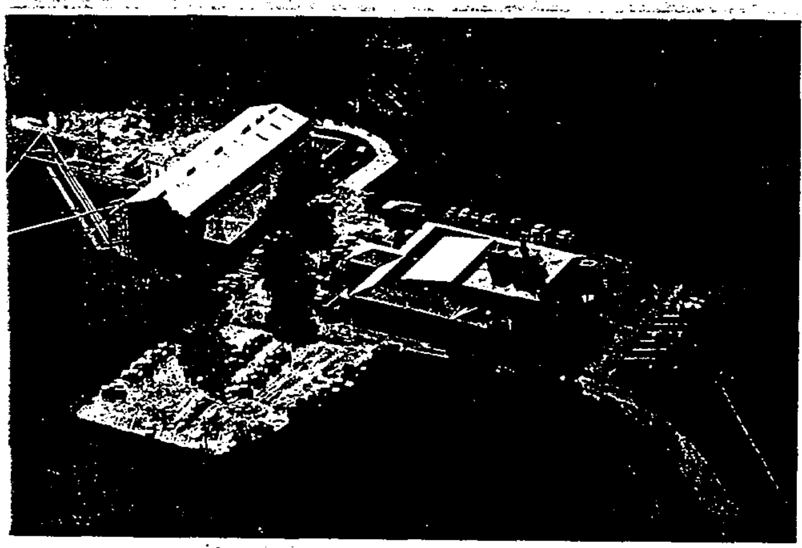
...It's A Slurry Think-Tank.

At GIW Industries, we love complex, brain-teasing slurry system problems. In fact, since our founding in 1891, we've learned our most valuable lessons through down-and-dirty applications that have taken us around the globe, wherever mining, dredging and industrial companies demand systems that expand the limits of slurry technology.

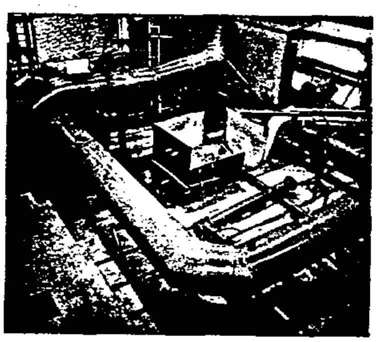
Along the way, we've compiled the world's largest database on slurry systems, a source of knowledge and experience used to discover your problems before they arise, prescribe practical solutions and ensure long, reliable service in the field—where it counts.

That's because we're much more than a manufacturing facility. We're application engineers who understand slurry pumps and slurry pumping systems: How to design them. How to troubleshoot them. How to improve them.

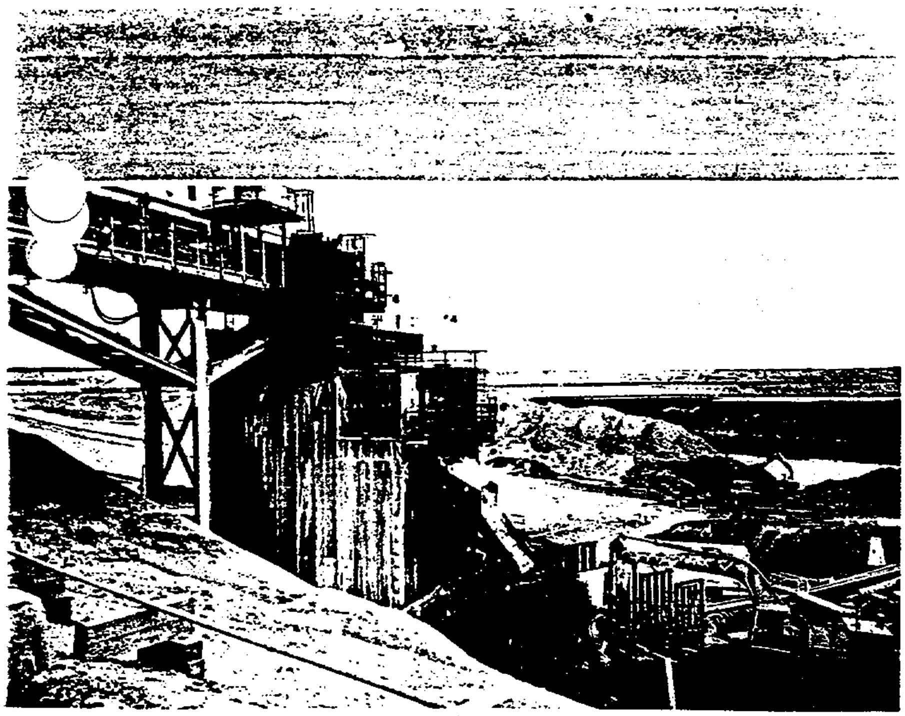
So go ahead, bring us your most challenging dilemmas. As a subsidiary of KSB AG of Frankenthal, Germany, a global pump and valve manufacturer, we have the infrastructure to handle the situation.

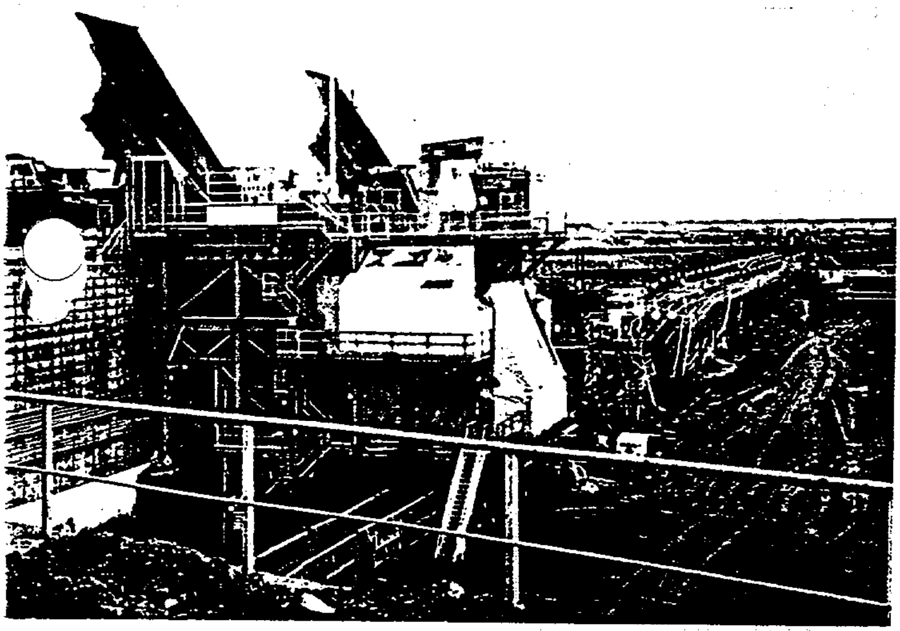


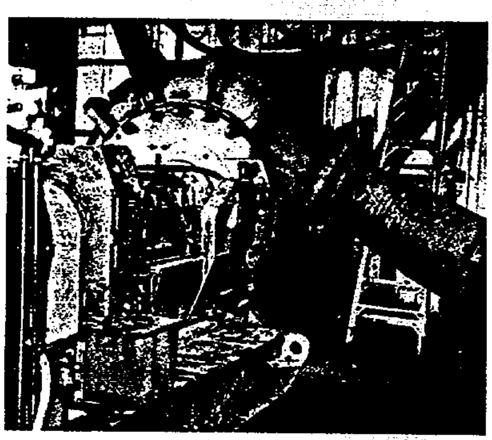
Corporate Headquarters and Hydraulic Testing Laboratory.



GIW's Hydraulic Testing Laboratory is available for contract testing of slurry and pipeline components.







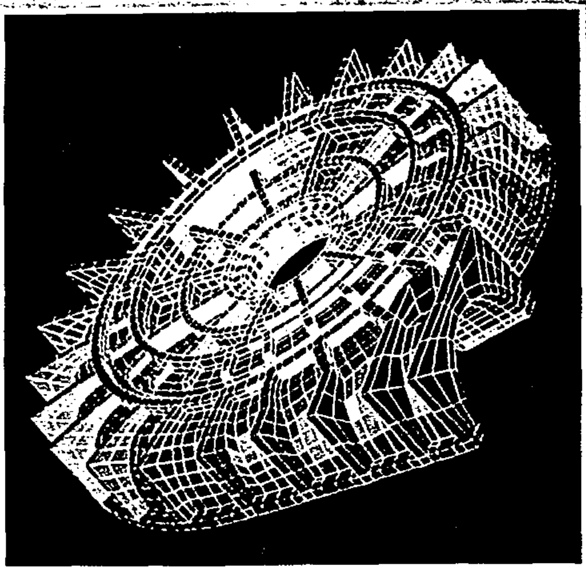
■ Problem:

In implementing their new hydrotransport technology, a synthetic crude oil production company in Canada wanted to move oil sands to processing plants kilometers away from the mines via pipelines instead of on traditional conveyor belts.

■ Solution:

Using our experience in pumping slurries long distances in Florida's phosphate mines, we helped the company design a system based on special all-metal pumps made of Gasite® WD28G, our proprietary, abrasion-resistant, high-chromium white iron. By placing three of these pumps, which pass four-inch (10-centimeter) solids, in a series, the company pumped the oil sands to the plant and saved significantly on each barrel of oil they processed.

Design Engineering: The First Step To Successful Applications.



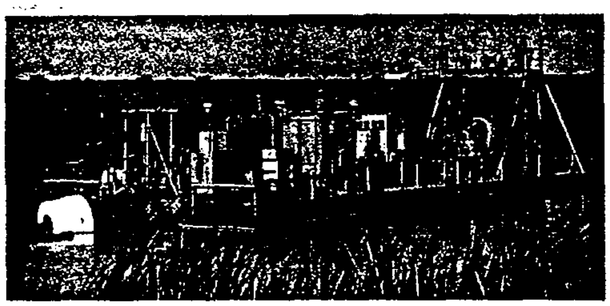
GIW leads the industry in the design of heavy-duty slurry pumps, because our designs are based on solid test data, not just theory.

Using state-of-the art hydraulic and mechanical design programs, GIW's designers create two and three-dimensional finite-element models that duplicate the flow of slurry within a pump. And they use GIW's proprietary Slysel Computer Program to assess Newtonian liquid, settling slurry and non-settling slurry pipeline systems. The information gathered through these programs and through hundreds of lab, hydraulic and wear tests results in superior product development.

GIW pumps offer higher efficiency, longer wear life and greater mechanical reliability. What does this mean to you? Pumps and systems that sustain production, decrease downtime and improve energy efficiency.

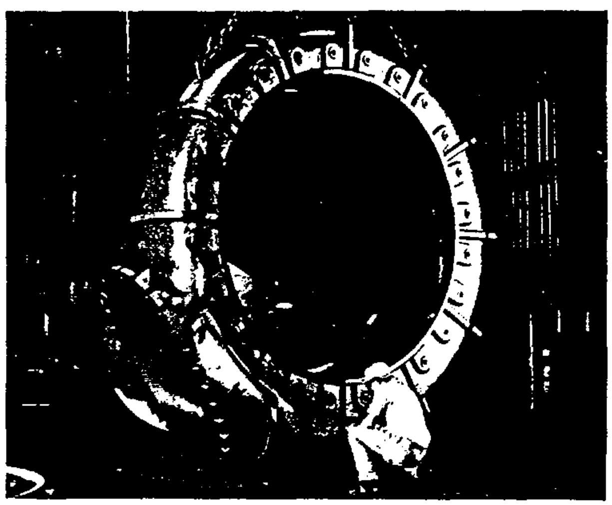
■ Problem:

When a Germany-based dredge designer and builder with more than 120 years of experience wanted to advance the state of dredging technology, they asked GIW Industries to design the hydraulics for a new standard range of dredge pumps.

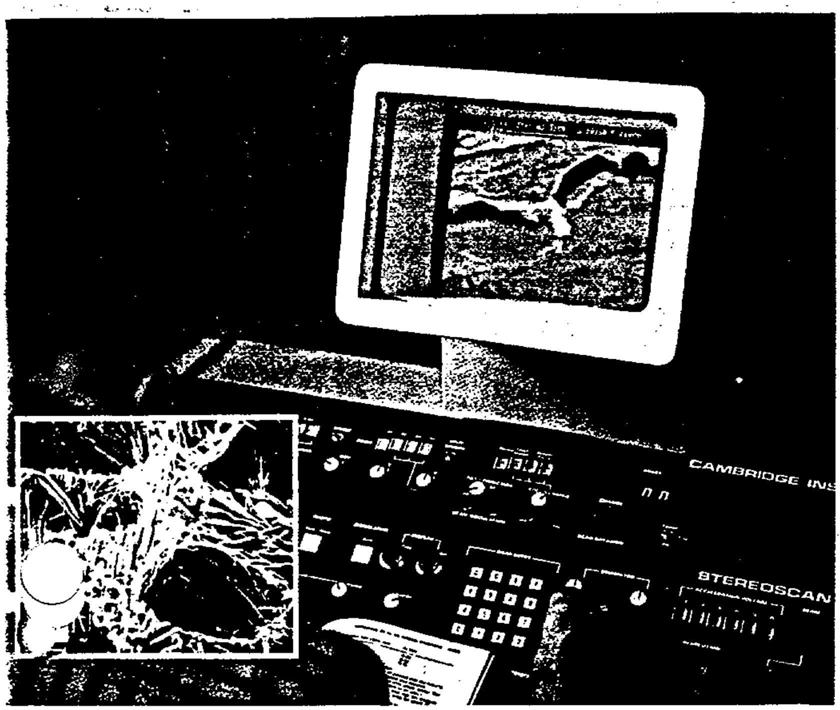


■ Solution:

Using their experience in dredge pump technology, GIW designed a line of eight dredge pumps by maximizing the elements critical to a dredging environment then balancing these for optimum performance. These dredge pumps, which operate at up to 90 percent efficiency, are revolutionizing dredging technology.



Materials Technology: Building Strength Into Your Pumps.



How do we select the proper materials for your pumps? Carefully. Thoughtfully. Scientifically. That's because the key to long life lies in matching the material to the application. And in controlling the manufacturing process, where the all-important microstructure is developed. That's why our on-site Metallurgical Laboratory works with manufacturing personnel to:

- Conduct chemical evaluations on incoming melting stock for each heat.
- Analyze the chemistry of the molten metal.
- Oversee heat treatments.
- Evaluate test bars.
- Perform failure analyses of metallic and non-metallic materials.

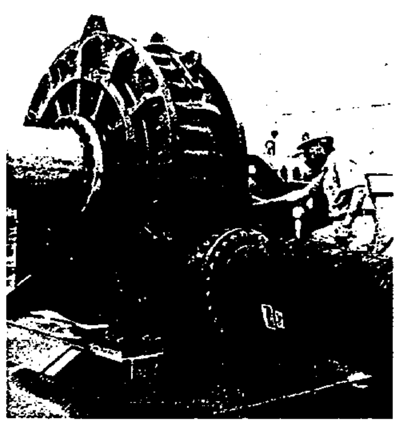
The knowledge gained from these tests, combined with that garnered in our research and development laboratory, led to the development of GIW's proprietary line of Gasite® white irons. With their balanced chemistry and controlled processing, these heat-treated, high-chromium alloys will withstand your most rigorous abrasive, corrosive and combined field conditions.

■ Problem:

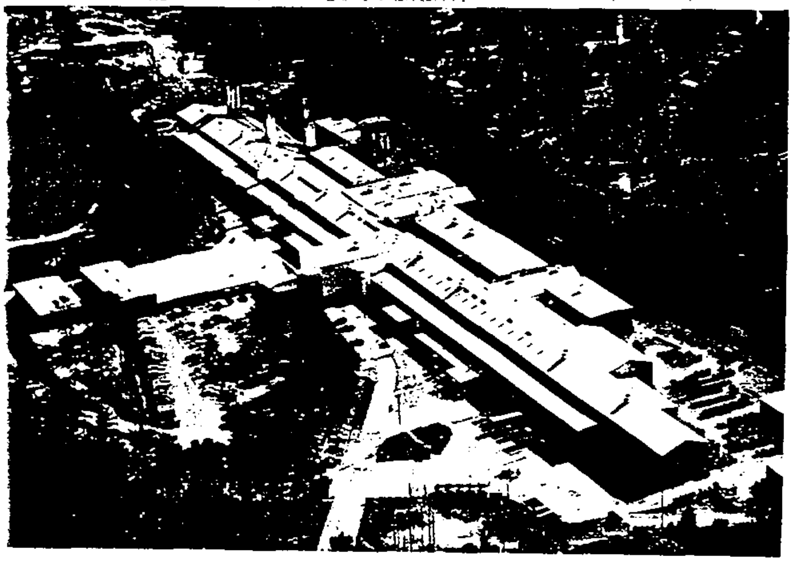
The phosphate industry had long needed an alloy with combined corrosion-abrasion resistance to increase the life of the pumps in their phosphoric acid plants.

■ Solution:

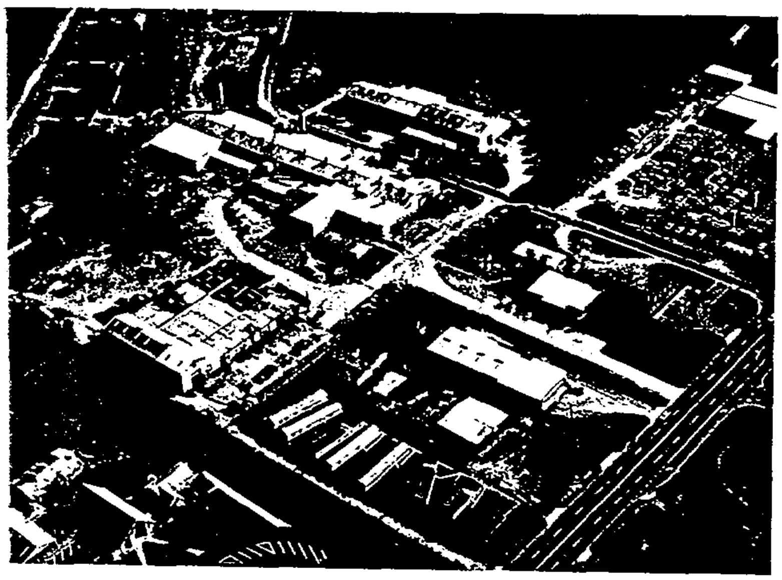
After years of research, GIW metallurgists developed Gasite® T90G, a super-alloyed white iron that handles pH levels below three and offers optimum abrasion resistance. This material is increasing the service life of pumps in phosphoric acid plants by four to five times, thereby reducing operating costs significantly.



Manufacturing Facilities: Where It All Comes Together.



Grovetown, Georgia, USA, manufacturing facility.

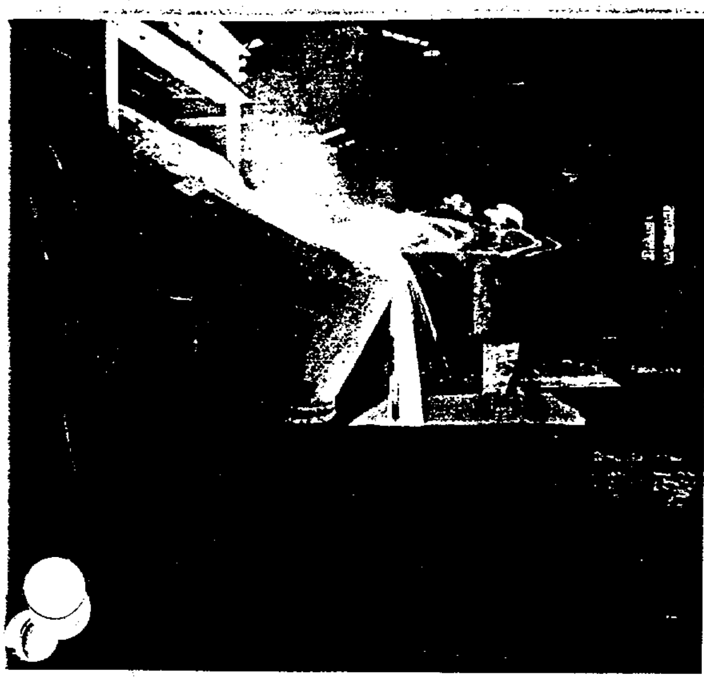


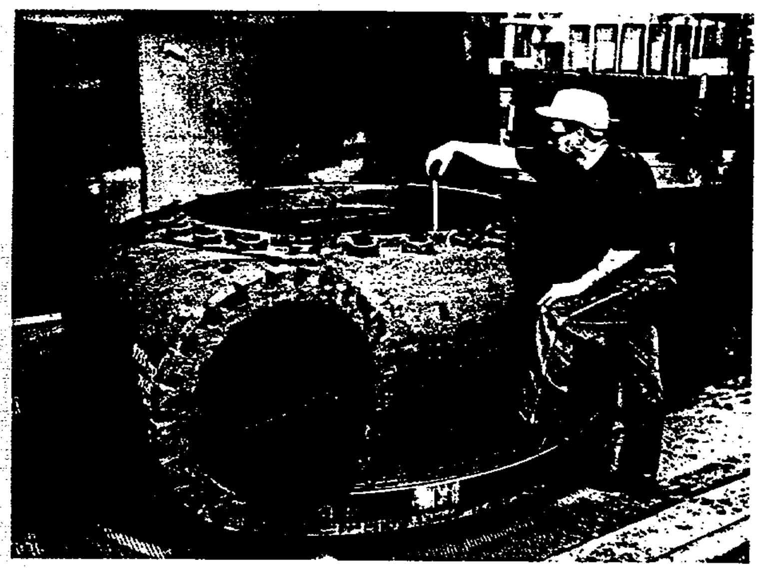
Thomson, Georgia, USA, manufacturing facility.

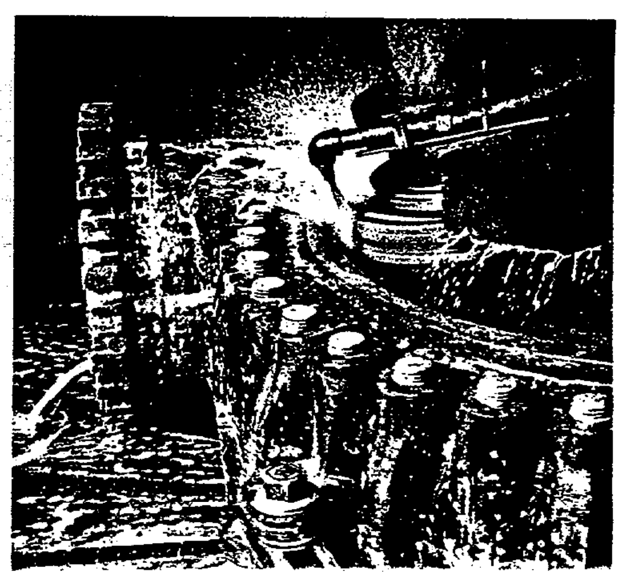
In GIW's two manufacturing facilities, located in Grovetown and Thomson, Ga., teams of employees cast, machine and assemble gray iron, ductile iron, white iron and elastomer pumps. Their largest pour capacity of 50,000 pounds (22.000 kilograms) yields a finished casting of 33,000 pounds (14.400 kilograms).

Together these facilities cover 300,000 square feet (28.000 square meters). They operate under a quality system certified to ISO-9001 standards, which means that GIW's manufacturing process has been analyzed and formalized—from beginning to end—and that GIW employees are trained in quality control techniques. This guarantees reliable, standardized pumps and parts and allows you to eliminate customer audits.

To further meet your requirements, GIW manufactures and produces stock locally around the world. By shipping over 80 percent of its spare parts from stock, GIW offers delivery in days instead of weeks. This helps you reduce your inventory and avoid the expensive pitfalls associated with pirated parts.







Product Lines: Anticipating Your Every Need.

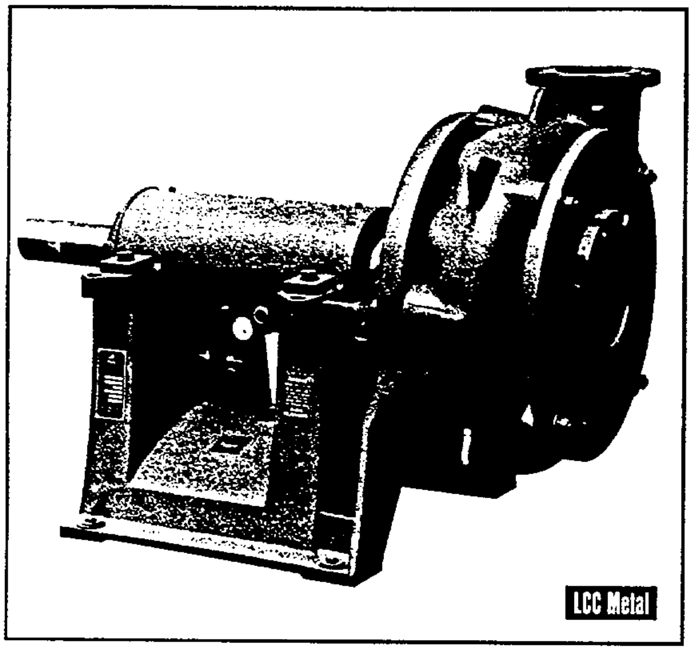
GIW pumps are based on intelligent designs, superior materials and heavy-duty construction. Their easy-to-assemble, interchangeable components provide long, trouble-free wear, reduce and simplify maintenance, and allow for varying operating conditions.

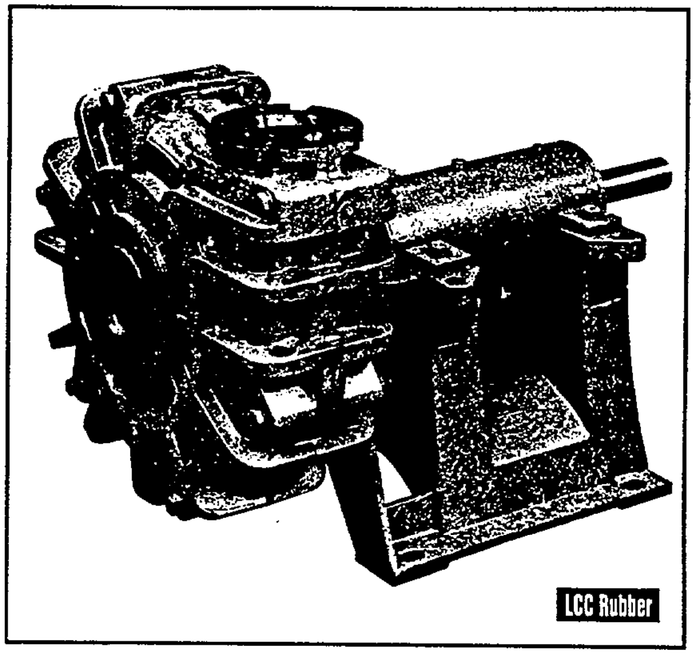
Their superior hydraulics maximize energy efficiency, reduce downtime and increase production. Further, GIW's twisted-vane design allows for the efficient passage of large solids and unparalleled wear resistance. And our impeller-design software ensures our impellers deliver optimum suction performance.

LCC Series:

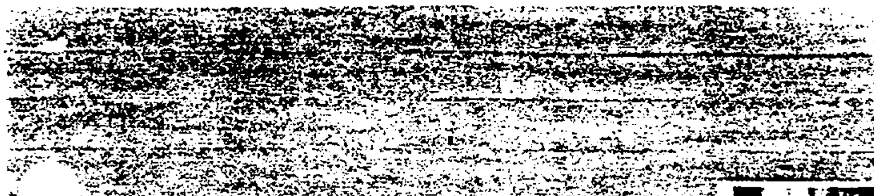
Horizontal, end-suction, modified-volute-casing pumps with three-vane impellers for large solids passage. Good suction performance, high efficiency and long wear. Interchangeable rubber and metal designs allow you to select the material best suited for your application.

These pumps are equipped with the new Inpro/Seal™ bearing isolators to prevent contamination by water or solids, ensure proper lubrication and eliminate the maintenance and replacement costs associated with lip-design oil seals.


LCC Metal


LCC Rubber

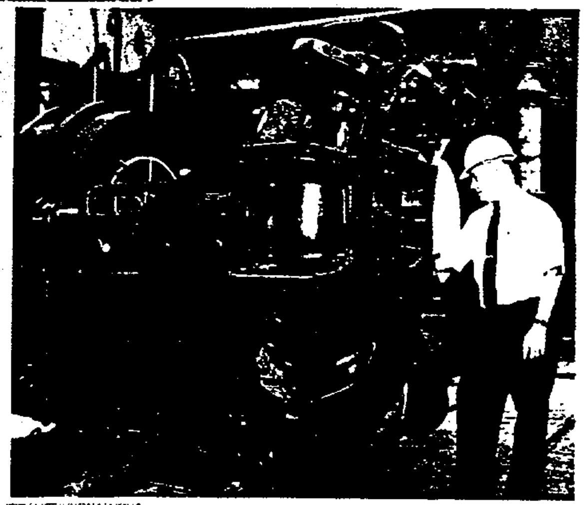
Flow:	To 14,000 gpm (3.200 m^3/h)
Total Dynamic Head:	To 300 ft. (91 m)
Discharge Diameter:	From 2–12 in. (50–300 mm)
Power Rating:	To 750 hp (560 kW)



LSA Series:

Horizontal, end-suction, centrifugal pumps. Single-wall shell with replaceable suction-side liners and three- or four-vane impellers. Designed for severe service in a variety of plant and field applications.

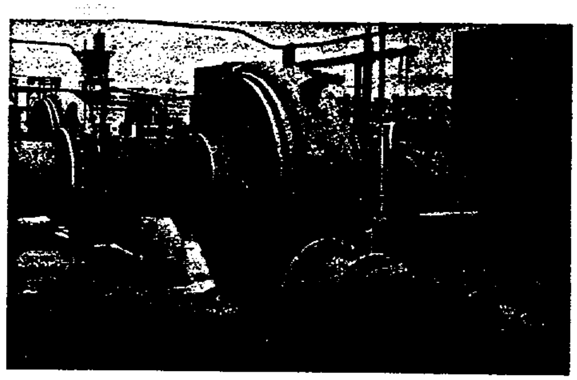
Flow:	100–60,000 gpm (23–13.600 m^3/h)
Total Dynamic Head:	300 ft. (91 m) per stage
Discharge Diameter:	2–26 in. (50–650 mm)
Power Rating:	To 4,000 hp (3.000 kW)



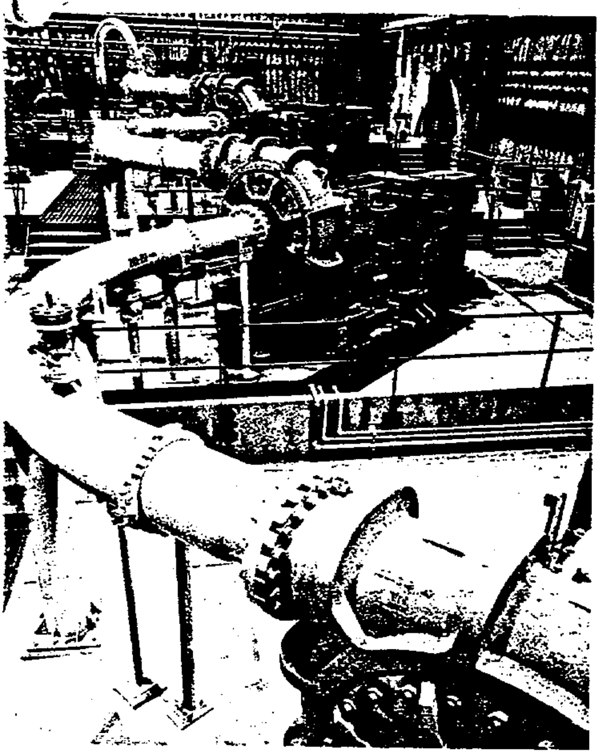
LSA high-pressure pump.

Customized LSA 20X24-48.

LSA mill discharge pump.

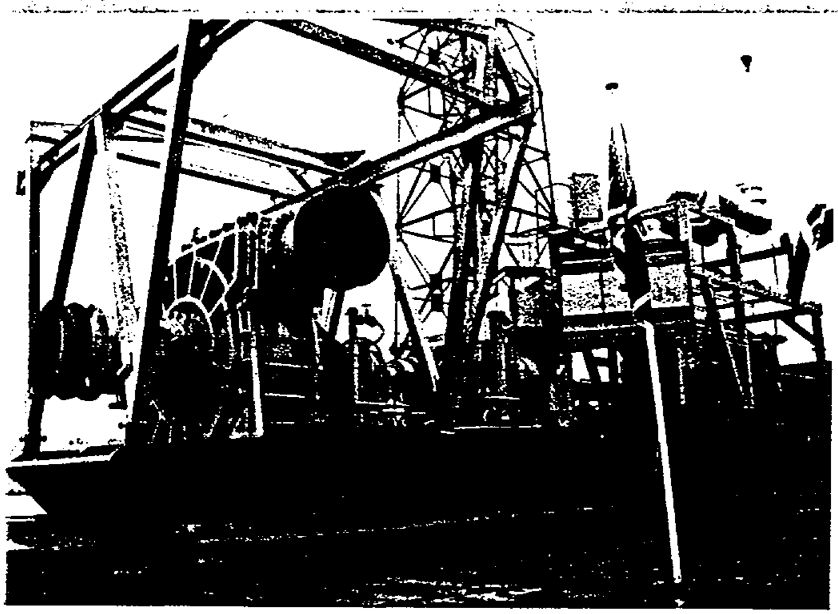


LSA high-efficiency washer recycle water pump.



High-pressure versions of the LSA Series Slurry Pump perform well in long-distance tailings disposal.

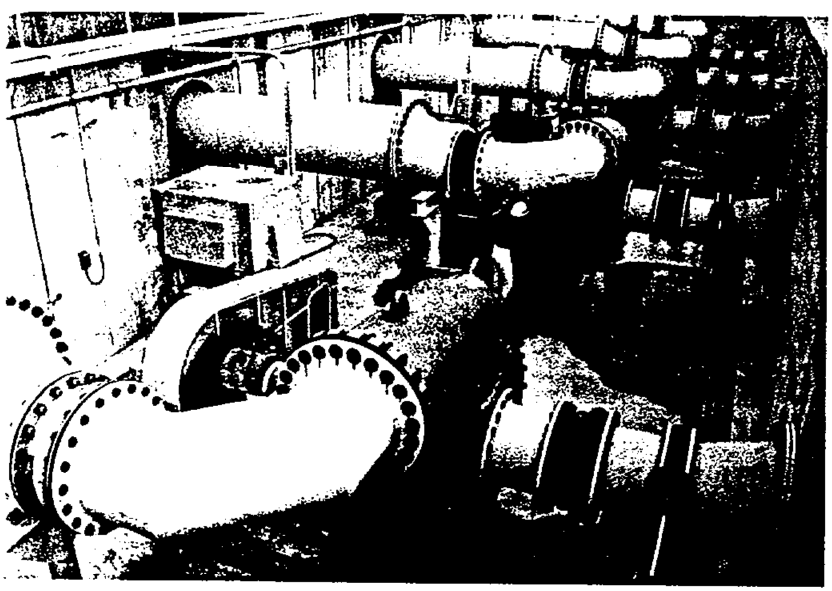
Product Lines: Anticipating Your Every Need.



TBC & WBC Series:

These patented designs incorporate state-of-the-art hydraulic wear technology for severe-duty, high-pressure applications. Primarily used in ore and tailings transport lines subject to sudden pressure spikes.

Flow:	More than 75,000 gpm (17.000 m^3/h)
Total Dynamic Head:	To 300 ft. (91 m)
Discharge Diameter:	18–30 in. (450–750 mm)
Power Rating:	To 9,500 hp (7.100 kW)

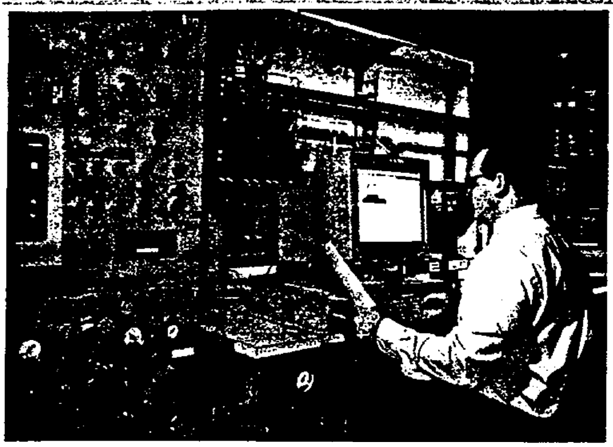


HHD, LHD & MHD Series:

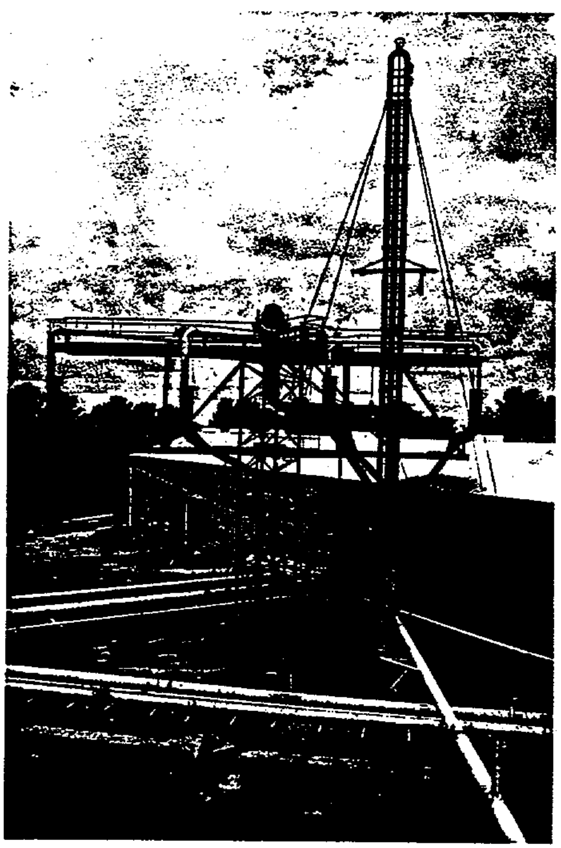
Horizontal, end-suction, centrifugal pumps available with three- or four-vane impellers. Conventional single-wall and modified designs. Feature high heads and flows for dredging, pipeline booster stations and other severe duties.

Flow:	5,000–100,000 gpm (1.100–23.000 m^3/h)
Total Dynamic Head:	300 ft. (91 m)
Discharge Diameters:	Up to 42 in. (1.070 mm)
Power Rating:	To 9,500 hp (7.100 kW)

Technical Services: Ensuring Superior Application.



With multiple slurry test loop systems and sophisticated instrumentation, GIW's Hydraulic Testing Laboratory is well equipped to carry out pump and pipeline performance testing on water and slurry.



The GIW Hydraulic Testing Laboratory is the largest, most sophisticated slurry test lab in the world.

Technical expertise is critical to slurry pump users. According to our experience, misapplication is the cause of 90 percent of all problems. Problems that cost you time and money. But GIW products are backed by renowned technical experts who have analyzed hundreds of slurry pumping systems. Their resources include:

GIW's Hydraulic Testing Laboratory, the largest, most sophisticated slurry test lab in the world. It allows our engineers to select the best pump and pipe size for your application.

Working with multiple slurry test loop systems and a variety of instrumentation, GIW engineers conduct both pump and pipeline tests on water and slurry. The lab is available for contract testing of slurry and pipeline components.

GIW's Proprietary Slysel Computer Program. It takes the guesswork out of designing your slurry system and allows GIW's sales engineers and members of its worldwide representative network to:

- Evaluate a specific pump at desired operating conditions.
- Select the pump that will balance maximum efficiency with the severity of your duty.
- Calculate pipe friction head losses for various flow parameters, energy requirements, and recommended pumping velocities.

"Transportation of Solids Using Centrifugal Pumps" Course, which GIW co-sponsors every spring. This intensive five-day course, attended by leading designers and engineers from around the world, keeps our customers up-to-date on the latest in slurry technology and creates a forum between academics and industry leaders. It consists of lectures, design-oriented tutorials and hands-on demonstrations in GIW's Hydraulic Testing Laboratory.

Over 100 Years of Experience.

Problem:

When the management of the largest offshore oil platform in North America wanted to verify the design of the ballast distribution system, they called GIW's Hydraulic Testing Laboratory. The platform consists of a concrete gravity-based structure (GBS) and a topside structure. The GBS was filled at sea with 450,000 tons of iron ore ballast that provided the foundation stability to withstand the impact of icebergs.

Solution:

GIW installed one of the company's systems on a tower then connected it to a GIW pump identical to the two that would be used on the platform. They then pumped iron ore from the lab into the center of the vessel outlets to simulate and test the actual operation of the system. The GIW test results enabled the company to: determine the total system head, estimate pipe size and ensure the instrumentation would perform to expectations.

GIW has acquired an unparalleled understanding of slurry systems.

Armed with these resources and the knowledge and expertise of KSB's Research and Development Division, GIW's technical services personnel will help you design, troubleshoot and start your system for best operating efficiency. And if you have questions or problems, we're only a phone call away.

That's why companies around the world call us with their concerns and questions. They know if it can be done, GIW's team of engineers, designers, metallurgists and authorized representatives will find a way to do it. And in the process, we'll push the limits of slurry pumping technology...one problem at a time.

KSB

GIW®

State-Of-The-Art Slurry Smarts

GIW INDUSTRIES, INC.

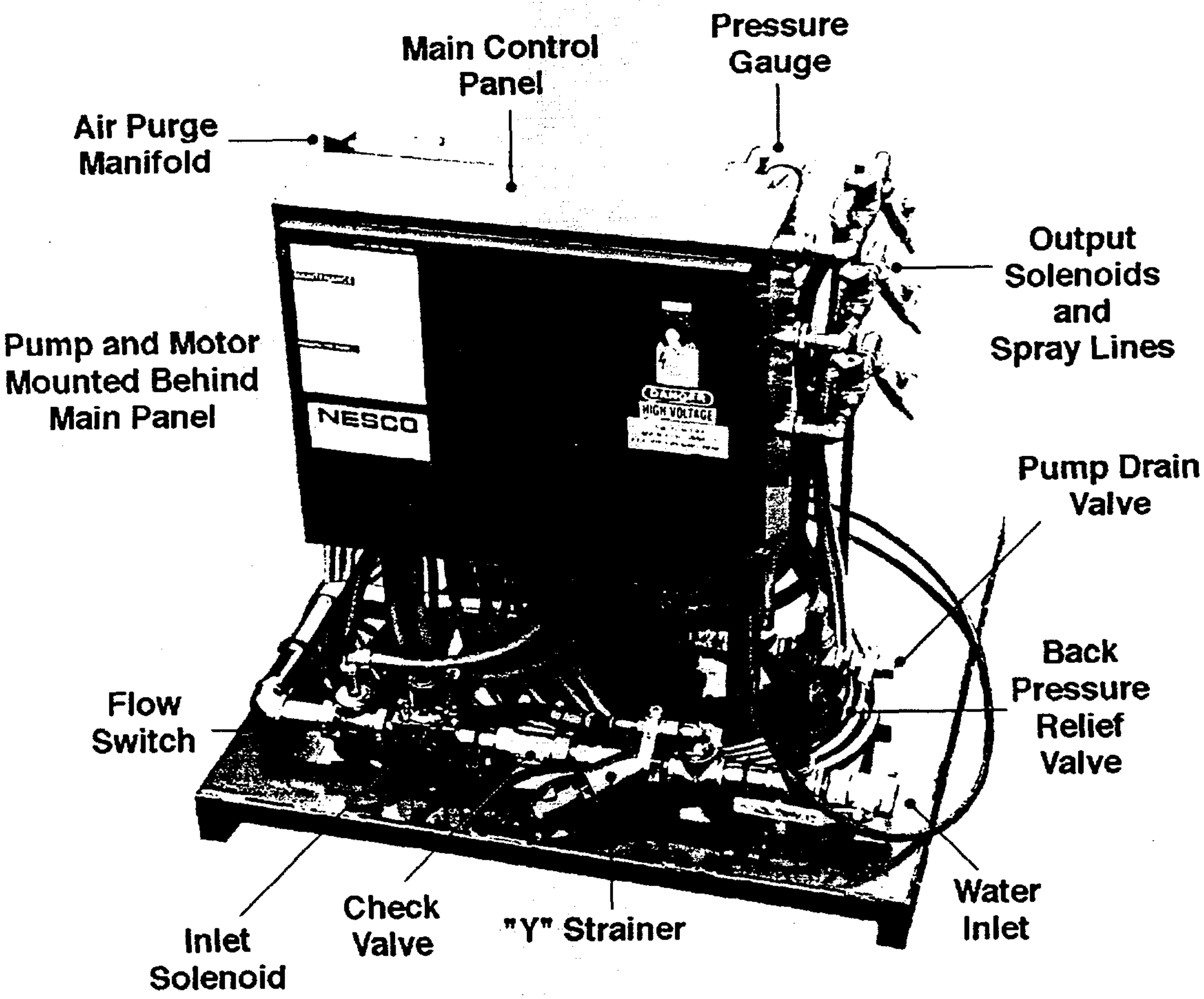
5000 Wrightsboro Road
Grovetown, GA 30813 USA
Phone: (706) 863-1011
Fax: (706) 860-5897

BRO 11/09/97-10000
Miller #22002-A

Franklin Environmental Services
Gravel Separation System

TAB 9

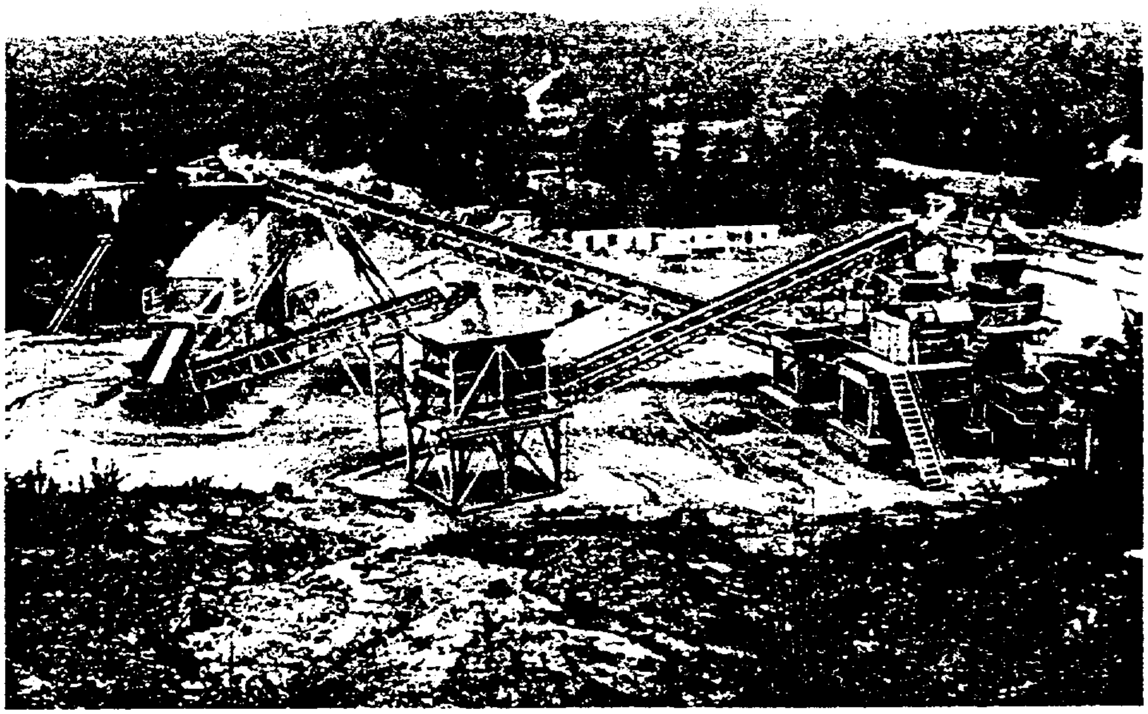
EMISSION CONTROLS



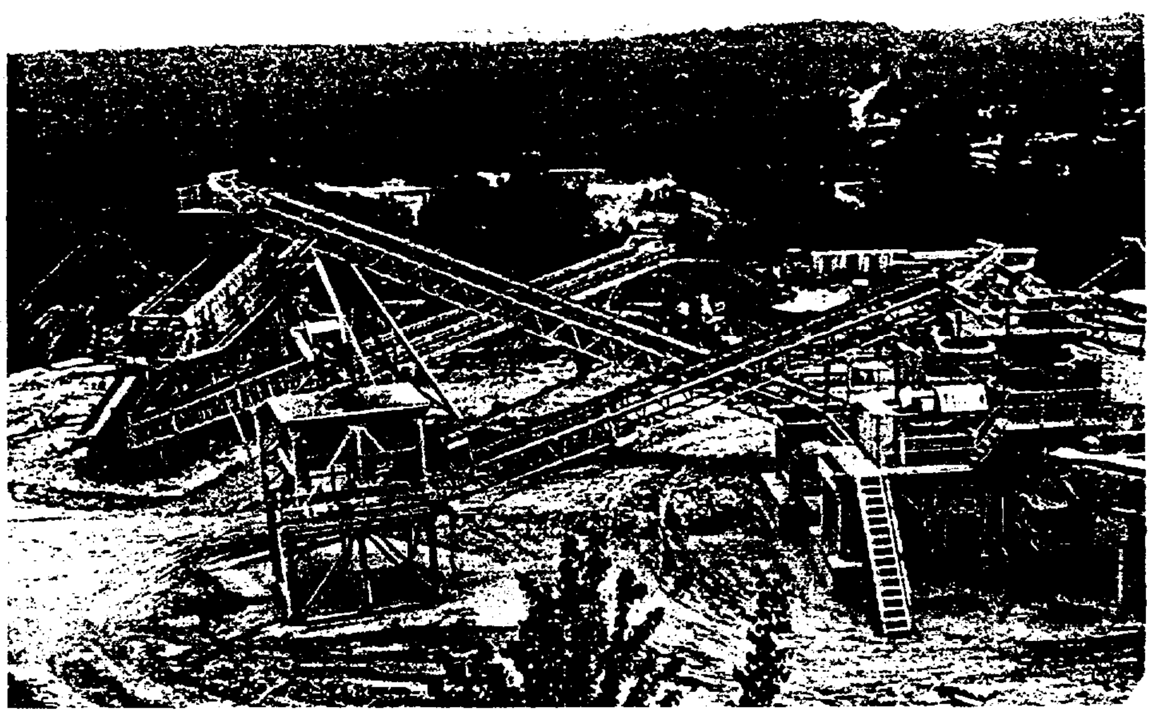
TYPICAL SPRAY SYSTEM PUMP MODULE

NESCO spray systems feature a vertical stage centrifugal pump and an electrical control panel mounted on a 4' x 4' welded steel skid. Designed to operate at 200 psi, the spray system is built for durability and easy maintenance.

Typical nozzle arrangements at a truck hopper (above) and a jaw crusher discharge (below). Galvanized spray nozzle manifolds are mounted on unistrut brackets and connected to the pump module with high pressure water hose. Correct nozzle placement and selection is essential for optimum performance.



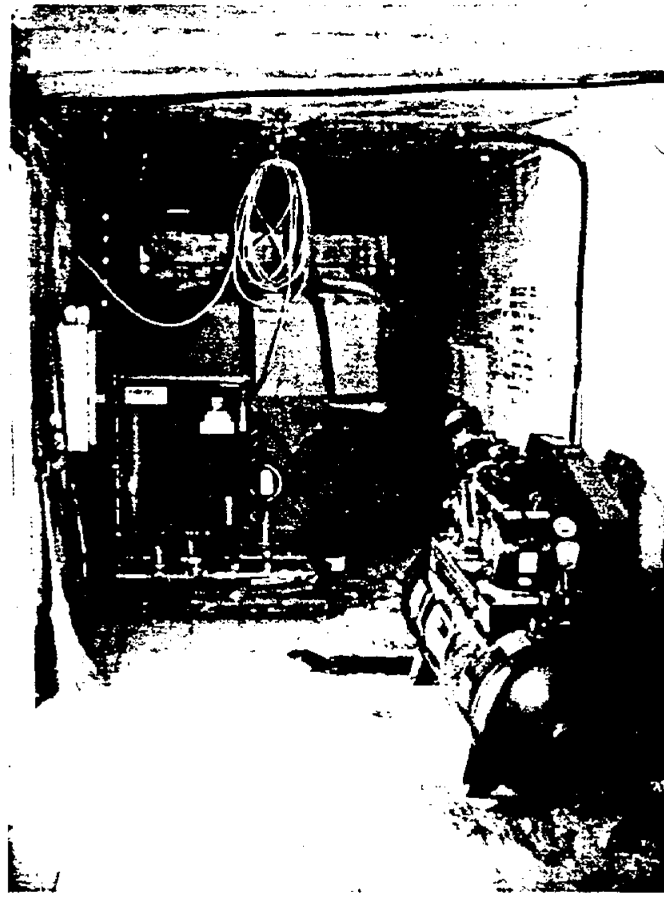
Moisture is an important process variable that affects screen efficiency and product specs. The photo above shows uncontrolled emissions. But high production rates don't have to mean lots of dust. The photo below shows the effectiveness of spray treatment at the cone crusher at right. Just the right amount of water controls dust throughout the entire circuit without any adverse effect on plant production.

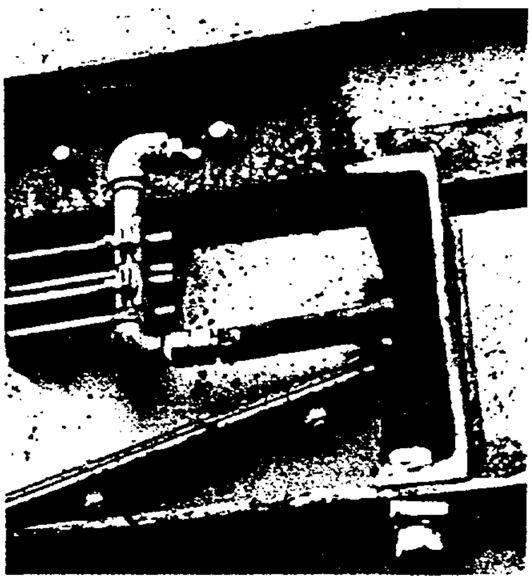


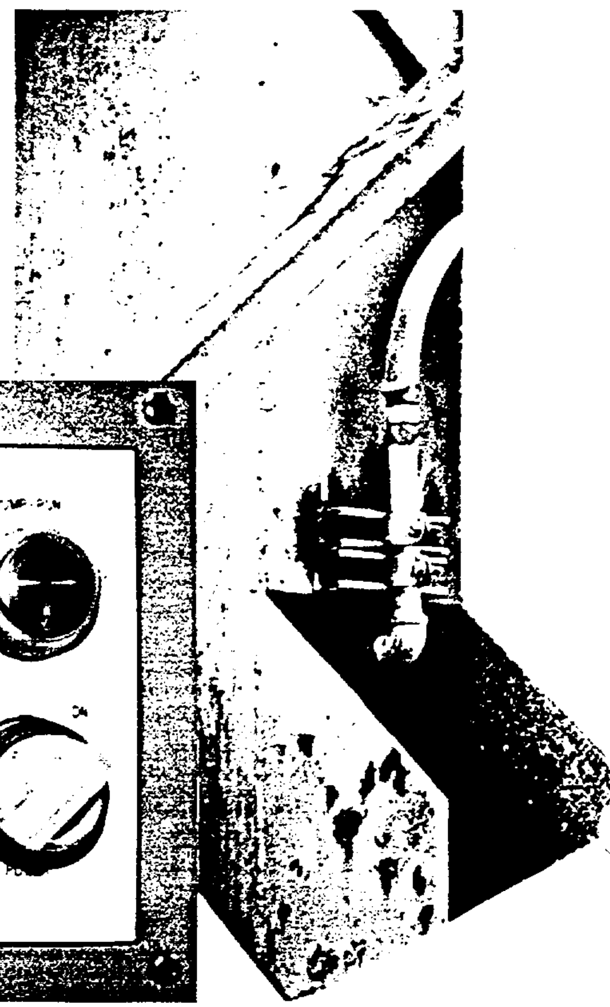
NESCO spray systems are available in 5 to 80 gpm capacities and consist of a pump module, remote control panel, spray manifolds and connecting hose and hardware.

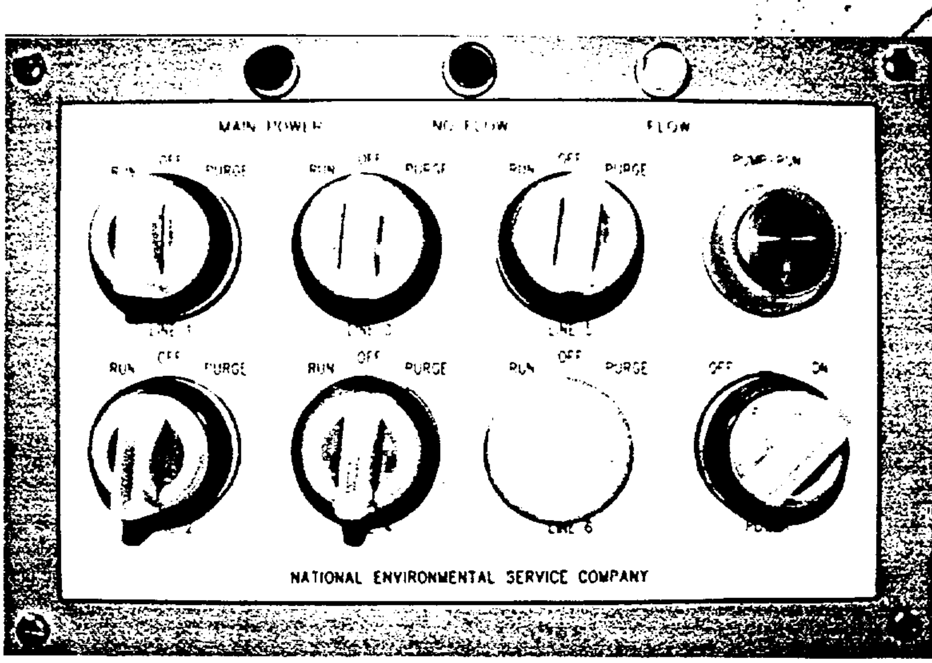
Accessory equipment for winter operation or other special purposes is also available to suit your needs and budget.

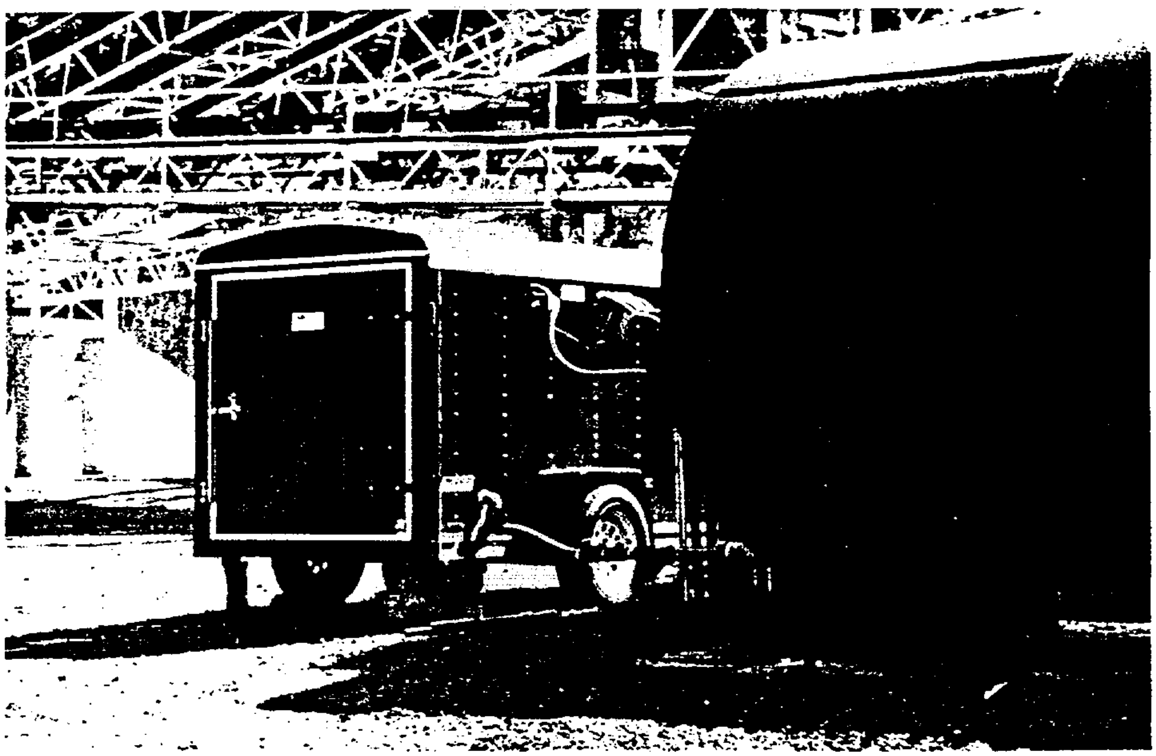
Our equipment is built to last and we guarantee that you will comply with visible emission standards.

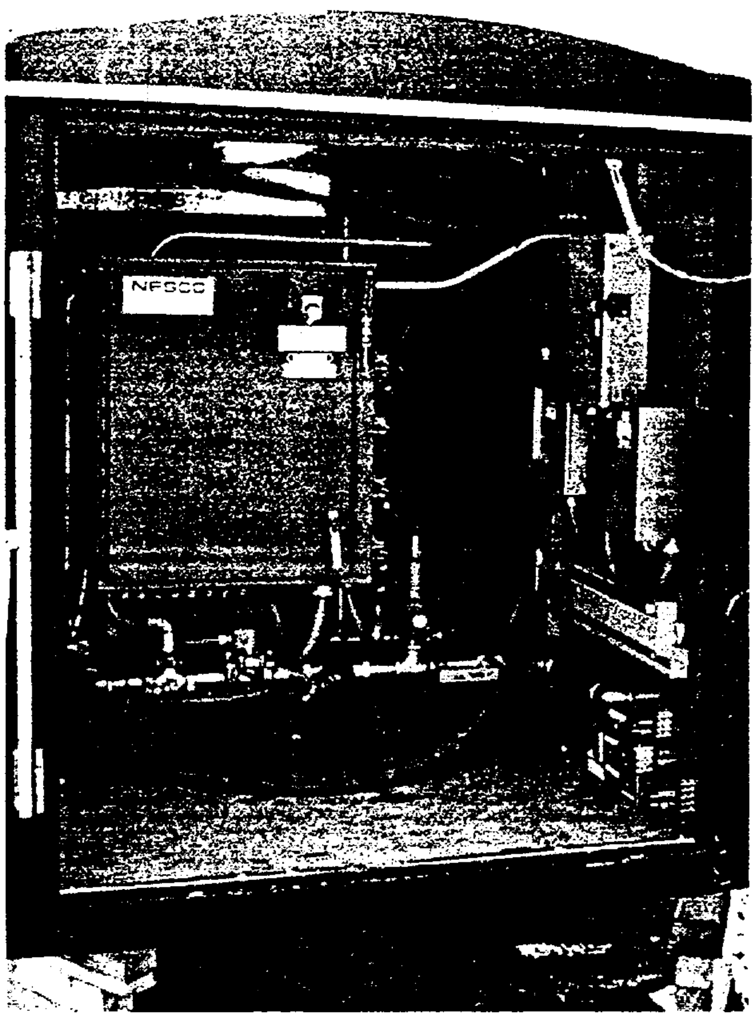












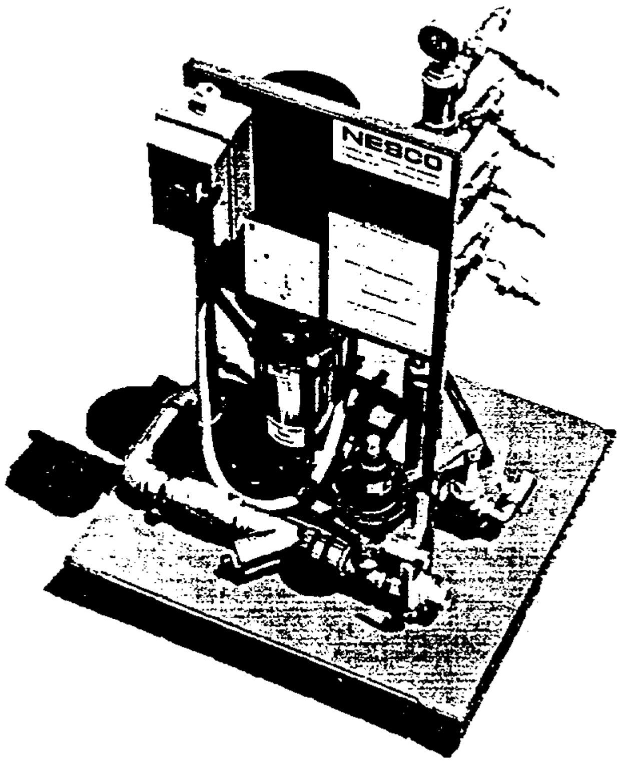
Spray systems can be housed in a single axle trailer that is ideal for portable plants.

Our trailer is fully insulated and equipped with a vent, light, and heater.

Water can be supplied from a tank, well, or city line. A dual basket strainer is recommended for pond or well water.

DUSTBOY

High Pressure Water Spray System for Dust Control



LOW, LOW Cost !
BIG, BIG Savings!

At last! A spray system for small mines, quarries and recyling plants.

Standard Features:

- ***200 psi, 10 gpm Pump***
- ***TEFC, 3 Hp Motor***
- ***Pressure Gauge***
- ***All Brass Plumbing***
- ***Water Filter***

The DUSTBOY is the latest addition to our product line. Designed for one- or two- stage crushing and screening plants that handle less than 500 tph, this compact unit packs a big punch. Just flip the switch and nozzles spray an atomized mist with plenty of power to control dust from production machinery. The DUSTBOY is just what you need to comply with Subpart OOO and pass your inspection.

For more information call us at 1-800-237-3878 that's...

1-800-2DR-DUST

The DUSTBOY pump module can pe purchased separately or as part of a package system that includes 1000 ft. of connecting hose, universal spray bars, nozzles and mounting brackets. DUSTBOY has four independent output spray lines, and is fitted with compressor connections for winter blowdown. For a firm price, send or fax us a process flow diagram.

National Environmental Service Co. (NESCO)

Tel: 973-543-4586   7 Hampshire Dr., Mendham NJ 07945   Fax: 973-543-4588

Making Tracks?

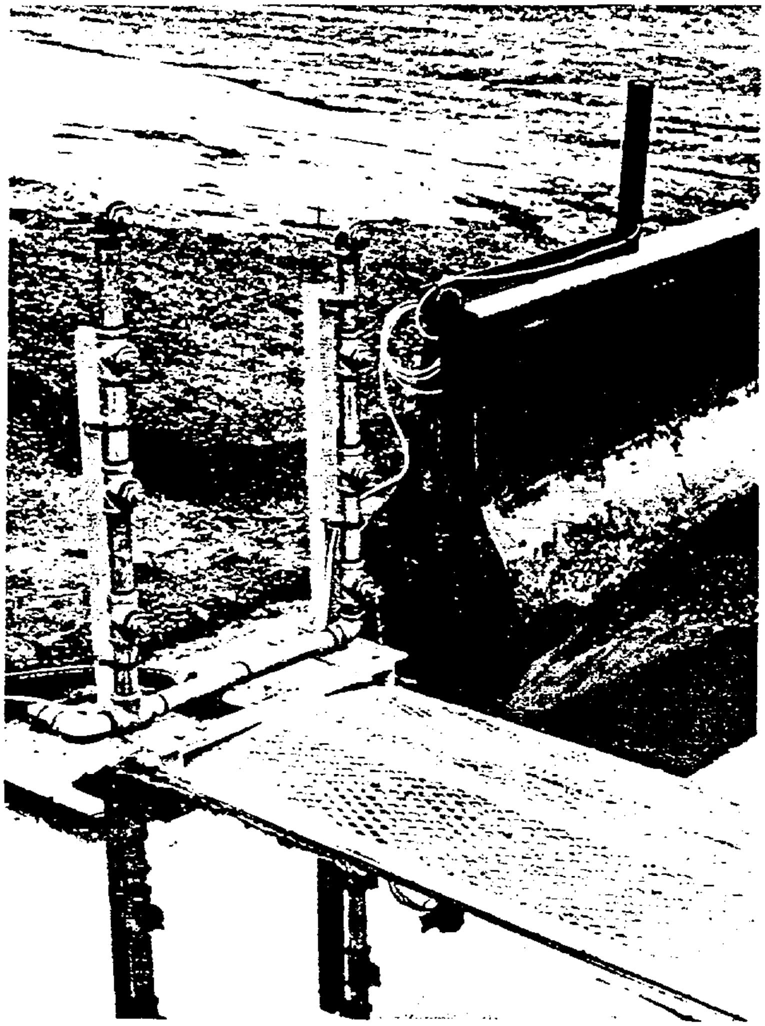
We hope not. But if your trucks do track mud and dirt out of the plant, we can help keep your neighbors happy and the EPA off your back. Our DirtSquirt wheel wash is an effective and affordable system that can be set up at your front door. The DirtSquirt uses about 20 gallons per truck and is entirely portable.

DirtSquirt power washes tires so that your trucks hit the pavement clean. No more complaining phone calls. No more hassles with city hall. Check out the DirtSquirt and our other dust control systems on our website or call "Dr. Dust" directly at 1-800-237-3878 for more information and prices.

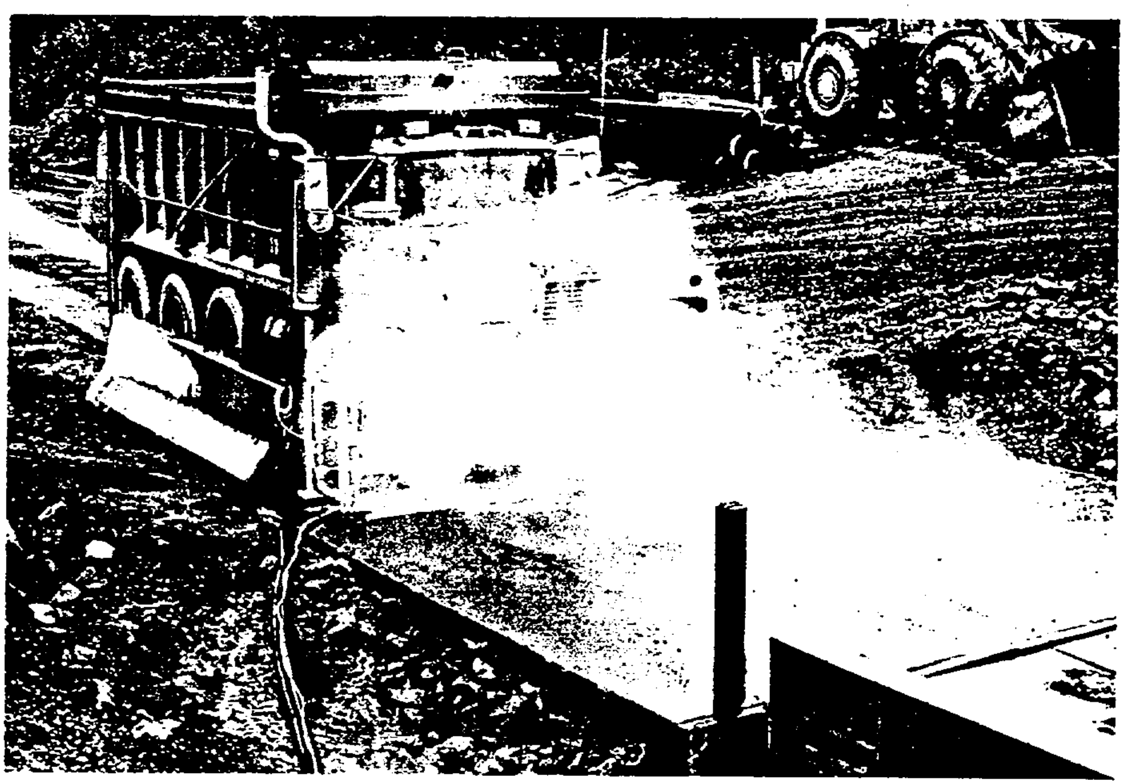
nesco

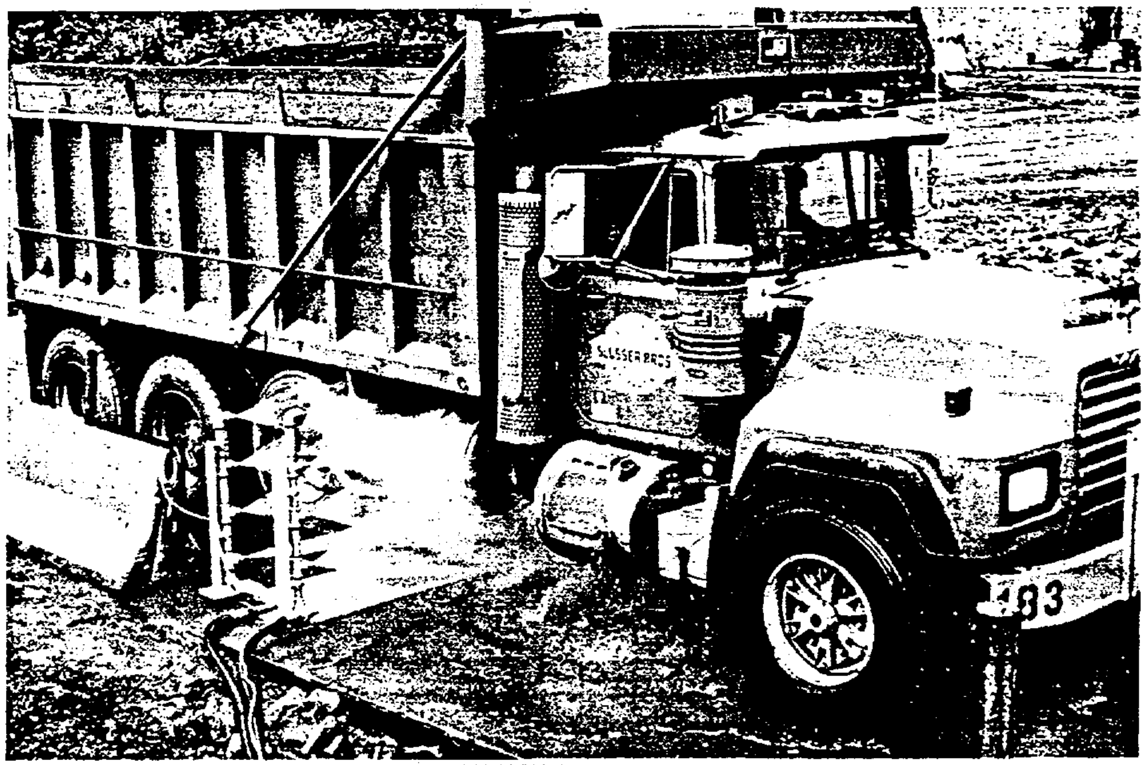
National Environmental Service Co.

7 Hampshire Dr. • Mendham, NJ 07945 • Tel 973-543-4586 or 800-2DR-DUST
Fax 973-543-4588 • www.drdust.com

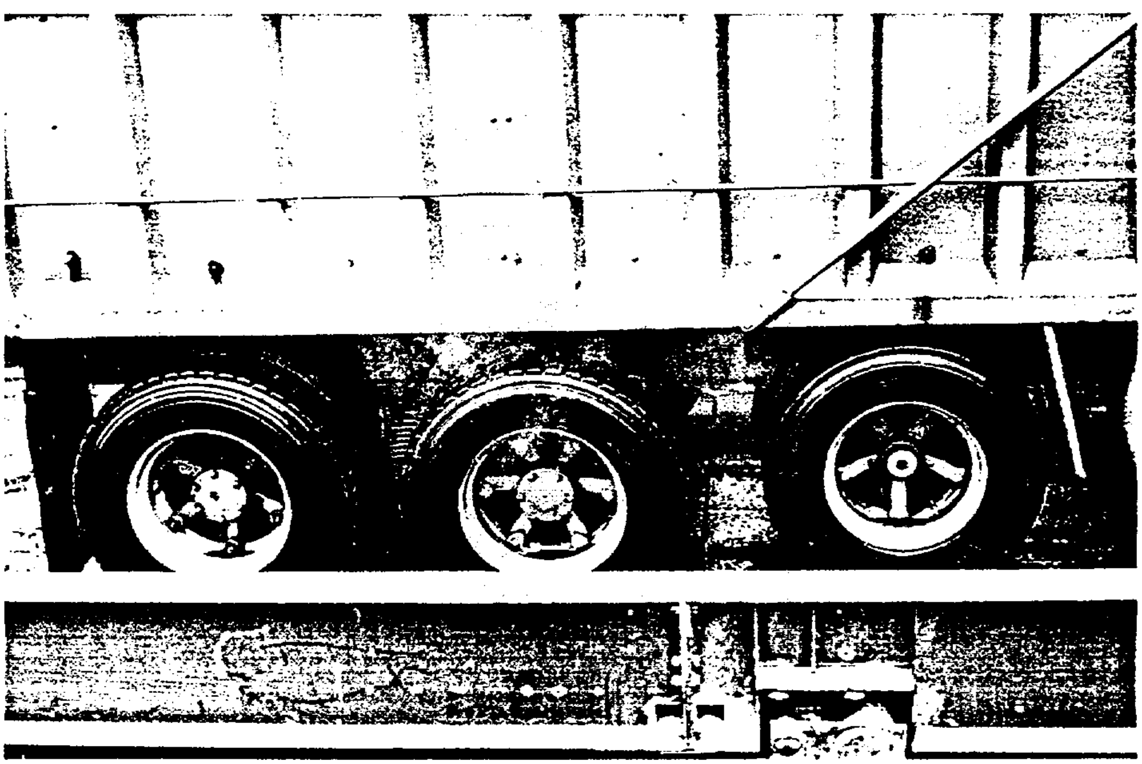


The DirtSquirt is activated automatically whenever a truck passes by the motion sensor mounted about 5 feet in front of the wheel wash.





The DirtSquirt washes only the tires - not the undercarriage. Greases and oils stay on the truck and don't run off into your water supply. Sprays shut off automatically when the truck passes the sensor. Tires are left clean and ready to hit the pavement without tracking out a lot of mud and dirt.



DIRTSQUIRT Wheel Wash

The DirtSquirt Wheel Wash is designed to clean truck tires and let them exit onto pavement without tracking out lots of mud and dirt. The DirtSquirt is portable and can be installed on any level concrete surface. Kit includes:

- **A 160 gpm high pressure pump module** with a 20 HP TEFC motor, Nema 4X control panel, strainer, check valve, drain valve, two 1.5" output lines, and pressure gauge. All brass plumbing, mounted on welded steel skid and painted safety blue. Wired for 440- VAC unless otherwise specified.
- **Dual action spray manifolds.** Two sets of 1.5" galvanized spray manifolds with 20 high pressure spray nozzles.
- **All-weather infrared motion sensor** detects passing trucks and turns wheel wash on and off.
- **Speed bump** to slow trucks and feed water line across road. Comes in two pieces, adjustable from 12 to 14 ft span.
- **200 ft. of 1.5" high pressure hose and 100 ft. of electrical cable** connecting pump module with spray bars and sensor.
- **"STOP" sign with pedestal and epoxy resin** for mounting speed bump.

Price and Installation...

The complete **DirtSquirt Wheel Wash System** sells for $29,995. Freight from Hackettstown, NJ is not included. We can send a supervising engineer to help install the system for a flat rate of $450 per day plus travel expenses. You can also install the **DirtSquirt** system yourself. The pump module is pre-wired with its own fused disconnect. All you have to do is connect three wires and check the pump rotation. No excavation work is required. Delivery 4-6 weeks.

What does the plant have to supply?

- A level concrete pad to mount the speed bump. Surface should be pitched to drain and placed to exit onto pavement.
- An enclosure for the pump to protect it from the elements. In winter weather, the pump unit must be heated or purged with glycol to protect it from freezing. NESCO does not warranty freeze damage of any kind.
- Power and water for the pump module. If other than 440 VAC required, please specify. Pump should be supplied from a surge tank (500 gal. min) with auto fill switch. Supply with clean water from city line, well, or pond.

Contact us at 800-2DR-DUST or call your local dealer for more information...

Arkansas
G. W. Van Keppel
Little Rock 501-945-4594

California (Northern)
Compass Equipment
Oroville 530-533-7284

California (Southern)
Cooley Equipment
Corona 909-277-7820

Connecticut
Whitney & Son
Fitchburg, MA 800-245-5472

Delaware
Nance Corporation
Richmond, VA 804-784-5266

Georgia
Martin Technologies
Augusta, GA 706-737-3700

Illinois (Northern)
Process Machinery
Indianapolis 317-241-3315

Illinois (Southern)
G. W. Van Keppel
St. Louis 314-872-8440

Indiana
Process Machinery
Indianapolis 317-241-3315

Iowa
Contractors Supply
Des Moines 800-422-3083

Kansas
G. W. Van Keppel Co.
Kansas City 913-281-4800

Kentucky
Process Machinery
Shelbyville 800-860-1523

Maine
Whitney & Son
Fitchburg, MA 800-245-5472

Maryland
Nance Corporation
Richmond, VA 804-784-5266

Massachusetts
Whitney & Son
Fitchburg, MA 800-245-5472

Michigan (U.P.)
R. B. Scott Equipment
Eau Claire, WI 715-832-9792

Minnesota
R. B. Scott Equipment
Osage 218-538-6766

Missouri
G. W. Van Keppel
St. Louis 314-872-8440

Montana
Westate Machinery
Billings 406-373-6010

New Hampshire
Whitney & Son
Fitchburg, MA 800-245-5472

New Mexico
Aggregate & Mining Supply
Albuquerque 505-344-1300

New York
L. B. Smith
Syracuse 315-474-1567

Ohio (Northern)
Process Machinery
Medina 330-723-3864

Ohio (Southern)
Process Machinery
Guilford, IN 812-487-2237

Oklahoma
G. W. Van Keppel Co.
Oklahoma City 405-495-0606

Pennsylvania (Eastern)
ACM Equipment
Lansdale 215-361-3632

Pennsylvania (Western)
ACM Equipment
Washington 724-223-8162

Rhode Island
Whitney & Son
Fitchburg, MA 800-245-5472

South Carolina
Martin Technologies
Augusta, GA 706-737-3700

Tennessee
Agg. & Mining Supply
Maryville 423-984-5525

Vermont
Whitney & Son
Fitchburg, MA 800-245-5472

Virginia
Nance Corporation
Richmond, VA 804-784-5266

West Virginia
Nance Corporation
Richmond, VA 804-784-5266

Wisconsin
R. B. Scott Equipment
Eau Claire 715-832-9792

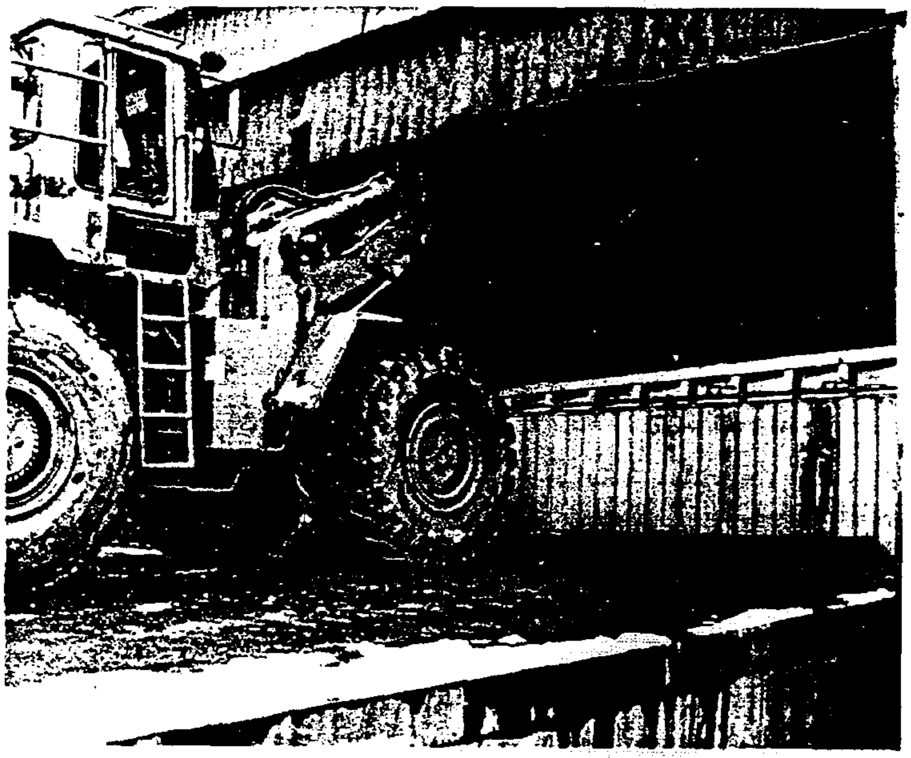
International:

Chile
Tetramet, S. A.
Santiago (56-2)203-7198

Argentina
CPL, S.A.
Buenos Aires 328-5814

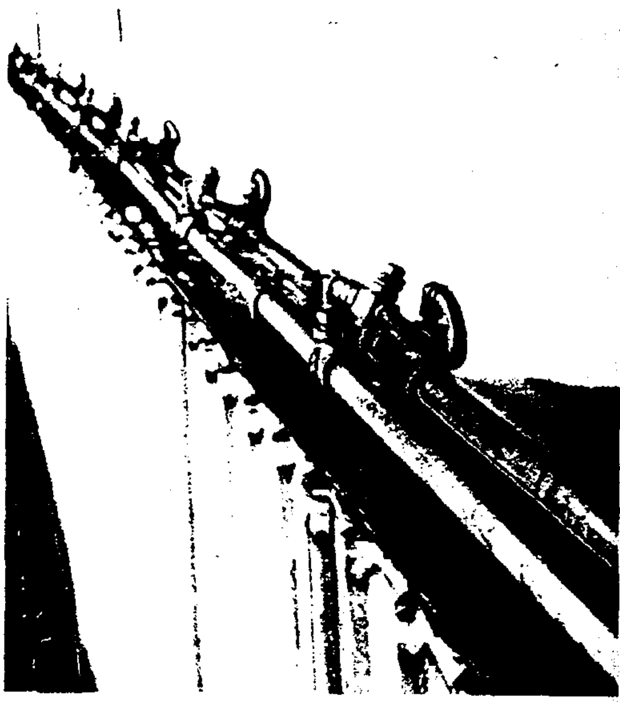
United Arab Emirates
Variety Middle East
Dubai (971) 506-5325

nesco
National Environmental Service Co.
7 Hampshire Drive
Mendham, NJ 07945
Tel: 973-543-4586
www.drdust,com

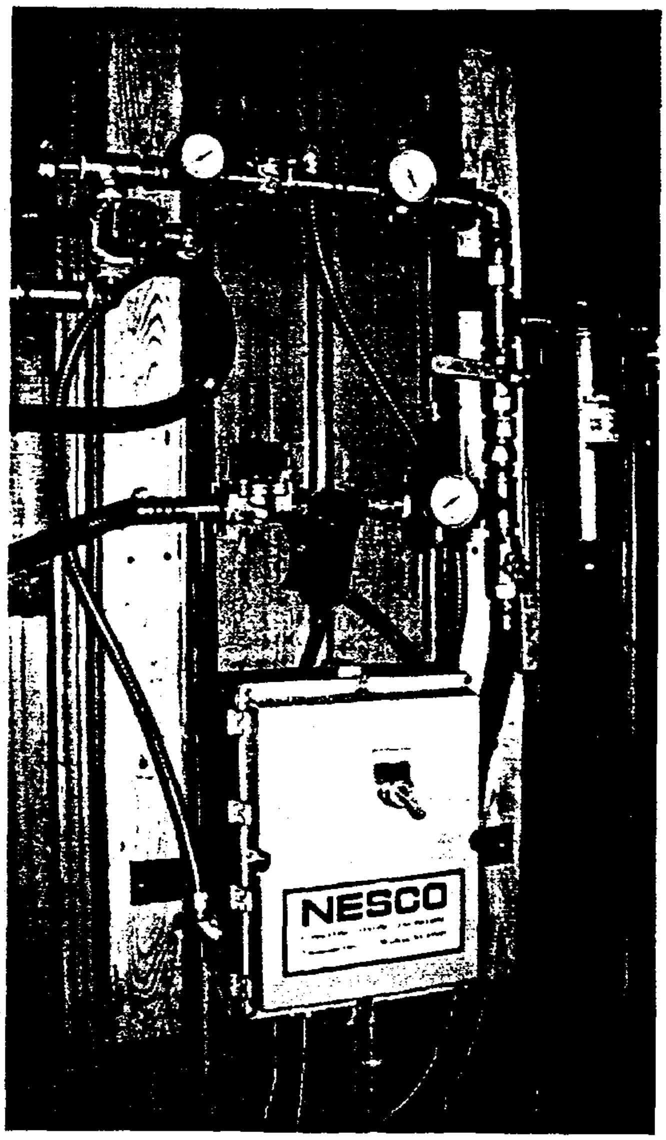


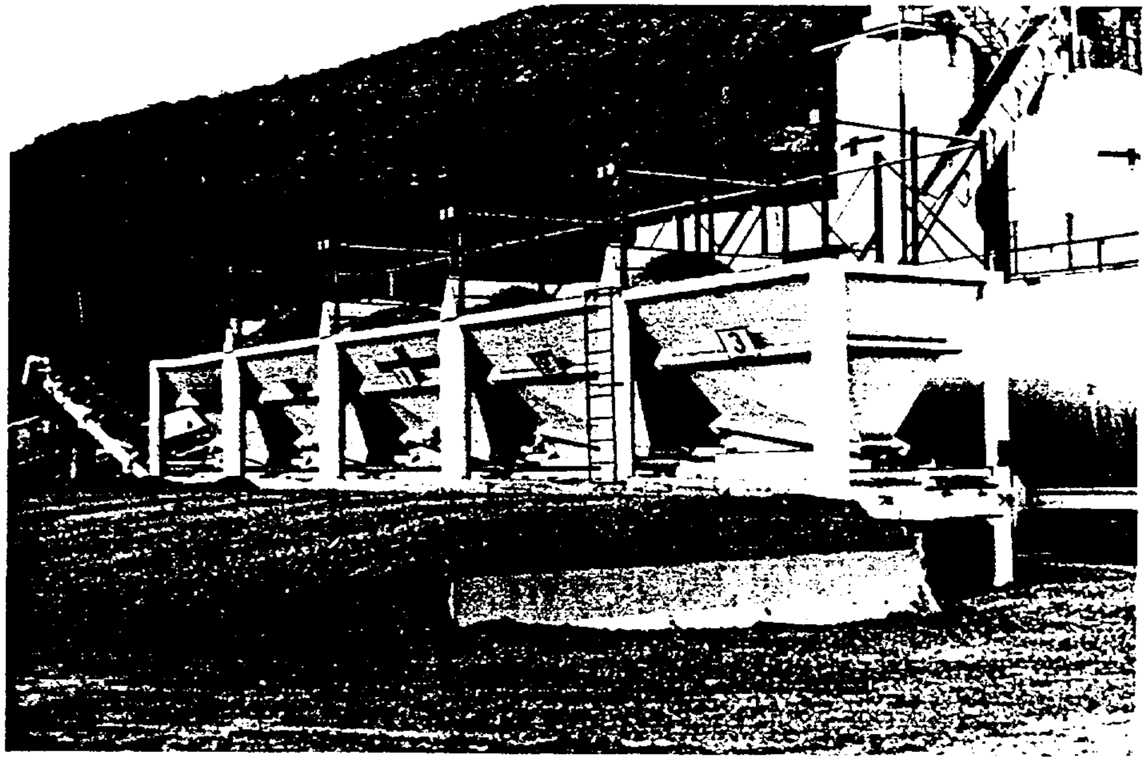
NESCO can build any type of wet suppression system including fog, foam, and surfactant - we just don't sell the chemicals.

The air atomizing system shown here is used to create a curtain of high pressure fog that contains dust inside the loading bay when the loader dumps and then backs down the ramp.

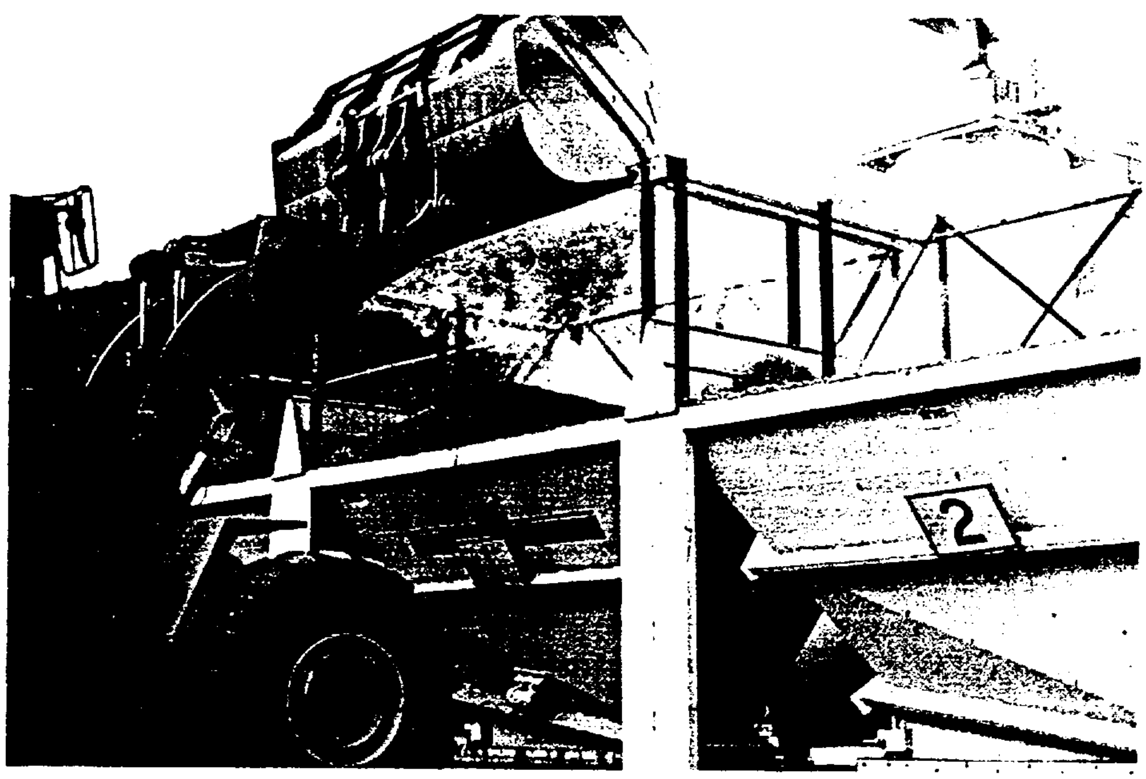


The system uses water and compressed air at regulated flows and pressures. This technology uses very little water and adds no detectable moisture to the material. Sprays are activated when the loader breaks a photocell beam.





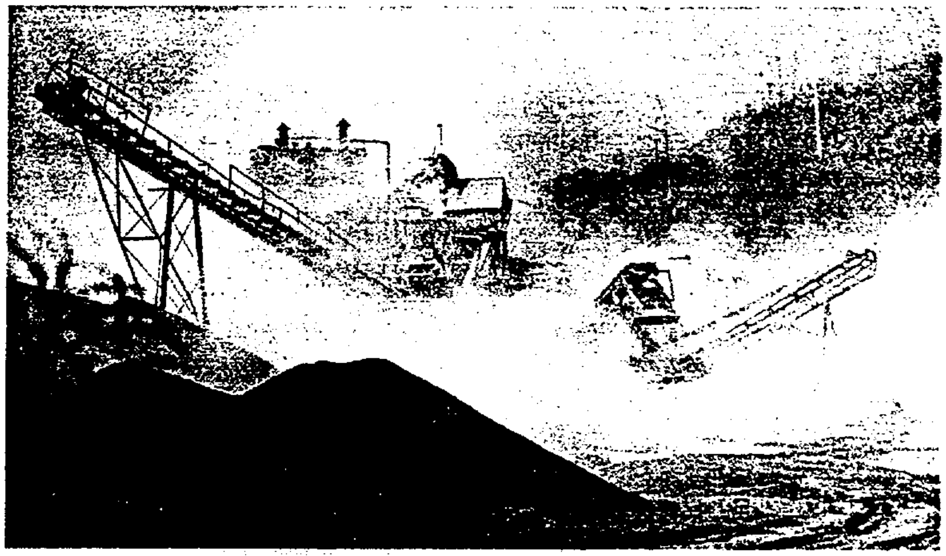
Fog technology can be used for dust sources that are diffuse and not very intense. Ultra-high pressure is used to produce minus 10 micron droplets that suppress airborne dust. Here, a fog system is used to control dust at some asphalt plant feed bins.



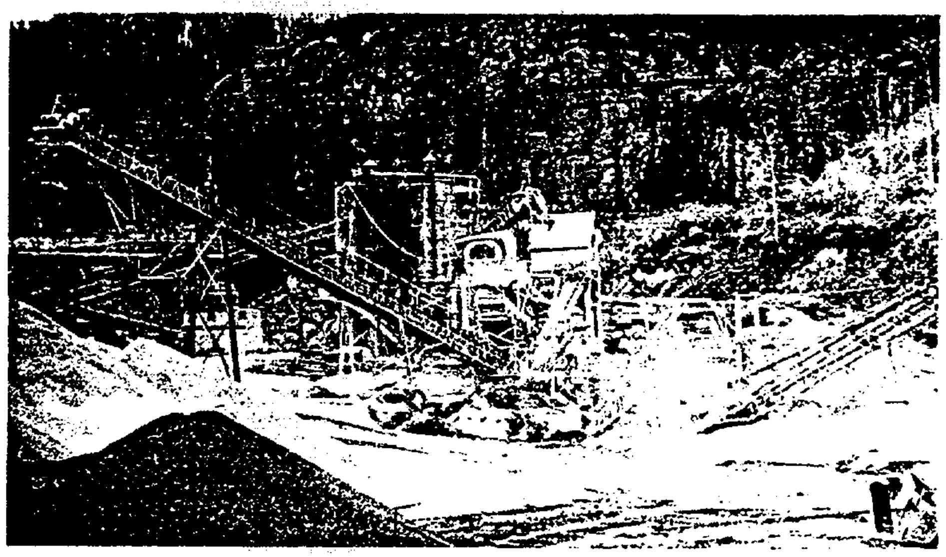
NESCO

Effective and Affordable Water Spray Systems

Cloud of dust created by quarry operations



Before & After



A high pressure water spray system suppresses visible dust and keeps the plant in compliance

NESCO'S Water Spray Systems use state-of-the-art technology to control dust year round in aggregate plants without blinding screens or throwing products out of spec. High pressure sprays use a powerful mist to suppress dust and conserve water.

Plant operators adjust the amount of water from a remote control panel - no hand valves to turn on or off.

Constructed with quality components this equipment is built to last and uses no chemical additives that can spill or leak.

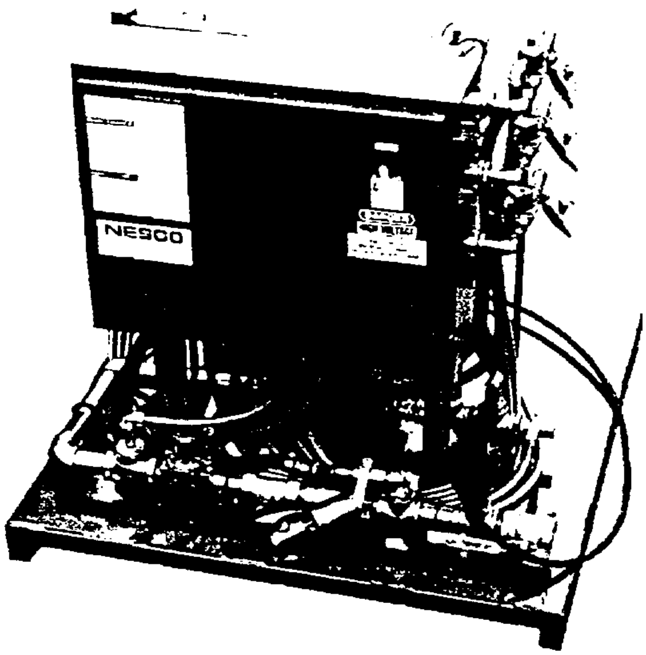
Low Capital, Operating, and Maintenance Costs make water spray systems the most cost-effective solution for visible dust.

Call 800-2DR-DUST for a catalog and FREE price quotation.

National Environmental Service Co., 7 Hampshire Dr., Mendham, NJ 07945 Tel: 973-543-4586 Fax: 973-543-5574

DUST PRO

Professional Series High Pressure Water Spray Systems



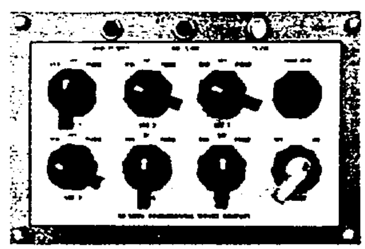
Standard Features:

- *High Pressure 200 psi Pump*
- *Flow Switch and Strainer*
- *Pressure Gauge and Relief Valve*
- *Remote Control Panel*
- *Running Time Meter*
- *All Brass Plumbing*
- *Anti-Hammer Solenoids*
- *Heavy Duty Construction*
- *10, 20, or 40 gpm Pump Sizes*

Options:

- *Air Purge for Cold Weather*
- *Glycol Injection*
- *Dual Basket Strainer*
- *Trailer Mounted*
- *Automation*

NESCO's Remote Control Panel lets your operator switch on spray nozzles when and where they are needed. Saves time and conserves water. Status lights verify that the pump is running and alert the operator if water supply is interrupted. Switches illuminate for night operation.



NESCO spray systems can be adapted to any stationary or portable plant. A centrally located pump module supplies spray nozzles. High pressure hose connects spray bars to pump unit. Easy to operate and maintain, NESCO spray systems can eliminate visible dust using less than a gallon of water per ton.

For more information call us at 1-800-237-3878 that's...

1-800-2DR-DUST

To obtain a firm price for a complete DUSTPRO system, send or fax us a process flow diagram and plan view or call to schedule a site visit.

National Environmental Service Co. (NESCO)

Tel: 973-543-4586 7 Hampshire Dr., Mendham NJ 07945 Fax: 973-543-4588

Franklin Environmental Services
Gravel Separation System

TAB 10

OPERATIONS SEQUENCE FOR CONVEYOR CONTROLS

January 13, 2000

Whitney & Son, Inc.
Prepared for: Franklin Environmental Services

Operations Sequence and Safety Related Issues - Maywood Project

		Protocol Sequential Start
Emergency Stop Switch	Run	Bypass
	Auto	Manual
	→	Keyswitch

Auto mode used for operation of equipment.

Start C7= triggers an alarm (adjustable time to 60 sec. Adjustable volume to 100 DB), C7 starts.

Start C6,
Start Screen 2
Start Water Pump 1 = latches pump on delay (adjustable) which is triggered by a no/flow switch at the feeder.

Start C5
Start C4
Start Screen 1
Start C3
Start C2
Start C1
Start feeder
Start dust suppression water pump **(not interlocked)**

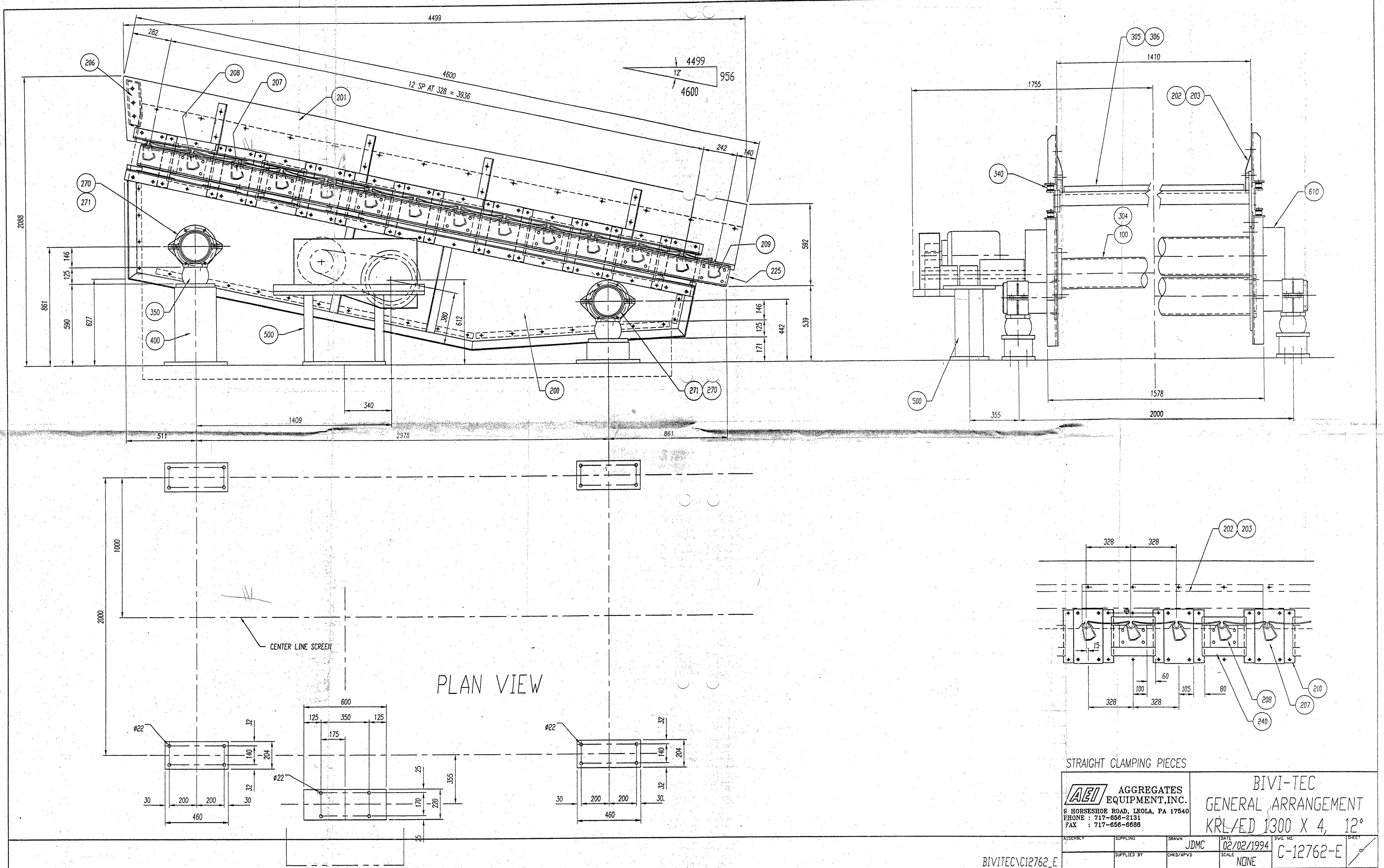
All of the above equipment (the system) is interlocked in such a manner that if any one component drops out, every piece of equipment upstream/feeding that component drops out with the water pump off delay (adjustable) triggered again by a no flow condition at the feeder.

Bypass/ manual position is used for maintenance and troubleshooting purposes only and completely bypass the interlock network this is a keyed position on the select switch and will be labelod accordingly.

Safety Issues: Should any of the safety switches (trip cords) be in latched weather intentionally or not the above shut down procedure will also be followed.

Emergency Stop Switch: Is prime and until it is in the run position noting can be started weather in the auto or bypass mode.

Safety Guards: All of the above equipment will have standard guarding as determined by each manufacturer, however local regulations have juristriction over guarding responsibilities and unless determined before hand additional guarding may be required and is the owners/users responsibilities.



AEI AGGREGATES EQUIPMENT, INC.
9 HORSESHOE ROAD, LEOLA, PA 17540
PHONE : 717-656-2131
FAX : 717-656-6686

BIVI-TEC
GENERAL ARRANGEMENT
KRL/ED 1300 X 4, 12°

ASSEMBLY	SUPPLYING	DRAWN	DATE	DWG. NO.	SHEET
	SUPPLIED BY	JDMC	02/02/1994	C-12762-E	
		CHKD/APVD	SCALE NONE		

Attachment B

RADIOLOGICAL SORTING SYSTEM

THERMO NUTECH INFORMATION

Thermo NUtech Information
Radiological Sorting System
Table of Contents

OPERATING PROCEDURES MANUAL

for the

THERMORETEC
SEGMENTED GATE SYSTEM

at

MAYWOOD INTERIM STORAGE SITE
Maywood, New Jersey

MAYWOOD Environmental Remediation Project

Prepared by: Joe Kimbrell, Project Manager

ThermoRetec Corporation
Nuclear Services Group
4501 Indian School Road, N.E. Suite 105
Albuquerque, New Mexico 87110-3929
http:\\www.thermoretec.com

January, 2000

ThermoRetec
Smart Solutions. Positive Outcomes.

Introduction

This manual is a combination of individual operating procedures for specific components of the Segmented Gate System (SGS) and certain safety and health requirements that pertain more readily to the equipment or operation. These procedures originated when the mobile SGS was constructed in 1995. As the SGS was modified and modernized to meet changing client needs and safety requirements, these procedures were revised. The most current version is included in this supplement.

The signature page at the beginning of each procedure reflects the date that the procedure required major revision and distribution. The procedures were written as generic documents with insert locations for site-specific information. Inserting the site-specific information is not considered a revision of the procedure.

This manual has been compared to documents provided by Stone & Webster for the Maywood Environmental Remediation Project and to the best of our knowledge complies with their intent: the protection of people, property, and the environment.

Joseph W. Kimbrell
Joseph W. Kimbrell
Project Manager

Date: 2/8/2000

Thermo NUtech

Segmented Gate System Operational Procedures Manual

Title: SGS Operating Procedures

Procedure Number:

Revision Number: 1

Reason for Revision: Suggestions from the S&H review at SNL that can apply to any site.

Approved: ______________________ 08-21-97
Project Manager, Thermo NUtech — Date

Approved: ______________________ 09-18-97
Assistant Project Manager, Thermo NUtech — Date

Approved: ______________________ 08-12-97
Corporate Quality Assurance/Safety Director, Thermo NUtech — Date

Approved: ______________________ 9/22/97
Vice President, Thermo NUtech — Date

SGS OPERATING PROCEDURES

1.0 Introduction

The TNU Segmented Gate System (SGS) is a combination of conveyor systems, radiation detectors and computer controls that remove contaminated soil from a moving feed supply on a conveyor belt. Contaminated soil is diverted by segmented gates to a conveyor belt which deposits the soil in a container for stockpiling and further processing.

1.1 Quality Assurance/Quality Control

a. The procedures in this document are to be used by only trained and qualified technicians. Operations or procedures that affect quality assurance or quality control of soil processing will be accomplished only when authorized by the Site Manager or Plant Superintendent.

CAUTION

No changes will be made to plant equipment or operating procedures that affect the quantity of material that is processed, such as change in belt speeds, processing depth or width of soil on the sorting belts, unless specifically authorized by the TNU Site Manager. All changes to operating procedures will be documented by the TNU Site Manager.

b. The segmented gate response time will be checked weekly and recorded on the appropriate checklist. See Appendix 1 for instructions.

c. As part of calibration procedures for conveyor detectors, particle and distributed efficiencies are accomplished during mobilization and will be recalculated during semi-annual calibration. See Appendix 3 for procedures.

d. Health and safety procedures that specifically apply to plant operations are contained in Appendix 5.

e. Directions for accessing Site Health Physics operating procedures are in Appendix 6.

f. QA sampling procedures are contained in Appendix 7.

1.2 Maintenance

Preventive maintenance, corrosion control, repairs and modifications will be performed in accordance with prescribed technical manuals and schedules for equipment and vehicles. (See Appendix 4)

2.0 Primary Plant Operations

a. Contaminated or suspect feed soil is loaded into the tipping grizzly of the screening plant with a front-end loader. The feed soil that passes the six inch openings of the grizzly is moved passed a hammermill and onto the vibrating screen deck. The screen deck sizes the feed soil either to minus .75 inches or minus 1.5 inches. Oversize material, greater than the screen size falls to the ground or into a container at the rear of the screen plant.

b. Feed soil passing the screen deck is conveyed by belt to the SGS charge bin which holds approximately 1 cubic yard of soil. The charge bin is mounted on the sorting conveyor.

c. The soil is spread across the sorter belt by a screed (leveling gate) that is attached to the bottom of the charge bin. The sorting conveyor is precisely controlled by a Variable Frequency Drive which maintains a specific belt speed set by a plant technician. The soil is deposited at a uniform thickness set by a plant technician.

e. The soil then passes under an array of sodium iodide detectors which measure the radioactive content. Signals from the detectors are processed by the central processing unit which also controls the gates at the end of the sorter belt. Soil that does not meet releasable criteria is diverted for further processing and soil that is below site release criteria is sent to a storage pile.

f. The soil that was contaminated and is diverted by the segmented gates falls onto the contaminated soil conveyor belt. This belt discharges the contaminated soil in a container to await further processing.

3.0 Plant Start-up Procedures

3.1 Operations Prior to Start-up

A truck-van is used for a control room for the SGS Plant and normally is positioned adjacent to the sorter conveyor. The truck wheels will be chocked and mechanical brakes set when the van is setup for control room operations. An 8'X16' trailer will be positioned adjacent to the truck-van.

The sequence for plant start-up begins in the control room by the Control Room Technician (CRT). The CRT will follow the "Daily Plant

The sequence for plant start-up begins in the control room by the Control Room Technician (CRT). The CRT will follow the "Daily Plant Operations Start-up Checklist" (Appendix 2) to bring the SGS computer systems on-line. The CRT will coordinate start-up times, SGS system parameters, and which soil to process with the Plant Superintendent before start-up.

3.2 Quality Assurance and Safety

a. The conveyor belts are interlocked to prevent soil buildup on the belts and damage to the system. If one conveyor stops, then all conveyors behind it will stop.

b. The sorting systems will not operate until the computer system is turned on.

c. Failure of any of the following will immediately pause the sorter system: gate failures, detectors; air pressure, mechanical and electrical failures.

d. Any of the Emergency Stops located around the machine will instantly stop all conveyor belts and the computer system. The screen plant is has its own Emergency Stop which will only stop the screen plant.

e. Plant operators may be supplied with radios to communicate with the CRT and other operators if needed.

f. The Plant electrical system must be locked out when not in use. See Appendix 8 for Lock-out/Tag-out procedures.

3.3 SGS Plant Start-up Sequence

a. The start-up controls are located on a breaker panel box next to the sorter plant. The panel box will be locked out when not in use. Unlock the panel and move the breaker handle to the on position. Next, ensure that any soil containers (if required) are positioned underneath the clean and contaminated soil diverter conveyors.

b. After the CRT brings the computer on line, the plant operator will be notified to conduct source board checks. Source board checks are performed each day prior to operations to ensure that the detectors are functioning properly. Insert the appropriate source board in the proper direction upon receipt of command from the CRT. The board is in properly when a source located in the board is directly below each of the 15 detectors. The board is removed when the CRT instructs the plant operator to do so. This same procedure is followed for each detector system.

c. When the source board checks are completed, the conveyor belts must be started to perform source/gate response checks and belt timings.

CAUTION

An audio warning signal will be sounded prior to starting any conveyor belt on the plant. This is done to notify all personnel to stand clear of the conveyor belts.

d. Proceed as follows:

1. Inform the CRT that belts are being started.

2. Start Contaminated Soil Conveyor and Stacker.

3. Start Clean Soil Conveyor and Stacker.

4. Start Sorter Belt. Perform a one revolution belt timing test. Notify CRT of results.

5. Inform CRT that source checks will be performed.

6. Conduct source checks by placing an appropriate source for the thin detectors or an appropriate source for the thick detectors on the moving belt ahead of the detector box. Pick up the source from the belt as soon as it clears the detector box on the other side and replace it with a source substitute. Ensure that the substitute is caught by one or more of the segmented gates. Report the results to CRT. The CRT will document the results in the control room log book.

7. A minimum of five sources will be run on each detector array.

8. Inform CRT that the rest of the belts are being started.

9. Start screen plant on CRT's approval.

10. Observe all belts for readiness.

e. Inform loader operator to begin filling the screen plant on CRT's approval.

f. Inform the CRT when soil has reached the sorter belt and when belts are full.

3.4 QA Source Checks and Belt Timings

a. After startup is complete and adjustments have been made, quality assurance source checks and belt timings must be accomplished and again just before ending the daily operations.

b. Source checks will be accomplished at the direction of the CRT. The plant technician will be informed when to conduct source checks on each detector box. Source checks are accomplished in the same manner as in startup.

c. The main SGS conveyor belt must be timed with a stop watch and times for one revolution reported to the CRT.

d. The CTR will record all results of source checks and belt speeds in the control room log book.

3.5 SGS Plant Shutdown

a. Shutdown is an orderly sequence of emptying the screen plant and all conveyors before the equipment is turned off. Emergency or automatic plant shutdown may occur any time the computer determines a problem with equipment or at operator's discretion. Notify the CRT any time the plant is shutdown.

b. Normal Shutdown Sequence

1. Empty surge bin
2. Stop Screen Plant
3. Stop sorter feed conveyor when empty
4. Advise CRT when sorter belts are empty
5. Sorter belts will be stopped by the CRT
6. Stop clean conveyor when empty
7. Stop contaminated soil conveyor when empty
8. Lock out panel

c. Emergency Shutdown Procedures (Use quickest method)

1. Press stop button located beside conveyor
2. Press sorter conveyor stop button on panel
3. Turn main breaker handle off on panel box

4.0 Plant Design Changes and Modifications

Any change or modification to plant design must be approved before implementation. All modification of equipment or structures will be documented by appropriate drawings, calculations, sketches, and diagrams. A "Proposed Engineering/Procedure Change" form must be completed and approved by appropriate TR personnel before implementation.

5.0 Appendices

The following is a list of appendixes that contain operating and procedure requirements that are used in conjunction with these plant operating procedures.

Appendix 1 Gate Timing Procedures
Appendix 2 Daily Startup Checklist
Appendix 3 Detector Efficiency Calculations
Appendix 4 TR SGS Vehicle and Equipment Maintenance
Appendix 5 Site Health and Safety Plan
Appendix 6 Health Physics Operating Procedures
Appendix 7 Quality Assurance and Sampling Procedures
Appendix 8 Lockout/Tagout Procedures
Appendix 9 Segmented Gate System Description
Appendix 10 Hoisting and Rigging and Equipment Demobilization
Appendix 11 Decontamination of the TR Segmented Gate System
Appendix 12 Software Acceptance Test Procedure Outline
Appendix 13 Control Chart Procedures
Appendix 14 Fire Protection and Prevention Program
Appendix 15 Welding, Cutting, and Grinding Program

Attachment 1: Job Hazard Analyses
Attachment 2: Site Specific Documents

Thermo NUtech

Segmented Gate System Operational Procedures Manual

Title: SGS Gate Timing Procedrues

Procedure Number: Appendix 1

Revision Number: 0

Reason for Revision:

Approved: Chuck Wellin
Project Manager, Thermo NUtech
6-2-97
Date

Approved: Scott M Rogers
Assistant Project Manager, Thermo NUtech
6-3-97
Date

Approved: D. C. Johnson
Corporate Quality Assurance/Safety Director, Thermo NUtech
05-29-97
Date

Approved: J. G. Brown
Vice President, Thermo NUtech
6/2/97
Date

GATE TIMING PROCEDURES

1.0 General

a. The segmented gate response time (opening and closing) will be checked during weekly plant inspections and maintenance.

b. The Plant Superintendent will ensure that the gate response time has been inspected, adjusted as required, and documented on the Weekly Segmented Gate Response Checklist.

c. Gate malfunctions or problems observed during the inspection will be brought to the attention of the Site Manager.

CAUTION

Before initiating gate response time test, the CRT must check with the SGS Technicians to ensure that all personnel are clear of the segmented gates.

2.0 Procedures

a. The segmented gates on the SGS will be checked weekly to ensure the gate opening and closing are within the specified tolerance listed below. The test can only be accomplished when the sorter system is in the "Maintenance Mode" as required by the SGS computer.

b. Gate response will be checked by initiating gate test at the SGS computer. Gates 1 through 8 will be opened and closed and the response time will be recorded on the checklist. Gates should complete the open and close cycle in 0.15 and 0.25 seconds respectively.

c. Gates that do not respond in the required time will be adjusted and so recorded on the checklist.

d. Upon completion of the gate inspection and test, record the results on the checklist and submit to the site manager for review and filing.

Thermo NUtech

Segmented Gate System Operational Procedures Manual

Title: Daily SGS Startup Checklist

Procedure Number: Appendix 2

Revision Number: 0

Reason for Revision:

Approved: Cheryl Heller 6-2-97

Project Manager, Thermo NUtech — Date

Approved: Scott M Rogers 6-3-97

Assistant Project Manager, Thermo NUtech — Date

Approved: L. G. Johnson 05-29-97

Corporate Quality Assurance/Safety Director, Thermo NUtech — Date

Approved: J. G. Brown 6/2/97

Vice President, Thermo NUtech — Date

DAILY STARTUP CHECKLIST

NOTE

Prior to operations, coordinate type of material to be processed with Plant Superintendent. Also coordinate the setting of System Parameters with the TR Site Manager to ensure that the desired conditions are met.

1.0 Startup Procedures

a. Ensure that electrical power is on. Ensure that the computer electrical power is operated through an uninterrupted power source (UPS).

b. Verify that the sorter power switch is on.

c. Turn on computer system electrical power supply. Verify that the computer, printer, and monitor are on.

d. From the C:\ prompt, type: CD SGS, Enter. then type: SGS, Enter.

e. Select "Edit" Menu and select Password. If password entry is unsuccessful, repeat password entry. If still unsuccessful, notify the Site Manager.

NOTE

Address select for units 1 and 2 can be accomplished in any menu by entering the number of the unit desired.

f. Select "Utilities" menu. Select STATUS and verify that the system is in PAUSE. If not, place the system in PAUSE.

g. Select the "Edit" menu. Then verify that the System Counting Parameters and Particle Parameters are correctly entered. Choose Print Parameters and record the data on the computer printout log. Do this for units 1 and 2.

h. Verify that all channel parameters, including high voltage, particle efficiency, and distributed efficiency for Channels 1-16 are satisfactory for units 1 and 2 from the printed record. Notify the Site Manager before proceeding if any differences are noted in the System, Particle, or Channel Parameters. Record verification check of parameters in the Control Room Log Book and execute Print Screen.

WARNING

CHECK THAT ALL PERSONNEL ARE CLEAR OF THE SEGMENTED GATES BEFORE PROCEEDING:

i. In the Utilities Menu, place units 1 and 2 in Maintenance. Then execute: Clear Abnormal Status, Synchronize Clock, and Restart from Pause. Verify that the gates go to full divert.

j. In the Maintenance Menu, execute Background Update and count for 15 seconds with source board in for units 1 and 2 to verify that each detector is responding correctly. Execute Print Screen for units 1 and 2. Notify the Site Manager if detectors respond incorrectly and enter information into the log book. At the CRT's discretion, once all detectors indicate proper response, the CRT may conduct a background update with clean material under the detectors. Execute Print Screen for units 1 and 2 and compare the update results with stored background factors. If the difference exceeds 15% in either plus or minus, notify the site manager. Remove the background tray if used.

k. Notify SGS technician to start belts and perform source response checks for units 1 and 2. Have the SGS technician report the belt speed time and results of source checks. Record results in the log book.

l. When the SGS technician is ready to process material, exit Maintenance mode and verify that Units 1 and 2 are in "Normal" and that the printer is printing 20 second summaries. Ensure that the clock is synchronized and record the run start time in the log book.

2.0 Operating Procedures

a. During operations, visually verify:

* Diversion Summary is printed every 20 seconds.
* Diversion Summary has correct time and date.
* No unusual number of mass diverts.
* No continuous divert on the same gate.
* Printout and computer monitor agree.

b. If the SGS technician wishes to stop operations for any routine reason, the material should be emptied from the sorter belt. Place the system in Pause or Maintenance mode as required, and print the Processing Report in the Edit menu. Record the run stop time and reason for stop in the log book. If material was left on the belt, i.e., a gate failure caused belt stoppage, the system will go into Pause automatically.

c. To restart the system from Pause with material on the belt, execute the Clear Abnormal Status, Synchronize Clock, and after the SGS technician has depressed the conveyor start button, execute Restart System From Pause. A 20 second divert should occur.

d. If the Maintenance mode was entered to accomplish any maintenance operation, i.e., background update, execute the Exit Maintenance mode.

e. To restart the system from Pause with an empty belt, Clear Abnormal Status, Synchronize Clock, and execute Restart System From Pause. A 20 second divert should occur.

3.0 Shutdown Procedures

a. Always print the Processing Report from the Edit menu when the system is placed into Pause, Maintenance, or before exiting the SGS system.

b. To exit the system after operations, ensure that the sorter belt is clear of material. Place units 1 and 2 in Pause, and execute Print Screen of the Normal run totals, then execute Print Processing Report from the Edit menu. Choose the Quit menu and execute Yes to exit the SGS program.

c. Copy daily run data from the hard drive "C" to diskette in drive "A" in the control room computer. Log the belt scale reading, stop run time, and run totals in the control room log book.

d. Turn off the computer electrical system power.

Thermo NUtech

Segmented Gate System Operational Procedures Manual

Title: SGS Detector Efficiency Calculations

Procedure Number: Appendix 3

Revision Number: 0

Reason for Revision:

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Project Manager, Thermo NUtech — Date

Approved: Scott M Rogers 6-3-97
Assistant Project Manager, Thermo NUtech — Date

Approved: L. A. Johnson 05-29-97
Corporate Quality Assurance/Safety Director, Thermo NUtech — Date

Approved: J. G. Brown 6/2/97
Vice President, Thermo NUtech — Date

DETECTOR EFFICIENCY CALCULATIONS

NOTE

Procedures listed in the SGS Central Computer Software Manual for detector efficiency calculations will be used in conjunction with calculations listed below.

1.0 Thin Detectors Calculations

a. The SGS operations and software manuals specify procedures for detector efficiency calculations as well as system calibration procedures. Calculations are performed for each detector and the system as a whole. Two separate efficiencies are performed; one for "hot" particles and one for distributed contamination. Calculations are based upon detector response to NIST traceable radioactive standards with an assayed activity rate listed in disintegrations per minute (dpm). These standard sources will be appropriate for the contaminant on interest at the site. For SGS operations at the Maywood Interim Storage Site, thorium-232, radium-226, and uranium-238 will be the standard source used for efficiency calculations. The SGS program contains an automatic efficiency calculation routine which is accessible from the main menu. The routine can perform either distributed or particle efficiencies. Source activity in disintegration's per second (dps) and the type of calculation is entered by the operator. The program will automatically calculate and record counts in the appropriate channel (detector).

b. Particle Efficiency. A point source or tile source may be used, decay corrected to the activity at the present time. The source is placed on the moving belt and then run under each detector at normal operating speed. Several particle efficiencies measurements are taken with the mean efficiency saved. An example of source activity calculation is shown below.

Source dpm/60 Seconds = source strength

135,000/60 = 2,250 dps

c. Procedure for calculating Particle Efficiencies.

1. Start SGS program and enter appropriate password.

2. Enter Maintenance Menu and Select Efficiency.

3. Select Particle Efficiency (F4)

4. Enter calculated source activity (2,250 (dps))

5. Starting with channel 1 (detector 1), place source on moving belt so that it passes directly under detector 1. The computer program will record the counts and automatically calculate the efficiency.

6. Conduct 5 passes directly under the center of detector 1. Wait until the counts have cleared the menu display before making subsequent passes with the source. Average the total of the 5 sets of passes to determine the average efficiency. Enter this number as the stored particle efficiency.

CAUTION!

When using hand held radios, remain at least four feet from computer or COMM FAIL may occur from RF transmissions. NOTE: Should COMM FAIL occur, Escape by pressing ESC, and reenter the Efficiency Menu. Ensure that desired efficiency is selected (F4).

7. After particle efficiency is stored (F3), proceed with channels 2-15 in the same manner as above. Note: Channel 16 is the Background channel and not a detector. Page up or down to move to different detectors.

d. Distributed Efficiency. Distributed efficiencies are calculated for detectors 1-8 only, since only these detectors are used to measure distributed activity. The computer program assumes the contaminated material is uniformly distributed across the belt. Distributed efficiencies are automatically calculated by passing a tile source brick on a moving belt under the detector. The tile sources simulate distributed activity in a simulated soil matrix.

e. Procedures for calculating distributed efficiencies.

1. Start the SGS program as described in Appendix 2 and enter appropriate password.

2. Enter Maintenance Menu and select Efficiency.

3. Select Distributed Efficiency (F4).

4. Enter calculated source activity (Paragraph 2. above) if not already recorded.

5. Select the distributed source tiles used for distributed source activity.

6. Starting with channel 1 (detector 1), place the brick on the moving belt so that it passes directly under the detector. Conduct 5 passes underneath detectors 1 through 8. Average the results of the 5 passes to determine

distributed efficiency and enter the average into the System Counting Parameters by entering the Edit Menu. This average serves as the basis for the distributed determination during actual soil processing. NOTE: Only detectors 1-8 are used for distributed activity measurements. Exit Efficiency Menu.

2.0 Thick Detector Calculations

a. Procedures used to calculate thick detector efficiencies are identical to those used for the thin detectors.

b. Record all efficiencies in the Control room logbook and furnish a copy to the Site Manager for filing. Prepare a new start-up check sheet with new efficiencies annotated. Exit Efficiency Menu.

Thermo NUtech

Segmented Gate System Operational Procedures Manual

Title: TNU SGS Vehicle and Equipment Maintenance

Procedure Number: Appendix 4

Revision Number: 0

Reason for Revision:

Approved: Chuck Hellis — 6-2-97
Project Manager, Thermo NUtech — Date

Approved: Scott M Rogers — 6-3-97
Assistant Project Manager, Thermo NUtech — Date

Approved: L. C. Johnson — 05-29-97
Corporate Quality Assurance/Safety Director, Thermo NUtech — Date

Approved: J. G. Brown — 6/2/97
Vice President, Thermo NUtech — Date

TR SGS VEHICLE AND EQUIPMENT MAINTENANCE

1.0 Vehicle Maintenance

TR SGS vehicles will be maintained in accordance with the vehicle maintenance schedules recommended by the leasing company. On-site routine maintenance includes greasing equipment bearings on both the stationary equipment as well as the front-end loader. It also includes fueling services. No services such as fluid changes or engine maintenance will be performed on-site.

2.0 SGS Maintenance and Inspection

a. SGS equipment including conveyors, belts, electrical components and segmented gates will be inspected before first use daily.

b. Should a discrepancy surface during daily inspection of vehicles and SGS equipment, the SGS technician will notify the TR Site Manager immediately.

c. Discrepancies that affect safety or that will prevent operation of equipment will be brought to the attention of the TR Site Manager immediately.

Thermo NUtech

Segmented Gate System Operational Procedures Manual

Title:	Site Health and Safety Plan
Procedure Number:	Appendix 5
Revision Number:	0
Reason for Revision:	Suggestions from the S&H review at SNL that can apply to any site.

Approved: ______________________________ 08-21-97
Project Manager, Thermo NUtech — Date

Approved: ______________________________ 09-18-97
Assistant Project Manager, Thermo NUtech — Date

Approved: ______________________________ 08-12-97
Corporate Quality Assurance/Safety Director, Thermo NUtech — Date

Approved: ______________________________ 9/22/97
Vice President, Thermo NUtech — Date

Safety and Health

All vendors will operate under the project SSHP and the task Safety and Health Plan (SHP - refer to Volume 4). The following section describes *additional* safety and health considerations (job hazard analyses) which are specific to the vendor's system. Any work that is not specifically covered by the SSHP or the SHP will be coordinated with the Maywood HSO/RSO and will be conducted under an HWP.

SITE HEALTH AND SAFETY PLAN
Maywood Interim Storage Site

1.0 Introduction

This TR Health and Safety Plan (HASP) defines the site specific health and safety requirements for TR employees and TR subcontractors working on the Maywood Interim Storage Site project. It is to be used in conjunction with the TR Health and Safety Manuals, Maywood Interim Storage Site Radiological Protection Procedures Manual (RPPM) and a Maywood Interim Storage Site-approved radiological Work permit (RWP). Where a conflict exists between this HASP and other references, the most stringent requirement consistent with the requirements of the Maywood Interim Storage Site RPPM will apply.

This HASP was developed with consideration given to known contaminants, and potential exposure to unknown substances. Additionally, current health and safety standards contained in the following references have been consulted and will be followed.

* 10 CFR 20, Standards for Protection against Radiation
* Radiological Protection Procedures Manual Maywood Interim Storage Site
* TR Safety Manual, Vol. II, Field Operations
* TR Industrial Hygiene Procedures Manual
* TR Respiratory Protection Program
* OSHA 29 CFR 1910, General Industry Standards
* OSHA 29 CFR 1926, Construction Standards
* ACGIH, Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices
* TR Quality Assurance Program Manual
* 10 CFR 835, Occupational Radiation Protection
* ER RSD Guidance Manual

All changes to this HASP must be made in writing to the document custodian, approved by the SGS project manager, and the revised document distributed to all TR SGS management. This HASP complies with the requirements of 29 CFR 1910.120, however, all requirements of 29 CFR Parts 1910 and 1926 are applicable.

2.0 General

The TR Site Manager is responsible for the overall safety of TR personnel at the TR project. In the absence of the Site Manager, the Plant Superintendent will assume safety responsibilities.

3.0 Site Hazards

a. Soil Processing Operations

1. Particles of radioactive materials are present in soil that will be processed through the SGS and moved by earth moving equipment. Inhalation is the primary path exposure to airborne radioactive materials. If ThermoRetec is responsible for occupational and environmental monitoring, an aggressive airborne hazard monitoring program will be initiated at the site to determine radioactive hazards in the air in accordance with the air monitoring procedures contained in the ThermoRetec Health Physics Operational Procedures Manual. The appropriate area will be bounded, posted and PPE will be utilized for soil processing operations according to the instructions contained in the ThermoRetec Health Physics Operational Procedures Manual if the potential exists for site contamination levels to exceed the levels contained in 10 CFR 835 appendix D or other appropriate regulatory guidance, airborne concentrations of radioactive materials to exceed 10% of the derived air concentrations (DACs), or for chemical contaminants to exceed their respective action levels.

If the client is responsible for occupational and environmental monitoring then all aspects of exposure, access and work controls such as wind speed limitations for operations will be in accordance with the appropriate facility policies and procedures. Air monitoring, posting, access control, work and PPE requirements for radiological and/or chemical constituents at the Maywood Interim Storage Site will be outlined in the **Maywood Interim Storage Site** RWP.

Occupational and environmental monitoring at the **Maywood Interim Storage Site** is a **Maywood Interim Storage Site** responsibility.

2. Soil processing involves dumping soil in a grizzly bin and moving soil on conveyor belts. Falling rock hazards exist at the grizzly and overhead conveyor belts. Conveyor belts may have pinch points and moving parts that although guarded, must be avoided at all times.

Safety glasses, hard hats and steel toe safety shoes are required when processing material through the plant.

b. Noise Protection

All TR personnel will be trained and provided PPE as necessary for hearing protection. The results of noise level surveys will be kept on file.

c. Heat Stress

All personnel will be trained in heat injury and heat related problems before working on site. When ambient temperatures exceed 90° F., heat stress monitoring will be performed by the TR Senior Health Physics Technician. Determinations on work and rest periods will be made according to weather conditions. (TR IH Procedure 3.01)

d. Chemicals and compressed gases.

Acetylene and air cylinders will be used only by authorized personnel and stored/secured appropriately in an upright position. MSDSs will be maintained for all chemicals and cleaning materials stored on site. All site TR personnel will receive Hazardous Communication training in accordance with the ThermoRetec Hazard Communications Program, SP-02.

e. Storage drums and containers

Personnel handling drums and containers will be informed not to lift them by hand and to use only approved lifting devices for this purpose.

f. Pinch Points

The conveyor systems have pinch points that are guarded. The guarding must not be removed, except for maintenance. When removed, the system will be locked out and tagged out.

g. Lockout and Tagout Procedures

Lockout/Tagout procedures will be made available to all site personnel. All personnel will be trained in these procedures (see Appendix 8 of this SOP).

h. Heavy Equipment

Only personnel assigned as heavy equipment operators and other personnel designated by the TR Site Manager will operate heavy equipment. Heavy equipment operators will be properly trained and licensed for the equipment they operate.

i. Site Excavations

Site excavations will not normally be accomplished by SGS technicians. Any site excavation will be coordinated with the **appropriate Maywood Interim Storage Site** official.

4.0 Personnel Training Requirements

a. Prior to performing SGS soil processing operations, technicians will be required to complete the DOE Radiation Worker II Training provided by ThermoRetec, be instructed in the use of personnel protective equipment (PPE) to be used on site, and must have completed the 40 hour OSHA hazardous waste training course and the required yearly 8 hour refresher training.

b. Other training requirements for TR personnel include but are not limited to: Hearing protection, quality assurance, site safety, lifting safety, PPE use, hazardous communication program including use of MSDSs, Lockout/Tagout procedures, heavy equipment for operators and other site specific training requirements.

5.0 Emergency Plan

Maywood Interim Storage Site Site emergency warning signals will be made available to all TR personnel during General Employee Training. In the event of an operational or medical emergency, the TR Site Manager will be notified as soon as possible. If assistance is required, call the telephone number listed below:

FIRE ______
MEDICAL ______
SECURITY ______
Maywood Interim Storage Site Rep. ______

The numbers listed above will be posted in all TR telephone areas.

a. Where ThermoRetec SGS operations result in soil being deposited in an unintended location, ThermoRetec will recovered the soil and survey the area with the appropriate operational instrumentation to ensure that residual contamination is recovered to a level as low as reasonably achievable.

6.0 Medical Surveillance Program

TR personnel may be required to participate in the Maywood Interim Storage Site site bioassay baseline test program before they begin work. Periodic and exit testing may also be required in accordance with site requirements. Maywood Interim Storage Site Thermoluminescent Dosimeters (TLD's), if issued, must be worn at all times while on site. Dosimetry will be stipulated in the Maywood Interim Storage Site RWP.

7.0 Site Control

a. All TR personnel are required to sign in and out of radiologically controlled areas according to the Maywood Interim Storage Site RWP. When departing controlled areas, personnel must follow monitoring procedures for exit as stipulated in the RWP.

b. Personnel will be required to frisk (monitor) hands and feet before entering the TR control van (control room) if it is inside a controlled area and the potential for radiological contamination exists. If contamination is detected, personnel will not enter the control room and shall notify the site radiological control.

8.0 Procedures Review

a. The TR Site Manager is responsible for reviewing the HASP to ensure procedures and requirements are kept up to date.

b. Reference materials listed in paragraph 1 above are maintained by the Site Manager and can be obtained at the administration offices of TR Nuclear Services Group, telephone number 505-254-0955 and/or at the Oak Ridge Project Office, telephone number 423-481-0683.

Thermo NUtech

Segmented Gate System Operational Procedures Manual

Title: Thermo NUtech Health Physics Procedures

Procedure Number: Appendix 6

Revision Number: 0

Reason for Revision:

Approved: ______________________________ 6/2/97
Project Manager, Thermo NUtech — Date

Approved: ______________________________ 6-3-97
Assistant Project Manager, Thermo NUtech — Date

Approved: ______________________________ 05-29-97
Corporate Quality Assurance/Safety Director, Thermo NUtech — Date

Approved: ______________________________ 6/2/97
Vice President, Thermo NUtech — Date

ThermoRetec

HEALTH PHYSICS PROCEDURES

SITE SPECIFIC PROCEDURES
FOR

Maywood Interim Storage Site

ARE CONTAINED IN

THERMORETEC HEALTH PHYSICS

PROCEDURES MANUAL

Thermo NUtech

Segmented Gate System Operational Procedures Manual

Title: Quality Assurance and Sampling Procedures

Procedure Number: Appendix 7

Revision Number: 0

Reason for Revision:

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Project Manager, Thermo NUtech — Date

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Assistant Project Manager, Thermo NUtech — Date

Approved: L. G. Johnson — 05-29-97
Corporate Quality Assurance/Safety Director, Thermo NUtech — Date

Approved: J. G. Brown — 6/2/97
Vice President, Thermo NUtech — Date

QUALITY ASSURANCE AND SAMPLING PROCEDURES

1.0 SOURCE CHECK DETECTOR/ GATE RESPONSE (Hourly)

a. When all of the soil is being diverted to the clean side, a source check is required to ensure that the detectors are operational and functioning properly. When all of the soil is being diverted to the "above criteria" side, a source check is not necessary.

NOTE: Criteria definition is a client determination. ThermoRetec will provide samples from both the above and below criteria outputs for the client. Criteria definition and responsibility for sample analysis will be determined by the client prior to calibration operations.

b. Place the point source, for which the system has been calibrated, ahead of the detector array, pushing the source into the soil layer. Allow the source to pass under both detector boxes. Remove the source, and in its exact former position, place a colored stone. Observe the stone for diversion by the SGS computer. If the stone was not diverted properly, stop operations and notify the Site manager immediately. Determine the cause for the malfunction.

c. If the stone was diverted properly, have the control room technician record the event on the printout and in the SGS daily run log.

2.0 TIME THE SORTER BELT (Hourly)

a. Using a stopwatch, time the sorter belt for one revolution. If the time does not match the established RPM for the proper speed setting within one second, stop operations and notify the Site manager immediately. Determine the cause for the malfunction.

b. If the timing was correct, have the control room technician record the event in the SGS daily run log.

3.0 ENVIRONMENTAL CONDITIONS

a. Record in SGS daily run log the temperatures in any of the detector boxes and control boxes requiring temperature monitoring. Temperatures should be recorded hourly.

b. At system startup up each morning record outside weather conditions and as necessary when the conditions change.

4.0 SAMPLE AND SURVEY THE CLEAN SOIL AND CONTAMINATED SOIL STREAM

a. The sampling method of the soil stream can vary from site to site and based on the purpose of the sample.

b. (Optional) For radiological sampling Festo automatic samplers are set up to transect (pass through the width of soil stream) the soil stream. These automatic air operated samplers can be adjusted to change the frequency of samples. This sampling technique represents an aggregate grab sample. Split samples may be necessary depending on client requirements. Place samples in appropriate containers and follow local procedures for further processing of sample.

5.0 DENSITY MEASUREMENTS

One of the main operating parameters is density recorded in grams/cubic centimeters. Normally, when a client provides a representative sample of the soil to be processed for TR to accomplish the laboratory tests, density of the sample is determined and used initially for calibration of the SGS. Once a client's soil is being processed, density measurements (as is on the belt) are performed using a TR Modified Jigged Method per ASTM Standard D75-87 Standard Practice for Sampling Aggregates (attachment 1). After five measurements have been taken, the TR Site Manager will consult with TR Project Management before changing the density parameter in the computer.

6.0 MOISTURE TESTING

Moisture testing is normally performed by the client since they normally have the proper facility in which to perform moisture testing. If TR had to perform moisture testing, TR prefers to use the method identified by ASTM Standard D4643-93, Determination of Water (Moisture) Content of Soil by the Microwave Oven Method (attachment 2)

Designation: D 75 – 87 (Reapproved 1992)$^{\epsilon 1}$

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American Association State Highway and Transportation Officials Standard
AASHTO No.: T2

Standard Practice for Sampling Aggregates[1]

This standard is issued under the fixed designation D 75; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.

This practice has been approved for use by agencies of the Department of Defense. Consult the DoD Index of Specifications and Standards for the specific year of issue which has been adopted by the Department of Defense.

$^{\epsilon 1}$ NOTE—Editorial changes were made throughout in September 1992.

1. Scope*

1.1 This practice covers sampling of coarse and fine aggregates for the following purposes:

1.1.1 Preliminary investigation of the potential source of supply,

1.1.2 Control of the product at the source of supply,

1.1.3 Control of the operations at the site of use, and

1.1.4 Acceptance or rejection of the materials.

NOTE 1—Sampling plans and acceptance and control tests vary with the type of construction in which the material is used. Attention is directed to Practices E 105 and D 3665.

1.2 The values stated in inch-pound units are to be regarded as the standard.

1.3 *This standard does not purport to address all of the safety problems, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 *ASTM Standards:*

C 702 Practice for Reducing Field Samples of Aggregate to Testing Size[2]

D 2234 Test Method for Collection of a Gross Sample of Coal[3]

D 3665 Practice for Random Sampling of Construction Materials[4]

E 105 Practice for Probability Sampling of Materials[5]

E 122 Practice for Choice of Sample Size to Estimate the Average Quality of a Lot or Process[5]

E 141 Practice for Acceptance of Evidence Based on the Results of Probability Sampling[5]

3. Significance and Use

3.1 Sampling is equally as important as the testing, and the sampler shall use every precaution to obtain samples that will show the nature and condition of the materials which they represent.

3.2 Samples for preliminary investigation tests are obtained by the party responsible for development of the potential source (Note 2). Samples of materials for control of the production at the source or control of the work at the site of use are obtained by the manufacturer, contractor, or other parties responsible for accomplishing the work. Samples for tests to be used in acceptance or rejection decisions by the purchaser are obtained by the purchaser or his authorized representative.

NOTE 2—The preliminary investigation and sampling of potential aggregate sources and types occupies a very important place in determining the availability and suitability of the largest single constituent entering into the construction. It influences the type of construction from the standpoint of economics and governs the necessary material control to ensure durability of the resulting structure, from the aggregate standpoint. This investigation should be done only by a responsible trained and experienced person. For more comprehensive guidance, see the Appendix.

4. Securing Samples

4.1 *General*—Where practicable, samples to be tested for quality shall be obtained from the finished product. Samples from the finished product to be tested for abrasion loss shall not be subject to further crushing or manual reduction in particle size in preparation for the abrasion test unless the size of the finished product is such that it requires further reduction for testing purposes.

4.2 *Inspection*—The material shall be inspected to determine discernible variations. The seller shall provide suitable equipment needed for proper inspection and sampling.

4.3 *Procedure:*

4.3.1 *Sampling from a Flowing Aggregate Stream (Bins or Belt Discharge)*—Select units to be sampled by a random method, such as Practice D 3665, from the production. Obtain at least three approximately equal increments, selected at random from the unit being sampled, and combine to form a field sample whose mass equals or exceeds the minimum recommended in 4.4.2. Take each increment from the entire cross section of the material as it is being

[1] This practice is under the jurisdiction of ASTM Committee D-4 on Road and Paving Materials and is the direct responsibility of Subcommittee D04.30 on Methods of Sampling.

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[2] *Annual Book of ASTM Standards*, Vol 04.02.

[3] *Annual Book of ASTM Standards*, Vol 05.05.

[4] *Annual Book of ASTM Standards*, Vol 04.03.

[5] *Annual Book of ASTM Standards*, Vol 14.02.

* A Summary of Changes section appears at the end of this practice.

discharged. It is usually necessary to have a special device constructed for use at each particular plant. This device consists of a pan of sufficient size to intercept the entire cross section of the discharge stream and hold the required quantity of material without overflowing. A set of rails may be necessary to support the pan as it is passed under the discharge stream. Insofar as is possible, keep bins continuously full or nearly full to reduce segregation.

NOTE 3—Sampling the initial discharge or the final few tons from a bin or conveyor belt increases the chances of obtaining segregated material and should be avoided.

4.3.2 *Sampling from the Conveyor Belt*—Select units to be sampled by a random method, such as Practice D 3665, from the production. Obtain at least three approximately equal increments, selected at random, from the unit being sampled and combine to form a field sample whose mass equals or exceeds the minimum recommended in 4.4.2. Stop the conveyor belt while the sample increments are being obtained. Insert two templates, the shape of which conforms to the shape of the belt in the aggregate stream on the belt, and space them such that the material contained between them will yield an increment of the required weight. Carefully scoop all material between the templates into a suitable container and collect the fines on the belt with a brush and dust pan and add to the container.

4.3.3 *Sampling from Stockpiles or Transportation Units*—Avoid sampling coarse aggregate or mixed coarse and fine aggregate from stockpiles or transportation units whenever possible, particularly when the sampling is done for the purpose of determining aggregate properties that may be dependent upon the grading of the sample. If circumstances make it necessary to obtain samples from a stockpile of coarse aggregate or a stockpile of combined coarse and fine aggregate, design a sampling plan for the specific case under consideration. This approach will allow the sampling agency to use a sampling plan that will give a confidence in results obtained therefrom that is agreed upon by all parties concerned to be acceptable for the particular situation. The sampling plan shall define the number of samples necessary to represent lots and sublots of specific sizes. General principles for sampling from stockpiles are applicable to sampling from trucks, rail cars, barges or other transportation units. For general guidance in sampling from stockpiles, see the Appendix.

4.3.4 *Sampling from Roadway (Bases and Subbases)*—Sample units selected by a random method, such as Practice D 3665, from the construction. Obtain at least three approximately equal increments, selected at random from the unit being sampled, and combine to form a field sample whose mass equals or exceeds the minimum recommended in 4.4.2. Take all increments from the roadway for the full depth of the material, taking care to exclude any underlying material. Clearly mark the specific areas from which each increment is to be removed; a metal template placed over the area is a definite aid in securing approximately equal increment weights.

4.4 *Number and Masses of Field Samples:*

TABLE 1 Size of Samples

Maximum Nominal Size of Aggregates[A]	Approximate Minimum Mass of Field Samples, lb (kg)[B]
Fine Aggregate	
No. 8 (2.36 mm)	25 (10)
No. 4 (4.75 mm)	25 (10)
Coarse Aggregate	
⅜ in. (9.5 mm)	25 (10)
½ in. (12.5 mm)	35 (15)
¾ in. (19.0 mm)	55 (25)
1 in. (25.0 mm)	110 (50)
1½ in. (37.5 mm)	165 (75)
2 in. (50 mm)	220 (100)
2½ in. (63 mm)	275 (125)
3 in. (75 mm)	330 (150)
3½ in. (90 mm)	385 (175)

[A] For processed aggregate the nominal maximum size of particles is the largest sieve size listed in the applicable specification, upon which any material is permitted to be retained.

[B] For combined coarse and fine aggregates (for example, base or subbase) minimum weight shall be coarse aggregate minimum plus 25 lb (10 kg).

4.4.1 The number of field samples (obtained by one of the methods described in 4.3) required depends on the criticality of, and variation in, the properties to be measured. Designate each unit from which a field sample is to be obtained prior to sampling. The number of field samples from the production should be sufficient to give the desired confidence in test results.

NOTE 4—Guidance for determining the number of samples required to obtain the desired level of confidence in test results may be found in Test Method D 2234, Practice E 105, Practice E 122, and Practice E 141.

4.4.2 The field sample masses cited are tentative. The masses must be predicated on the type and number of tests to which the material is to be subjected and sufficient material obtained to provide for the proper execution of these tests. Standard acceptance and control tests are covered by ASTM standards and specify the portion of the field sample required for each specific test. Generally speaking, the amounts specified in Table 1 will provide adequate material for routine grading and quality analysis. Extract test portions from the field sample according to Practice C 702 or as required by other applicable test methods.

5. Shipping Samples

5.1 Transport aggregates in bags or other containers so constructed as to preclude loss or contamination of any part of the sample, or damage to the contents from mishandling during shipment.

5.2 Shipping containers for aggregate samples shall have suitable individual identification attached and enclosed so that field reporting, laboratory logging, and test reporting may be facilitated.

6. Keywords

6.1 aggregates, exploration of potential sources; aggregates, number and sizes needed to estimate character; aggregates, sampling

APPENDIXES

(Nonmandatory Information)

X1. SAMPLING AGGREGATE FROM STOCKPILES OR TRANSPORTATION UNITS

X1.1 Scope

X1.1.1 In some situations it is mandatory to sample aggregates that have been stored in stockpiles or loaded into rail cars, barges, or trucks. In such cases the procedure should ensure that segregation does not introduce a serious bias in the results.

X1.2 Sampling from Stockpiles

X1.2.1 In sampling material from stockpiles it is very difficult to ensure unbiased samples, due to the segregation which often occurs when material is stockpiled, with coarser particles rolling to the outside base of the pile. For coarse or mixed coarse and fine aggregate, every effort should be made to enlist the services of power equipment to develop a separate, small sampling pile composed of materials drawn from various levels and locations in the main pile after which several increments may be combined to compose the field sample. If necessary to indicate the degree of variability existing within the main pile, separate samples should be drawn from separate areas of the pile.

X1.2.2 Where power equipment is not available, samples om stockpiles should be made up of at least three increents taken from the top third, at the mid-point, and at the bottom third of the volume of the pile. A board shoved vertically into the pile just above the sampling point aids in preventing further segregation. In sampling stockpiles of fine aggregate the outer layer, which may have become segregated, should be removed and the sample taken from the material beneath. Sampling tubes approximately 1¼-in. (30-mm) min by 6 ft (2-m) min in length may be inserted into the pile at random locations to extract a minimum of five increments of material to form the sample.

X1.3 Sampling from Transportation Units

X1.3.1 In sampling coarse aggregates from railroad cars or barges, effort should be made to enlist the services of power equipment capable of exposing the material at various levels and random locations. Where power equipment is not available, a common procedure requires excavation of three or more trenches across the unit at points that will, from visual appearance, give a reasonable estimate of the characteristics of the load. The trench bottom should be approximately level, at least 1 ft (0.3 m) in width and in depth below the surface. A minimum of three increments from approximately equally spaced points along each trench should be taken by pushing a shovel downward into the material. Coarse aggregate in trucks should be sampled in essentially the same manner as for rail cars or barges, except for adjusting the number of increments according to the size of the truck. For fine aggregate in transportation units, sampling tubes as described in X1.2 may be used to extract an appropriate number of increments to form the sample.

X2. EXPLORATION OF POTENTIAL AGGREGATE SOURCES

X2.1 Scope

X2.1.1 Sampling for evaluation of potential aggregate sources should be performed by a responsible trained and experienced person. Because of the wide variety of conditions under which sampling may have to be done it is not possible to describe detailed procedures applicable to all circumstances. This appendix is intended to provide general guidance and list more comprehensive references.

X2.2 Sampling Stone from Quarries or Ledges

X2.2.1 *Inspection*—The ledge or quarry face should be inspected to determine discernible variations or strata. Differences in color and structure should be recorded.

X2.2.2 *Sampling and Size of Sample*—Separate samples having a mass of at least 50 lb (approximately 25 kg) should be obtained from each discernible stratum. The sample should not include material weathered to such an extent that it is no longer suitable for the purpose intended. One or more pieces in each sample should be at least 6 by 6 by 4 in. (150 by 150 by 100 mm) in size with the bedding plane plainly marked, and this piece should be free of seams or fractures.

X2.2.3 *Record*—In addition to the general information accompanying all samples the following information should accompany samples taken from ledges or quarry faces:

X2.2.3.1 Approximate quantity available. (If quantity is very large this may be recorded as practically unlimited.)

X2.2.3.2 Quantity and character of overburden.

X2.2.3.3 A detailed record showing boundaries and location of material represented by each sample.

NOTE X2.1—A sketch, plan, and elevation, showing the thickness and location of the different layers is recommended for this purpose.

X2.3 Sampling Roadside or Bank Run Sand and Gravel Deposits

X2.3.1 *Inspection*—Potential sources of bank run sand and gravel may include previously worked pits from which there is an exposed face or potential deposits discovered through air-photo interpretation, geophysical exploration, or other types of terrain investigation.

X2.3.2 *Sampling*—Samples should be so chosen from each different stratum in the deposit discernible to the sampler. An estimate of the quantity of the different materials should be made. If the deposit is worked as an open-face bank or pit, samples should be taken by channeling the face ertically, bottom to top, so as to represent the materials proposed for use. Overburdened or disturbed material should not be included in the sample. Test holes should be excavated or drilled at numerous locations in the deposit to determine the quality of the material and the extent of the deposit beyond the exposed face, if any. The number and depth of test holes will depend upon the quantity of the material needed, topography of the area, nature of the deposit, character of the material, and potential value of the material in the deposit. If visual inspection indicates that there is considerable variation in the material, individual samples should be selected from the material in each well defined stratum. Each sample should be thoroughly mixed and quartered if necessary so that the field sample thus obtained will be at least 25 lb (12 kg) for sand and 75 lb (35 kg) if the deposit contains an appreciable amount of coarse aggregate.

X2.3.3 *Record*—In addition to the general information accompanying all samples the following information should accompany samples of bank run sand and gravel:

X2.3.3.1 Location of supply.

X2.3.3.2 Estimate of approximate quantity available.

X2.3.3.3 Quantity and character of overburden.

X2.3.3.4 Length of haul to proposed site of work.

X2.3.3.5 Character of haul (kind of road, maximum grades, etc.)

X2.3.3.6 Details as to extent and location of material represented by each sample.

NOTE X2.2—A sketch of plans and elevations, showing the thickness and location of different layers, is recommended for this purpose.

X3. NUMBER AND SIZE OF INCREMENTS NEEDED TO ESTIMATE CHARACTER OF UNIT SAMPLED

X3.1 Scope

X3.1.1 This appendix presents the rationale used by the responsible committee in the development of this practice.

X3.2 Descriptions of Terms Specific to This Standard

X3.2.1 *field sample*—a quantity of the material to be tested of sufficient size to provide an acceptable estimate of the average quality of a unit.

X3.2.2 *lot*—a sizable isolated quantity of bulk material from a single source, assumed to have been produced by the same process (for example, a day's production or a specific mass or volume).

X3.2.3 *test portion*—a quantity of the material of sufficient size extracted from the larger field sample by a procedure designed to ensure accurate representation of the field sample, and thus of the unit sampled.

X3.2.4 *unit*—a batch or finite subdivision of a lot of bulk material (for example, a truck load or a specific area covered).

X3.3 Test Unit, Size, and Variability

X3.3.1 The unit to be represented by a single field sample should neither be so large as to mask the effects of significant variability within the unit nor be so small as to be affected by the inherent variability between small portions of any bulk material.

X3.3.2 A unit of bulk material composed of graded aggregate or aggregate mixtures might consist of a full truckload. If it were possible, the entire load might be tested; as a practical matter, a field sample is composed of three or more increments chosen at random from the material as it is loaded or unloaded from the truck. Research has shown that such a procedure permits an acceptable estimate to be made of the average gradation that might be measured from 15 or 20 increments from the truck.

X3.3.3 Significant variability with a lot of material, where it might exist, should be indicated by statistical measures, such as the standard deviation between units selected at random from within the lot.

SUMMARY OF CHANGES

This section identifies the location of selected changes to this practice that have been incorporated since the last issue. For the convenience of the user, Committee D-4 has highlighted those changes that may impact the use of this practice. This section may also include descriptions of the changes or reasons for the changes, or both.

(1) Appendix X3 was added.

Designation: D 4643 – 93

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Standard Test Method for Determination of Water (Moisture) Content of Soil by the Microwave Oven Method[1]

This standard is issued under the fixed designation D 4643; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.

This standard has been approved for use by agencies of the Department of Defense. Consult the DoD Index of Specifications and Standards for the specific year of issue which has been adopted by the Department of Defense.

1. Scope

1.1 This test method outlines procedures for determining the water (moisture) content of soils by incrementally drying soil in a microwave oven.

1.2 This test method is not intended as a replacement for Test Method D 2216; but, rather as a supplement when more rapid results are required or desired to expedite other phases of testing. Test Method D 2216 is to be used as the method to compare for accuracy checks and correction.

1.3 When questions of accuracy between this test method and Test Method D 2216 arise, Test Method D 2216 shall be the referee method.

1.4 This test method is applicable for most soil types. For some soils, such as those containing significant amounts of halloysite, mica, montmorillonite, gypsum or other hydrated materials, highly organic soils, or soils in which the pore water contains dissolved solids (such as salt in the case of marine deposits), this test method may not yield reliable water content values.

1.5 The values stated in SI units are to be regarded as the standard.

1.6 *This standard does not purport to address all of the safety problems, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.* See Section 7.

NOTE 1—Notwithstanding statements of precision and bias contained in this standard, the precision of this test method is dependent on the competence of the personnel performing it and the suitability of the equipment and facilities used. Agencies that meet the criteria of Practice D 3740 are generally considered capable of competent and objective testing. Users of this test method are cautioned that compliance with Practice D 3740 does not in itself ensure reliable testing. Reliable testing depends on many factors; Practice D 3740 provides a means of evaluating some of those factors.

2. Referenced Documents

2.1 *ASTM Standards:*

D 653 Terminology Relating to Soil, Rock, and Contained Fluids[2]

D 2216 Test Method for Laboratory Determination of Water (Moisture) Content of Soil and Rock[2]

D 3740 Practice for Minimum Requirements for Agencies Engaged in the Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction[2]

D 4753 Specification for Evaluating, Selecting, and Specifying Balances and Scales for Use in Testing Soil, Rock, and Related Construction Materials[2]

3. Terminology

3.1 *Definitions:*

3.1.1 All definitions are in accordance with Terminology D 653.

3.2 *Descriptions of Terms Specific to this Standard:*

3.2.1 *microwave heating*—a process by which heat is induced within a material due to the interaction between dipolar molecules of the material and an alternating, high frequency electric field. Microwaves are electromagnetic waves with 1 mm to 1 m wavelengths.

3.2.2 *water (moisture) content*—the ratio, expressed as a percentage, of the mass of "pore" or "free" water in a given mass of soil to the mass of the solid particles.

4. Summary of Test Method

4.1 A moist soil specimen is placed in a suitable container and its mass is determined. It is then placed in a microwave oven, subjected to an interval of drying, and removed from the oven and its new mass is determined. This procedure is repeated until the mass becomes nearly constant.

4.2 The difference between the mass of the moist specimen and the dried specimen is used as the mass of water originally contained in the specimen. The water content is determined by dividing the mass of water by the dry mass of soil, multiplied by 100. For a given soil and sample size, the time to achieve a constant dry mass can be noted and used as a minimum drying time for subsequent tests using the same size specimen of the same soil.

5. Significance and Use

5.1 The water content of a soil is used throughout geotechnical engineering practice both in the laboratory and in the field. The use of Test Method D 2216 for water content determination can be time consuming and there are occasions when a more expedient method is desirable. The use of a microwave oven is one such method.

5.2 The principal objection to the use of the microwave oven for water-content determination has been the possi-

[1] This test method is under the jurisdiction of ASTM Committee D-18 on Soil and Rock and is the direct responsibility of Subcommittee D18.08 on Special and Construction Control Tests.

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[2] *Annual Book of ASTM Standards*, Vol 04.08.

bility of overheating the soil, thereby yielding a water content higher than would be determined by Test Method D 2216. While not eliminating this possibility, the incremental drying procedure described in this test method will minimize its effects. Some microwave ovens have settings at less than full power, which can also be used to reduce overheating.

5.3 The behavior of a soil, when subjected to microwave energy, is dependent on its mineralogical compositions, and as a result no one procedure is applicable for all types of soil. Therefore, the procedure recommended in this test method is meant to serve as a guide when using the microwave oven.

5.4 This test method is best suited for minus No. 4 sized material. Larger size particles can be tested; however, care must be taken because of the increased chance of particle shattering.

5.5 The use of this method may not be appropriate when highly accurate results are required, or the test using the data is extremely sensitive to moisture variations.

5.6 Due to the localized high temperatures that the specimen is exposed to in microwave heating, the physical characteristics of the soil may be altered. Degregation of individual particles may occur, along with vaporization or chemical transition. It is therefore recommended that samples used in this test method not be used for other tests subsequent to drying.

6. Apparatus

6.1 *Microwave Oven*—A microwave oven, preferably with a vented chamber, is suitable. The required size and power rating of the oven is dependent on its intended use. Ovens with variable power controls and input power ratings of about 700 W have been found to be adequate for this use. Variable power controls are important and reduce the potential for overheating of the test specimen.

NOTE 2—Microwave ovens equipped with built-in scales and computer controls have been developed for use in drying soils. Their use is compatible with this test method.

6.2 *Balances*, having a capacity of 2000 g or greater and meeting the requirements of Specification D 4753 for a balance of 0.1 g readability.

6.3 *Specimen Containers*—Suitable containers made of a nonmetallic nonabsorbent material, resistant to thermal shock, and not subject to changes in mass or shape when subjected to repeated heating, cooling, or cleaning. Porcelain evaporating dishes and standard borosilicate glass dishes perform satisfactorily. Other containers, such as paper cups or plates, also have been used satisfactorily; however, they may require pre-drying prior to use.

6.4 *Container Handling Apparatus*—A glove or holder, suitable for removing hot containers from the oven.

6.5 *Desiccator*—A desiccator cabinet or jar of suitable size containing silica gel, anhydrous calcium phosphate, or equivalent. It is preferable to use a desiccant that changes color to indicate that it needs reconstitution.

6.6 *Heat Sink*—A material or liquid placed in the microwave to absorb energy after the moisture has been driven from the test specimen. The heat sink reduces the possibility of overheating the specimen and damage to the oven. Glass beakers filled with water and materials that have a boiling point above water, such as nonflammable oils, have been used successfully. Moistened bricks have also been used.

6.7 *Stirring Tools*—Spatulas, putty knives, and glass rods for cutting and stirring the test specimen before and during the test. Short lengths of glass rods have been found useful for stirring and may be left in the specimen container during testing, reducing the possibility of specimen loss due to adhesion to the stirring tool.

7. Hazards

7.1 Handle hot containers with a container holder. Some soil types can retain considerable heat, and serious burns could result from improper handling.

7.2 Suitable eye protection is recommended due to the possibility of particle shattering during the heating, mixing, or mass determinations.

7.3 Safety precautions supplied by the manufacturer of the microwave should be observed. Particular attention should be paid to keeping the door sealing gasket and door interlocks clean and in good working condition.

NOTE 3—The use of a microwave oven for the drying of soils may be considered abusive by the manufacturers and constitute voiding of warranties. Microwave drying of soils containing metallic materials may cause arcing in the oven. Highly organic soils and soils containing oils and coal may ignite and burn during microwave drying. Continued operation of the oven after the soil has reached constant weight may also cause damage or premature failure of the microwave oven.

NOTE 4—When first introduced, microwave ovens were reported to affect heart pacemakers, primarily because of the operating frequencies of the two devices. Since that time, pacemakers have been redesigned, and the microwave oven is not regarded as the health hazard it once was. However, it may be advisable to post warnings that a microwave is in use.

7.4 Highly organic soils and soils containing oil or other contaminates may ignite into flames during microwave drying. Means for smothering flames to prevent operator injury or oven damage should be available during testing. Fumes given off from contaminated soils or wastes may be toxic, and the oven should be vented accordingly.

7.5 Due to the possibility of steam explosions, or thermal stress shattering porous or brittle aggregates, a covering over the sample container may be appropriate to prevent operator injury or oven damage. A cover of heavy paper toweling has been found satisfactory for this purpose. This also prevents scattering of the test sample in the oven during the drying cycle.

7.6 Do not use metallic containers in a microwave oven because arcing and oven damage may result.

7.7 Observe manufacturer's operating instructions when installing and using the oven.

7.8 The placement of the test specimen directly on the glass liner tray provided with some ovens is strongly discouraged. The concentrated heating of the specimen may result in the glass tray shattering, possibly causing injury to the operator.

8. Samples

8.1 Keep the samples that are stored prior to testing in

TABLE 1 Test Specimen Masses

Sieve Retaining Not More Than About 10 % of Sample	Recommended Mass of Moist Specimen, g
2.0 mm (No. 10)	100 to 200
4.75 mm (No. 4)	300 to 500
19 mm (¾ in.)	500 to 1000

noncorrodible airtight containers at a temperature between approximately 3 and 30°C in an area that prevents direct exposure to sunlight.

8.2 The water content determination should be performed as soon as practical after sampling, especially if potentially corrodible containers (such as steel thin-walled tubes, paint cans, and the like) or unsealed sample bags are used.

9. Test Specimen

9.1 For water contents being determined as part of another ASTM test method, the specimen selection process and techniques specified in that test method should be followed.

9.2 The manner in which the test specimen is selected and its required mass is basically dependent on the purpose (application) of the test, type of material being tested, and the type of sample (specimen from another test, bag, tube, split-barrel, and the like). In all cases, however, a representative portion of the total sample shall be selected. If a thinly layered soil or more than one soil type is encountered, select an average portion or individual portions, or both, and note which portion(s) was tested in the report of the results.

9.2.1 For bulk samples, select the test specimen from the material after it has been mixed thoroughly. The mass of moist material selected shall be in accordance with Table 1.

9.2.2 For small (jar) samples, select a representative portion in accordance with the following procedure:

9.2.2.1 For cohesionless soils, mix thoroughly the material, then select a test specimen having a mass of moist material in accordance with Table 1.

9.2.2.2 For cohesive soils, remove about 3 mm of material from the exposed periphery of the sample and slice the remaining specimen in half (to check if the material is layered), prior to selecting the test specimen. If the soil is layered, see 9.2. The mass of moist material selected should be in accordance with Table 1, if coarse-grained particles are noted. Breaking or cutting of cohesive samples to approximately 6-mm (¼-in.) particles will speed drying and prevent crusting or the overheating of the surface while drying the interior.

9.3 Using a test specimen smaller than the minimum mass indicated previously requires discretion, though it may be adequate for the purpose of the test. A specimen having a mass less than the previously indicated value shall be noted in the report of the results.

NOTE 5—In many cases, when working with a small sample containing a relatively large coarse-grained particle, it is appropriate not to include this particle in the test specimen. If this occurs, it should be noted in the report of the results.

9.4 When results of a water (moisture) content determination by the use of this test method are to be compared to the results of another method, such as Test Method D 2216, a second sample should be obtained during the selection of the sample for this test method. Precautions should be taken to obtain a sample of the same water (moisture) content. The comparison sample should be processed as quickly as possible to avoid moisture losses.

10. Conditioning

10.1 Prepare and process the specimens as quickly as possible to minimize unrecorded moisture loss that will result in erroneous water content determinations.

10.2 Cut or break up the soil into small size aggregations to aid in obtaining more uniform drying of the specimen.

10.3 If the specimens are not to be tested immediately, store them in sealed containers to prevent loss of moisture.

11. Procedure

11.1 Determine the mass of a clean, dry container or dish, and record.

11.2 Place the soil specimen in the container, and immediately determine and record the mass.

11.3 Place the soil and container in a microwave oven with the heat sink and turn the oven on for 3 min. If experience with a particular soil type and specimen size indicates shorter or longer initial drying times can be used without overheating, the initial and subsequent drying times may be adjusted.

NOTE 6—The 3-min initial setting is for a minimum sample mass of 100 g, as indicated in Table 1. Smaller samples are not recommended when using the microwave oven because drying may be too rapid for proper control. When very large samples are needed to represent soil containing large gravel particles, the sample may need to be split into segments and dried separately to obtain the dry mass of the total sample.

NOTE 7—Most ovens have a variable power setting. For the majority of soils tested, a setting of "high" should be satisfactory; however, for some soils such a setting may be too severe. The proper setting can be determined only through the use of and experience with a particular oven for various soil types and sample sizes. The energy output of microwave ovens may decrease with age and usage; therefore, power settings and drying times should be established for each oven.

11.4 After the set time has elapsed, remove the container and soil from the oven, either weigh the specimen immediately, or place in desiccator to cool to allow handling and to prevent damage to the balance. Determine and record the mass.

11.5 With a small spatula or knife or short length of glass rod carefully mix the soil, taking special precaution not to lose any soil.

11.6 Return the container and soil to the oven and reheat in the oven for 1 min.

11.7 Repeat 11.4 through 11.6, until the change between two consecutive mass determinations would have an insignificant effect on the calculated moisture content. A change of 0.1 % or less of the initial wet mass of the soil should be acceptable for most specimens.

11.8 Use the final mass determination in calculating the water content. Obtain this value immediately after the heating cycle, or, if the mass determination is to be delayed, after cooling in dessicator.

11.9 When routine testing of similar soils is contemplated, the drying times and number of cycles may be standardized for each oven. When standardized drying times and cycles are utilized, periodic verification to assure that the results of the final dry mass determination are equivalent to the procedure in 11.7 should be performed.

NOTE 8—Incremental heating, together with stirring, will minimize overheating and localized drying of the soil, thereby yielding results more consistent with results obtained by Test Method D 2216. The recommended time increments have been suitable for most specimens having particles smaller than a No. 4 sieve and with a mass of approximately 200 g; however, they may not be appropriate for all soils and ovens, and adjustment may be necessary.

NOTE 9—Water content specimens should be discarded after testing and not used in any other tests due to particle breakdown, chemical changes or losses, melting, or losses of organic constituents.

12. Calculations

12.1 Calculate the water content of the soil as follows:

$$w = [(\text{mass of water})/(\text{mass of ovendried soil})] \times 100$$

$$w = [(M_1 - M_2)/(M_2 - M_c)] \times 100 = M_w/M_s \times 100$$

where:

w = water content, %.
M_1 = mass of container and moist specimen, g.
M_2 = mass of container and ovendried specimen, g.
M_c = mass of container, g.
M_w = mass of water, g, and
M_s = mass of solid particles, g.

13. Report

13.1 The report (data sheet) shall include the following:

13.1.1 Identification of the sample (material) being tested, by boring number, sample number, test number, and the like.

13.1.2 Water content of the specimen to the nearest 0.1 or 1 %, depending on the purpose of the test.

13.1.3 Indicate if test specimen has a mass less than the minimum indicated in Table 1.

13.1.4 Indicate if test specimen contains more than one soil type (layered, and the like).

13.1.5 Indication of any material (size, amount, and layer or layer sequences) excluded from the test specimen.

13.1.6 Time and setting of initial drying period and subsequent incremental drying periods.

13.1.7 Initial mass of test specimen prior to drying, and the mass after the final incremental drying periods.

13.1.8 Identification of comparison test(s) if performed, and the method of test utilized.

13.1.9 Identification of the microwave oven and the drying settings and cycles used, when standardized drying is utilized.

NOTE 10—Water (moisture) content determinations conducted in accordance with Test Method D 2216 or other methods may be recorded on the same report. This is not a mandatory requirement, but may be convenient when the results of the two methods are to be compared.

14. Precision and Bias

14.1 *Precision*—Studies on microwave drying have indicated single laboratory average precisions, expressed as a percentage moisture content of 0.96 % or less, depending upon the soil type, initial moisture, and specimen size.

14.2 *Bias*—This test method has no bias because the values determined can be defined only in terms of the test method, and there are no accepted reference materials suitable for determining the bias. Studies to determine bias between this test method and Test Method D 2216 using a convection drying oven indicate that the mean difference between the value of water content, expressed as a percentage of mass, when tested by the microwave oven and the convection oven is 0.24 % for micaceous soils (having 5 to 25 % mica particles by mass) and 0.61 % for other soils. The standard deviation of the value of the difference between the water content, expressed as a percentage of mass, by the microwave and convection oven methods is 0.2 % for the micaceous soils and 0.3 % for other soils.

14.3 Subcommittee D18.08 is seeking pertinent data from users of this test method on precision and bias comparisons.

15. Keywords

15.1 microwave; microwave moisture; microwave oven; moisture content; rapid moisture test; water content

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Thermo NUtech

Segmented Gate System Operational Procedures Manual

Title: Lockout/Tagout Procedures

Procedure Number: Appendix 8

Revision Number: 0

Reason for Revision:

Approved: Chuck Hellin — 6-2-97
Project Manager, Thermo NUtech — Date

Approved: Scott M Rogers — 6-3-97
Assistant Project Manager, Thermo NUtech — Date

Approved: L. A. Johnson — 05-29-97
Corporate Quality Assurance/Safety Director, Thermo NUtech — Date

Approved: J. G. Brown — 6/2/97
Vice President, Thermo NUtech — Date

Lockout/Tagout Procedures

1.0 Purpose

The purpose of these procedures are to establish lockout and tagout requirements to be used on the SGS. It is intended that these procedures are to be applied when mechanical or electrical repairs or work are being accomplished on the SGS or other equipment so as to increase personal safety and comply with OSHA requirements.

2.0 Scope

These procedures apply to all TR and TR subcontractor personnel at the site.

3.0 Procedures

Both the supervisor and operator will place locks on equipment that is left unattended. After the lockout procedure is complete, the operator will attempt to energize the equipment to ensure that the equipment is inoperable.

a. General lockout - non-repair

Color coded RED and/or Silver Master locks will be used to lock motor control panels and other sensitive TR equipment at the end of a shift, lunch breaks, and when the equipment or machinery is left unattended.

b. Lockout/Tagout - repair or maintenance

The following steps will be taken when performing maintenance and or repairs where unexpected activation of the circuit or machinery being worked on could put the person performing the maintenance or repair task at risk of injury. Should more than one individual be involved in the same or separate maintenance activity or repair involving the same equipment or electrical source, then each involved person will complete the following:

NOTE

Lockout/Tagout procedures are the responsibility of the person making the repair or performing maintenance, and will be performed prior to beginning the repair or maintenance activity.

1. Notify the Site Manager or Plant Superintendent of the required repair or maintenance activity and that the equipment will be out of service.

2. Select a multi-lock tamper proof safety lockout and a single individually keyed **RED** lock. Install the safety lock out and **RED** lock on the equipment or electrical source being worked on.

3. Tag the equipment or electrical source with a lockout tag, filling in time and date of lockout and name of individual locking and maintaining the key.

4. Make appropriate entry into lockout register.

5. Completion of repair or maintenance activities, remove the lock and lockout tag and make appropriate entry into the lockout register. Notify the supervisor that the activity is completed.

WARNING

The person performing the repair or maintenance activity will maintain possession of the RED lock key until the procedure has been performed and the lockout tag has been removed. A violation of these procedures may result in disciplinary actions and/or may result in employment termination.

Thermo NUtech

Segmented Gate System Operational Procedures Manual

Title: Segmented Gate System Description

Procedure Number: Appendix 9

Revision Number: 0

Reason for Revision:

Approved:	Chuck Hellin Project Manager, Thermo NUtech	6/2/97 Date
Approved:	Scott M Rogers Assistant Project Manager, Thermo NUtech	6-3-97 Date
Approved:	L. G. Johnson Corporate Quality Assurance/Safety Director, Thermo NUtech	05-29-97 Date
Approved:	J. G. Brown Vice President, Thermo NUtech	6/2/97 Date

ThermoRetec
SEGMENTED GATE SYSTEM DESCRIPTION

1.0 Plant Description

The ThermoRetec Segmented Gate System (SGS) is a system that reduces the volume of radioactive contamination in soil and material. Radionuclides such as ^{137}Cs, ^{60}Co, ^{239}Pu, ^{241}Am, ^{238}U, ^{226}Ra, and ^{232}Th are removed from soil and material in accordance with site release criteria. Significant benefits resulting from use of the SGS compared to soil washing and treatment systems are that chemicals are not added to the feed material and the SGS does not generate a secondary waste stream. Additionally, the SGS provides a 100% assay of all material processed.

The SGS is a combination of sophisticated conveyor systems, computer operated radiation detectors and segmented gates that precisely remove contamination from feed material moving on a conveyor belt. The system works by conveying radioactive contaminated soil or material under arrays of sensitive radiation detectors. Material on the conveyor belt is 100% assayed and radioactivity content is logged by computer. Contamination is diverted by segmented gates to a conveyor belt which deposits it in a container for disposal. The SGS removes a minimum amount of "clean" soil with the radioactive contamination, significantly reducing the overall amount of material that requires disposal. The plant can be operated outdoors on any level surface and the throughput is 28 yd^3/hour for a single line SGS processing a 2 inch thick layer of soil.

2.0 Mechanical Systems Description

The mobile SGS plant includes belt conveyors for material feed, screening, and separating contamination from the feed material. Contaminated feed material is conveyed to a feed hopper via a screen plant and hammermill process. It is then moved by conveyor to the SGS sorting conveyor belt. A screed spreads the material across the conveyor belt to a specified depth and width, and then it is moved underneath the detectors which are linked to a control computer. The computer, based on count rates from the detectors, operates eight pneumatic diversion gates located at the end of the sorting conveyor. Contaminated material diverted by the gates is moved by a conveyor and placed into storage containers. The material assayed as below site release criteria is routed by a stacking conveyor to a storage pile.

The SGS is controlled by the Site Manager through the use of computers housed in a mobile van (control room) that is located adjacent to the plant. Up to three Plant Technicians are required to operate the conveyor belt systems and soil processing activities. Radiation worker safety support may be provided by an on-site Senior Health Physics Technician.

3.0 Electronics Description

3.1 Radiation Detectors

Two gamma radiation detector arrays are housed in shielded enclosures that can be adjusted vertically above the assay conveyor, allowing for various feed material thickness. The detector arrays can be operated simultaneously and each are designed to accommodate 15 NaI (Tl) detectors. The detectors are arranged in two offset rows of eight and seven and span the entire width of the belt. One array of detectors uses 0.16 inch thick NaI (Tl) crystals, while the other uses 2.0 inch thick NaI (Tl) crystals.

The shield assemblies are provided with penetrations for an air supply and an exit opening for coaxial cables which connect the detectors to the electronics housing. The shielded detector arrays require a "shadow shield" below the conveyor belt which is constructed of steel plate lined with 2.0 inch thick lead brick.

3.2 System Electronics

The electronics housing contains all of the detector interfacing and signal processing electronics for operation of the segmented gates. The housing is provided with penetrations and connection points for temperature control, conditioned 115 VAC power, coaxial cables for the thick and thin detector arrays, computer communications and a communication port for a laptop computer.

The internal electronics housing includes modular detector board (MDB) cards and cages. A 486-66MHz control computer is also mounted inside the electronics housing and provides all the required data processing and communication interfacing. The MDB is a high performance detector interface board which provides detector high voltage, amplifier and signal processing circuitry, and a single channel analyzer. The high voltage and discriminator levels are controlled via a high speed RS-485 computer-to-computer serial communications network. The MDBs mount in MDB card cages which accommodate six assemblies per card cage. Six card cages and 32 MDBs are required to interface with the 15 detectors in each shield assembly and to provide for the two background channels. DC power supplies are provided for ± 5 V and ± 12 V for the control computer and MDBs.

The control computer interfaces with a 486-100MHz remote computer located in an adjacent control room. The remote computer has a local display and keyboard and stores proprietary software on its internal hard drive which can be updated by floppy disk. The remote computer monitors soil processing based on operating parameters supplied by the operator. A menu-select provision is available for entering efficiency data for each detector and information regarding operating conditions. When the plant is operating, the remote computer stores in memory the chronological time of each diversion to the contaminated path, the amount of radioactivity diverted, amount not diverted, and the amount of soil processed. The remote computer saves the image of the most recent hot particle and is able to display that image upon request from the operator. The operating display on the remote computer will show real-time status of the conveyor monitor system and can shut down any conveyor feed belt when abnormal conditions are detected or on operator command.

3.3 System Algorithm

The primary function of the control computer is to count the soil increment under the detector and make "hot" particle and distributed activity determinations using the appropriate mathematical algorithms. Count rate determinations are made directly by the control computer via its on-board counters. The MDBs control the detector high voltage and threshold levels by sending the appropriate messages over the RS-485 communication bus. All data processing including hot particle and distributed determinations are made by the control computer.

The control computer analyzes the detector data using the appropriate algorithms and transmits divert commands to the segmented gates. It tracks contaminated material on the assay conveyor belt and determines when each increment of soil will reach the segmented gates. The computer signals the appropriate gate to activate, catch, and route contaminated material to the proper path.

Counting is performed via a time-slice method. The minimum time interval recognized by the control computer is 50 milliseconds and a time slice is 250 milliseconds. Time slice integration for distributed counts occur every two seconds. The integrated gross counts are divided by two seconds and the background is subtracted to give the net count rate. Each detector's background is subtracted as a percentage of the counts seen in the last update of the background channel. Combined distributed net count rates from all of the detectors are used to make a distributed contamination determination over a number of soil increments in a grid array. In cases of high count rates that qualify as hot particles, the soil increments are marked for diversion. These marked elements are not included in the distributed contamination calculation since they are diverted regardless of the status of the rest of the material on the belt.

3.4 Segmented Gate Control

The segmented gates have magnetically activated limit switches that provide electrical signals when they are fully extended or retracted. The control computer monitors the position of each segmented gate and alarms if a gate is not in the required position for any reason. This alarm will automatically stop the processing conveyor belts.

3.4.1 Hot Particle Activity

All diversions, including hot particle diversions, are made on 2 second boundaries, so all hot particles, regardless of the level of activity, will divert the same amount of soil. Hot particles falling on a 2 second boundary will divert 4 seconds worth of soil.

The microprocessor obtains a net count from each detector at the end of every time-slice and sends it to the control computer. The control computer analyzes of the shape of the activity peak generated by the signal to determine if the count threshold level is exceeded. If the count threshold was exceeded, the microprocessor determines the specific time the increment will reach the segmented gate(s)s and sends a message to actuate the appropriate gate(s). A return signal is sent to the computer to confirm that switch closure occurred. If succeeding increments exceed the count threshold, the selected gates continue to divert soil towards the contaminated pathway until all contaminated elements are diverted. After the last contaminated element has been fully diverted, the microprocessor stops the signal to the gate(s), and they return to their original position.

3.4.2 Distributed Activity

The control computer totals the net counts for each detector in the array during each count-time slice, and tracks the results on an 8 by 10 unit array. The microprocessor attempts to distinguish the higher activity segments and divert them, rather than diverting the segments at the front of a 20 second section, until the activity drops below the threshold activity level. If the net activity in the array exceeds a predetermined threshold count for total dispersed activity per total mass, the control computer sends a signal to the appropriate segmented gate(s) to divert selected high-activity increments of soil from the array. The gate(s) remain retracted until the activity in the units of the array no longer exceed the threshold activity level, at which time the gate(s) are closed by signal from the microprocessor.

3.5 Data Storage

The control computer will record the date, time, activity amount, gates used, and mass of each contaminated soil diversion. This information is tabulated by the control computer in the internal hard disk for data archiving and report generation.

The computer software program calculates the mass of the "clean" material processed based on the volume of contaminated material diverted. The calculation is based on an input value for material density and material thickness on the assay belt at a specified width and speed. Upon command, the control room computer can copy archived data onto floppy disk for use in generation of periodic reports.

Thermo NUtech

Segmented Gate System Operational Procedures Manual

Title: Hoisting and Rigging and Equipment Demobilization

Procedure Number: Appendix 10

Revision Number: 1

Reason for Revision: To incorporate physical changes to the SGS, incorporate updated drawings, and to better define the responsibilities of the contracted crane company.

Approved: Joseph W Kimbell 2/24/99
Project Engineer, Thermo NUtech — Date

Approved: 2-24-99
Corporate Health and Safety Director, Thermo NUtech — Date

Approved: Martin R. Keller 2/24/99
Corporate Quality Assurance, Thermo NUtech — Date

Approved: J. G. Brown 2/24/99
Vice President, Thermo NUtech — Date

HOISTING AND RIGGING AND EQUIPMENT DEMOBILIZATION

1.0 Purpose

The purpose of this procedure is to establish hoisting and rigging and demobilization requirements to be used on the SGS. It is intended that the hoisting and rigging procedures are to be applied when moving the TR Segmented Gate System (SGS) from its carrier to its position of operation, and back onto the carrier.

2.0 Scope

These procedures apply to all TR and TR subcontractor SGS field personnel. They cover the required equipment, specific conditions, special requirements and outline the operational tasks of hoisting and rigging and demobilization of the equipment.

3. 0 Hoisting and Rigging

3.1 Crane Company Requirements

- Four one-inch by 20-foot steel slings or nylon equivalent tagged for a rating of at least 7.5-ton for vertical lifts.
- Six one-inch shackles rated at least 7.5-ton working load limit.
- Two 20-foot nylon slings tagged and rated for minimum of 7500 pounds.
- Crane documentation to include current annual load test, operator and rigger certification, and inspection record.
- In states where there is no state certification for Riggers, the company providing the rigger will certify competency in writing.

3.2 Equipment

- SGS Sorter: 36.29 feet long by ~7 feet wide by 8.34 feet tall - 26,000 lbs.
- 2 Diversion Conveyors - 3 feet by 16 feet - 1,400 lbs. each
- 2 Stacker Conveyors - 3 feet by 32 feet - 4,100 lbs. each

- Screen Plant Belt Cover - 3 feet by 6 feet - 150 lbs.

- Surge Bin Top - odd size - 50 lbs.

- Catwalk ladder/hand rail - odd size - 100 lbs.

- Miscellaneous steel

- Crane: Minimum 35-ton Rough Terrain or Rubber-tired Truck hydraulic boom crane. Typical used is a 50-ton hydraulic.

- Lifting Materials: Nylon and/or steel slings, rope (tag lines only), spreader bar (if required), shackles, etc. of adequate working capacity using minimum safety factors of 5 as detailed on the attached rigging sketches.

NOTE: Orange vests, hard hats, safety glasses, and safety shoes are required for all personnel working on or near cranes and for all personnel working on or near heavy equipment.

3.3 Responsibilities

All persons acting as signalers during crane operations must be identified to the crane operator by the use of one or more of the following: Orange hat or orange gloves, and orange vest.

3.3.1 Person in Charge

The ThermoRetec Site Manager shall be designated as the Person in Charge or (PIC) as defined by the DOE Hoisting and Rigging Manual, and shall be qualified as the Competent Person under OSHA 1926 subpart H, for the lifting operations governed by this procedure. The responsibilities of the person in charge include:

- Verification that all equipment is in proper operating order, and current required periodic inspection and maintenance of the crane and the rigging to be used has been performed and documented.
- Evaluation of operators, riggers, and signalers qualifications and experience.
- Performance of a survey of the site for hazardous or unsafe conditions which could affect the completion of the lifts in a safe manner.
- Conducting a pre-lift brief and documentation of such a brief.

- Selection of an appropriate communication mode (e.g. hand-held radios) between the Operating Engineer, the riggers, and the signalman.
- Ensuring the lifting and handling equipment is properly set up and positioned.
- Ensuring that a signal person(s) is assigned, and identified to the equipment operator.
- Direction of the lifting operation to ensure the job is done safely and efficiently, including oversight of SGS placement.
- Stopping the job when any potentially unsafe condition is recognized.
- Direction of emergency stabilization operations should an accident or injuries occur.
- Coordinating follow-up operations and disposition of packaging materials, cribbing, and other miscellaneous items following the lifting activities.
- Verification that hoisting equipment is rated for the load over its entire load movement.
- Verification of all pre-lift operations on Section 3.4.1.
- Verification of grade materials and subgrade conditions under outriggers and/or wheels.
- Verification that outriggers, when loaded, are sufficiently spaced from underground utilities.

3.3.2 Operating Engineer

The Operating Engineer shall be responsible to:

- Be cognizant of any and all conditions affecting the control and safe movement of a load, and stop the lift if any unsafe conditions arise.
- Be in constant uninterrupted communication with his signalman.
- Halt movement of the load of there is any breakdown in communications with his signalman or riggers.
- Respond to direction from any individual to stop movement of his load.
- Place the load in a secure position in the event of an accident or emergency.
- Provide documentation that he had received thorough training and orientation on the crane he is to operate.

3.3.3 Rigger(s)

The designated rigger(s) shall be responsible to:

- Ensure that lifting equipment such as ropes, chains and slings are kept in safe operating condition prior to each lift.

- Ensure equipment is rigged in accordance with the appropriate rigging sketch.
- Ensure correct distribution of the load prior to each lift.
- Ensure that the applied load rating, safety warning tags, markings or decals are not removed or defaced from the lifting equipment.
- Verify that the rigging such as ropes, chains and slings are not over-loaded in excess of their rated capacity.
- Stop the lift should any unsafe condition arise, if acting as signalman.

3.4 Operations

The PIC shall be responsible for the following lifting operations.

3.4.1 Pre-lift operations

- Verify preparation of the footings for the equipment has been completed to the extent necessary to provide support for all live loads imposed by the equipment.
- Provide clear access to the area where the equipment will be set so that no obstructions shall interfere with swing or travel of the crane.
- Install warning signs and barriers.
- Hold a pre-lift meeting. The meeting must be attended by the Person In Charge, Operating Engineer, signalmen, rigger(s), site Safety and Health operations. During this meeting, the entire Hoisting and Rigging Plan shall be reviewed with emphasis on safety related issues. The meeting shall be held before the start of operations and shall be repeated should any change in operating conditions or operating personnel occur. Any questions regarding Attachment 2 (Drawing SGS-05-H&R001-018) shall be addressed.

3.4.2 Lifting Operations

Mobilize the crane to the transport vehicles (anticipated as two flatbed trucks). The crane position must satisfy the crane reach and radius requirements necessary for the lifts. As work progresses, the crane may be repositioned as required by the PIC. The crane shall be positioned on as solid and level a footing as possible. The use of traffic plate, rail ties or other such members shall be employed if the compressive characteristics of the ground contact point of the crane's outriggers are in question. The maximum weight of each individual lift will not exceed 26,000 lbs. Loads less than 10 tons may be rigged by a rigger meeting the requirements imposed by the state in lieu of rigging plans.

- For each location, ensure that the crane load rating is greater than the load to be lifted, based upon boom length, angle and radius of operation from the load charts particular to the crane in use.
- Perform pre-lift inspection of the critical safety components of the crane, slings, hooks, and other lifting apparatuses.
- Verify crosswinds in the immediate area of the lifts are not excessive. Lifts should not be performed while winds are in excess of 25 miles per hour. Perform the lifts only in safe, favorable weather conditions. Reschedule the lifts if necessary.

3.4.2.1 SGS Sorter

At the direction of the PIC, the following work steps shall be implemented:

- Position the hook of the crane directly above the SGS Sorter, and configure the rigging in accordance with the rigging sketch (Attachment 1).
- Tie a tag line near the end of the SGS Sorter of sufficient length to assist in maneuvering the Sorter to its destination.
- Verify the rigging is configured in accordance with the Rigging Sketch (Attachment 1).
- The designated signalman shall direct the crane operator to take the slack from the rigging, and then to take the load on the crane by closely monitoring the rigging and the impact of the rigging on the lifting lugs.
- Hoist the Sorter to its destination, and allow craftsmen to place it correctly on the designated pedestals or cribbing.

3.4.2.2 Conveyors

- Position the hook of the crane directly above the first Conveyor. Using slings of appropriate length (at least 20 feet long) to maintain at least an angle of 45 degrees between the horizontal and the slings, basket or choke the conveyor, taking care to use softeners and means to protect the structure of the conveyor. As an alternative, a fork-lift may be used to place the conveyor, providing that both the fork-lift and tines are appropriately rated for the load and distance of the load from the end of the tines. The load shall be adequately secured during lifting operations with the forklift.
- The rigger shall verify the slings are placed such that they are secured and protected, and that the center of gravity of the Diversion Conveyor (weight approximately 0.8 ton each) or Stacker Conveyor (weight approximately 2 tons) is properly oriented for the lift.

- The designated signalman shall direct the crane operator to take the slack from the rigging, and place the first Conveyor in its proper location, as directed by the Site Supervisor.
- Repeat the procedure for the second Diversion Conveyor and/or Stacker Conveyor.

4.0 Demobilization

Demobilization of the SGS involves disassembly and return of the unit to the carriers. After soil processing and the internal decontamination processes in Appendix 11 have been completed:

- Hoist the lids of the detector boxes using the certified jib hoist and set on a secure area on the SGS while the 30 gamma detectors are removed and packed for shipment. The detectors will not need to be scanned since the detector box is continuously under positive pressure.
- Disconnect the Control Van's electrical power and data link to the SGS so that the van can be removed for servicing and/or packing.
- Remove the electrical feeds when there is no more need of power tools or the air compressor

The previous steps are usually conducted a day prior to the following steps.

- Prepare the long brown stackers for loading by removing the supports and axles using a front-end loader, forklift or crane.
- Remove the side panels of the short diversion conveyors to gain access to unbolt the internal rubber skirting.
- Pull the conveyors from under the SGS using available heavy equipment or the crane.
- Unbolt the top of the surge bin and remove it using the crane whip line.
- Unbolt the cover of the top conveyor of the screen plant and place the whip line and slings through the lifting handles.
- Hold the SGS catwalk in place using the crane whip line, the jib hoist, or a forklift and remove the two support legs. Lower the catwalk to a vertical position for transportation. This must be done prior to lifting the SGS.
- Pick up and remove the jib hoist from its holder using the crane whip and place on the flatbed.
- Lift and load the SGS onto the flatbed using the steps listed in 3.4.2.1 above.
- Place the Stacker Conveyors on wood blocks to keep the load off of the rollers. Position the stackers outside the trailer so miscellaneous items can

be stacked between them for transport. Position the stackers forward on the trailer towards the cab.

- Place the two diversion conveyors on the rear of the trailer.
- Hook the transport truck to the screen plant and pull it to the access control line. Radiological contamination scans and/or decontamination (if chemical contamination is likely) will be performed on all tires and surfaces that were in contact with the ground.

NOTE: All isolations of electrical and hydraulic sources shall be verified prior to the initiation of removal activities.

5.0 Special Requirements

- The crane lifting hook shall be equipped with a self-locking safety latch (mouse) to bridge the throat opening to prevent the release of lines, slings or chains under service or slack conditions.
- During lifting operations, the PIC shall be stationed in the area with a full view of crane movements.
- The required safe clearance from the electrical transmission lines shall be maintained throughout the rigging and hoisting operations. The distances are contained in the table below.

Line Rating	**Minimum Clearance**	**Clearance in Transit** • **Boom Lowered** • **No Load**
≤ 50kV	10 feet	4 feet
> 50 kV ≤ 345 kV	• 10′ + 0.4″ /kV over 50 kV, or • 2 times the line insulator length • never less than 10 feet	10 feet
> 345 kV	Same as for 50 to 345 kV	16 feet

- Tag lines shall be used except when the lift swing may bring a load in the proximity of live electrical transmission lines.
- Personnel shall not be permitted in the area immediately under a suspended load.
- Each sling in use shall have an identification tag attached indicating the rated load capacity.

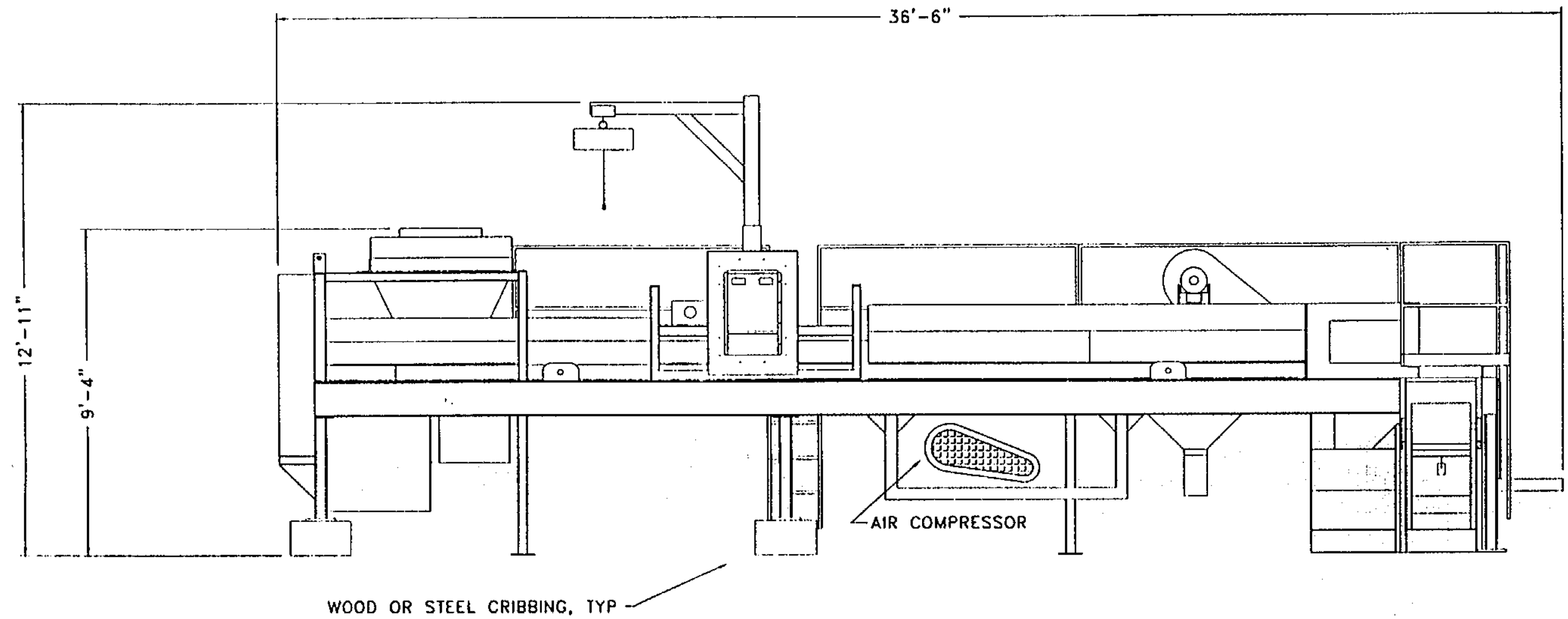
6.0 Documentation

Upon completion of these tasks, the PIC shall provide a copy of the following documents to the client representative.

- Crane Inspection Certification
- Operating Engineer and rigger(s) qualifications
- Minutes of pre-lift meeting
- Record of any special observations during lift operations

REVISIONS				
ZONE	REV	DESCRIPTION	DATE	APPROVED
	1	CY98 MODIFICATIONS, CATWALK EXTENSION, AIR COMPRESSOR	FEB-99	J. KIMBRELL

Attachment 1



ASSEMBLY ELEVATION OF SGS SORTER
DIMENSIONS ARE APPROXIMATE – DO NOT SCALE

UNLESS OTHERWISE SPECIFIED:
DIMENSIONS ARE IN INCHES
TOLERANCES
INCHES XX" Ω 1/16"
ANGULAR Ω 0.5o
DO NOT SCALE DRAWING

Thermo NUtech
A THERMO Retec Company

ASSEMBLY/HOISTING & RIGGING

DRAWN	MJD	DATE 04-97
CHECKED		
DESIGN		

SIZE	FSCM NO.	DWG NO.	REV
B		SGS-05-H&RP01.0	

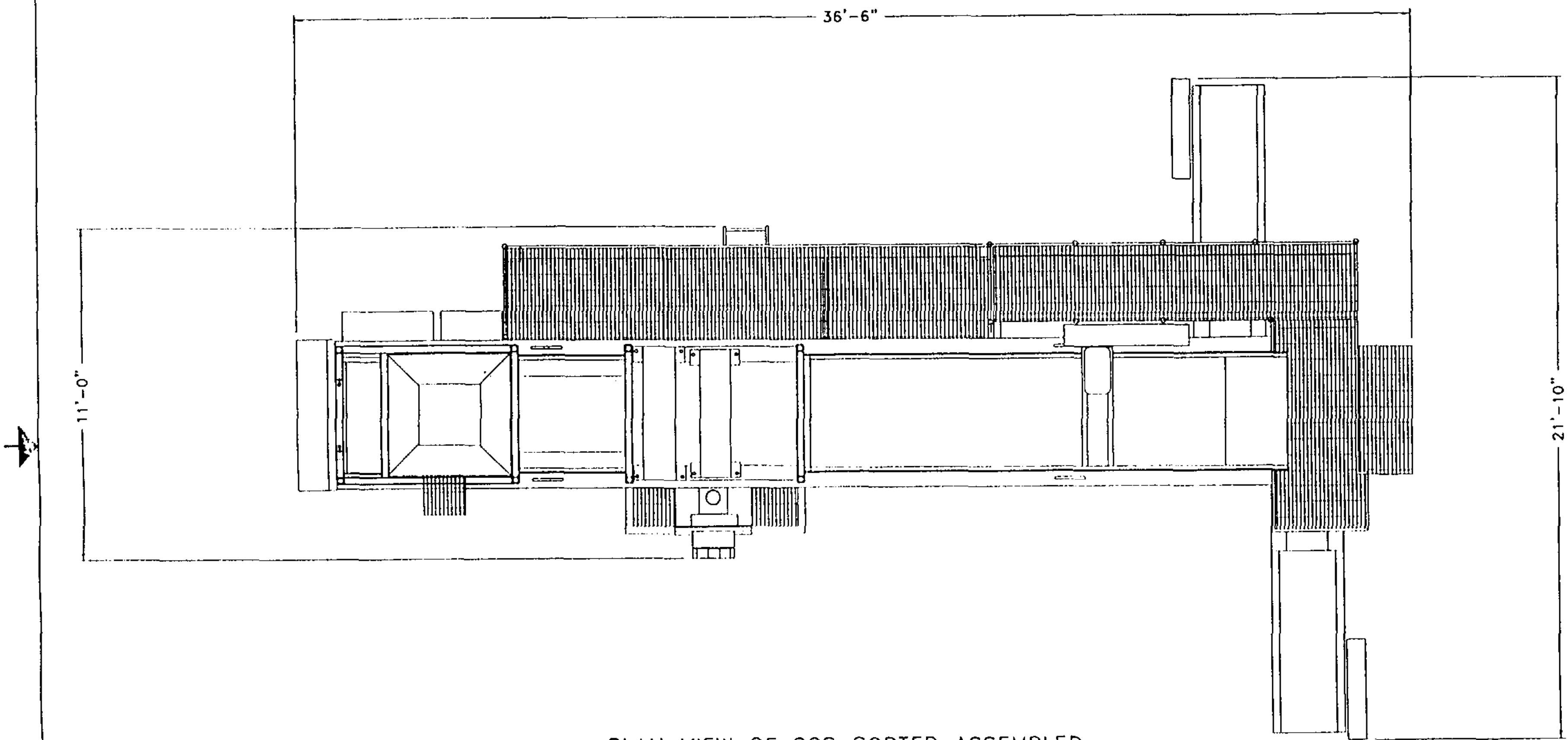
SCALE: NONE | SGS DWGS | SHEET 1

Appendix 10 (TNU SGS Operating Procedures)

Attachment 1

Appendix 10 (TNU SGS Operating Procedures)

REVISIONS				
ZONE	REV	DESCRIPTION	DATE	APPROVED
	1	CY98 MODIFICATIONS, CATWALK EXTENSION, AIR COMPRESSOR	FEB-99	J. KIMBRELL

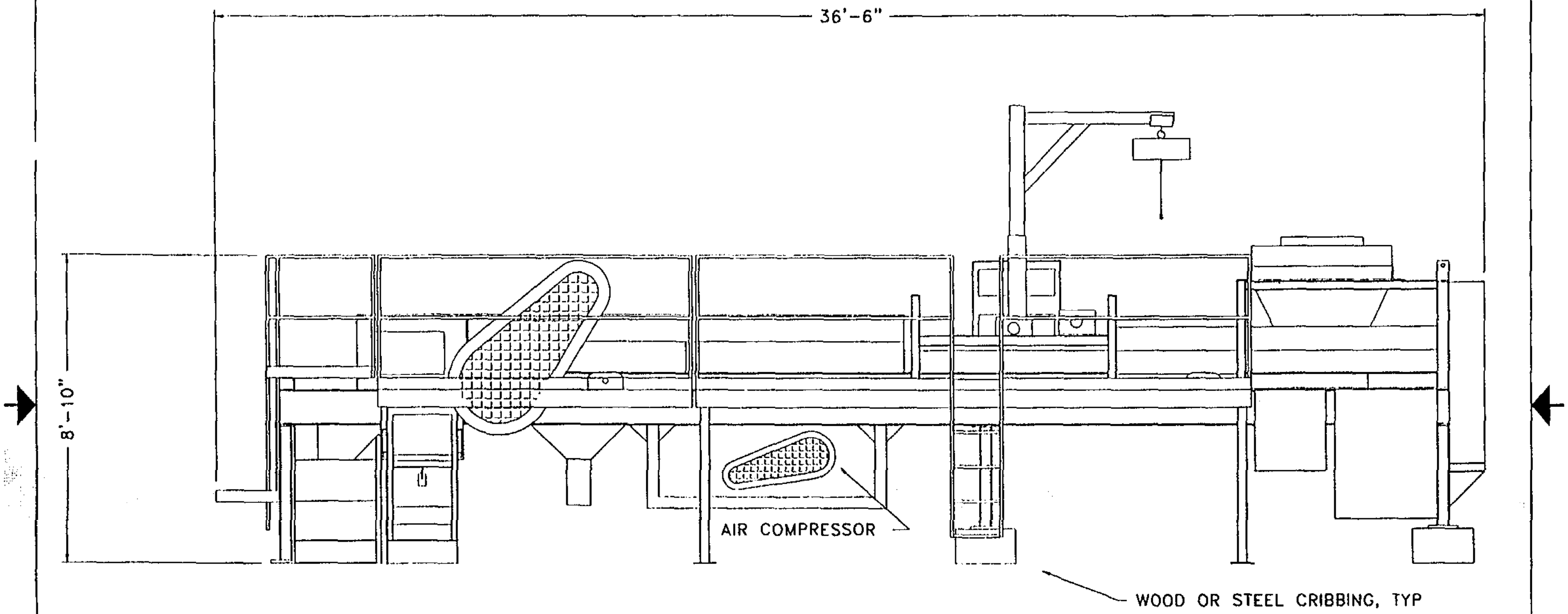


PLAN VIEW OF SGS SORTER ASSEMBLED
DIMENSIONS ARE APPROXIMATE - DO NOT SCALE

UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES TOLERANCES INCHES XX" Ω 1/16" ANGULAR Ω 0.5o DO NOT SCALE DRAWING	Thermo NUtech A THERMO Retec Company
DRAWN MJD — DATE 04-97	ASSEMBLY/HOISTING & RIGGING
CHECKED	SIZE B — FSCM NO. — DWG NO. SGS-05-H&RP01.0 — REV
DESIGN	SCALE: NONE — SGS DWGS — SHEET 2

REVISIONS

ZONE	REV	DESCRIPTION	DATE	APPROVED
	1	CY98 MODIFICATIONS, CATWALK EXTENSION, AIR COMPRESSOR	FEB-99	J. KIMBRELL



ASSEMBLY ELEVATION OF SGS SORTER
DIMENSIONS ARE APPROXIMATE – DO NOT SCALE

UNLESS OTHERWISE SPECIFIED:
DIMENSIONS ARE IN INCHES
TOLERANCES
INCHES XX" Ω 1/16"
ANGULAR Ω 0.5o

DO NOT SCALE DRAWING

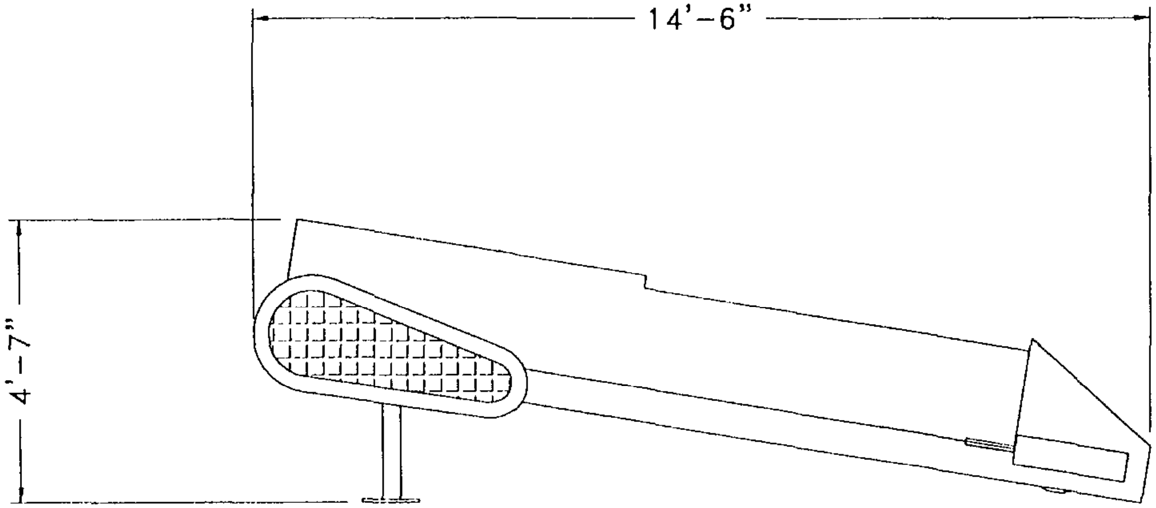
DRAWN MJD	DATE 04-97
CHECKED	
DESIGN	

Thermo NUtech
A THERMO Retec Company

ASSEMBLY/HOISTING & RIGGING

SIZE	FSCM NO.	DWG NO.	REV
B		SGS-05-H&RP01.0	
SCALE: NONE	SGS DWGS	SHEET 3	

REVISIONS				
ZONE	REV	DESCRIPTION	DATE	APPROVED
	1	CY98 MODIFICATIONS, CATWALK EXTENSION, AIR COMPRESSOR	FEB-99	J. KIMBRELL

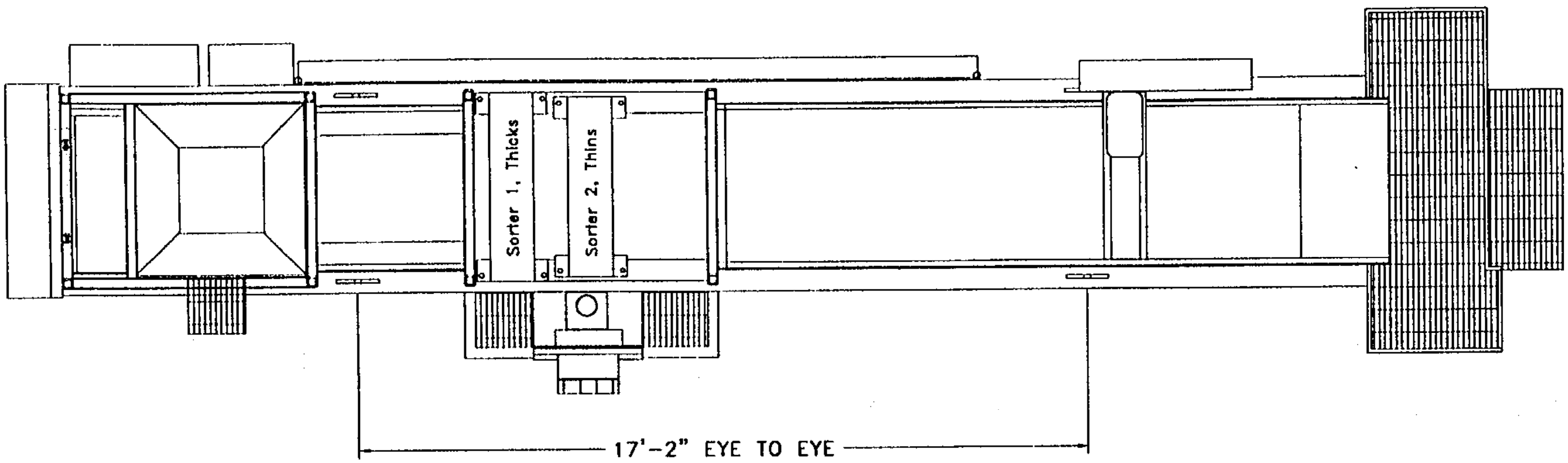


ELEVATION OF SGS DIVERSION CONVEYOR

DIMENSIONS ARE APPROXIMATE – DO NOT SCALE

UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES TOLERANCES INCHES XX" Ω 1/16" ANGULAR Ω 0.5o DO NOT SCALE DRAWING		Thermo NUtech A THERMO Retec Company	
DRAWN MJD	DATE 04-97	ASSEMBLY/HOISTING & RIGGING	
CHECKED		SIZE B / FSCM NO. / DWG NO. SGS-05-H&RP01.0	REV
DESIGN		SCALE: NONE / SGS DWGS	SHEET 4

REVISIONS				
ZONE	REV	DESCRIPTION	DATE	APPROVED
	1	CY98 MODIFICATIONS, CATWALK EXTENSION, AIR COMPRESSOR	FEB-99	J. KIMBRELL



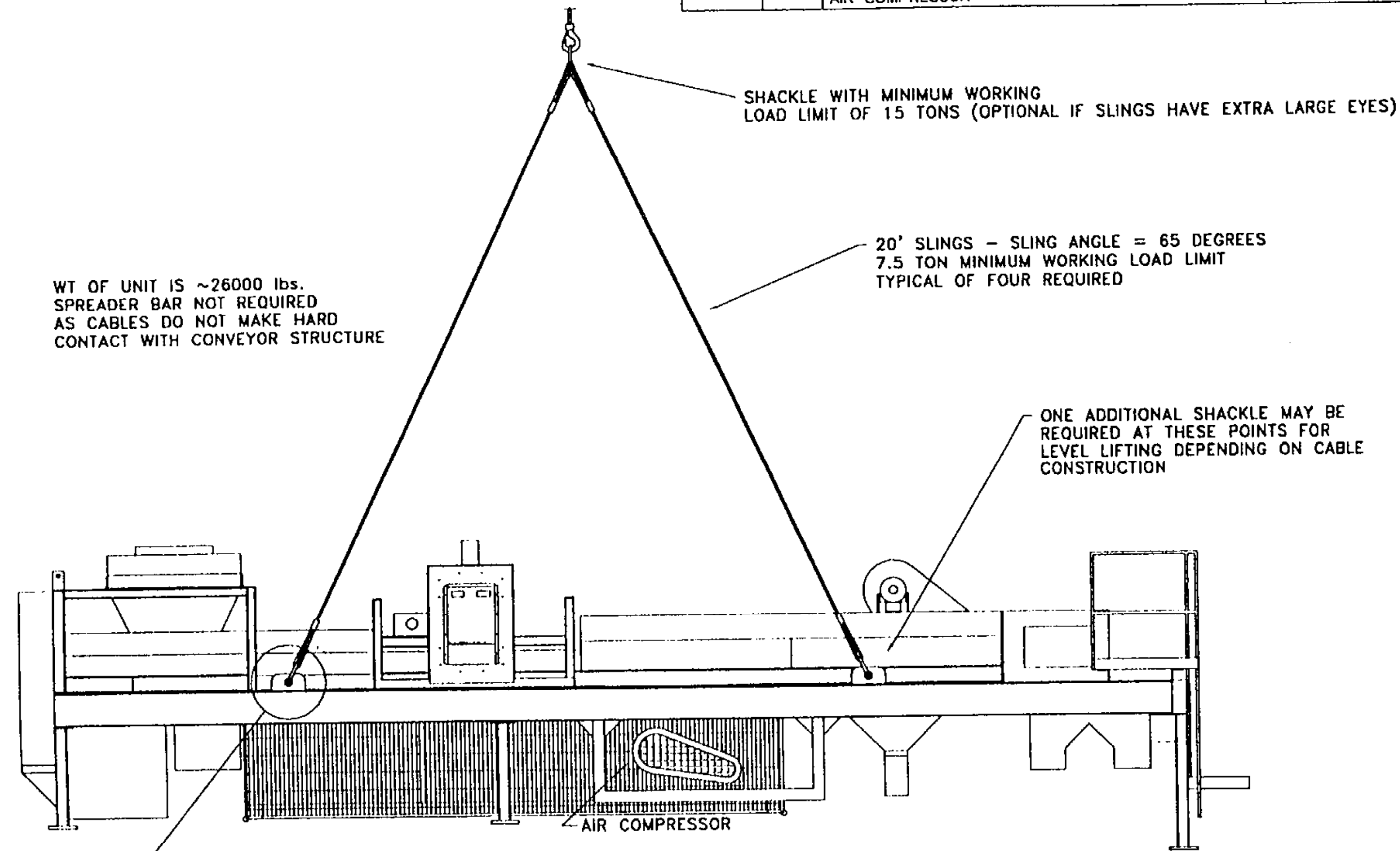
PLAN VIEW OF SGS SORTER
DIMENSIONS ARE APPROXIMATE – DO NOT SCALE

Shipping Configuration, Catwalks down

UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES TOLERANCES INCHES XX" Ω 1/16" ANGULAR Ω 0.5a DO NOT SCALE DRAWING		Thermo NUtech A THERMO Retec Company
DRAWN MJD	DATE 04-97	ASSEMBLY/HOISTING & RIGGING
CHECKED		SIZE B; FSCM NO.; DWG NO. SGS-05-H&RP01.0; REV
DESIGN		SCALE: NONE; SGS DWGS; SHEET 7

Attachment 1

REVISIONS				
ZONE	REV	DESCRIPTION	DATE	APPROVED
	1	CY98 MODIFICATIONS, CATWALK EXTENSION, AIR COMPRESSOR	FEB-99	J. KIMBRELL



ELEVATION OF SGS SORTER
DIMENSIONS ARE APPROXIMATE - DO NOT SCALE

UNLESS OTHERWISE SPECIFIED:
DIMENSIONS ARE IN INCHES
TOLERANCES
INCHES XX" Ω 1/16" ANGULAR Ω 0.5Ω

DO NOT SCALE DRAWING

DRAWN MJD	DATE 04-97
CHECKED	
DESIGN	

Thermo NUtech
A THERMO Retec Company

ASSEMBLY/HOISTING & RIGGING

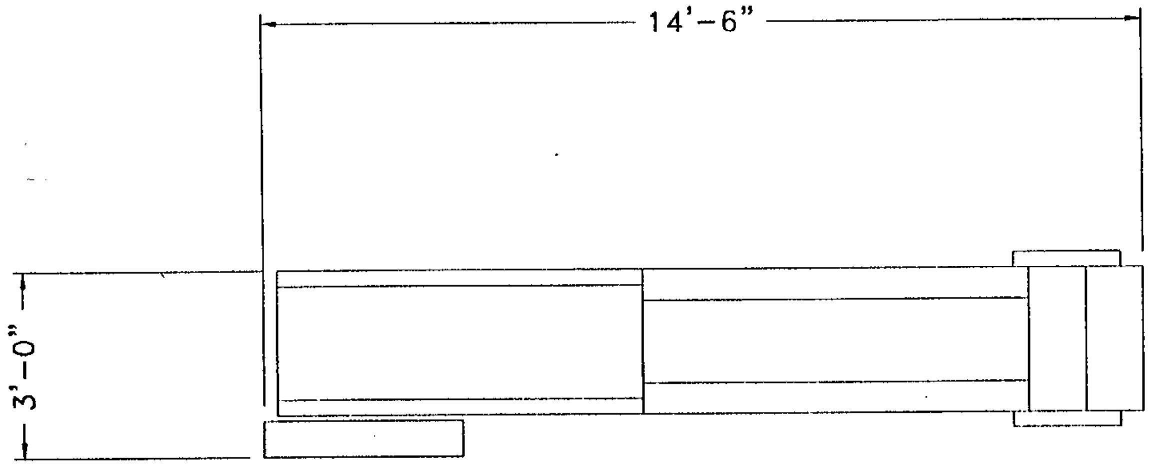
SIZE	FSCM NO.	DWG NO.	REV
B		SGS-05-H&RP01.0	

SCALE: NONE | SGS DWGS | SHEET 6

Appendix 10 (TNU SGS Operating Procedures)

REVISIONS

ZONE	REV	DESCRIPTION	DATE	APPROVED
	1	CY98 MODIFICATIONS, CATWALK EXTENSION, AIR COMPRESSOR	FEB-99	J. KIMBRELL



PLAN VIEW OF SGS DIVERSION CONVEYOR
DIMENSIONS ARE APPROXIMATE – DO NOT SCALE

UNLESS OTHERWISE SPECIFIED:
DIMENSIONS ARE IN INCHES
TOLERANCES
INCHES XX" Ω 1/16" ANGULAR Ω 0.5o

DO NOT SCALE DRAWING

DRAWN MJD	DATE 04-97
CHECKED	
DESIGN	

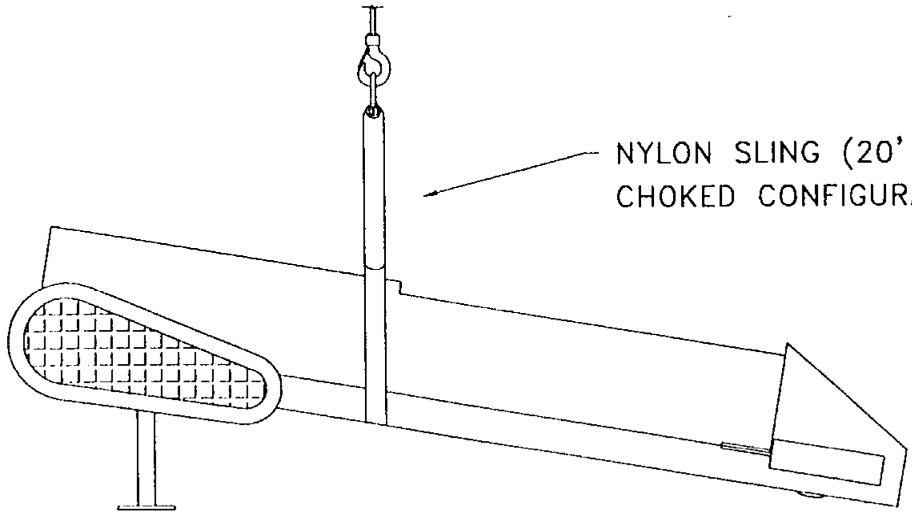
Thermo NUtech
A THERMO Retec Company

ASSEMBLY/HOISTING & RIGGING

SIZE	FSCM NO.	DWG NO.	REV
B		SGS-05-H&RP01.0	

SCALE: NONE	SGS DWGS	SHEET 5

REVISIONS				
ZONE	REV	DESCRIPTION	DATE	APPROVED
	1	CY98 MODIFICATIONS, CATWALK EXTENSION, AIR COMPRESSOR	FEB-99	J. KIMBRELL



WT OF UNIT IS ~1600 lbs.

ELEVATION OF SGS DIVERSION CONVEYOR

DIMENSIONS ARE APPROXIMATE – DO NOT SCALE

UNLESS OTHERWISE SPECIFIED:
DIMENSIONS ARE IN INCHES
TOLERANCES
INCHES XX" Ω 1/16"   ANGULAR Ω 0.5o

DO NOT SCALE DRAWING

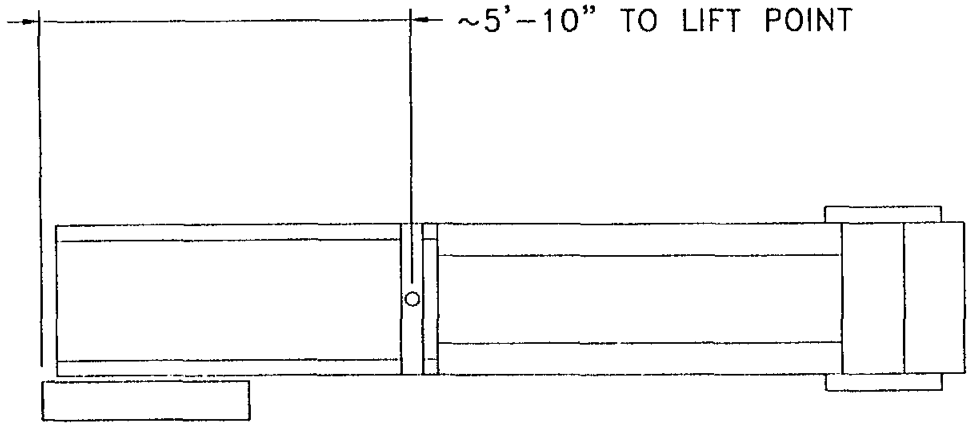
DRAWN MJD	DATE 04-97
CHECKED	
DESIGN	

Thermo NUtech
A THERMO Retec Company

ASSEMBLY/HOISTING & RIGGING

SIZE	FSCM NO.	DWG NO.	REV
B		SGS-05-H&RP01.0	
SCALE: NONE	SGS DWGS	SHEET 8	

REVISIONS				
ZONE	REV	DESCRIPTION	DATE	APPROVED
	1	CY98 MODIFICATIONS, CATWALK EXTENSION, AIR COMPRESSOR	FEB-99	J. KIMBRELL

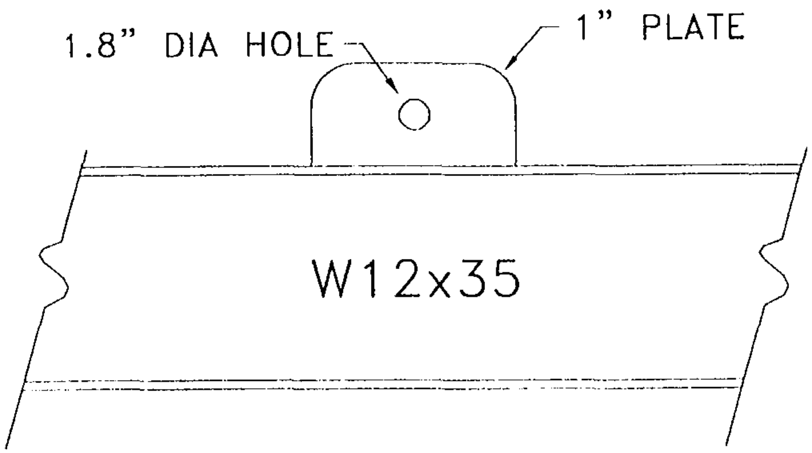


WT OF UNIT IS ~1600 lbs.

PLAN VIEW OF SGS DIVERSION CONVEYOR
DIMENSIONS ARE APPROXIMATE – DO NOT SCALE

UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES TOLERANCES INCHES XX" Ω 1/16" ANGULAR Ω 0.5o DO NOT SCALE DRAWING		Thermo NUtech A THERMO Retec Company			
DRAWN MJD	DATE 04-97	ASSEMBLY/HOISTING & RIGGING			
CHECKED		SIZE B	FSCM NO.	DWG NO. SGS-05-H&RP01.0	REV
DESIGN		SCALE: NONE	SGS DWGS	SHEET 9	

REVISIONS				
ZONE	REV	DESCRIPTION	DATE	APPROVED
	1	CY98 MODIFICATIONS, CATWALK EXTENSION, AIR COMPRESSOR	FEB-99	J. KIMBRELL

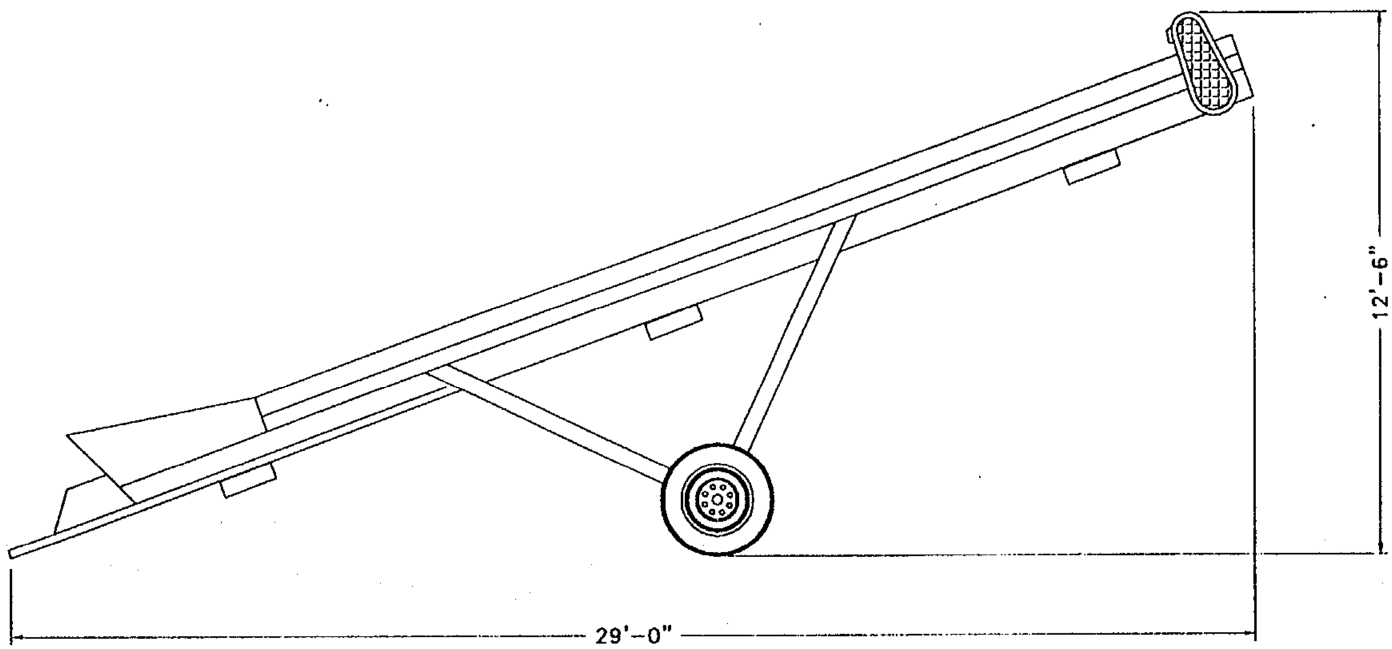


DETAIL OF SGS LIFTING EYE

NO SCALE

UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES TOLERANCES INCHES XX" Ω 1/16" ANGULAR Ω 0.5o DO NOT SCALE DRAWING		Thermo NUtech A THERMO Retec Company	
DRAWN MJD	DATE 04-97	ASSEMBLY/HOISTING & RIGGING	
CHECKED		SIZE B FSCM NO. DWG NO. SGS-05-H&RP01.0	REV
DESIGN		SCALE: NONE SGS DWGS	SHEET 10

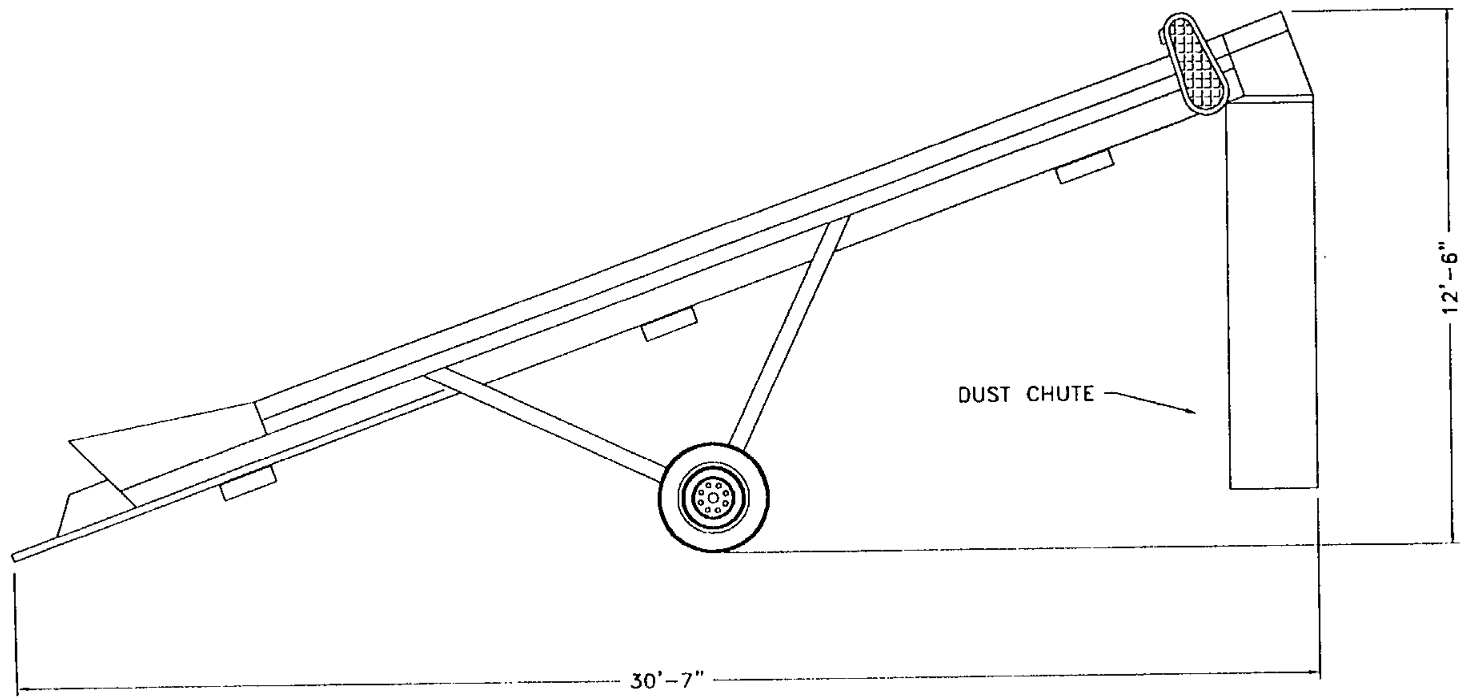
REVISIONS				
ZONE	REV	DESCRIPTION	DATE	APPROVED
	1	CY98 MODIFICATIONS, CATWALK EXTENSION, AIR COMPRESSOR	FEB-99	J. KIMBRELL



ELEVATION OF SGS CLEAN STACKING CONVEYOR
DIMENSIONS ARE APPROXIMATE – DO NOT SCALE

UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES TOLERANCES INCHES XX" Ω 1/16" ANGULAR Ω 0.5a DO NOT SCALE DRAWING		Thermo NUtech A THERMO Retec Company	
DRAWN MJD	DATE 04-97	ASSEMBLY/HOISTING & RIGGING	
CHECKED		SIZE B FSCM NO. DWG NO. SGS-05-H&RP01.0	REV
DESIGN		SCALE: NONE SGS DWGS	SHEET 11

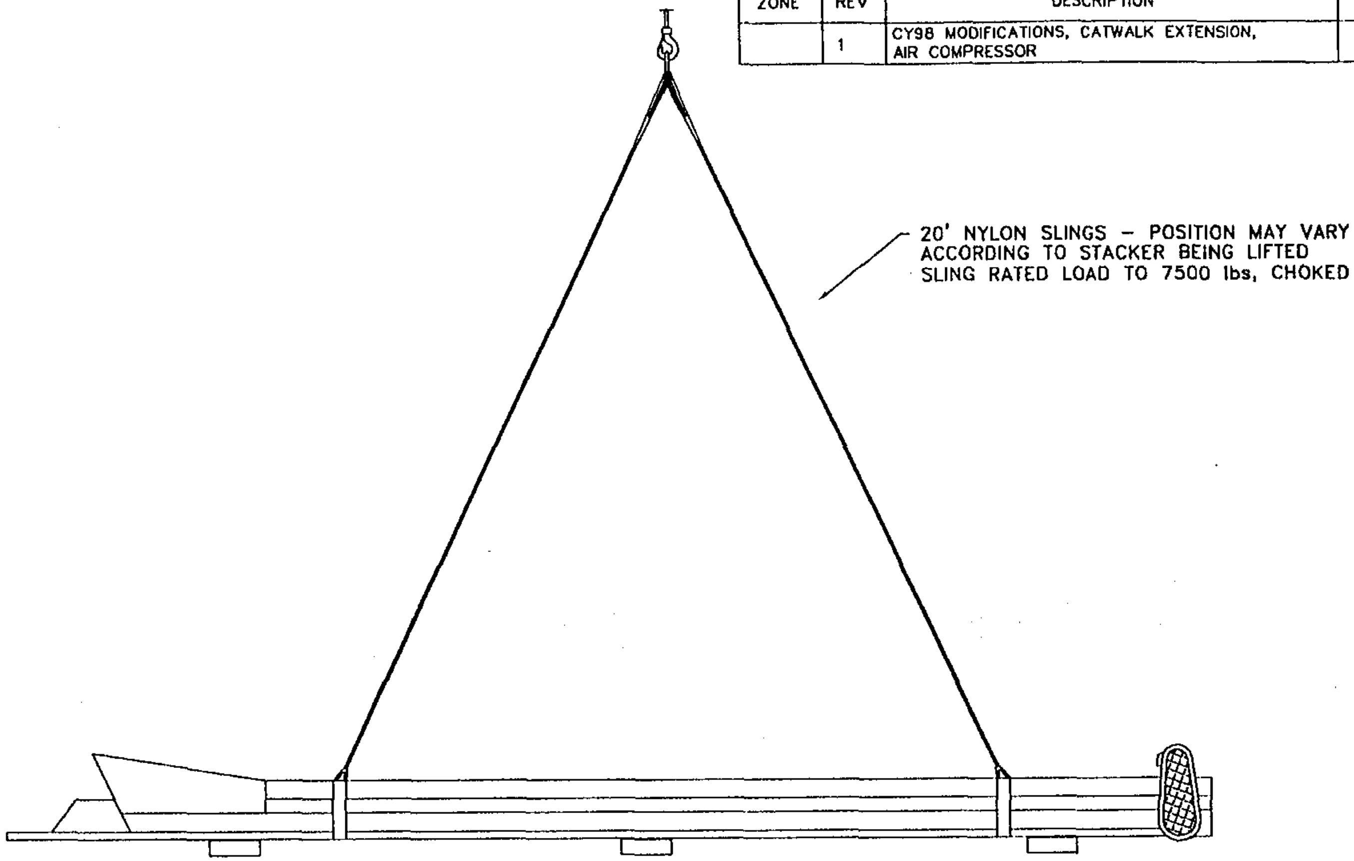
REVISIONS				
ZONE	REV	DESCRIPTION	DATE	APPROVED
	1	CY98 MODIFICATIONS, CATWALK EXTENSION, AIR COMPRESSOR	FEB-99	J. KIMBRELL



ELEVATION OF SGS HOT STACKING CONVEYOR
DIMENSIONS ARE APPROXIMATE – DO NOT SCALE

UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES TOLERANCES INCHES XX" Ω 1/16" ANGULAR Ω 0.5a DO NOT SCALE DRAWING		Thermo NUtech A THERMO Retec Company			
DRAWN MJD	DATE 04-97	ASSEMBLY/HOISTING & RIGGING			
CHECKED		SIZE B	FSCM NO.	DWG NO. SGS-05-H&RP01.0	REV
DESIGN		SCALE: NONE	SGS DWGS	SHEET 12	

REVISIONS				
ZONE	REV	DESCRIPTION	DATE	APPROVED
	1	CY98 MODIFICATIONS, CATWALK EXTENSION, AIR COMPRESSOR	FEB-99	J. KIMBRELL



ELEVATION OF SGS STACKING CONVEYOR
DIMENSIONS ARE APPROXIMATE – DO NOT SCALE

UNLESS OTHERWISE SPECIFIED:
DIMENSIONS ARE IN INCHES
TOLERANCES
INCHES XX" Ω 1/16" ANGULAR Ω 0.5o

DO NOT SCALE DRAWING

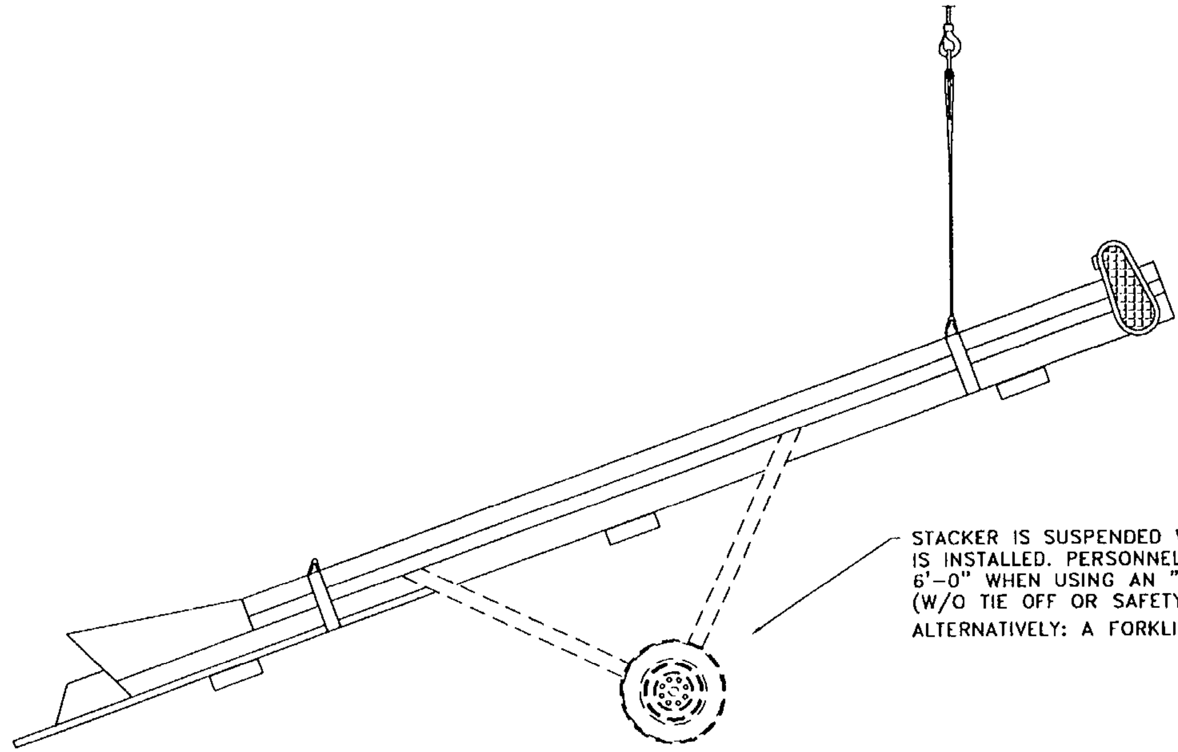
DRAWN MJD	DATE 04-97
CHECKED	
DESIGN	

Thermo NUtech
A THERMO Retec Company

ASSEMBLY/HOISTING & RIGGING

SIZE	FSCM NO.	DWG NO.	REV
B		SGS-05-H&RP01.0	
SCALE: NONE	SGS DWGS	SHEET 13	

REVISIONS				
ZONE	REV	DESCRIPTION	DATE	APPROVED
	1	CY98 MODIFICATIONS, CATWALK EXTENSION, AIR COMPRESSOR	FEB-99	J. KIMBRELL



ELEVATION OF SGS STACKING CONVEYOR
DIMENSIONS ARE APPROXIMATE - DO NOT SCALE

UNLESS OTHERWISE SPECIFIED:
DIMENSIONS ARE IN INCHES
TOLERANCES
INCHES XX" Ω 1/16"   ANGULAR Ω 0.5a
DO NOT SCALE DRAWING

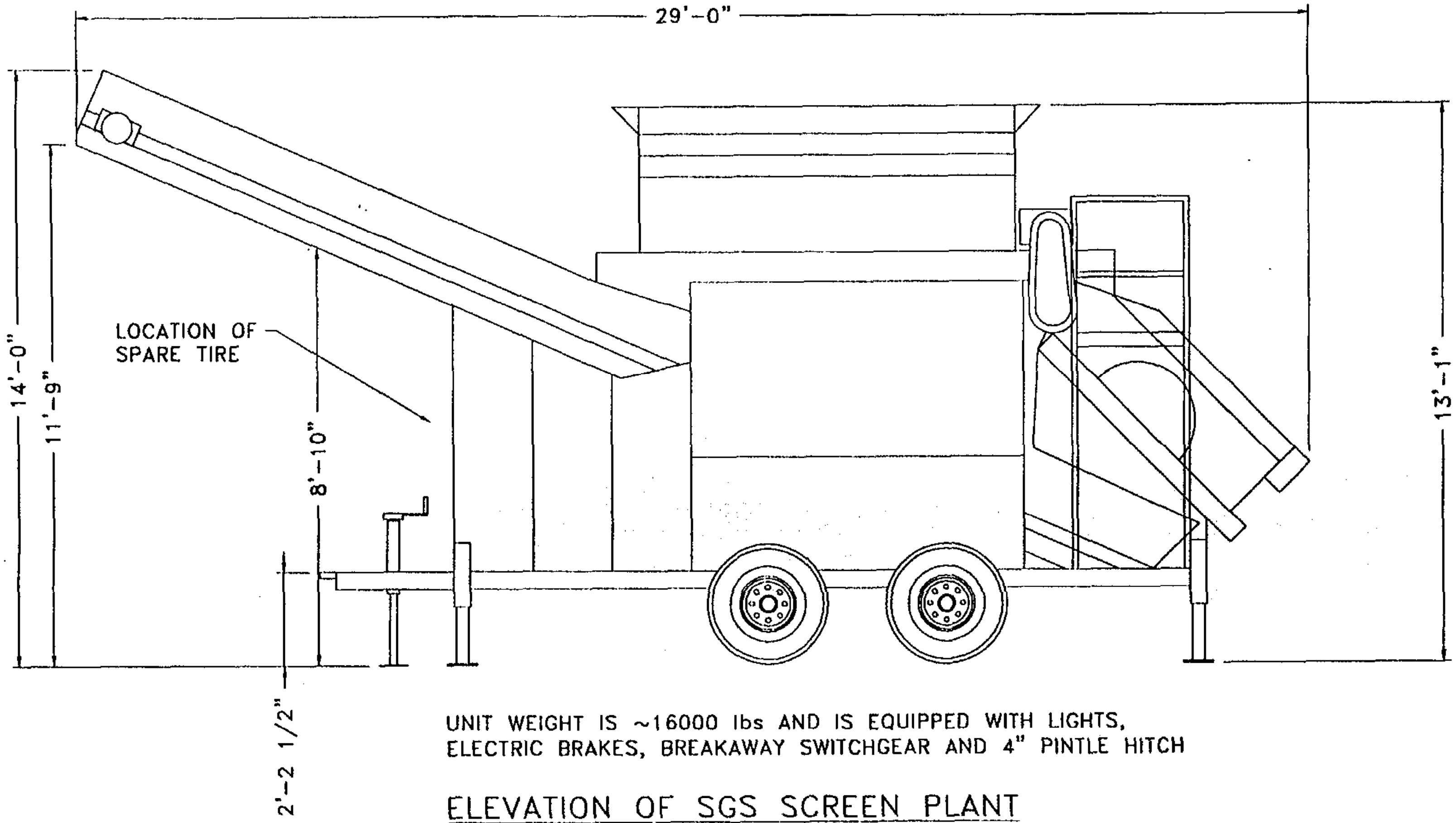
DRAWN MJD	DATE 04-97
CHECKED	
DESIGN	

Thermo NUtech
A THERMO Retec Company

ASSEMBLY/HOISTING & RIGGING

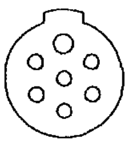
SIZE	FSCM NO.	DWG NO.	REV
B		SGS-05-H&RP01.0	
SCALE: NONE	SGS DWGS	SHEET 14	

REVISIONS				
ZONE	REV	DESCRIPTION	DATE	APPROVED
	1	CY98 MODIFICATIONS, CATWALK EXTENSION, AIR COMPRESSOR	FEB-99	J. KIMBRELL



UNIT WEIGHT IS ~16000 lbs AND IS EQUIPPED WITH LIGHTS, ELECTRIC BRAKES, BREAKAWAY SWITCHGEAR AND 4" PINTLE HITCH

ELEVATION OF SGS SCREEN PLANT
DIMENSIONS ARE APPROXIMATE – DO NOT SCALE



LAYOUT OF SCREEN'S ELECTRICAL PLUG – (FEMALE) DIA = 1-1/2"

UNLESS OTHERWISE SPECIFIED:
DIMENSIONS ARE IN INCHES
TOLERANCES
INCHES XX" Ω 1/16" ANGULAR Ω 0.5o
DO NOT SCALE DRAWING

DRAWN	MJD	DATE 04-97
CHECKED		
DESIGN		

Thermo NUtech
A THERMO Retec Company

ASSEMBLY/HOISTING & RIGGING

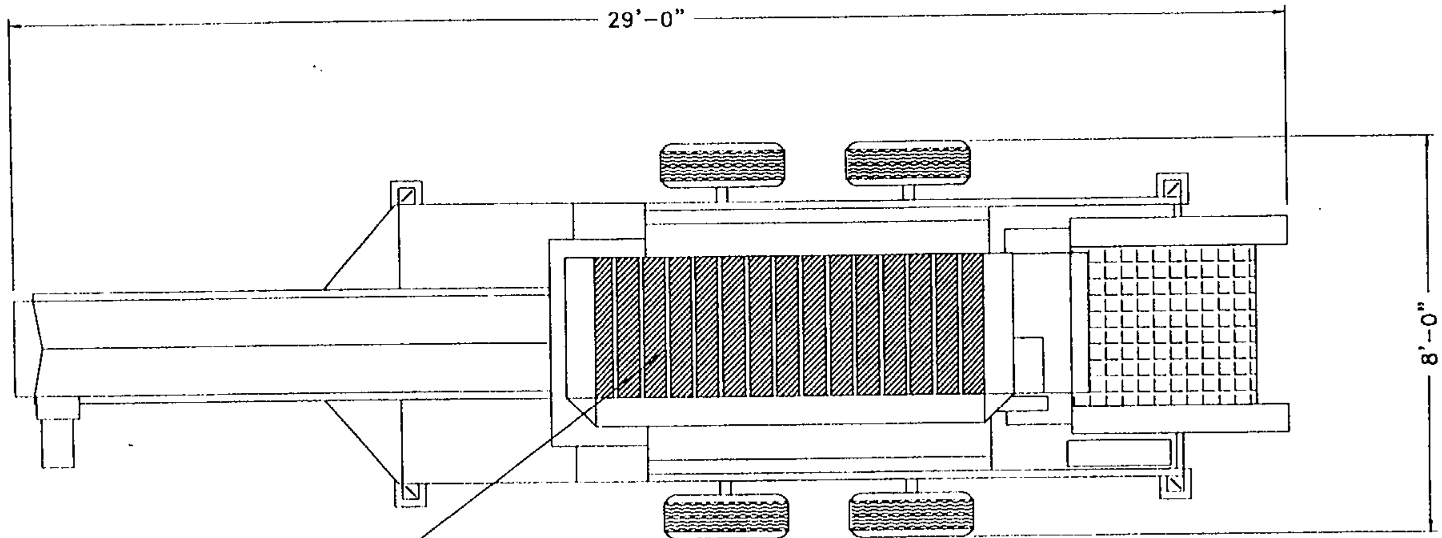
SIZE	FSCM NO.	DWG NO.	REV
B		SGS-05-H&RP01.0	

SCALE: NONE | SGS DWGS | SHEET 15

Attachment 1

Appendix 10 (TNU SGS Operating Procedures)

REVISIONS				
ZONE	REV	DESCRIPTION	DATE	APPROVED
	1	CY98 MODIFICATIONS, CATWALK EXTENSION, AIR COMPRESSOR	FEB-99	J. KIMBRELL

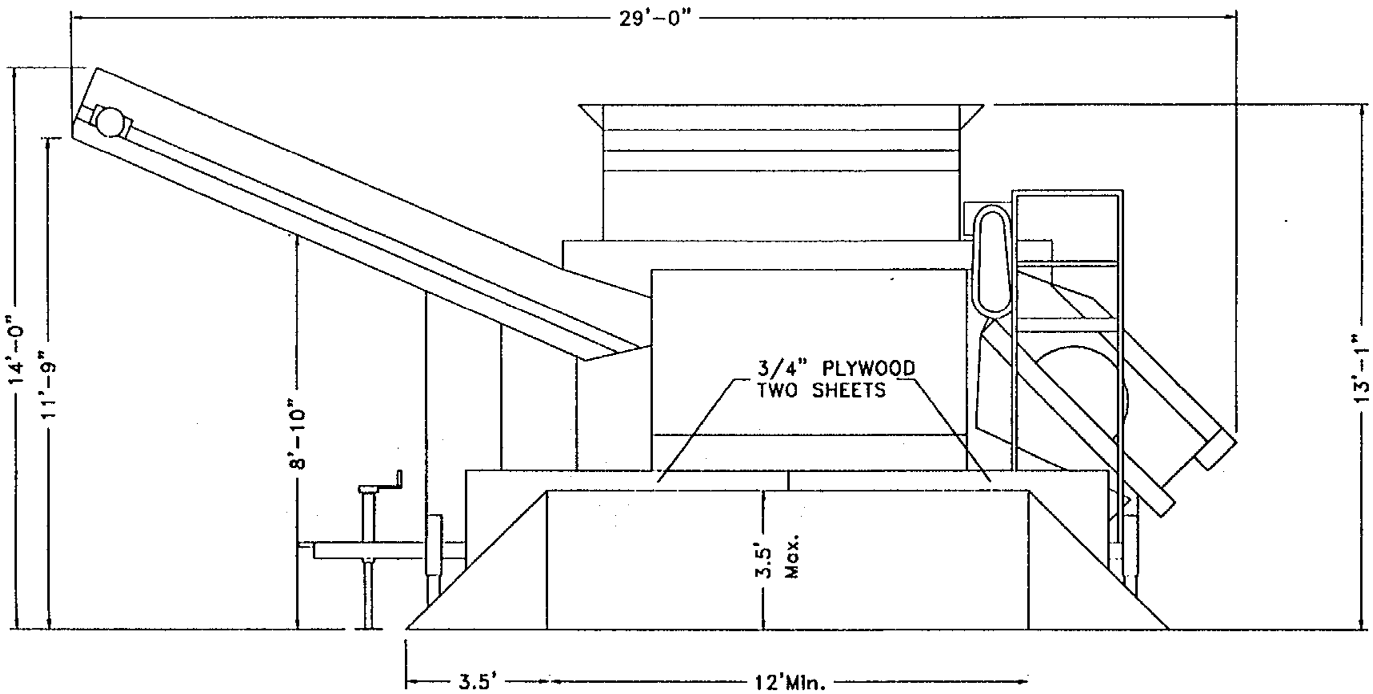


GRIZZLY OPENING = 3'-10" x 9'-0"
GRIZZLY CAPACITY OF 3 CUBIC YARDS

PLAN VIEW OF SGS SCREEN PLANT
DIMENSIONS ARE APPROXIMATE – DO NOT SCALE

UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES TOLERANCES INCHES XX" Ω 1/16" ANGULAR Ω 0.5o DO NOT SCALE DRAWING		Thermo NUtech A THERMO Retec Company		
DRAWN MJD	DATE 04-97	ASSEMBLY/HOISTING & RIGGING		
CHECKED		SIZE B	FSCM NO.	DWG NO. SGS-05-H&RP01.0	REV
DESIGN		SCALE: NONE	SGS DWGS	SHEET 16

REVISIONS				
ZONE	REV	DESCRIPTION	DATE	APPROVED
	1	CY98 MODIFICATIONS, CATWALK EXTENSION, AIR COMPRESSOR	FEB-99	J. KIMBRELL



SOIL RAMP CONSTRUCTION, TYPICAL FOR VOLVO L-90/70 LOADER

ELEVATION VIEW OF SGS SCREEN PLANT

DIMENSIONS ARE APPROXIMATE - DO NOT SCALE

UNLESS OTHERWISE SPECIFIED:
DIMENSIONS ARE IN INCHES
TOLERANCES
INCHES XX" Ω 1/16"
ANGULAR Ω 0.5o

DO NOT SCALE DRAWING

DRAWN	DATE
MJD	04-97
CHECKED	
DESIGN	

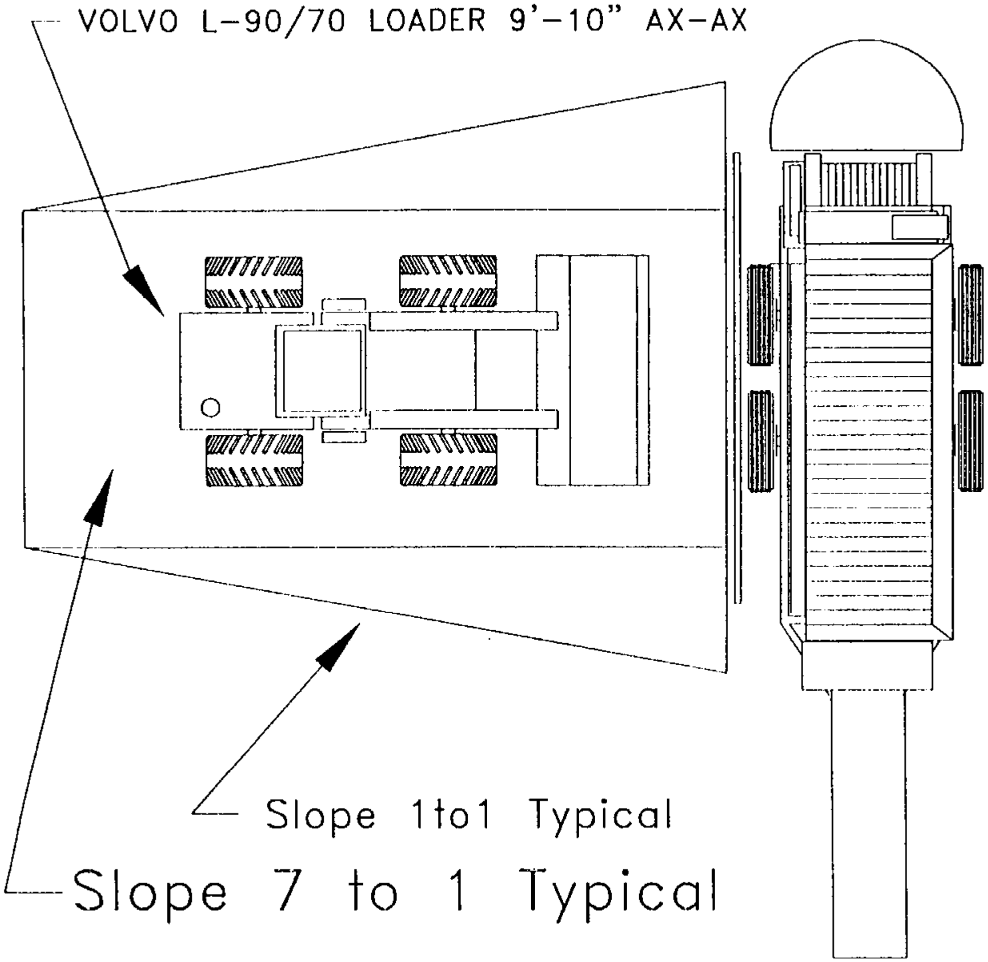
Thermo NUtech
A THERMO Retec Company

ASSEMBLY/HOISTING & RIGGING

SIZE	FSCM NO.	DWG NO.	REV
B		SGS-05-H&RP01.0	

SCALE: NONE | SGS DWGS | SHEET 17 ~~18~~

REVISIONS				
ZONE	REV	DESCRIPTION	DATE	APPROVED
	1	CY98 MODIFICATIONS, CATWALK EXTENSION, AIR COMPRESSOR	FEB-99	J. KIMBRELL



PLAN VIEW OF SGS SCREEN PLANT/RAMP
DIMENSIONS ARE APPROXIMATE – DO NOT SCALE

UNLESS OTHERWISE SPECIFIED:
DIMENSIONS ARE IN INCHES
TOLERANCES
INCHES XX" Ω 1/16" ANGULAR Ω 0.5o
DO NOT SCALE DRAWING

DRAWN MJD	DATE 04-97	Thermo NUtech A THERMO Retec Company	ASSEMBLY/HOISTING & RIGGING
CHECKED		SIZE B	FSCM NO.	DWG NO. SGS-05-H&RP01.0	REV
DESIGN		SCALE: NONE	SGS DWGS	SHEET 18

Thermo NUtech

Segmented Gate System Operational Procedures Manual

Title:	Decontamination of the Thermo NUtech Segmented Gate System
Procedure Number:	Appendix 11
Revision Number:	1
Reason for Revision:	Suggestions from the S&H review at SNL that can apply to any site.

Approved: Chuck Hollis — 08-21-97
Project Manager, Thermo NUtech — Date

Approved: Scott M Rogers — 09-18-97
Assistant Project Manager, Thermo NUtech — Date

Approved: L. A. Johnson — 08-12-97
Corporate Quality Assurance/Safety Director, Thermo NUtech — Date

Approved: J. G. Brown — 9/24/97
Vice President, Thermo NUtech — Date

DECONTAMINATION OF THE
ThermoRetec SEGMENTED GATE SYSTEM

1.0 Purpose

The purpose of this procedure is to establish the survey and decontamination requirements for the Segmented Gate System (SGS). It is intended that the survey/decontamination procedure be applied during disassembly and demobilization of the SGS from any site where contaminated material has been processed. All decontamination activities will be covered by a Pantex RWP.

2.0 Scope

These procedures apply to all TR and TR subcontractor personnel at the site. It covers the required equipment the operational tasks of surveying and decontaminating the equipment.

3.0 Equipment

- Appropriate radiological contamination detection equipment (Eberline Instruments Model SHP-360 or equivalent with a scaler/ratemeter).
- Brushes, brooms, HEPA vacuum, etc.
- Wipes and water for wet method decontamination
- Proper forms on which to record the survey results

4.0 Survey/Decontamination Process

- Dry brush, HEPA vacuum, or sweep the external surfaces of the unit until no visible signs of residual soil are evident.
- Scan all exterior surfaces for radiological contamination. If any areas are above criteria, decontaminate using wet methods with the least amount of water possible. On some sites where potentially contaminated water can be contained and sampled, the total SGS Plant will be washed to remove all dirt. If wet method decontamination is allowed, runoff will be containerized, analyzed and handled according to Maywood Interim Storage Site policies and procedures.

At the **Maywood Interim Storage Site** waste containment, analysis and disposal is the responsibility of **Maywood Interim Storage Site** or **ThermoRetec.**

- Scan and decontaminate (if necessary) the interior surfaces during dismantlement of the SGS (Appendix 10, SGS Operating Procedures). Plant loading will commence when accessible areas are found to be free of radiological contamination above the site criteria.

Thermo NUtech

Segmented Gate System Operational Procedures Manual

Title:	Software Acceptance Test Procedure Outline
Procedure Number:	Appendix 12
Revision Number:	0
Reason for Revision:	

Approved:	Chuck Heller Project Manager, Thermo NUtech	6-2-97 Date
Approved:	Scott M Rogers Assistant Project Manager, Thermo NUtech	6-3-97 Date
Approved:	L. G. Johnson Corporate Quality Assurance/Safety Director, Thermo NUtech	05-29-97 Date
Approved:	J. G. Brown Vice President, Thermo NUtech	6/2/97 Date

SOFTWARE ACCEPTANCE TEST PROCEDURE OUTLINE

1.0 Power On Test

a. Verify that system loads program from floppy to fixed disk and launches program

b. Verify that after program has loaded the first time, system will boot from fixed disk

c. Verify that system starts in pause mode

d. Verify that belt drive is halted and diversion gates are inactive

2.0 Communication Test

a. Verify that system responds to remote PC

b. Verify that all parameters may be edited

c. Verify that all commands produce desired results

3.0 Calibration and Background Test

a. Verify that calibration routines return appropriate activity for hot particle

b. Verify that the distributed efficiency is appropriate for the distributed source

c. Verify that the background factors are properly calculated and stored

d. Verify that mass sensor is calibrated and operational

4.0 Start Up Test

a. Verify that belt drive becomes active on start up

b. Verify that all gates go to actuated position until first measured material reaches gates

5. Hot Particle Performance Test

a. Verify that hot particles are detected

b. Verify that log message is generated and sent in response to a poll from remote PC

c. Verify that the elapse time from particle detection to gate actuation is correct

d. Verify that proper gate(s) are actuated for corresponding detector

e. Verify that the reported hot particle activity is appropriate for the particle used

f. Verify that the distributed contamination report for the interval of the hot particle is appropriate for the number of segments diverted and the activity of the particle.

6. Distributed Contamination Test

a. Verify that the system detects distributed contamination

1. at levels appropriate for the alarm level and confidence level set

2. no distributed contamination is detected when all activity is hot particles

b. Verify that log message is generated and sent in response to a poll from remote PC

c. Verify that the proper number of segments are diverted based on log message

d. Verify that mass reports correspond to the number of segments diverted

7. System Shut Down

a. Verify that the belt drive stops when system is placed in Pause Mode

b. Verify that any gate activity ceases when system is placed in Pause Mode

Thermo NUtech

Segmented Gate System Operational Procedures Manual

Title: Control Chart Procedures

Procedure Number: Appendix 13

Revision Number: 0

Reason for Revision:

Approved: ______________________________ 6/2/97
Project Manager, Thermo NUtech — Date

Approved: Scott M Rogers 6-3-97
Assistant Project Manager, Thermo NUtech — Date

Approved: L. A. Johnson 05-29-97
Corporate Quality Assurance/Safety Director, Thermo NUtech — Date

Approved: J. G. Brown 6/2/97
Vice President, Thermo NUtech — Date

CONTROL CHART PROCEDURES
DAILY DETECTOR OPERATION CHECKS

1.0 PURPOSE

The purpose of these procedures is to insure that the quality of operation of the detection system is maintained by performing periodic functional tests of all detectors and maintaining charts which facilitate the evaluation of detector performance trends and changes.

2.0 SCOPE

These procedures apply to any day which soil will be processed through the SGS. These procedures will not be used during the mobilization, transportation, calibration or demobilization of the SGS. These procedures are to be used before processing any soil for a given day. At the discretion of the SGS Site Manager, these procedures may also be performed after processing is finished for any given day.

3.0 PROCEDURES

a. Startup

The SGS is normally powered 24 hours per day to maintain the temperature controlled environment for the detectors. If the SGS is not turned on, start the system by following the processes described in Appendix 2 of this document, "Daily SGS Startup Checklist" through step 11. The conveyor belts should not be started at this time. Enter the "MAINTENANCE" menu and place both conveyor 1 and conveyor 2 in the "maintenance" mode. Enter the "UTILITIES" menu and place the system in "run" mode. The status of both conveyors should now be displayed as "maintenance" when viewed on the "RUN" screen. From the "MAINTENANCE" menu, select the background update screen. For each conveyor, enter a 10 second count time and confirm after several updates that all detectors are registering counts. If one or more detectors do not register counts, investigate and remedy the problem for the necessary detectors. If all detectors display count rates of 0 cps, verify that the system is not in "pause" mode by exiting the "maintenance" mode and confirming the status is "normal" for both conveyors. If the status is not "normal", investigate and remedy the cause of the abnormal status.

b. Background Count Rate Detector Data

This procedure should be performed once for each conveyor.

Confirm that the main SGS conveyor belt is empty and that there is no soil present under the detectors. All radioactive test sources should be secured in their storage location to insure that they will not affect the background count rates.

Enter a count time appropriate for the background count rate for the detector reporting the lowest count rate. The minimum count time is 600 seconds (10 minutes). The count time entered should be sufficient to accumulate a minimum of 4000 counts for each detector, to achieve 5 percent 3 sigma accuracy. Allow the display to update after the count time has expired. Print the screen data for later entry into the control chart template. Using the limits for each detector taken from the previous day's control charts, confirm that the count rate for each detector falls within the limits specified for that detector on the control chart. If a detector's background count rate falls outside the limits, investigate and remedy the problem and repeat this procedure. Preserve this data for later entry into the control chart template.

c. Test Source Count Rate Detector Data

This procedure should be performed once for each conveyor.

Confirm that the main SGS conveyor belt is empty and that there is no soil present under the detectors. Insert the appropriate test source fixture for the detector array to be tested under the proper detector enclosure. Align the test source fixture carefully using the alignment marks and brackets, as small variations in position can significantly affect detector count rates.

Enter a count time appropriate for the source count rate for the detector reporting the lowest count rate. The minimum count time is 60 seconds (1 minute). The count time entered should be sufficient to accumulate a minimum of 4000 counts for each detector, to achieve 5 percent 3 sigma accuracy. Allow the display to update after the count time has expired. Print the screen data for later entry into the control chart template. Using the limits for each detector taken from the previous day's control charts, confirm that the count rate for each detector falls within the limits specified for that detector on the control chart. If a detector's source count rate falls outside the limits, investigate and remedy the problem and repeat this procedure. Preserve this data for later entry into the control chart template.

d. Data Entry and Confirmation

Using the Excel spreadsheet control chart data entry program, enter the background and source count rates for each detector. Generate the new control charts for each detector. Examine the resultant charts and confirm that all detectors fall within their respective limits. If a data entry error occurred, it may be corrected now and the charts re-generated. If the latest detector data point falls outside the limits for that detector or an obvious trend is noticed in the detector performance, notify the SGS Site Manager immediately so corrective action may be taken. Previous data points may be marginally outside the limits after the new charts are generated since the limits are calculated based on the mean of the accumulated data points. Control charts exhibiting this type of characteristic are considered acceptable. Record the tolerances for each detector for comparison to the count rates obtained the next operational day that this procedure is performed. Control charts will be printed weekly as a minimum and at the discretion of the SGS Site Manager.

If the control charts are acceptable, file the charts for comparison to the next day's data.

Thermo NUtech

Segmented Gate System Operational Procedures Manual

Title: Fire Protection and Prevention Program

Procedure Number: Appendix 14

Revision Number: 0

Reason for Revision:

Approved: Chuck Hellin — 6-2-97
Project Manager, Thermo NUtech — Date

Approved: Scott M Rogers — 6-3-97
Assistant Project Manager, Thermo NUtech — Date

Approved: L. A. Johnson — 05-29-97
Corporate Quality Assurance/Safety Director, Thermo NUtech — Date

Approved: J. G. Brown — 6/2/97
Vice President, Thermo NUtech — Date

Fire Protection and Prevention Program

1.0 PURPOSE

The purpose of this procedure is to establish fire protection and prevention requirements to be used on the SGS.

2.0 Scope

These procedures apply to all TR and TR subcontractor personnel at the site.

3.0 Fire Protection and Prevention

Portable fire extinguishers suitable for the hazard shall be provided and spaced such that travel distance to the extinguisher does not exceed 75 feet. All fire extinguishers shall be conspicuously located. All fire extinguishers shall be inspected (documented) at intervals not to exceed 30 days. All ThermoRetec employees and subcontractors that are expected to use fire extinguishers shall be properly trained.

4.0 Fire Prevention

Smoking shall not be permitted in a construction area or in the vicinity of any area that constitutes a fire hazard. All materials shall be stored, handled, and stacked with regard to their fire characteristics. Only approved containers shall be used for storage and handling of flammable and combustible liquids and other materials.

During welding, cutting, or grinding operations, a fire extinguisher shall be in the immediate area. A "Fire Watch" shall be assigned for any welding, cutting, or grinding located outside designated welding areas (see appendix 15).

Thermo NUtech

Segmented Gate System Operational Procedures Manual

Title: Welding, Cutting, and Grinding Program

Procedure Number: Appendix 15

Revision Number: 1

Reason for Revision: Suggestions from the S&H review at SNL that can apply to any site.

Approved: Chuck Deller — 08-21-97
Project Manager, Thermo NUtech — Date

Approved: Scott M Rogers — 09-18-97
Assistant Project Manager, Thermo NUtech — Date

Approved: D Johnson — 08-12-97
Corporate Quality Assurance/Safety Director, Thermo NUtech — Date

Approved: J. G. Brown — 9/24/97
Vice President, Thermo NUtech — Date

Welding, Cutting, and Grinding Program

1.0 Purpose

The purpose of this procedure is to establish welding, cutting, and grinding safety requirements to be used on the SGS. Welding, cutting, and grinding operations should be allowed if determined necessary to repair the SGS.

2.0 Scope

These procedures apply to all TR and TR subcontractor personnel at the site. Any welding, cutting, or grinding on material with radioactive contamination will be covered by a Maywood Interim Storage Site RWP.

3.0 Shielding

Welding screens and/or portable flash curtains shall be used for all field welding, cutting, and grinding operations. They shall be constructed of non-combustible materials, adequate to contain any weld sparks or spatter, and shall shield personnel at all approaches to the operation.

4.0 Fire Watch

A trained fire watch shall be assigned in the immediate work area whenever welding, cutting, or burning is being conducted outside designated welding areas. The documented training shall be in accordance with the requirements for fire watch contained in 29 CFR 1910.252 (a) (2) (iii) Fire Watch. At a minimum the following apply:

a. The fire watch shall have no other responsibilities and perform no other duties while acting as the fire watch.

b. The fire watch shall cover or protect all material and equipment that could be damaged during the welding, cutting, or grinding operation.

c. The fire watch shall have a fire extinguisher in the immediate area at all times.

d. The fire watch shall remain in the work area at least 30 minutes after completion of the work to guard against flash fires.

Safety and Health

All vendors will operate under the project SSHP and the task Safety and Health Plan (SHP - refer to Volume 4). The following section describes *additional* safety and health considerations, which are specific to the vendor's system. Any work that is not specifically covered by the SSHP or the SHP will be coordinated with the Maywood HSO/RSO and will be conducted under an HWP.

1.0 Job Hazard Analysis – Hoisting and Rigging Operations

TASK - Unloading and assembly of SGS components

These task activities will involve (1) use of a mobile crane to unload SGS components from transport vehicles (2) assembling and installing the wheels and supports for the stackers (3) installing the short diversion conveyors under the gates of the SGS conveyor. (4) Pulling the Screening Plant into place above the SGS conveyor feed hopper (5) moving the stackers to place the tail pulleys directly beneath the head pulleys of the diversion conveyors.

1. POTENTIAL HAZARDS (Existing hazards or those resulting from activities, Check all that apply)

Potential Energy Sources		Physical Hazards		Environmental/Atmospheres Hazards	
	Energized Systems		Radiation (ionizing/non)		Confined Spaces
	Pressurized Systems		Heated Surfaces/Equip		Oxygen Deficient Atmosphere
1	Overhead Hazards		Flying Debris/Projectiles		Explosive Atmosphere
	High Vehicle Traffic	x	Pinch Points		Open Excavation/Trenches/Pits
2	Heavy Equipment	x	Physical Exertion		High Noise (>85 dBA)
	Rotating Equipment	x	Lifting/Back Strain		Heat Stress
3	Elevated Work (>6 ft.)	x	Slip/Tripping Hazards		Cold Stress
	Cutting/Welding		Other:		Biological (snakes, ticks, Hanta virus, plants)
	Intrusive Activities				Chemical Contamination
	Flammables/Combustibles			4	Radiological Contamination
	Other:				Other:

Comments/Notes:

(1) Mobile crane will be used in unloading and positioning some SGS components.
(2) Front-end loader will be used to move and lift some of the SGS components.
(3) Final connection of Screening Plant conveyor and SGS feed hopper requires the plant operator to secure a connection in area not protected by a handrail at >6 foot elevation.
(4) Amount of surface radiological contamination at site is believed to be minimal: no special procedures for non-intrusive work.

2. EVALUATION (Based on the hazards checked above)

[Evaluation of the task based on known site conditions and measured concentrations of contaminates or physical hazards. Explain how task will be conducted and mitigating procedural controls.]

Hoisting and rigging operations will be conducted in accordance with the Operating Procedures Manual for the Thermo NUtech Segmented Gate System. Final positioning and assembly of the SGS components will be performed using the front-end loader (with a boom attachment if available) and mechanical come-alongs. A pre-job briefing will be held prior to the commencement of work.

3. CONTROLS (Administrative, Engineering, PPE)

Administrative (check all that apply)		Monitoring (check all that apply)	
x	Pre-job Safety Meetings		Total Volatile Organic Compounds VOCS)
x	Specific Task Training (RW II, SSHSP)		Explosive atmosphere (LEL/UEL)
1	Site Control (zones)		Oxygen
x	Decontamination (Equipment)		Wet Bulb Globe Temperature (WBGT)
Work Permits			Total Dust (<10uM)
x	Task Hazard Analysis	Radiological	
	Safe Work/ Construction	x	Radiation (<5mR/Hr)
	Hot Work (welding/cutting)	x	Soil Contamination (<300 pCi/g)
	Excavation	Specific Contaminants	
x	Lockout/Tagout	x	Depleted uranium fragments and oxides
	Confined Space Entry		
2	Radiation Work Permit		

Comments/Notes:

(1) Work zones will be established based on site-specific hazards and tasks.
(2) Radiation Work Permits will be completed by Pantex RSD and will reflect site specific activities.

4. Initial Level of Personal Protective Equipment for unloading and assembly of SGS components.

The initial level of PPE that has been assigned for unloading and assembly of SGS components is based on the potential hazard evaluations, as stated in section 2 above. PPE levels for each task may differ based on the hazards. PPE levels may be upgraded or downgraded based on changing site conditions and as deemed appropriate by the Health and Safety Manager and Pantex RSD.

x	Level D		Level D+		Level C		Level B

Respiratory Protection (Level C and above)		Protective Clothing		Head and Foot Protection		Hand Protection			
	Half-Face	x	Standard Work Clothes	x	Hard Hat	Inner Glove			
	Full face		Modesty/Coveralls		Welding Helmet/Goggles		Cotton Liner		
	Airline/PAPR		Tyvek-QC (hooded)		Face Shield		Latex		
	SCBA		Tyvek/Saranex		Chemical Goggles	Outer Glove			
Cartridge			Tychem/PVC/PVA	x	Safety Glasses w/ side shields		Latex		PVA
	Organic Vapor		Encapsulating		Ear Muffs/ Plugs		Nitrile		Butyl
	HEPA		Acid Resistant	x	Steel Toed Boots		Neo.		PVC
	Comb. (OV/HEPA)		Nomex (or equivalent)		Rubber Outer Boots		Natural Rubber		
	Other:	x	Other: Orange Vest		Other:	x	Leather/Cotton		

Modifications Allowed:

Comments/Notes:

Note 1: High wind conditions (>25 mph) or lightning strikes in the area will halt crane hoisting operations.

1.0 Job Hazard Analysis –Hoisting and Rigging Operations

To be provided

2.0 Job Hazard Analysis –SGS Operations.

TASK - Operation of SGS for processing contaminated soil.

These task activities will involve

1. POTENTIAL HAZARDS (Existing hazards or those resulting from activities, Check all that apply)

Potential Energy Sources		Physical Hazards		Environmental/Atmospheres Hazards	
1	Energized Systems	x	Radiation (ionizing/non)		Confined Spaces
2	Pressurized Systems	6	Heated Surfaces/Equip		Oxygen Deficient Atmosphere
	Overhead Hazards	7	Flying Debris/Projectiles		Explosive Atmosphere
	High Vehicle Traffic	x	Pinch Points		Open Excavation/Trenches/Pits
3	Heavy Equipment		Physical Exertion		High Noise (>85 dBA)
4	Rotating Equipment		Lifting/Back Strain		Heat Stress
	Elevated Work (>6 ft.)	x	Slip/Tripping Hazards		Cold Stress
	Cutting/Welding		Other:		Biological (snakes, ticks, Hanta virus, plants)
5	Intrusive Activities				Chemical Contamination
	Flammables/Combustibles			8	Radiological Contamination
	Other:				Other:

Comments/Notes:

(1) All electrical components will be de-energized using lockout/tagout procedures prior to working on move able components. Troubleshooting will be allowed by trained personnel on energized system to determine faults but the breaker controlling the system will be de-energized prior to repairs.

(2) Compressed air is used to actuate sorting gate cylinders and automated samplers. Prior to contacting the cylinders with the hand or other part of the body the cylinders air supply the cylinders will be isolated and discharged. Hydraulic oil pressure is used to power the grizzly dump system, drag chain, hammer mill., screen deck and the screening plant conveyor. Prior to working on the system or its components the motor driving the hydraulic pump will be locked out. The system does not contain valves which allow the system to remain pressurized when the system is shut off.

(3) The area of operation of the front end loader shall be designated and all personnel in the area with the exception of the loader operator will wear high visibility vests. Pre-job meetings will be held with the crew to caution them to establish eye contact with the operator prior to the entering the area.

(4) There are many rotating parts in the SGS components. The system consists of six conveyors, a hammer mill, a screen deck and a drag chain. The units are guarded where accessible and lockout/tagout procedures will be used when guards are removed to facilitate unplugging.

(5) The digging of the soil and moving of the clean, oversize and contaminated stockpiles is by its nature an intrusive activity. Such activities will be governed by Radiation Work Permits will be completed by Pantex RSD and will reflect site specific activities.

(6) The hydraulic oil powering the screening plant is hot after several hours of operation. While in normal operation, personnel do not come in contact with the fluid opening the system for maintenance would pose a hazard. Adequate cooling time wil be allowed prior to opening the system.

(7) The presence of a hammer mill presents the possibility of flying projectiles. The area is guarded but no one will be allowed on the deck in the area of the hammer mill until the hammer mill is locked out and has stopped spinning.

(8) Amount of radiological contamination at site soil surface believe to be minimal. Activities will be governed by Radiation Work Permits will be completed by Pantex RSD and will reflect site specific activities.

2.0 Job Hazard Analysis –SGS Operations– conti.

2. EVALUATION (Based on the hazards checked above)			
[Evaluation of the task based on known site conditions and measured concentrations of contaminates or physical hazards. Explain how task will be conducted and mitigating procedural controls.] Operations will be conducted in accordance with the Operating Procedures Manual for the Thermo NUtech Segmented Gate System. Personnel working on the SGS has a minimum of six months experience work with the equipment. The primary area the plant operators will be working on is near the SGS conveyor. The conveyor move quite slowly (30 feet per minute) minimizing the potential hazard. The gate area is hazardous in that the gates are air actuated and move quickly. The plant operator has to clean the gates often but is able to perform this task using a 36 inch metal lath which minimizes the potential hazard. A pre-job will be held prior to the commencement of work.			
3. CONTROLS (Administrative, Engineering, PPE)			
Administrative (check all that apply)		Monitoring (check all that apply)	
x	Pre-job Safety Meetings		Total Volatile Organic Compounds VOCS)
x	Specific Task Training (RW II, SSHSP)		Explosive atmosphere (LEL/UEL)
1	Site Control (zones)		Oxygen
	Decontamination (Equipment)		Wet Bulb Globe Temperature (WBGT)
Work Permits			Total Dust (<10uM)
x	Task Hazard Analysis	Radiological	
	Safe Work/ Construction	x	Radiation (<5mR/Hr)
	Hot Work (welding/cutting)	x	Soil Contamination (<300 pCi/g)
	Excavation	Specific Contaminants	
x	Lockout/Tagout	x	Depleted uranium fragments and oxides
	Confined Space Entry		
2	Radiation Work Permit		
Comments/Notes:			
(1) Work zones will be established based on site-specific hazards and tasks. (2) Radiation Work Permits will be completed by Pantex RSD and will reflect site specific activities.			

2.0 Job Hazard Analysis –SGS Operations– conti.

4. Initial Level of Personal Protective Equipment for unloading and assembly of SGS components.									
The initial level of PPE that has been assigned of SGS operating tasks is based on the potential hazards evaluations, as stated in section 2 above. PPE levels for each task may differ based on the hazards. PPE levels may be upgraded or downgraded based on changing site conditions, and as deem appropriate by the Health and Safety Manager and Pantex RSD.									
	Level D	+	Level D+		Level C		Level B		
Respiratory Protection (Level C and above)		Protective Clothing		Head and Foot Protection		Hand Protection			
	Half-Face	x	Standard Work Clothes	x	Hard Hat	Inner Glove			
	Full face		Modesty/Coveralls		Welding Helmet/Goggles	x	Cotton Liner		
	Airline/PAPR	1 2	Tyvek-QC (hooded)		Face Shield	x	Latex		
	SCBA		Tyvek/Saranex		Chemical Goggles	Outer Glove			
Cartridge			Tychem/PVC/PVA	x	Safety Glasses w/ side shields		Latex		PVA
	Organic Vapor		Encapsulating		Ear Muffs/ Plugs		Nitrile		Butyl
	HEPA		Acid Resistant	x	Steel Toed Boots		Neo.		PVC
	Comb. (OV/HEPA)		Nomex (or equivalent)	x	Rubber Outer Boots		Natural Rubber		
	Other:	x	Other: Orange Vest		Other:	x	Leather/Cotton		
Modifications Allowed: (1) Hood required when working under belt or other areas where an overhead contamination potential exists. (2) No Tyvek requirement for loader operator.									
Comments/Notes:									

3.0 Job Hazard Analysis – Decontamination of SGS

TASK - Disassembly and loading of SGS components

These task activities will involve (1) use of mobile crane to load SGS components onto transport vehicles (2) disassembling the wheels and supports for the stackers (3) removing the short diversion conveyors under the gates of the SGS conveyor.

1. POTENTIAL HAZARDS (Existing hazards or those resulting from activities, Check all that apply)

Potential Energy Sources		Physical Hazards		Environmental/Atmospheres Hazards	
	Energized Systems		Radiation (ionizing/non)		Confined Spaces
	Pressurized Systems		Heated Surfaces/Equip		Oxygen Deficient Atmosphere
1	Overhead Hazards		Flying Debris/Projectiles		Explosive Atmosphere
	High Vehicle Traffic	x	Pinch Points		Open Excavation/Trenches/Pits
2	Heavy Equipment	x	Physical Exertion		High Noise (>85 dBA)
	Rotating Equipment	x	Lifting/Back Strain		Heat Stress
3	Elevated Work (>6 ft.)	x	Slip/Tripping Hazards		Cold Stress
	Cutting/Welding		Other:		Biological (snakes, ticks, Hanta virus, plants)
	Intrusive Activities				Chemical Contamination
	Flammables/Combustibles			x	Radiological Contamination
	Other:				Other:

Comments/Notes:

(1) Mobile crane will be used in loading some of the SGS components.
(2) Front end loader will be used to move and load some of the SGS components.
(3) Final disconnection of Screening Plant conveyor and SGS feed hopper requires plant operator secure connection in area not protected by the hand rail at >6 foot elevation.

2. EVALUATION (Based on the hazards checked above)

[Evaluation of the task based on known site conditions and measured concentrations of contaminates or physical hazards. Explain how task will be conducted and mitigating procedural controls.]

Hoisting and rigging operations will be conducted in accordance with the Operating Procedures Manual for the Thermo NUtech Segmented Gate System. Disassembly of the SGS components will be performed using the front end loader (with a boom attachment if available). A pre-job will be held prior to the commencement of work.

3.0 Job Hazard Analysis – Decontamination of SGS – continued

3. CONTROLS (Administrative, Engineering, PPE)			
Administrative (check all that apply)		Monitoring (check all that apply)	
x	Pre-job Safety Meetings		Total Volatile Organic Compounds VOCS)
x	Specific Task Training (RW II, SSHSP)		Explosive atmosphere (LEL/UEL)
1	Site Control (zones)		Oxygen
x	Decontamination (Equipment)		Wet Bulb Globe Temperature (WBGT)
Work Permits			Total Dust (<10uM)
x	Task Hazard Analysis	Radiological	
	Safe Work/ Construction	x	Radiation (<5mR/Hr)
	Hot Work (welding/cutting)	x	Soil Contamination (<300 pCi/g)
	Excavation	Specific Contaminants	
x	Lockout/Tagout	x	Depleted uranium fragments and oxides
	Confined Space Entry		
2	Radiation Work Permit		
Comments/Notes:			
(1) Work zones will be established based on site-specific hazards and tasks. (2) Radiation Work Permits will be completed by Pantex RSD and will reflect site specific activities.			

4. Initial Level of Personal Protective Equipment for unloading and assembly of SGS components.							
The initial level of PPE that has been assigned of unloading and assembly of SGS components tasks is based on the potential hazards evaluations, as stated in section 2 above. PPE levels for each task may differ based on the hazards. PPE levels may be upgraded or downgraded based on changing site conditions, and as deem appropriate by the Health and Safety Manager and Pantex RSD.							
x	Level D		Level D+		Level C		Level B

Respiratory Protection (Level C and above)		Protective Clothing		Head and Foot Protection		Hand Protection			
	Half-Face	x	Standard Work Clothes	x	Hard Hat	Inner Glove			
	Full face		Modesty/Coveralls		Welding Helmet/Goggles	x	Cotton Liner		
	Airline/PAPR	1	Tyvek-QC (hooded)		Face Shield	x	Latex		
	SCBA		Tyvek/Saranex		Chemical Goggles	Outer Glove			
Cartridge			Tychem/PVC/PVA	x	Safety Glasses w/ side shields		Latex		PVA
	Organic Vapor		Encapsulating		Ear Muffs/ Plugs		Nitrile		Butyl
	HEPA		Acid Resistant	x	Steel Toed Boots		Neo.		PVC
	Comb. (OV/HEPA)		Nomex (or equivalent)	x	Rubber Outer Boots		Natural Rubber		
	Other:	x	Other: Orange Vest		Other:	x	Leather/Cotton		

Modifications Allowed:
(1) Loader operator inside cab exempt from Tyvek requirement.
Comments/Notes: Note 1: High wind conditions (>25 mph) or lightning strikes in area will be halt crane hoisting operations.

4.0 Job Hazard Analysis – Disassembly and Loading of the SGS

TASK - Disassembly and loading of SGS components

These task activities will involve (1) use of mobile crane to load SGS components onto transport vehicles (2) disassembling the wheels and supports for the stackers (3) removing the short diversion conveyors under the gates of the SGS conveyor.

1. POTENTIAL HAZARDS (Existing hazards or those resulting from activities, Check all that apply)

Potential Energy Sources		Physical Hazards		Environmental/Atmospheres Hazards	
	Energized Systems		Radiation (ionizing/non)		Confined Spaces
	Pressurized Systems		Heated Surfaces/Equip		Oxygen Deficient Atmosphere
1	Overhead Hazards		Flying Debris/Projectiles		Explosive Atmosphere
	High Vehicle Traffic	x	Pinch Points		Open Excavation/Trenches/Pits
2	Heavy Equipment	x	Physical Exertion		High Noise (>85 dBA)
	Rotating Equipment	x	Lifting/Back Strain		Heat Stress
3	Elevated Work (>6 ft.)	x	Slip/Tripping Hazards		Cold Stress
	Cutting/Welding		Other:		Biological (snakes, ticks, Hanta virus, plants)
	Intrusive Activities				Chemical Contamination
	Flammables/Combustibles			x	Radiological Contamination
	Other:				Other:

Comments/Notes:

(1) Mobile crane will be used in loading some of the SGS components.
(2) Front end loader will be used to move and load some of the SGS components.
(3) Final disconnection of Screening Plant conveyor and SGS feed hopper requires plant operator secure connection in area not protected by the hand rail at >6 foot elevation.

2. EVALUATION (Based on the hazards checked above)

[Evaluation of the task based on known site conditions and measured concentrations of contaminates or physical hazards. Explain how task will be conducted and mitigating procedural controls.]

Hoisting and rigging operations will be conducted in accordance with the Operating Procedures Manual for the Thermo NUtech Segmented Gate System. Disassembly of the SGS components will be performed using the front end loader (with a boom attachment if available). A pre-job will be held prior to the commencement of work.

3. CONTROLS (Administrative, Engineering, PPE)			
Administrative (check all that apply)		Monitoring (check all that apply)	
x	Pre-job Safety Meetings		Total Volatile Organic Compounds VOCS)
x	Specific Task Training (RW II, SSHSP)		Explosive atmosphere (LEL/UEL)
1	Site Control (zones)		Oxygen
x	Decontamination (Equipment)		Wet Bulb Globe Temperature (WBGT)
Work Permits			Total Dust (<10uM)
x	Task Hazard Analysis	Radiological	
	Safe Work/ Construction	x	Radiation (<5mR/Hr)
	Hot Work (welding/cutting)	x	Soil Contamination (<300 pCi/g)
	Excavation	Specific Contaminants	
x	Lockout/Tagout	x	Depleted uranium fragments and oxides
	Confined Space Entry		
2	Radiation Work Permit		
Comments/Notes:			
(1) Work zones will be established based on site-specific hazards and tasks. (2) Radiation Work Permits will be completed by Pantex RSD and will reflect site specific activities.			

4. Initial Level of Personal Protective Equipment for unloading and assembly of SGS components.									
The initial level of PPE that has been assigned of unloading and assembly of SGS components tasks is based on the potential hazards evaluations, as stated in section 2 above. PPE levels for each task may differ based on the hazards. PPE levels may be upgraded or downgraded based on changing site conditions, and as deem appropriate by the Health and Safety Manager and Pantex RSD.									
x	Level D		Level D+		Level C		Level B		
Respiratory Protection (Level C and above)		Protective Clothing		Head and Foot Protection		Hand Protection			
	Half-Face	x	Standard Work Clothes	x	Hard Hat	Inner Glove			
	Full face		Modesty/Coveralls		Welding Helmet/Goggles	x	Cotton Liner		
	Airline/PAPR	1	Tyvek-QC (hooded)		Face Shield	x	Latex		
	SCBA		Tyvek/Saranex		Chemical Goggles	Outer Glove			
Cartridge			Tychem/PVC/PVA	x	Safety Glasses w/ side shields		Latex		PVA
	Organic Vapor		Encapsulating		Ear Muffs/ Plugs		Nitrile		Butyl
	HEPA		Acid Resistant	x	Steel Toed Boots		Neo.		PVC
	Comb. (OV/HEPA)		Nomex (or equivalent)	x	Rubber Outer Boots		Natural Rubber		
	Other:	x	Other: Orange Vest		Other:	x	Leather/Cotton		
Modifications Allowed: (1) Loader operator inside cab exempt from Tyvek requirement.									
Comments/Notes: Note 1: High wind conditions (>25 mph) or lightning strikes in area will be halt crane hoisting operations.									

FINAL
PILOT DEMONSTRATION WORK PLAN

VOLUME 4
SAMPLING AND ANALYSIS PLAN, CONSTRUCTION QUALITY CONTROL PLAN, AND SAFETY AND HEALTH PLAN

FUSRAP MAYWOOD SUPERFUND SITE
MAYWOOD, NEW JERSEY

CONTRACT NO. DACW41-99-D-9001
WAD 06 WBS 07

Submitted to:

Department of the Army
U.S. Army Engineer District, Kansas City
Corps of Engineers
700 Federal Building
Kansas City, Missouri 64106

Department of the Army
U.S. Army Engineer District, New York
Corps of Engineers
FUSRAP Project Office
26 Federal Plaza
New York, New York 10278

Submitted by:

Stone & Webster Environmental Technology & Services
245 Summer Street
Boston, Massachusetts 02210

June, 2000

Issued to: ____________________ **Date:** ____________________

Copy #: __________ ☐ **Controlled** ☐ **Uncontrolled**

FINAL
PILOT DEMONSTRATION WORK PLAN

VOLUME 4
SAMPLING AND ANALYSIS PLAN

FUSRAP MAYWOOD SUPERFUND SITE
MAYWOOD, NEW JERSEY

SITE-SPECIFIC ENVIRONMENTAL RESTORATION
CONTRACT NO. DACW41-99-D-9001
WAD 06 WBS 07

Submitted to:

Department of the Army
U.S. Army Engineer District, Kansas City
Corps of Engineers
700 Federal Building
Kansas City, Missouri 64106

Department of the Army
U.S. Army Engineer District, New York
Corps of Engineers
FUSRAP Project Office
26 Federal Plaza
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Submitted by:
Stone & Webster Environmental Technology & Services
245 Summer Street
Boston, Massachusetts 02210
June, 2000

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Approved by ________________________ **Date:** ____________________
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Project Certified Health Physicist

Prepared/ Reviewed/
Approved by ________________________ **Date:** ____________________
Richard Skryness, P.G.
Task Manager

TABLE OF CONTENTS

VOLUME 4
SAMPLING AND ANALYSIS PLAN

Tables

Figures

Appendices

LIST OF ACRONYMS AND ABBREVIATIONS

ASTM	American Society for Testing and Materials
CDQMP	Chemical Data Quality Management Plan
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
COC	Chain of Custody
cpm	counts per minute
CQCP	Contractor Quality Control Plan
DQCR	Daily Quality Control Report
DQO	Data Quality Objectives
FMSS	FUSRAP Maywood Superfund Site
FUSRAP	Formerly Utilized Sites Remedial Action Program
ISOCS	In situ Object Counting System
MARSSIM	Multi-Agency Radiation Survey and Site Investigation Manual
MISS	Maywood Interim Storage Site
MS	Matrix Spike
MSD	Matrix Spike Duplicate
NCP	National Oil and Hazardous Substances Contingency Plan
NJDEP	New Jersey Department of Environmental Protection
PCB	polychlorinated biphenyl
pCi	picocurie
QA	Quality Assurance
QC	Quality Control
SAP	Sampling and Analysis Plan
SOP	Standard Operating Procedure
SOR	Sum- of-the-Ratios
SSERC	Site-Specific Environmental Restoration Contract
SSHP	Site Safety and Health Plan
SVOC	Semivolatile Organic Compound
TCLP	Toxicity Characteristic Leaching Procedure
USACE	U.S. Army Corps of Engineers
USEPA	U.S. Environmental Protection Agency
VOC	Volatile Organic Compound

1.0 INTRODUCTION

The United States Army Corps of Engineers (USACE), under Site-Specific Environmental Restoration Contract (SSERC) No. DACW41-99-D-9001, has contracted Stone & Webster Environmental Technology & Services (Stone & Webster), a division of Stone & Webster Engineering Corporation, to perform remediation of the FUSRAP Maywood Superfund Site (FMSS), in Maywood, Lodi, and Rochelle Park, New Jersey (Figure 1). As discussed in the Overview in Volume 1, gravel separation and radiological sorting technologies offer promise in substantially reducing the volume of soil requiring disposal as radioactive waste. Technologies which result in permanent and significant volume reduction are a statutory preference under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) and the National Oil and Hazardous Substances Contingency Plan (NCP). A pilot study, involving the demonstration of these technologies utilizing two separate processing systems, is planned to be carried out at the Maywood Interim Storage Site (MISS) to further evaluate the viability of full-scale implementation of the technologies at the FMSS.

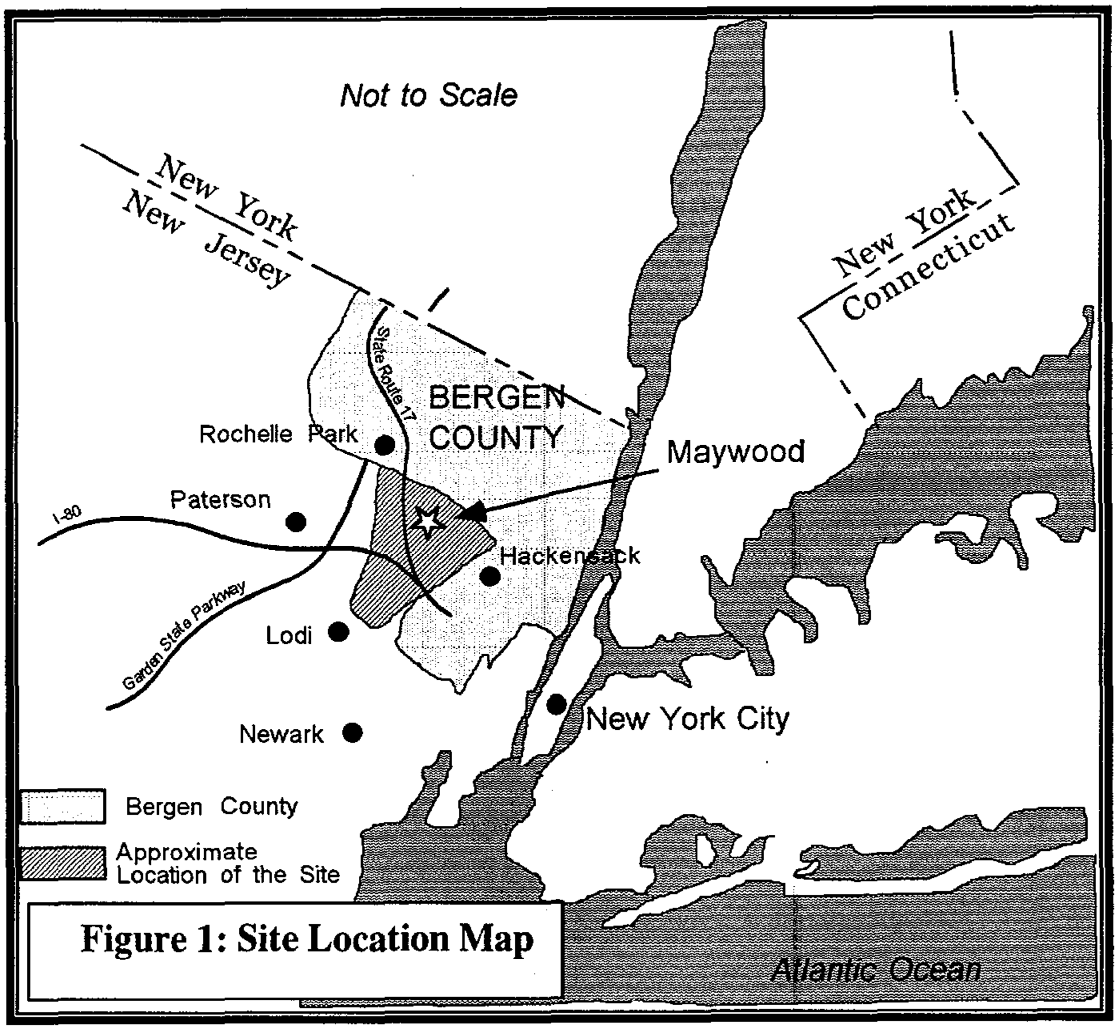


Figure 1: Site Location Map

This pilot demonstration will be used to assess the operational, technical and economic feasibility of applying particle separation and radiological sorting to the soils at the FMSS. The primary objectives of the pilot demonstration are to:

- Determine the applicability of gravel separation of the FMSS site soils for the purpose of achieving volume reduction and remediation cost savings.
- Determine the applicability of radiological sorting of the FMSS site soils for the purpose of achieving volume reduction and remediation cost savings.

The secondary objective of the pilot demonstration is to quantify or qualify the benefits of employing soil processing technology at the FMSS for the purposes of volume reduction of radiologically contaminated soils. The benefits, which are statutory, economic, and community oriented, may include:

- Utilizing soil processing technologies during the remedial action, pursuant to CERCLA's preference for treatment, and satisfying the mandate of the NCP that technologies be evaluated as remedial options;
- Satisfying the preference of CERCLA and the NCP that selected remedies reduce the volume of contaminants, pollutants or hazardous substances through treatment;
- Reducing the number of trucks hauling material on local roads;
- Potential time savings by preventing an overburdening of transportation routes;
- Utilizing technology that allows bulk excavation thereby reducing the amount of time individual property owners are impacted by remediation;
- Cost savings from potentially reducing the volume of material requiring off-site disposal or that must go to more expensive disposal facilities capable of handling higher level radiologically contaminated material;
- Cost savings through reducing the volume of fill material required from off-site sources.

The technologies selected and the configuration of the demonstration are based on the recognition that the bulk of the soils at Maywood are not uniformly contaminated. Rather, the radiologically contaminated soil is likely surrounded by soil that is "clean" (below criteria). It is also recognized that the radiological contamination is concentrated in the finer fractions of the soil mass. These principles were demonstrated in the Engineering Test Pits at MISS Program (see Volume 5). Physical separation of the coarse fraction (greater than 3/8 inch diameter) from the soil mass will result in a soil volume reduction that will be proportional to the percentage of coarse material. A radiological sort of the material which is less than 3/8 inch diameter will then create two streams: above criteria and below criteria. The criteria used in the radiological sort will be based on either reuse or disposal requirements.

The objective of this SAP is to set the procedures to be followed when collecting and testing soil and water samples during the pilot demonstration. A Chemical Data Quality Management Plan (CDQMP), consisting of a Field Sampling Plan (FSP) and Quality Assurance Project Plan (QAPP) has been issued for the project. The CDQMP provides the project-level sampling and analytical requirements for the FMSS. It presents procedures for sampling, chain of custody (COC), laboratory instrument calibration, laboratory analysis, reporting of data, internal quality control (QC), audits, preventive maintenance of field equipment, and corrective action. Task-specific sampling and analysis details not covered by the CDQMP or changes to procedures previously presented in the CDQMP are discussed in this SAP. All sampling and analysis will be conducted in accordance with this SAP and the CDQMP.

This SAP provides guidance and specifications to ensure that:

- Samples are obtained under controlled conditions using appropriate and documented procedures;

- Samples are identified uniquely (see Subsection 6.2.2), and controlled through sample tracking systems and COC protocols;

- Field determinations and laboratory analytical results are of known quality and are valid and consistent through the use of certified methods, preventive maintenance, calibration and analytical protocols, quality assurance (QA)/QC measurements, appropriate review methodologies, correction of noncompliant situations, and audits as necessary;

- Records are retained as documentary evidence of the quality of the sample data collected.

Soil samples will be collected at various points during the pilot demonstration to facilitate an evaluation of the applicability of the technologies to the project. Excavation for the demonstration will take place in three stages. Stage I will involve the excavation of granular material and Stage II will involve the excavation of retention pond material. Stage III activities will be performed when sufficient data has been collected to satisfy the primary objectives of the pilot demonstration. Sampling will be performed during the three main stages of the pilot demonstration: soil acquisition for Stages I and II, soil processing for each stage of excavation, and Stage III activities. All sampling to be performed is detailed herein.

During the soil acquisition task, soil intended as feed stock for the pilot plant will be excavated and stockpiled prior to processing. (For additional information regarding soil acquisition, see the Soil Acquisition Work Plan and Pilot Plant Pad Design in Volume 2.)

During the operation of the pilot plant, the feed soil will be processed utilizing two technologies. These technologies are a gravel separation system and a radiological sorting system. The gravel separation unit will initially be used to separate out oversize material. The coarse material will then be separated from the sands and fines. The coarse material will be rinsed to remove any adhered contaminated fines. The sands and fines initially separated from the coarse material will be directed through the radiological sorting system and sorted into clean and contaminated soil streams, based on radioactivity levels. (For additional information regarding the operation of the pilot plant, see the Pilot Plant Operation Plan in Volume 3.)

Following the completion of the excavation for soil acquisition, Stage III activities will be initiated as discussed in the Soil Acquisition Work Plan and Pilot Plant Pad Design in Volume 2. A final status survey will be included in these activities. It will be conducted of the base of the excavation to demonstrate compliance with project clean-up goals prior to backfilling the excavation.

Wastewater will be generated during the pilot demonstration, as either excavation water, process wastewater, or as decontamination wastewater. Any water generated during the pilot demonstration will be containerized. Excavation water and heavy equipment wash water may be used onsite for dust control purposes in the radioactive materials area. Process wastewater and small tool decontamination water, as well as residual excavation water and heavy equipment wash water not used for dust control, will be characterized to determine appropriate disposal or treatment options.

This Sampling and Analysis Plan (SAP) is one plan within the Pilot Demonstration Work Plan. Since this plan is intended to be a "stand alone" document, essential information from other plans is repeated. For specific details regarding the pilot demonstration, the reader is directed to the appropriate plan. The Pilot Demonstration Work Plan is comprised of the following volumes:

Table 1 - Pilot Demonstration Work Plan Outline

Volume	Section/Title	Description
1	Overview	Provides description and justification for overall effort. Provides a summary of the work plan and road map to associated volumes. Presents the elements of the Pilot Demonstration Report.
2	Soil Acquisition Work Plan and Pilot Plant Pad Design	Provides design and detailed drawings for the host site pad. Provides description, drawings and staging for the soil acquisition effort, including excavation stabilization plan and procedures.
	Processed Material Soil Reuse Evaluation Plan	Evaluates the potential for reusing soil on the FMSS. Soil reuse is not proposed for the pilot demonstration.
3	Pilot Plant Operation Plan	Contains technical details and operational procedures for the pilot plant.
	Attachment A: Gravel Separation System	This information, supplied by the gravel separation system vendor, provides equipment mobilization, safety and health, system operation and maintenance information.
	Attachment B: Radiological Sorting System	This information, supplied by the radiological sorting system vendor provides equipment mobilization, safety and health, system operation and maintenance information.
4	Sampling and Analysis Plan	The SAP implements the project CDQMP, and provides the details on frequency, parameters, and locations for all sampling under the pilot demonstration. This includes the soil acquisition, pilot plant operation, and final survey of the soil acquisition area.
	Construction Quality Control Plan	This plan details how the project Contractor Quality Control Plan (CQCP) will be implemented on this task.
	Safety and Health Plan	This plan implements the project Site Safety and Health Plan and provides the task-specific safety and health considerations.
5	Results of Engineering Test Pits Program at MISS	This volume reports the results of the Engineering Test Pits at MISS program, which was performed as a precursor to the pilot demonstration.

2.0 SAMPLING TASK ORGANIZATION AND RESPONSIBILITIES

This portion of the SAP addresses the organization of the sampling crew and the interface between it and the relevant subcontractors. It describes the sampling task organization and its principal lines of communication and authority. All task personnel including subcontractors are required to comply with the project work plans.

2.1 Sampling Coordinator

The Sampling Coordinator, Mike Ciminera, will be responsible for overseeing all sampling and analysis activities, including preparing sample bottles for collection; managing field sampling records, laboratory chains-of-custody, and other sampling related documentation; coordinating laboratory sample pick-ups; and/or packaging and shipping samples. This individual will manage the activities of the sampling support staff. The Sampling Coordinator will also interface directly with the laboratories regarding the day to day analytical activities of the program.

2.2 Sampling Support Staff

Sufficient sampling support staff will be on hand to collect samples at each location. These support personnel will be responsible to the Sampling Coordinator.

2.3 Project Chemist

The Project Chemist is Brian Tucker. He will provide guidance and technical assistance as needed by the sampling crew.

2.4 Soil Processing Vendors

The gravel separation system will be operated by Franklin Environmental Services. The radiological sorting system will be operated by Thermo NUtech. These vendors will report to the Field Operations Leader (see the Pilot Plant Operation Plan in Volume 3)

2.5 Laboratories

Two laboratories will be utilized in support of this task, an onsite laboratory and an offsite laboratory. The onsite radiological analytical laboratory to be used will be operated by Safety and Ecology Corporation. This laboratory is in the process of becoming USACE-validated. The offsite laboratory will be Severn Trent Laboratories, a USACE-validated analytical laboratory, which will perform both chemical and radiological analyses. Advanced Terra Testing, a geotechnical laboratory, will perform the grain size analyses. These laboratories will report directly to the Sampling Coordinator or the Project Chemist where appropriate.

2.6 QA Laboratory

A QA Laboratory will be assigned by the USACE to evaluate splits of the field samples. Splits will be collected at a frequency of 10% of the offsite laboratory samples.

2.7 Data Validator

An independent data validator, Kestrel Environmental Technologies, will review the laboratory data and evaluate its usability. Section 6.3 discusses the data validation proposed for the pilot demonstration.

3.0 PROBLEM DEFINITION/BACKGROUND

The FMSS became contaminated as a result of processing operations at the Maywood Chemical Works (MCW) where thorium, a radioactive element, was extracted from monazite sand. The primary radioactive contaminants are Thorium-232 (Th-232) and its decay products. There are also lesser amounts of the Uranium-238 (U-238) decay chain, including Radium-226 (Ra-226). Based on laboratory bench-scale testing, investigations at various FUSRAP sites, and rough order-of-magnitude cost estimates for remediating radioactively contaminated soils, use of volume reduction technologies, such as gravel separation or radiological sorting, may reduce the costs of remediating soils at the Maywood site, as well as provide other statutory and community benefits as listed in Section 1.0.

A pilot demonstration is planned to evaluate the feasibility and applicability of using a gravel separation or radiological sorting process at this site. In order to best evaluate these technologies, the pilot demonstration will be conducted using representative soils from the MISS. Data collected will be used to compare the costs associated with use of the full-scale technology to manage and dispose of Maywood soils to the disposal costs without implementing gravel separation or radiological sorting.

4.0 PROJECT DESCRIPTION

The pilot demonstration program will consist of several major tasks. The majority of the sampling and analysis will be conducted during soil acquisition for Stages I and II, soil processing for each stage of excavation, and Stage III activities. These tasks are discussed below. Figure 2 shows the physical layout of the key elements of the program. Figure 3 presents a schematic of the pilot plant process.

4.1 Soil Acquisition

The area of excavation for the soil acquisition will be approximately 190 feet by 165 feet at the ground surface. The excavation will extend to 6 feet in depth. During the soil acquisition task, feedstock soil for the pilot demonstration will be excavated in 1-foot cuts and stockpiled. The majority of the soil will be excavated from an area west of Building 76, as shown in Figure 2. Additional stockpiled material will also be processed. This area contains some retention pond (high fines) material as well as granular material. Stage I of the soil acquisition will involve excavation of the granular material and Stage II will involve excavation of the retention pond material. Volume 2 contains additional details regarding the soil acquisition process.

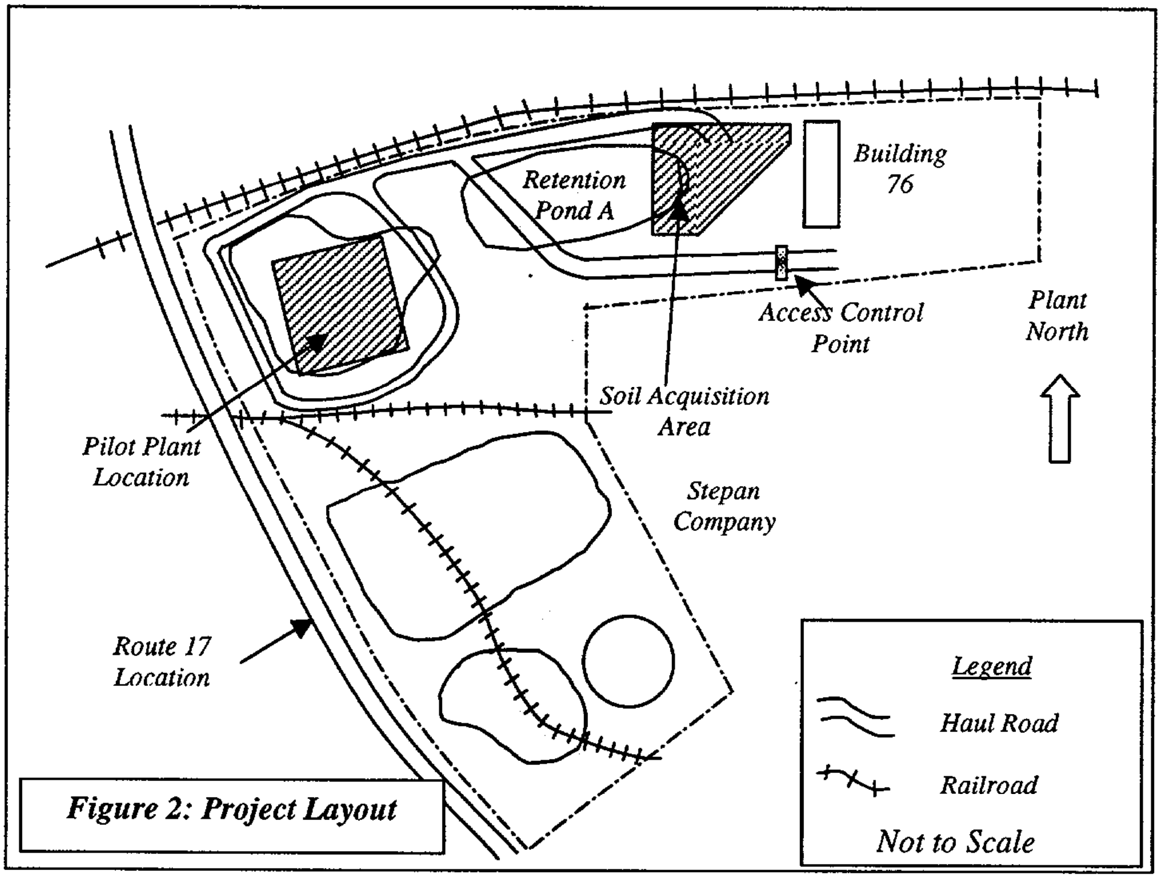


Figure 2: Project Layout

Characterization of the feedstock soil is necessary to establish the input conditions for later comparison with the separated materials that result following the processing. This initial characterization will also be used to identify material which should not be processed because contaminant levels are significantly elevated (above radiological criteria or RCRA standards) such that there is no benefit to be realized by processing it. This characterization will occur prior to the excavation and between each excavation cut. This characterization is discussed further in Section 5.2.

4.2 Soil Processing

Soil deemed processable will be directed through the following process systems:

Gravel Separation – The gravel separation system will be used to produce clean coarse material for beneficial reuse, and sorted 3/8-inch minus material for further processing. In addition to providing an acceptable feed stream for downstream treatment processes, this closed-loop system also rinses the segregated coarse material to remove any adhered contaminated fines.

Radiological Sorting - From the gravel separation process, the 3/8-inch minus material will then be sent through the radiological sorting system and separated into clean and contaminated soil streams, based on radioactivity levels. The material will be sorted based on selected criteria. One of the selected criteria for the pilot demonstration at the MISS is based on 15 pCi/g for Th-232 and Ra-226 and 50 pCi/g for U-238 regardless of depth or location. Other criteria include the permit limits for potential disposal facilities. The equipment will be set to a particular radiological sorting value consistent with the selected criteria for an individual isotope or the sum of the ratios (SOR) for multiple isotopes.

At the endpoints of the operations, the processed material will be sampled for characterization and to facilitate a final comparison of the processed soil conditions with the in situ soil conditions. The processed material characterization will also be used to evaluate options for final disposition.

The process streams are described as follows:

Table 2 - Process System Summary

#	SYSTEM	PROCESS STREAM
1	Soil Acquisition	Feed material: ➢ Stockpiled Material ➢ Granular (Soil Acquisition Stage I) ➢ Fines (Retention Pond Material) (Soil Acquisition Stage II) ➢ Additional Material (Soil Acquisition Stage III)
2	Soil Acquisition	Material not processed (OUTPUT) This material may be oversize, debris, organics, below criteria overburden, or highly contaminated material.
3	Gravel Separation	Material scalped out of the feed by the 6 inch grizzly (>6 inch) (OUTPUT) Remainder of feed goes to shaker screen
4	Gravel Separation	Material greater than 3/8 inches and less than 6 inches. Passing from the gravel separation screen to the gravel rinse system.
5	Gravel Separation	Fines from the gravel rinse (OUTPUT) Fines are recovered from the filters and the sump. They will be placed in an interim container and stockpiled with the other streams.
6	Gravel Separation	Rinsed gravel (>3/8 inch to <6 inch) (OUTPUT) Material that has had adhered fines rinsed off.
7	Gravel Separation	<3/8 inch material directly conveyed to radiological sort This is the material that passes through the screen.
N/A	Radiological Sorting	Material scalped out of the feed by the 1.5 inch screen (>1.5 inch) – for direct feed of retention pond material only. – Sent to Gravel Separation System
8	Radiological Sorting	Soil exceeding the radiological sorting setpoint (OUTPUT) Soil from the gravel separation or the radiological sort screen is processed through the radiological sort system. This is the "above criteria" stream.
9	Radiological Sorting	Soil below the radiological sorting setpoint (OUTPUT) Soil from the gravel separation or the radiological sort screen is processed through the radiological sort system. This is the "below criteria" stream.

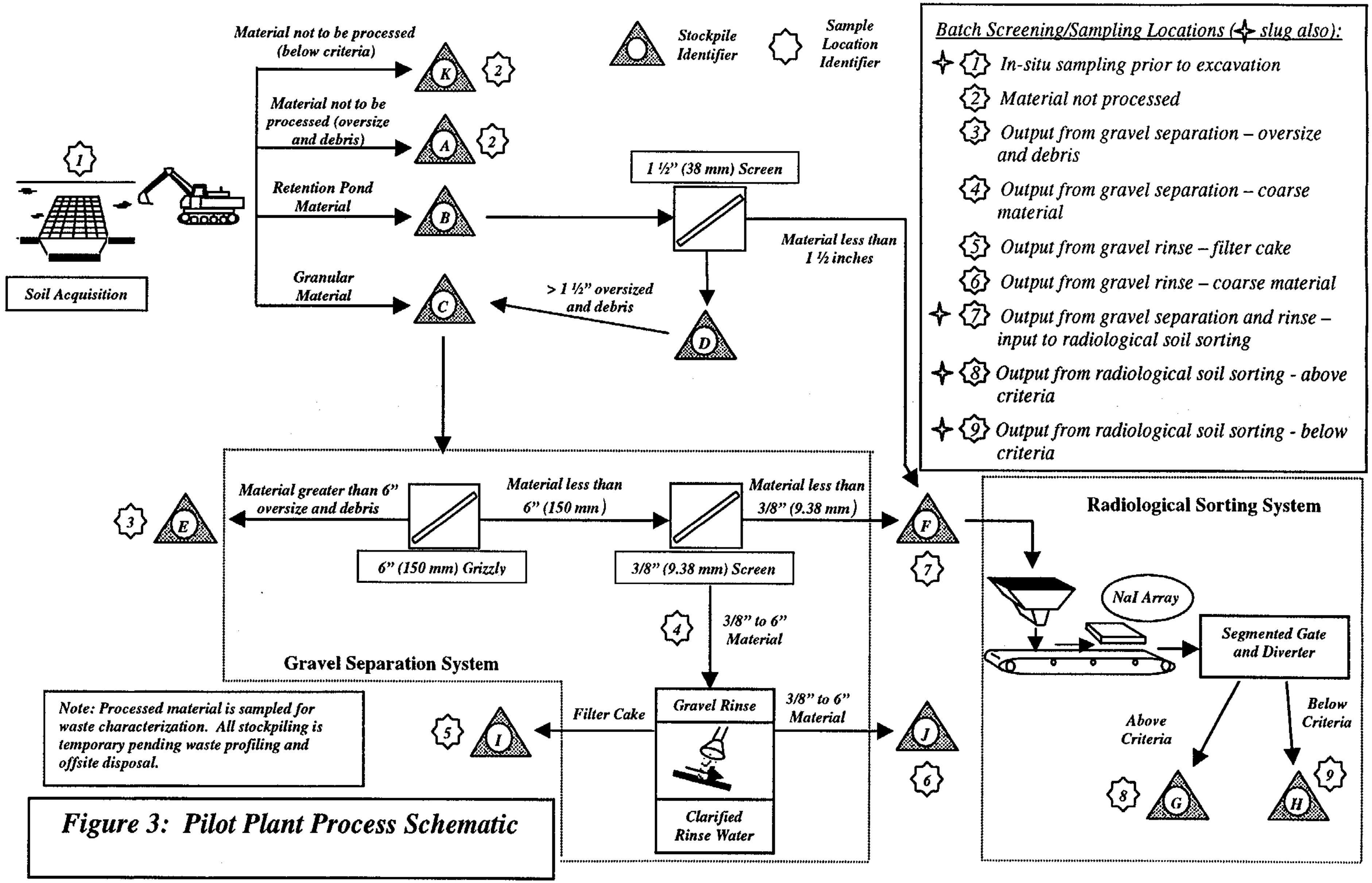


Figure 3: Pilot Plant Process Schematic

4.3 Stage III Activities

When sufficient data has been collected to adequately evaluate the performance of the soil processing systems, the pilot demonstration will proceed to Stage III as discussed in the Soil Acquisition Work Plan and Pilot Plant Pad Design in Volume 2. The following activities are anticipated for Stage III:

- Look at various excavation and material handling techniques (other than excavation in 1-foot cuts), that would be used in full-scale operations and see how they impact the heterogeneity of the feed soil and operation of the system.
- Test various field screening techniques for development of a protocol for identification and removal of residual contamination after initial cut lines are completed.
- Test throughput limits of system (gravel separation unit in particular).
- Test compaction methods used on off-site borrow material to refine methods that attain the desired compaction requirements.
- Obtain experience in implementation of the MARSSIM final status survey methodology. Use both traditional soil sampling with laboratory analysis and surface In situ Object Counting System (ISOCS) to see if there are differences in the outcome of the final status survey using the different methodologies.
- Evaluate techniques for surface water control and management for application during remediation of vicinity properties.

As stated above, a final status survey will be performed following the completion of the soil acquisition excavation and prior to backfilling, once it can be determined that all contaminated material has been removed. The final status survey will be performed using a MARSSIM-like approach. A Final Status Survey Work Plan will be prepared for the implementation of the survey and will be provided at a later date. The final status survey will involve radiological sampling. Chemical samples will also be collected at this time. This testing will be conducted to demonstrate compliance with project cleanup goals for radionuclides and chemicals of concern at the base of the excavation. Additional details regarding the final status survey and backfilling is included in the Soil Acquisition Work Plan and Pilot Plant Pad Design in Volume 2.

4.4 Schedule

The pilot demonstration is anticipated to occur during summer of 2000. Specifically, processing of the material is anticipated to begin on August 7, 2000 and be completed by October 13, 2000. Sampling will occur throughout the demonstration. The Pilot Plant Operation Plan in Volume 3 contains further details regarding the project schedule and key milestones.

5.0 DATA COLLECTION

Both soil and water samples will be collected during the pilot demonstration. Tables 3 and 4 show the frequency of the sampling to be performed. A combination of Screening Level and Definitive Level data as defined in USACE EM 200-1-6 will be collected for soil. Definitive Level data will be collected for water. (Definitive Level data is typically data generated under laboratory conditions using EPA-approved procedures.) Data will be obtained in accordance with the CDQMP and this SAP for the Pilot Demonstration Work Plan. All sampling data collected will be entered into an Access database.

5.1 Data Quality Objectives Process

5.1.1 DQO Process

The formal multi-step DQO process described in Section 2.0 of the QAPP in the CDQMP has been followed to establish the soil sampling requirements for the pilot demonstration project. This process is outlined in the Pilot Plant Operation Plan, Volume 3. Because the water data will not be used for making pilot demonstration decisions, the formal DQO process has not been followed for this medium. The water sampling data obtained will be validated by the data validator prior to using it.

Radiological and chemical measurements will be made using a combination of field screening, onsite laboratory, and offsite laboratory capabilities. QC sample collection, testing methods, and control, as well as laboratory QA protocol shall provide assurance to the data user that the data is of measurable quality. As a measure of quality, the data user shall use laboratory precision, accuracy and completeness criteria for the analytical methods of interest.

5.1.2 Precision, Accuracy, Representativeness, Comparability, and Completeness

The approach to providing reliable data that meets the DQOs for the pilot demonstration includes requirements that are media- and method-specific. Precision, accuracy, representativeness, comparability, and completeness goals have been set for the project. They are detailed in Appendix B of the QAPP within the CDQMP. Method detection limits and practical quantitation limits for the analytical methods of interest are also presented in Appendix A of the QAPP in the CDQMP.

5.2 Sampling Process Design

In order to fully evaluate this data, sufficient samples must be collected to ensure that the data collected is representative of the material being processed. The selection of sampling techniques to be employed is typically based upon the depth from which samples must be obtained, the types of exploration, and/or the nature of the soils to be sampled. A general summary of the sampling sequence for the pilot demonstration is provided in Appendix A.

5.2.1 Soil Sampling Network Design

Sampling will occur during mobilization and start up, soil acquisition, and soil processing for the pilot demonstration. The sampling to be performed during each task is described below. In addition, a final status survey will be performed as part of Stage III activities. The sampling details for the final status survey will be presented in a Final Status Survey Work Plan to be submitted at a later date. Thus these sampling details are not included herein. The Soil Acquisition Work Plan and Pilot Plant Pad Design and Pilot Plant Operation Plan in Volumes 2 and 3 respectively contain additional details regarding the operations and associated equipment to be used.

Soil will be tracked by batch or slug, and in general sampling will be performed on either a batch or slug basis as noted below. A batch will be selected to fit a particular processing scenario (as listed in Table 8 of the Pilot Plant Operation Plan in Volume 3). For example it may consist entirely of above criteria soils, below criteria soils, or a mixture of both. The batch will be used to simulate full-production level efforts. Batch sampling will primarily be used to collect appropriate data to evaluate effectiveness of the processing systems and options for final disposition of the processed materials. Process streams that are initially being sampled on a per batch basis, may have their sampling frequencies reduced if the amount of material generated is sufficiently small to warrant such a reduction.

The slug will consist of a small subset of soil within the batch, it is not intended to characterize the batch. The slug will comprise approximately 8 – 10 cubic yards. This small quantity of soil will be used to track activity and weight to compare pre-processing radiological measurements with those of the separated stockpiles at the conclusion of processing. It will be used to evaluate mixing/dilution and how well the radioactive material can be accounted for. This tracking is further discussed in the Overview in Volume 1. Initially one slug will be evaluated per batch, however, as objectives of the pilot demonstration are realized, the frequencies of the slugs may be reduced. Because the majority of the radioactivity is believed to be associated with the less than 3/8 inch material and due to the geometry of the radiological sample container to be used, only material less than 3/8 inch in size (pre- and post-processing) will be tracked for activity. Thus material greater than 3/8 inch in size will be screened out.

Data collected from the soil acquisition area will be used to chemically characterize the feed soil to profile it for disposal prior to excavation. Because the separated process streams will be mixed back together for disposal purposes following processing, such data will be representative of the waste stream requiring disposal. These results will also be used to tailor the analytes requested for the post-processing samples to only those detected initially. Thus limited sampling will be required of the processed material to evaluate disposal options. This will facilitate transporting the material to an appropriate disposal facility in a more timely fashion.

Before the start up of the pilot demonstration, existing data will be reviewed for the soil acquisition area and additional NaI measurements will be collected utilizing the instrumentation planned for the demonstration. This data will be used to develop a rough correlation between the NaI counts and concentrations of the isotopes of concern to relate the count rates to the SOR. It will be used to guide the selection of the batches and slugs. The count rate that correlates to an

SOR of 1 will be used as the criteria to estimate which soils are greater than or less than the selected criteria. The plan is to process batches consisting of soil that is all above criteria, all below criteria, or mixed etc.

The following sampling will be performed during the pilot demonstration:

Mobilization and Startup: Prior to initiating the pilot demonstration, a test run of the equipment will be performed. For this test run, 10 cubic yards of clean soil obtained from an offsite source will be directed through the systems. A sodium iodide (NaI) surface scan will be performed of this material to ensure radioactivity levels are below background. This material will also be tested for chemical and radiological parameters.

Soil Acquisition: The excavation is planned to occur in 1-foot cuts. Prior to excavation, a 5 foot by 5 foot grid system will be established within the footprint. A gamma survey will be performed for each cut of the excavation. This survey will be conducted in accordance with this SAP and SOP 107, Exposure Rate Instruments. During the survey, gamma count measurements will be obtained by walking at a constant pace (0.5 meters per second) using a NaI detector with a Global Positioning System (GPS) data logger. By downloading this data to a mapping program, an average count rate will be identified for each grid. Based on these readings, a batch will be selected to meet the proposed scenarios (as listed in Table 8 of the Pilot Plant Operation Plan in Volume 3). Initially for each batch, one slug of soil (consisting of 8 to 10 cubic yards from contiguous grids) within the batch will be processed separately. (The frequencies of the slugs may be reduced as objectives of the pilot demonstration are realized.) This slug will be selected based upon the type of evaluation planned for the batch (for example, it may consist completely of above criteria material or below criteria material or a combination of both). The slug will be sampled (<3/8 inch material only) with more detail to facilitate activity tracking around the pilot plant. For the slug, one grab sample will be collected from each grid within the slug at a location representing the average count rate for the grid. These samples will be analyzed by the onsite laboratory for gamma spectroscopy. Following this characterization, a 1-foot cut will be excavated over the designated cells for the slug. After the slug has been excavated, the remaining cells within the batch will be excavated also in 1-foot cuts. The slug will be stockpiled separately from the remainder of the batch to await processing.

The excavated material will be stockpiled into one of four stockpile areas. One stockpile area will consist of below criteria material that would not require processing. This material will be sampled for radiological and chemical parameters to evaluate it for final disposition. A second stockpile area will consist of radiological material not suitable for processing, such as debris or highly radiologically- or chemically-contaminated material (substantially above criteria or above RCRA standards). A NaI surface scan will be performed on the debris to survey it for waste disposal. Material that could be categorized as construction debris (brick, concrete, etc.) will have a wipe sample collected for each batch or each 50 cubic yards (whichever is less), for radiological and chemical parameters to evaluate options for final disposition. The results of the wipe samples will be used to calculate a surface activity to mass ratio using NUREG 1640. The highly radiologically- and chemically-contaminated material will be sampled for radiological and chemical parameters to characterize it for waste disposal. The third stockpile area will consist of retention pond material (high fines), which will not be processed by the gravel separation system and will instead be placed directly into the radiological sorting system. The fourth stockpile area will be for granular material which will be processed by both systems.

Soil Processing: The slug will be processed before the remainder of the batch. Oversize material (greater than 6 inches in diameter) and debris will first be separated out using a grizzly. This oversize material will be stockpiled and, at the end of each batch, radiologically screened using a NaI detector to survey it for disposal. Material that could be categorized as construction debris (brick, concrete, etc.) will have a wipe sample collected for each batch or each 50 cubic yards (whichever is less), for radiological and chemical parameters to evaluate options for final disposition. The results of the wipe samples will be used to calculate a surface activity to mass ratio using NUREG 1640. The material that is less than 6 inches in diameter will proceed through the system, where it will then be separated into two process streams (3/8 – 6 inch and <3/8 inch), using a 3/8 inch screen. (During the course of the pilot demonstration, additional screens may be used in lieu of the 3/8 inch screen for comparison.)

The first process stream, consisting of material between 3/8 and 6 inches, will be directed to the rinsing area. Over the course of the pilot demonstration, approximately four or five grab samples will be collected of this process stream before it enters the rinse area. These samples will be analyzed for gamma spectroscopy to determine if the rinse operation is beneficial. Once in the rinse area, the material will be rinsed to remove the contaminated fines. At the end of each batch or each 50 cubic yards (whichever is less), one grab sample each will be collected for the rinsed material between 3/8 and 6 inches. While batch sampling will be conducted initially for the filter cake, due to the small volume anticipated to be generated, less frequent sampling may be adopted. These samples will be analyzed for radiological and chemical parameters and their results used to evaluate options for final disposition.

The second stream, material less than 3/8 inch in size, will proceed to the radiological sorting system. For each slug, three grab samples will be collected of this process stream before it enters the radiological sorting system. These samples will be analyzed for gamma spectroscopy for input to the activity tracking. In addition, over the course of the pilot demonstration, approximately four or five composite samples will be collected of this process stream before it enters the radiological sorting system. The samples will be analyzed for grain size distribution, with gamma spectroscopy being run subsequently on the fractions retained on the #4 sieve (1/4 inch), in order to evaluate the impact the use of different screen sizes might have.

Excavated retention pond material (high fines) will be directly loaded into the radiological sorting system (i.e. it will not be processed in the gravel separation system). This material will pass through an initial screen to remove material greater than 1½ inches. The material that is removed will be stockpiled for later processing by the gravel separation system.

In the radiological sorting system, the material will be separated based on radiological concentration. The material above the selected criteria will be separated from that below the selected criteria. During the processing of each slug, three grab samples will be collected from each of the above criteria and below criteria streams for analysis of radiological parameters for input to the activity tracking. For each batch or 50 cubic yards (whichever is less), one grab sample will be collected from each output stream for radiological and chemical parameters to evaluate options for final disposition.

5.2.2 Water Sampling Process Design

Wastewater may be generated during any of the three tasks discussed above. It will likely consist of either excavation water (if precipitation run on occurs into the excavation or a perched layer of groundwater within the excavation footprint is encountered), process wastewater, or decontamination wastewater. The excavation water will be collected via sumps constructed during the soil acquisition task. This water will be pumped from the excavation into a temporary storage tank. Process wastewater will be generated by the gravel separation system. Although this system is a closed system, there will be a need to periodically purge the water in the system and replace it with fresh water if it cannot be adequately cleaned by the system's filters. Also, at the conclusion of the demonstration, the water within the system will need to be removed prior to demobilization. This process wastewater will be pumped into a separate temporary storage tank. Decontamination wastewater will result from either the decontamination of heavy equipment or small sampling tools. This water will also be collected and placed in drums. Excavation water and heavy equipment wash water may be used onsite for dust control purposes in the radioactive materials area. Process wastewater and small tool decontamination water will require appropriate disposal or treatment. Individual samples will be collected of all wastewater not used for dust control in order to characterize it to determine appropriate disposal options. Turbid water will be clarified prior to disposal.

5.2.3 Measurement parameters

The testing of soil for radiological parameters will utilize field and onsite methodologies. Field methodologies (to collect screening level data) will consist of a NaI scan performed using a Ludlum 2221 scaler/ratemeter or equivalent combined with a Ludlum Model 44-10 2-inch x 2-inch NaI gamma scintillation detector or equivalent. This instrument will be linked to a Global Positioning System (GPS) datalogger. This walkover survey will be conducted in accordance with SOP 107, Exposure Rate Instruments (see Appendix B). The onsite laboratory will perform definitive level gamma spectroscopy analyses for the radiological isotopes of concern Th-232, Ra-226, and U-238. All water samples will be submitted to the offsite laboratory for gamma spectroscopy as well as gross alpha and gross beta analyses.

Chemical analyses will be performed by the offsite laboratory to characterize the processed material and wastewater to evaluate disposal options. This testing will involve the parameters identified in Section 5.4.2. Sampling parameters for each process stream are detailed in Table 4.

Geotechnical samples will be collected and analyzed for grain size distribution. Gamma spectroscopy will be run on the fractions retained on the #4 sieve (1/4 inch). The grain size analyses will be performed by the offsite geotechnical laboratory.

5.2.4 Sample Identification

Sample identification protocols are presented in Table 3-1 of the FSP in the CDQMP. A 19-digit sample/site identification number will be used (XXX AAA VV NNN mm n #####). For the pilot demonstration, several of these digits will remain constant. For example, in accordance with Table 3-1 of the CDQMP, the site designation, "XXX", for the MISS will be "12b" and the activity designation, "AAA", will be "PT1". The sample collection designation, "VV", will be HN for hand sampling.

Thus, the sample/site identifier for data base reporting will look like:

12b PT1 HN NNN mm n #####

with the latter digits varying by sample as follows:

The unique station number "NNN" will be identified as follows:

- INS – Insitu Soil, Prior to Excavation
- MNP – Material Not Processed
- GOV – Oversize (>6 inch) Material Resulting from the Gravel Separation System
- GBR – 3/8 to 6 inch Material Before Being Rinsed
- GPS - 3/8 to 6 inch Rinsed Material Resulting from the Gravel Rinse
- GFN – Fines Resulting from the Gravel Rinse
- GTS – <3/8 inch Material Exiting the Gravel Separation System and Entering the Radiological Sorting System
- SBC – Sorted Material Below Criteria Resulting from Radiological Sorting System
- SAC – Sorted Material Above Criteria Resulting from Radiological Sorting System

The media, "mm", will be designated as "SS" for surface soil, "SB" for subsurface soil, "SK" for stockpiles, "SM" for wipes, and "PS" for process soil.

The number "n" for the sample type (i.e. regular (0), duplicate (1), split (2), etc.) will be designated in the field, as will the sequential sample number "#####".

For example, sample identification number "12b PT1 HN SBC SK 1 37000" represents a duplicate stockpile soil sample collected from material that has exited the radiological sorting system and is below the selected criteria. It is the 37,000th sample point to be registered to the database for the project.

5.2.5 Decontamination

Decontamination will be performed in accordance with SOP 506, Decontamination. All sampling equipment will be decontaminated between samples and all excavation equipment will be decontaminated prior to arriving at or leaving the site. Excavation equipment will be decontaminated by the equipment subcontractor using high-pressure water or steam to the satisfaction of the onsite Stone & Webster representative. Water used will be from an approved source.

For heavy equipment decontamination, a temporary decontamination pad will be built to replace the existing decontamination pad, which must be demolished because it is within the soil acquisition area. The temporary decontamination pad will be located so as to be accessible to others on the project as necessary. Decontamination liquids will be collected in drums and may be used for dust control for post-processing stockpiles.

5.3 Sampling Methods Requirements

For soil sampling for the pilot demonstration, samples will be collected using several different methodologies. Soil samples collected during the soil acquisition will be collected using hand tools (such as trowels) in accordance with SOP 307, Surface and Shallow Subsurface Soil Sampling. During soil processing, stockpile sampling will be performed using a hand auger or equivalent piece of equipment in accordance with SOP 314, Stockpile Sampling. Direct sampling from the conveyors will also be employed. During the processing of each slug, three grab samples will be collected from the conveyors between the two systems and at the end of the radiological sorting process from both the above and below criteria streams. These samples will be collected at three intervals (1/3, 2/3, and 3/3 of the way through the slug). They will be analyzed for gamma spectroscopy. A composite sample will also be collected during the processing of several of the slugs from the conveyor located between the systems. These composite samples will be analyzed for grain size distribution and respective activity content of certain fractions. The composite sample will be collected by taking an aliquot of soil each minute that the slug of soil is being processed and mixing all the aliquots together following completion of the processing of the slug.

Samples of wastewater will be taken in accordance with SOP 302, Surface Water Sampling. A dipper such as a bailer or a clean glass bottle will be utilized to collect the samples.

5.4 Analytical Methods Summary

Tables 3 and 4 present the summary of sampling and analyses to be performed during the pilot demonstration. These tables do not include QA and QC samples, which will be collected at a frequency of 10% of the regular samples.

5.4.1 Radiological

An onsite laboratory will be utilized to perform the gamma spectroscopy of soil samples. The field laboratory will utilize a Canberra GC3020 detector coupled to an "A" Module or equivalent. Data will be analyzed by GENII 2000 and Procount 2000 software or equivalent. The Procedures Manual for the field laboratory is located in Appendix H of the QAPP within the CDQMP. While this laboratory is in the process of being validated by the USACE, it is anticipated that this process will not be completed before the start of the pilot demonstration. Therefore, until the onsite laboratory becomes USACE-validated, the offsite laboratory will perform confirmatory analysis on ten percent of the pilot demonstration soil samples analyzed by the onsite laboratory. The following radiological methods will be utilized for the confirmatory analyses:

- Th 232 and U-238 – HASL-300
- Ra-226 – Modified EPA 903.1

The offsite laboratory will also analyze all the radiological water samples. The following radiological methods will be utilized for the water samples:

- Th 232 and U-238 – HASL-300
- Ra-226 – Modified EPA 903.1
- Gross Alpha and Gross Beta – EPA 900

Minimum Detectable Concentrations for the radiological isotopes of interest for the onsite and offsite laboratories are included in Appendix A of the QAPP within the CDQMP.

QA of the offsite laboratory will be performed by a USACE-designated offsite laboratory. Ten percent of the soil and water laboratory samples submitted for offsite analysis will be submitted to the QA laboratory.

5.4.2 Chemical

Chemical sampling will be conducted by the offsite laboratory. Soil samples will be analyzed for reuse and disposal parameters. Disposal sampling will depend on the permit for the selected disposal facility. For soil samples, the following methods are provided as an example of possible parameters:

VOCs	SW 846 Method 5035/8260B
SVOCs	SW 846 Method 3540C, 3541, or 3550B/8270C
TAL Metals & Mo Mercury	SW 846 Method 3050B/6010B SW 846 Method 7471A
Pesticides	SW 846 Method 3540C, 3541, or 3550B/8081A
PCBs	SW 846 Method 3540C, 3541, or 3550B/8082
TRPH	EPA Method 418.1
pH	SW 846 Method 9045C
TCLP	SW 846 Method 1311 (Extraction) Analyses as per above method
Total Organic Halides	SW 846 Method 9020
Paint Filter Liquid Test	SW 846 Method 9095A
Flashpoint	SW 846 Method 1010
Reactive Cyanide	SW 846 Chapter 7
Reactive Sulfide	SW 846 Chapter 7

Stone & Webster will utilize a sonication extraction method for all SVOC, pesticide, and PCB samples with the exception of those containing a clay matrix (cohesive). For clay soils, a soxhlet extraction method will be utilized. Samples selected to have corresponding QA or QC samples will be chosen such that some require the soxhlet extraction method and some require the sonication extraction method, thus allowing both methods to be evaluated.

Analyses requested for the water samples submitted to the offsite laboratory will depend on the permit for the selected receiving facility. The following analyses are provided as an example:

VOCs	SW 846 Method 5030B/8260B
SVOCs	SW 846 Method 3510C or 3520C/8270C
TAL Metals & Mo Mercury	SW 846 Method 3010A/6010B SW 846 Method 7470A
Pesticides	SW 846 Method 3510C or 3520C/8081A
PCBs	SW 846 Method 3510C or 3520C/8082
TRPH	EPA Method 418.1
pH	EPA Method 150.1
Total Suspended Solids	EPA Method 160.2
Biological Oxygen Demand	EPA Method 405.1
Ammonia as Nitrogen	EPA Method 350.1
Oil and Grease	EPA Method 413.1

Once disposal facilities are identified, the above soil and water parameter lists will be modified according to the facilities' requirements.

Geotechnical samples will be analyzed for grain size distribution by ASTM Method D422.

Tables 4-1 and 4-2 in the QAPP within the CDQMP details the container, preservative, and holding time requirements for the soil and water analyses respectively.

QA splits, at a frequency of 10% of the regular samples, will be collected and submitted to a QA Laboratory to be designated by the USACE.

6.0 SAMPLING AND ANALYSIS QUALITY CONTROL

QC activities will be performed in accordance with the CQCP and the CDQMP. This section details the QC to be employed during the sampling and analysis activities proposed for the pilot demonstration. In all cases, QC methods commensurate with the anticipated future use of the data being collected will be employed. QC of the pilot demonstration in general is discussed in further detail in the Construction Quality Control Plan, also included in this Volume 4.

The three phase control system as described in the CQCP will be executed. During the preparatory inspection, the Contractor Quality Control System Manager will evaluate key sampling criteria including sampling techniques, sample control, sample logging protocol, and field document control.

Daily follow up inspections will be performed during the course of the demonstration to ensure quality is maintained.

6.1 Field Sampling Quality Control

The field QC process for sampling activities includes the use of checklists to document the performance of necessary tasks. The following sampling checklists will be utilized:

- Instrument Calibration
- Field Documentation
- Demobilization Decontamination
- Data Management
- Reports and Other Documents
- Sample Collection
- Packing, Storing, and Shipment of Samples

All samples collected will be documented on the Daily Quality Control Reports (DQCRs) (see the Construction Quality Control Plan also within Volume 4) to be completed to document project activities. These reports will be submitted weekly, as specified in the CDQMP, to the USACE Kansas City District and any onsite USACE representatives. Sampling field changes will be documented utilizing a Field Change Record.

Field QC also involves the use of calibration standards and blanks for photoionization detector measurements and other field measurements. Special samples to be submitted to the laboratory will include trip blanks, equipment rinsate blanks, and field duplicates. They are analyzed in the laboratory as samples, and their purpose is to assess transport, decontamination procedures, and sampling and testing procedures as possible sources of sample contamination and to document overall sampling and analytical precision. These samples will be submitted at a rate of 10% of the total samples for each medium. Additional blanks or duplicates may be collected if field circumstances are such that normal procedures are considered insufficient to prevent or control sample contamination. Rigorous documentation of all field QC samples in the project logbooks is mandatory. Field notebooks will be maintained in accordance with SOP 507, Field Notebook Content and Control.

6.2 Laboratory Quality Control/Quality Assurance

Laboratory QC is addressed in Section 4.0 of the QAPP within the CDQMP. The laboratory QC for chemical analyses is based on criteria developed for the QA elements of ER 1110-1-263. The analysis of control samples (e.g., laboratory control samples and method blanks) is routinely done to monitor the performance of each analytical method. An important element of the Maywood effort will be the collection and analysis of samples to evaluate matrix effects on target compound response. These samples, designated matrix spike/matrix spike duplicates (MS/MSDs), will be prepared in the laboratory by adding a known amount of pure compounds to an actual sample to determine potential interferences. MS/MSDs will be collected in accordance with standard USEPA and SW-846 protocols.

The performance of QC samples are continually evaluated. Acceptable limits are established for each method as described in SW-846. Both the onsite and offsite laboratories will provide results of control sample analyses to Stone & Webster on an ongoing basis during the field/analytical program. The laboratories are responsible to identify sample results that do not meet established criteria. Noncompliance situations must be addressed and corrective actions are required prior to analysis of additional samples.

QA procedures have been established by both the USACE and by Stone & Webster for this project. Laboratory QA is further discussed in QAPP in the CDQMP. The USACE QA program is outlined in ER 1110-1-263. One element of this program is the use of a QA laboratory. Splits of certain samples (10% of the offsite laboratory samples) will be sent to a QA laboratory designated by the USACE. This QA laboratory will analyze the samples independent of Stone & Webster's offsite laboratory. The results will be submitted to the USACE along with the corresponding laboratory results for evaluation.

6.3 Data Validation

Prior to use, all sampling data will be validated by a data validator utilizing EPA and USACE procedures. Data validation will be conducted by comparing the contents of the data package, including QA/QC results, to the requirements stipulated by the individual methods. The data validation subcontractor will use the specific guidance contained in Appendix G of the CDQMP, USACE Data Quality Evaluation Guidance, and USACE Radionuclide Data Quality Evaluation Guidance.

7.0 REFERENCES

1. Stone & Webster. *Chemical Data Quality Management Plan, Revision 1*, February 2000.

2. Stone & Webster. *Contractor Quality Control Plan*, October 1999.

3. Stone & Webster. *Materials Handling/Transport and Disposal Plan, Revision 1*, January 2000.

4. Stone & Webster. *Site Safety and Health Plan*, August 1999.

5. Stone & Webster. *General Environmental Protection Plan*, November 1999.

6. USACE. *Chemical Data Management for Hazardous Waste Remedial Activities*, ER 1110-1-263, 30 April 1998.

7. USACE. *Chemical Quality Assurance for HTRW Projects*, EM-200-1-6, October 1997.

8. USACE. *Requirements for the Preparation of Sampling and Analysis Plans*, EM 200-1-3, September 1994.

9. USEPA. *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, SW-846, Third Edition, Revision 1, Updates 1, 2, and 3.*

TABLES

TABLE 3 RADIOLOGICAL SAMPLING REQUIREMENTS
PILOT DEMONSTRATION

Sample Location		Sample Type/Media	Frequency[1]	Radiological Analyses	Rationale
In situ – Prior to Excavation (Screen/Sample Location 1)[2]	Field Screening	Scan/Soil	Entire lift – 100% scan	Sodium Iodide	Establish insitu conditions prior to excavation for activity tracking of input process stream Collect data to define slugs and batches
	Onsite Laboratory	Grab/Soil	One sample per grid within each slug	Gamma Spectroscopy	
Test Run Material	Field Screening	Scan/Soil	Entire stockpile – 100% scan	Sodium Iodide	Verify below criteria prior to use in test run of equipment
	Offsite Laboratory	Grab/Soil	One sample	Gamma Spectroscopy	
Material Not Processed (Screen/Sample Location 2)[2]	Field Screening	Scan/Bulk (Oversize construction debris and trash)	Entire stockpile - 100% scan	Sodium Iodide	Evaluate for final disposition
	Onsite Laboratory	Wipe/Bulk (Oversize construction debris)	One sample per batch or 50 cubic yards, whichever is less	Gamma Spectroscopy – Surface wipes, use surface activity/mass ratio	
	Onsite Laboratory	Grab/Soil	One sample per 50 cubic yards (Retention Pond Material and below criteria soil, based on in situ gamma survey, only)	Gamma Spectroscopy	
Output from Gravel Separation *Oversize and Debris (> 6 inches)* (Screen/Sample Location 3)[2]	Field Screening	Scan/Bulk	100% scan of each slug stockpile and each batch stockpile	Sodium Iodide	Evaluate for final disposition
	Onsite Laboratory	Wipe/Bulk (Oversize construction debris)	One sample per batch or 50 cubic yards, whichever is less	Gamma Spectroscopy – Surface wipes, use surface activity/mass ratio	
Output from Gravel Separation (prior to rinse) *Coarse Material (3/8 – 6 inches)* (Screen/Sample Location 4)[2]	Onsite Laboratory	Grab/Soil	4-5 samples over course of demonstration	Gamma Spectroscopy	Determine applicability of gravel rinse system
Output from Gravel Rinse *Filter Cake* (Screen/Sample Location 5)[2]	Onsite Laboratory	Grab/Sludge	One sample for each batch	Gamma Spectroscopy	Characterize material for disposal
Output from Gravel Rinse *Coarse Material (3/8 – 6 inches)* (Screen/Sample Location 6)[2]	Field Screening	Scan/Soil	100% scan of each slug stockpile and each batch stockpile	Sodium Iodide	Evaluate for final disposition
	Onsite Laboratory	Grab/Soil	One sample for each batch or 50 cubic yards, whichever is less	Gamma Spectroscopy	
Output from Gravel Separation and Rinse/ Input to Radiological Soil Sorting (< 3/8 inch) (Screen/Sample Location 7)[2]	Onsite Laboratory	Composite/Soil	4-5 samples over course of demonstration	Gamma Spectroscopy of fractions following grain size analysis	Evaluate use of different screen sizes
	Onsite Laboratory	Grab/Soil	Three samples per slug	Gamma Spectroscopy	Characterize intermediate process stream for activity tracking
Output from Radiological Soil Sorting *Above Criteria* (Screen/Sample Location 8)[2]	Field Screening	Scan/Soil	100% scan of each slug stockpile	Sodium Iodide	Characterize output process stream for activity tracking Characterize material for disposal
	Onsite Laboratory	Grab/Soil	Three samples for each slug and one sample for each batch or 50 cubic yards, whichever is less	Gamma Spectroscopy	
Output from Radiological Soil Sorting *Below Criteria* (Screen/Sample Location 9)[2]	Field Screening	Scan/Soil	100% scan of each slug stockpile	Sodium Iodide	Characterize output process stream for activity tracking Evaluate for final disposition
	Onsite Laboratory	Grab/Soil	Three samples for each slug and one sample for each batch or 50 cubic yards, whichever is less	Gamma Spectroscopy	
Final Status Survey – Refer to Soil Acquisition Plan in Volume 2	Offsite Laboratory	Grab/Soil	To be submitted as part of Final Status Survey Work Plan at later date		Document compliance with project clean up goals Perform MARSSIM-type survey of base

Sample Location		Sample Type/Media	Frequency[1]	Radiological Analyses	Rationale
Excavation Water (if not used for dust control)	Offsite Laboratory	Grab/Water	One sample per frac tank	Gamma Spectroscopy, Gross Alpha, Gross Beta	Characterize water for disposal
Process Wastewater	Offsite Laboratory	Grab/Water	One sample per frac tank	Gamma Spectroscopy, Gross Alpha, Gross Beta	Characterize water for disposal
Decontamination Wastewater (if not used for dust control)	Offsite Laboratory	GrabWater	One sample per drum	Gamma Spectroscopy, Gross Alpha, Gross Beta	Characterize water for disposal

Notes: 1. A batch consists of a pre-determined quantity of soil with characteristics which satisfy a specific objective. Each slug (consisting of 8 – 10 cubic yards within the batch) will undergo detailed sampling to facilitate activity tracking. Slugs will be processed one per batch initially, and less frequently as the objectives are realized. In addition, QA/QC samples will be collected at a frequency of ten percent each for all samples.

2. Refer to Figure 3 for Screen/Sample Locations

TABLE 4 CHEMICAL AND GEOTECHNICAL SAMPLING REQUIREMENTS
PILOT DEMONSTRATION

Sample Location		Sample Type/Media	Frequency[1]	Chemical Analyses[2]	Rationale
In situ Prior to Excavation (Sample location 1)[3]	Offsite Laboratory	Grab/Soil	Approximately one sample per 1000 cubic yards of in place soil	VOCs, SVOCs, TAL Metals & Mo, Pesticides, PCBs, TRPH, Waste Characteristics	Characterize material for disposal
Test Run Material	Offsite Laboratory	Grab/Soil	One sample	VOCs, SVOCs, Pesticides, PCBs, TAL metals	Verify not contaminated prior to use in test run of equipment
Material Not Processed (Screen/Sample Location 2)[3]	Offsite Laboratory	Grab/Soil	One sample per 50 cubic yards (Retention Pond Material and below criteria soil, based on in situ survey, only)	VOCs, SVOCs, TAL Metals & Mo, Pesticides, PCBs, TRPH, Waste Characteristics	Evaluate for final disposition.
	Offsite Laboratory	Wipe/Bulk (Oversize construction debris)	One sample per batch or 50 cubic yards, whichever is less	VOCs, SVOCs, TAL Metals, Pesticides, PCBs – use surface activity/mass ratio	
Output from Gravel Separation *Oversize and Debris (> 6 inches)* (Screen/Sample Location 3)[3]	Offsite Laboratory	Wipe/Bulk (Oversize construction debris)	One sample per batch or 50 cubic yards, whichever is less	VOCs, SVOCs, TAL Metals, Pesticides, PCBs - use surface activity/mass ratio	Evaluate for final disposition.
Output from Gravel Rinse *Filter Cake* (Sample Location 5)[3]	Offsite Laboratory	Grab/Sludge	One sample for each batch	VOCs, SVOCs, TAL Metals & Mo, Pesticides, PCBs, TRPH, Waste Characteristics	Characterize material for disposal
Output from Gravel Rinse *Coarse Material (3/8 – 6 inches)* (Sample Location 6)[3]	Offsite Laboratory	Grab/Soil	One sample per batch or 50 cubic yards, whichever is less	VOCs, SVOCs, TAL Metals & Mo, Pesticides, PCBs, TRPH, Waste Characteristics	Evaluate for final disposition
Output from Gravel Separation and Rinse Input to Radiological Soil Sorting (< 3/8 inch) (Sample Location 7)[3]	Offsite Laboratory	Composite/Soil	4-5 samples over course of demonstration	Grain Size Distribution	Evaluate use of different screen sizes
Output from Radiological Soil Sorting *Above Criteria* (Sample Location 8)[3]	Offsite Laboratory	Grab/Soil	One sample per batch or 50 cubic yards, whichever is less	VOCs, SVOCs, TAL Metals & Mo, Pesticides, PCBs, TRPH, Waste Characteristics	Characterize material for disposal
Output from Radiological Soil Sorting *Below Criteria* (Sample Location 9)[3]	Offsite Laboratory	Grab/Soil	One sample per batch or 50 cubic yards, whichever is less	VOCs, SVOCs, TAL Metals & Mo, Pesticides, PCBs, TRPH, Waste Characteristics	Evaluate for final disposition
Excavation Water (if not used for dust control)	Offsite Laboratory	Grab/Water	One sample per frac tank	VOCs, SVOCs, TAL Metals & Mo, Pesticides, PCBs, TRPH, pH, Total Suspended Solids, Biological Oxygen Demand, Ammonia as Nitrogen, Oil and Grease	Characterize water for disposal
Process Wastewater	Offsite Laboratory	Grab/Water	One sample per frac tank	VOCs, SVOCs, TAL Metals & Mo, Pesticides, PCBs, TRPH, pH, Total Suspended Solids, Biological Oxygen Demand, Ammonia as Nitrogen, Oil and Grease	Characterize water for disposal

Sample Location		Sample Type/Media	Frequency[1]	Chemical Analyses[2]	Rationale
Decontamination Wastewater (if not used for dust control)	Offsite Laboratory	Grab/Water	One sample per drum	VOCs, SVOCs, TAL Metals & Mo, Pesticides, PCBs, TRPH, pH, Total Suspended Solids, Biological Oxygen Demand, Ammonia as Nitrogen, Oil and Grease	Characterize water for disposal

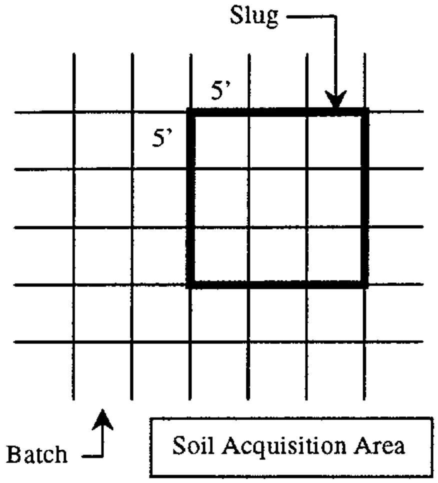
Notes: 1. A batch consists of a pre-determined quantity of soil with characteristics which satisfy a specific objective. Each slug (consisting of 8 – 10 cubic yards of the batch) will undergo detailed sampling to facilitate mass and activity tracking. Slugs will be processed one per batch initially, and less frequently as the objectives are realized. In addition, QA/QC samples will be collected at a frequency of ten percent each for all samples.
2. Waste Characteristics consist of pH, TCLP, Total Organic Halides, Paint Filter Liquid Test, Flashpoint, Reactive Cyanide, and Reactive Sulfide.
Soil and water analyses listed are provided as example only. Disposal analyses to be performed in accordance with the permit for the selected receiving facility.
3. Refer to Figure 3 for Screen/Sample Locations

APPENDIX A

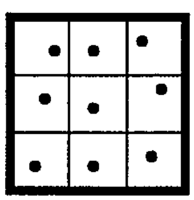
General Sampling Sequence

GENERAL SOIL ACQUISITION SAMPLING SEQUENCE FOR PILOT DEMONSTRATION

Steps 1 – 4:



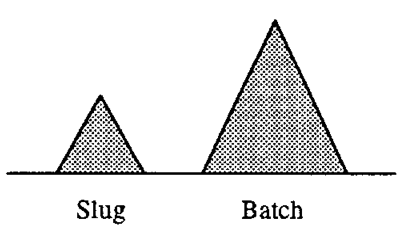
Step 5:



Slug

• Sampling Point for Gamma Spectroscopy

Steps 6 – 8:



Note: Material not suitable for processing is stockpiled separately from the slug and the batch.

SOIL ACQUISITION – SLUG AND BATCH:

1. Set up a 5' by 5' grid system in the soil acquisition area.

2. Obtain a 100% scan of the footprint of the soil acquisition area using a NaI detector linked to GPS. This is done by walking at a constant pace across each grid in the soil acquisition footprint. (Refer to SOP SW-MWD-111-0)

3. Review the data collected from the scan – identify the batch(es) to meet the proposed scenarios such as: all above criteria, all below criteria, mixed, all certain type of material, etc. The batch will be used to evaluate the effectiveness of the systems and look at the economics of implementing them, such as operational costs and options for final disposition of the processed materials. Material deemed unprocessable, either because it is highly contaminated or already below criteria or else it consists of debris will not be considered as part of the batch and will be excavated and stockpiled separately.

4. Within each identified batch, select a slug consisting of a set number of grids (e.g. 9 grids total, 3 grids by 3 grids in size). Mark the boundaries of this material. The slug will be used to track the activity of the material entering and exiting the processing systems in order to determine the degree of homogenization that soils handling and processing has on the selected soil.

5. Within each grid for the slug, re-scan the grid and collect a sample corresponding to the location of the average count rate for the respective grid. (Refer to SOP SW-MWD-307-0; Note that only <3/8 inch material is to be sampled because the majority of the radioactivity is believed to be associated with the <3/8 inch material and the geometry of the sample container places constraints on the size of the material analyzed.) This sample is to be analyzed by the onsite laboratory using gamma spectroscopy. Thus, for the example provided, 9 total samples will be collected for each slug. This sampling will facilitate determining the curie concentration of the slug prior to processing.

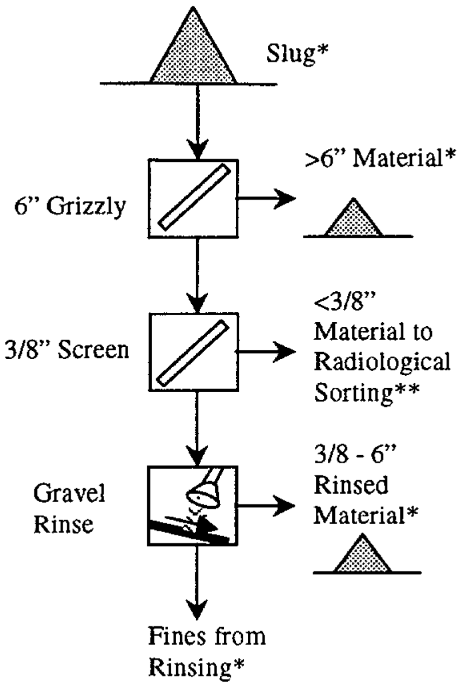
6. Excavate the slug first (ahead of the remainder of the batch) and stockpile it separately to prepare for processing. It will be processed first.

7. Material unsuitable for processing is then removed from the remainder of the batch and placed into separate stockpiles. This material will be characterized and disposed of directly without processing.

8. Excavate the remainder of the batch and stockpile it separately from the slug. It will be processed once the slug is complete.

GENERAL SLUG SAMPLING SEQUENCE FOR PILOT DEMONSTRATION

Gravel Separation
Steps 1 – 4:



* Obtain Weight of Material after Processing is Complete
** Obtain Weight and Collect Sample of Material after Processing is Complete

SOIL PROCESSING – GRAVEL SEPARATION - SLUG:

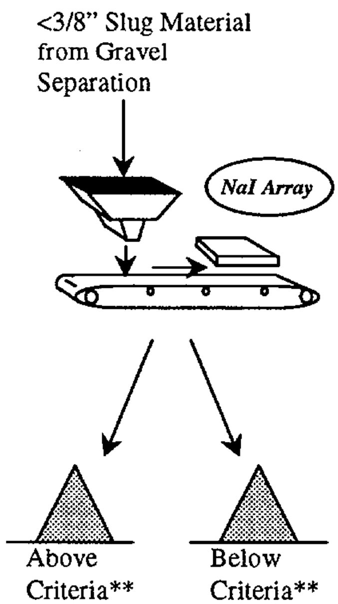
1. Begin loading the slug into the gravel separation system feed hopper. Weigh the material as it is loaded. This information will be used to track the weight of the material being processed. It will also be used in association with the previously obtained gamma spectroscopy results of the 9 soil samples to calculate the total activity of the slug.

2. The material will be separated into 4 streams. The streams are:
   - >6 inch material separated by the grizzly
   - <3/8 inch material which will be conveyed to the radiological sorting system
   - 3/8 - 6 inch material rinsed to remove fines
   - fines rinsed from the 3/8 - 6 inch material

3. Once the processing of the slug is complete, tally the weights of the >6 inch material, <3/8 inch material which proceeds to the radiological sorting system, and the 3/8 – 6 inch material that has been rinsed. Also weigh the fines resulting from the rinsing. This information will be used to track the weight of the material being processed.

4. Collect three grab samples from the conveyor between the gravel separation and radiological sorting systems. These samples should be collected at the intervals 1/3, 2/3, and 3/3 of the way through the slug. This information in association with the weight of the slug will be used to calculate the activity of the <3/8 inch material for the slug.

Radiological Sorting
Steps 1 – 3:



** Obtain Weight and Collect Sample of Material after Processing is Complete

SOIL PROCESSING – RADIOLOGICAL SORTING - SLUG:

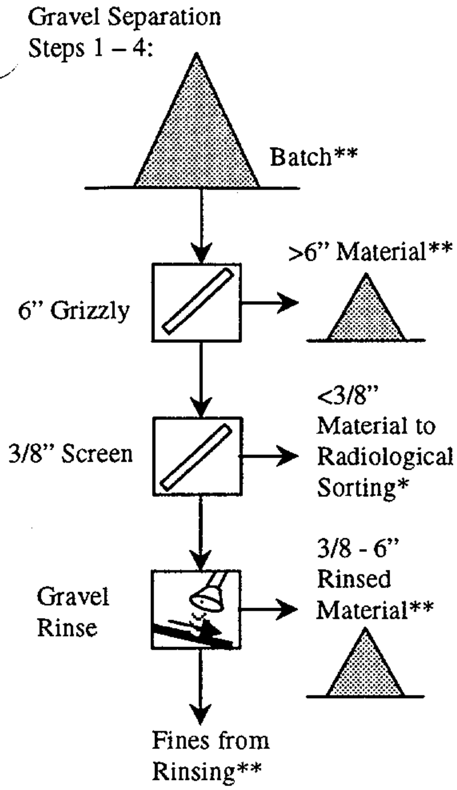
1. The <3/8 inch material from the slug is conveyed from the gravel separation system into the radiological sorting system.

2. The equipment will sort the remainder of the slug into 2 streams. They are (1) above criteria soils and (2) below criteria soils. Collect three samples from each conveyor (at 1/3, 2/3, and 3/3 of the way through the slug). This information in association with the weights of the piles will be used to calculate the total activity of the <3/8 inch material for the slug.

3. Once the processing of the slug is complete, tally the weights of the material in each stockpile. This information will be used to track the weight of the material being processed and facilitate calculating the total activity of the slug.

4. For the activity tracking, compare the total activity calculated for the slug following processing with that calculated prior to processing.

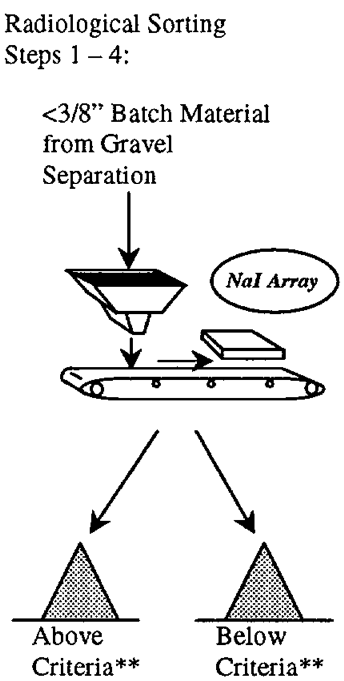
GENERAL BATCH SAMPLING SEQUENCE FOR PILOT DEMONSTRATION



* Obtain Weight of Material after Processing is Complete
** Obtain Weight and Collect Sample(s) of Material after Processing is Complete

SOIL PROCESSING – GRAVEL SEPARATION - BATCH:

1. After the slug has been processed, load the remainder of the batch into the gravel separation system. Weigh the material as it is loaded. This information will be used to track the weight of the batch.
2. The material will be separated into 4 streams. The streams are:
   - >6 inch material separated by the grizzly
   - <3/8 inch material which will be conveyed to the radiological sorting system
   - 3/8 - 6 inch material rinsed to remove fines
   - fines rinsed from the 3/8 - 6 inch material
3. Once the batch is through the gravel separation system, tally the weights of the >6 inch material, <3/8 inch material which proceeds to the radiological sorting system, and the 3/8 – 6 inch material. Also weigh the fines resulting from the rinsing. This information will be used to track the weight of the material being processed.
4. Collect samples of the >6 inch material, 3/8 - 6 inch material, and the fines resulting from the rinsing. (Refer to SW-MWD-312-0 and SW-MWD-314-0) Collect these samples at a frequency of the lesser of 1 sample per batch or every 50 cubic yards of separated material (if the individual stockpiles exceed 50 cubic yards). This sample data will be used to evaluate options for final disposition of the processed materials.
5. Other special samples may also be collected in accordance with the SAP at intermediate points in the process.



* Obtain Weight and Collect Sample(s) of Material after Processing is Complete

SOIL PROCESSING – RADIOLOGICAL SORTING - BATCH:

1. The <3/8 inch material from the batch is conveyed from the gravel separation system into the radiological sorting system.
2. The equipment will sort the remainder of the batch into 2 streams. They are (1) above criteria soils and (2) below criteria soils.
3. Once the processing of the batch is complete, tally the weights of the material in each stockpile. This information will be used to track the weight of the material being processed.
4. Collect one sample from each stockpile. (Refer to SW-MWD-314-0) Collect these samples at a frequency of the lesser of 1 sample per batch or every 50 cubic yards of separated material (if the individual stockpiles exceed 50 cubic yards). This sample data will be used to evaluate options for final disposition of the processed materials.
5. Other special samples may also be collected in accordance with the SAP at intermediate points in the process.
6. Since the batch will be used to evaluate the system under conditions similar to those expected during full-scale operation, following processing compare: the weights of the pre- and post-processed materials to assess effectiveness; the actual throughput to the rated throughput to assess efficiency; and sample data to determine disposal options and their economics.

APPENDIX B

Standard Operating Procedures

SW-MWD-107-0	**Exposure Rate Instruments**
SW-MWD-302-0	**Surface Water Sampling**
SW-MWD-307-0	**Surface and Shallow Subsurface Soil Sampling**
SW-MWD-312-0	**Wipe Sample Procedures**
SW-MWD-314-0	**Stockpile Sampling**
SW-MWD-504-0	**Labeling, Packaging and Shipping Environmental Samples**
SW-MWD-505-0	**Cuttings and Fluids Management**
SW-MWD-506-0	**Decontamination**
SW-MWD-507-0	**Field Notebook Content and Control**
SW-MWD-508-0	**Procedure for Shipping Radiologically Contaminated Environmental Samples**

TITLE: Exposure Rate Instruments	NO.:	SW-MWD-107-0
	PAGE	1 of 8
	DATE:	January 2000

APPROVED:

[signature] 2/29/00
Project Manager

Richard Skrynesz 2/29/00
Project Engineer

1.0 PURPOSE

This procedure provides consistent methodology and guidelines for establishing acceptable ranges and daily performance checks for exposure rate instrumentation to include the Ludlum Model 12S Micro R Meter, the Eberline RO-2 Ion chamber or their equivalents. Due to the differences in response between the Ludlum Model 12S; Micro R Meter and the Eberline Model RO-2; Ion Chamber, establishing of acceptable ranges and daily performance check will be addressed separately.

2.0 SCOPE

This procedure applies to personnel trained in establishing acceptable ranges, performing daily checks of, or operation of the Ludlum Model 12S Micro R Meter, the Eberline RO-2 Ion chamber or their equivalents.

The Ludlum Model 12S Micro R Meter, the Eberline RO-2 Ion chamber and their equivalents are exposure rate instruments intended for use as a tool in determining ambient external radiation exposure rates. These instruments are also useful in demonstrating compliance with various regulations governing exposure and release limits.

3.0 REFERENCES

3.1 Ludlum Measurements; Ludlum Model Instruction Manual 12S Micro R Meter

3.2 Thermo Instruments System Inc.; Eberline Model RO-2 Ion chamber

3.3 Glenn F. Knoll, *Radiation Detection and Measurements*, 2nd Edition, John Wiley& Sons, New York, 1979.

4.0 DEFINITIONS

4.1 ACCEPTABLE RANGE

Acceptable Range is the range established to indicate the proper functioning of an instrument. For instruments intended for field use this range is defined as plus or minus 20% of the mean value as established in section 5.0 of this procedure.

4.2 DAILY PERFORMANCE CHECK

A Daily Performance Check is an operation performed on a daily basis, during operations, to prove an instrument is operating within the Acceptable Range.

4.3 SOURCE DECAY CORRECTION

Source Decay Correction is used to account for the decrease in observed activity of a source due to radioactive decay and is mathematically described as

$$A = A_O e^{-\lambda T}$$

Where

A = the "present" activity (calculated)
A_O= the original (calibrated) activity
λ = the decay constant (.693)/half-life (of the nuclide)
And T = the time of decay

4.4 6CEN

The 6CEN Equation is used to estimate the intensity (exposure rate), of the gamma radiation field intensity from a point source at a distance of 1 foot and is mathematically described as

$$I_{1ft} = 6CEN$$

Where

I_{1ft} = gamma field intensity (I), in T/hr, at 1 foot
C= the activity of the source, in curies (Ci)
E = the gamma energy (ies) of the nuclide, in MeV, (0.662, for Cs-137)
N = number of gammas per disintegration (photon yield), (N = 0.85, for Cs-137)

Note: this equation is accurate to within ± 20% for gamma energies between 0.05 MeV and 3 MeV.

4.5 POINT SOURCE EQUATION

The Point Source Equation is used to estimate the intensity (exposure rate), of a gamma radiation field from a point source at a given distance and is mathematically defined as

$$I_1(d_1)^2 = I_2(d_2)^2$$

Where

I_1 = intensity at distance 1 (d_1)

I_2 = intensity at distance 2 (d_2)

d_1 = distance 1

d_2 = distance 2

and is algebraically manipulated for the purpose of this procedure to be

$$I_2 = \frac{I_1(d_1)^2}{(d_2)^2}$$

5.0 RESPONSIBILITIES

5.1 RADIATION SAFETY OFFICER (RSO)

Radiation Safety Officer (RSO) is responsible for:

1. Implementing instrumentation procedures.
2. Reviewing instrumentation documentation.
3. Oversight of the instrumentation program.

5.2 RADIATION PROTECTION TECHNICIAN

Radiation Protection Technicians are responsible for:

1. Performing/overseeing daily performance checks and routine sample counting.
2. Reviewing daily performance checks and routine sample counting documentation

6.0 PROCEDURES

6.1 GENERAL

6.1.1 Instrument shall have been calibrated within the previous 12-month period. The instrument shall have a valid Certificate of Calibration and have a current calibration "sticker" affixed.

6.1.2 Inspections, acceptable ranges, daily performance checks and operational use of instrument/detectors shall only be performed by persons qualified to do so.

6.1.3 A physical inspection shall be performed prior to initiating any of the above operations. This inspection should include inspection of meters, audible/visible response(s), beta shield "door" and Mylar window (RO-2) and general physical condition of the instrument. The inspection shall include confirmation of current calibration and that a current calibration sticker is affixed to the instrument.

6.1.4 Operating parameters shall be verified. These parameters should include battery (s) level(s) and Scale zero (RO-2).

CAUTION
The Eberline Model RO-2 Ion Chamber incorporates a thin Mylar window behind a beta shield "door". Caution should always be used when performing daily response checks or operating the instrument with the beta shield "door" open as damage to the Mylar window and ion chamber could occur.

6.1.5 Any instrument failing the above inspections shall not be used until corrective action has been made. Any finding during inspection that may effect calibration shall require the instrument to be tagged out-of-service and the instrument shall not be used until a new calibration has been performed.

6.1.6 An acceptable range for instrument response shall be established prior to operational data collection.

6.1.7 Cs-137 sources shall be decay corrected at a minimum of every 6 months. New acceptable ranges shall be calculated at the time of the decay correction.

6.1.8 Appropriate ALARA measures shall be used to minimize the potential for contamination and unnecessary dose.

6.2 ACCEPTABLE RANGES

6.2.1 Upon receipt and/or prior to placing any given instrument into service, an acceptable range shall be established.

6.2.2 Complete the source information on the Acceptable Range Data Sheet - Exposure Rate Instruments form, attachment 1.

6.2.3 Calculate and record the "present" activity for the chosen CS-137 check source on the Acceptable Range Data Sheet - Exposure Rate Instruments form, using the source decay equation described in 4.2.3 of this procedure.

6.2.4 Calculate and record, on the Acceptable Range Data Sheet - Exposure Rate Instruments form, the 1-foot, "contact" and 3-foot exposure rate values using the "6CEN" and the "point source" equations, described in 4.4 and 4.5, respectively, of this procedure. **Note: for the purpose of this procedure the "contact" exposure rate shall be calculated using the value, 0.115-ft.**

6.2.5 Calculate, convert to the appropriate units and record the plus and minus 20% range for each of the above values on the Acceptable Range Data Sheet - Exposure Rate Instruments form.

6.2.6 Sign and date the Acceptable Range Data Sheet - Exposure Rate Instruments form. The original copy of this form shall be retained for the records.

6.3 DAILY PERFORMANCE CHECKS – LUDLUM MODEL 12S; MICRO R METER

6.3.1 Obtain and complete the required information, for the instrument to be checked, on a "Daily Field Source Check Log – Exposure Rate Instruments", Attachment 2. **Note: the plus/minus 20% ranges are those ranges obtained from the Acceptable Range Data Sheet - Exposure Rate Instruments form".**

6.3.2 Perform a Physical inspection of the instrument. Indicate the results of the inspection on the "Daily Field Source Check Log – Exposure Rate Instruments, Attachment 2". If the results are satisfactory, indicate this with a check mark. If the results are unsatisfactory, indicate this with an asterisk (*) and explain in the remarks section.

6.3.3 Verify the operating parameters of the instrument.

6.3.4 Any/all deficiencies identified in the previous steps shall be corrected prior to proceeding, see section 4.3.

6.3.5 Turn on the instrument and verify the battery level. The battery level shall fall within the "Battery Test" range. Change the batteries if the check indicates a battery level outside the range. Indicate satisfactory battery level by placing a check mark in the appropriate section on the "Daily Field Source Check Log – Exposure Rate Instruments, Attachment 2".

6.3.6 Observe and record on the "Acceptable Range Data Sheet - Exposure Rate Instruments, Attachment 1", a stabilized background obsevation. **Note: the background observation shall be completed in an area of ambient background. The influence of gamma check sources shall be kept at a minimum.**

6.3.7 Place the Cs-137 source in the source holder; place the instrument in one of the established check positions.

6.3.8 Observe and record in the appropriate section of the "Acceptable Range Data Sheet - Exposure Rate Instruments", a stabilized source observation.

6.3.9 Observe and record in the appropriate section of the "Acceptable Range Data Sheet - Exposure Rate Instruments", a stabilized source observation from each of the other check positions.

6.3.10 Compare each of the above observations with its corresponding range. The daily check for each of the observations must fall within the acceptable range. If any observation falls outside the acceptable range the instrument shall not be used until corrective action has been taken. Corrective action that will not effect the calibration of the instrument may be performed and the combination rechecked.

6.3.11 If corrective action is taken that will not effect the calibration, an explanation of the corrective action, along with the initials of the person performing the action shall be recorded in the remarks section of "Daily Field Source Check Log – Exposure Rate Instruments, Attachment 2".

6.3.12 Daily Field Source Check Log – Exposure Rate Instruments shall be retained for the records.

6.3.13 Instruments that pass the above steps may be used for data collection.

6.4 DAILY PERFORMANCE CHECKS – EBERLINE MODEL RO-2 ION CHAMBER

6.4.1 Obtain and complete the required information, for the instrument to be checked, on a "Daily Field Source Check Log – Exposure Rate Instruments", Attachment 2. **Note: the plus/minus 20% range is the "contact" range obtained from the Acceptable Range Data Sheet - Exposure Rate Instruments form".**

6.4.2 Perform a Physical inspection of the instrument. Indicate the results of the inspection on the "Daily Field Source Check Log – Exposure Rate Instruments". If the results are satisfactory, indicate this with a check mark. If the results are unsatisfactory, indicate this with an asterisk (*) and explain in the remarks section.

6.4.3 Verify the operating parameters of the instrument.

6.4.4 Any/all deficiencies identified in the previous steps shall be corrected prior to proceeding, see section 4.3.

6.4.5 Turn on the instrument and verify the battery levels. The battery levels shall fall within the "Battery Ok" range. Change the batteries if the check indicates a battery level out side the range. Indicate satisfactory battery levels by placing a check mark in the appropriate section on the "Daily Field Source Check Log – Exposure Rate Instruments"

6.4.6 Observe and record on the "Acceptable Range Data Sheet - Exposure Rate Instruments", a stabilized background observation. **Note: the background observation shall be completed in an area of ambient background. The influence of gamma check sources shall be kept at a minimum.**

6.4.7 Open the beta shield "door".

1.1CAUTION
The Eberline Model RO-2 Ion Chamber incorporates a thin Mylar window behind a beta shield "door". Caution should always be used when performing daily response checks or operating the instrument with the beta shield "door" open as damage to the Mylar window and ion chamber could occur.

6.4.8 Observe and record in the appropriate section of the "Acceptable Range Data Sheet - Exposure Rate Instruments", a stabilized **contact** source observation.

6.4.9 Compare the above observation to the "contact" range. The daily check for the observation must fall within the acceptable range. If an observation falls outside the acceptable range the instrument shall not be used until corrective action has been taken. Corrective action that will not effect the calibration of the instrument may be performed and the combination rechecked.

6.4.10 If corrective action is taken that will not effect the calibration, an explanation of the corrective action, along with the initials of the person performing the action shall be recorded in the remarks section of "Daily Field Source Check Log – Exposure Rate Instruments".

6.4.11 Daily Field Source Check Log – Exposure Rate Instruments shall be retained for the records.

Instruments that pass the above steps may be used for data collection.

<u>ATTACHMENTS</u>

1. Acceptable Range Data Sheet - Exposure Rate Instruments
2. Daily Field Source Check Log – Exposure Rate Instruments

ACCEPTABLE RANGE DATA SHEET- EXPOSURE RATE INSTRUMENTS

MONTH: ______________ YEAR: ______________

SOURCE: ______________ SERIAL #: ______________ CAL DUE: ______________

CAL ACTIVITY (Ci) ______________

HALF LIFE ($T_{1/2}$) ______________
(For Cs-137, $T_{1/2}$ =30.17 yrs.)

ENERGY(MeV) ______________
(for Cs-137, MeV=0.662)

GAMMAS PER DECAY (YIELD) ______________
(For Cs-137, yield = 0.85)

ORIGINAL ACTIVITY (A_o) (CALIBRATED): ______________ CAL. DATE: ______________

HALF LIFE ($T_{1/2}$)(IN YEARS) ______________

DECAY TIME (T) (IN YEARS) ______________

$$A = A_O e^{-\lambda T}$$

$$\boxed{\lambda = \frac{.693}{T\frac{1}{2}}}$$

CURRENT (PRESENT) ACTIVITY (a): ______________

6CEN (EXPOSURE RATE AT 1')(b) ______________

$$\boxed{I_{1ft} = 6CEN}$$

C = Ci (Current Activity)
E = MeV - Source
N = Yield

"INT SOURCE EQUATION:

"ONTACT" EXPOSURE RATE (c): ______________
Note: Contact exposure rate calculated at 0.115'

3' EXPOSURE RATE (d): ______________

$$I_2 = \frac{I_1(d_1)^2}{(d_2)^2}$$

CURRENT (PRESENT) ACTIVITY (a): ______________ DATE OF CALCULATION: ______________

EXPOSURE RATE AT 1' (b): ______		EXPOSURE RATE ON CONTACT (c): ______		EXPOSURE RATE AT 3' (d) : ______	
PLUS 20%	______	PLUS 20%	______	PLUS 20%	______
MINUS 20%	______	MINUS 20%	______	MINUS 20%	______

PERFORMED BY: ______________ DATE: ______________

REVIEWED BY: ______________ DATE: ______________

DAILY FIELD SOURCE CHECK LOG ⸺ ᵞPOSURE RATE INSTRUMENTS

Site Name: ____________ Week Ending: ____________ Bkg. Location: ____________

Instrument ____________ S/N: ____________ Cal. Date: ____________ Cal. Due: ____________

Date / Time	Source	Serial No.	Source Activity	Source Check _R/hr	Bkg. _R/hr	Net Response Contact (A)	Net Response 1' (B)	Net Response 3' (C)	Batt.	Spkr.	Disp.	OK By
				Contact								
				1'								
	CS137			3'								
				Contact								
				1'								
	CS137			3'								
				Contact								
				1'								
	CS137			3'								
				Contact								
				1'								
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				Contact								
				1'								
	CS137			3'								

± 20% of Calibrated Value - Contact (A)	+ Value	- Value	Remarks:
± 20% of Calibrated Value - 1' (B)	+ Value	- Value	
± 20% of Calibrated Value - 3' (C)	+ Value	- Value	

REVIEWED BY: ____________ DATE: ____________

TITLE: Surface Water Sampling	NO.:	SW-MWD-302-0
	PAGE	1 of 8
	DATE:	May 1999

APPROVED:

[signature] 2/28/00
Project Manager

Richard Skrypness 2/29/00
Project Engineer

1.0 PURPOSE

This Standard Operating Procedure (SOP) - Surface Water Sampling is to be employed when collecting surface water samples from locations with known or suspected environmental contamination at the FUSRAP Maywood Superfund Site.

This SOP describes the procedures for collecting representative environmental samples from surface water. Surface water describes the water above the bottom of a body of water. The samples are typically taken 3 feet above the bottom. Where possible, surface water samples shall not be taken from the surface of a body of water. The following sections describe various methods and equipment used to collect surface water samples. These types of samples can be used for biological and analytical testing purposes.

2.0 SCOPE

This procedure presents the proper methods of collecting surface water samples. Selection of site-specific sampling locations and specific sampling technique(s) is dependent on the objectives of the environmental assessment. Consult the task-specific Sampling and Analysis Plan (SAP) or other applicable work plan(s) for sampling locations and techniques. Field changes to this SOP shall be discussed with the Project Superintendent prior to implementation and shall be documented in project field log books. All changes shall be made in accordance with the Maywood Contractor Quality Control Plan.

3.0 REFERENCES

U.S. Environmental Protection Agency, Characterization of Hazardous Waste Sites - A Methods Manual, Volume II: Available Sampling Methods, EPA/600/X-83/018, March 1983.

Cuttings and Fluids Management SOP
Decontamination SOP
Labeling, Packaging and Shipping Environmental Samples SOP

4.0 DEFINITIONS

None.

5.0 RESPONSIBILITIES

5.1 PROJECT MANAGER

Sets technical capability requirement criteria for personnel and ensures that personnel assigned to project tasks are properly qualified for the needed work.

5.2 PROJECT ENGINEER

Translates client's requirements into technical direction of project. Reviews and approves technical progress, ensures that the Project Superintendent has been properly briefed and is prepared for surface water sampling task.

5.3 SITE SAFETY AND HEALTH OFFICER

All field activities must be carried out in accordance with the SSHP. The Site Safety and Health Officer (who may also serve as a surface water sampler) is responsible for ensuring that all site workers (Stone & Webster and subcontractors) have read, signed and are familiar with the requirements of the SSHP and that the requirements of the SSHP are met during site activities.

5.4 PROJECT SUPERINTENDENT

The Project Superintendent is the individual designated by the Project Manager to supervise investigative activities by Stone & Webster and related subcontracting personnel at a given site for the designated tasks. The Project Superintendent is responsible for ensuring that the field personnel have been briefed in conducting the method of surface water sampling chosen in accordance with the project requirements, this SOP and related SOPs. The Project Superintendent assures that all necessary equipment including safety equipment is available and functioning properly before project operations begin and that all necessary personnel are mobilized on time. This individual also maintains a daily log of activities each work day.

The Project Superintendent coordinates and consults with the Project Manager on decisions relative to unexpected occurrences during surface water sampling and deviation from this SOP.

5.5 SITE PERSONNEL

Site personnel assigned to perform the surface water sampling activities will be trained in the proper techniques for conducting the work. All employees who are engaging in surface water sampling activities are required to read and sign the Site Safety and Health Plan (SSHP) and to follow the procedures in this SOP, unless superseded by other project-specific requirements. All surface water sampling activities, including deviations to this SOP, will be recorded in field logbooks during on-site activities.

6.0 PROCEDURE

6.1 GENERAL EQUIPMENT & MATERIAL REQUIREMENTS FOR SURFACE WATER

SAMPLING

The following is a list of equipment & material which is commonly used on all surface water sampling projects. Refer also to related SOP equipment & material requirements to ensure completeness.

- Field Sampling Plan (FSP) (in Chemical Data Quality Management Plan) and task-specific SAPs
- SSHP. To be read and signed by all site personnel prior to site activities.
- Personal Protective Equipment
- Field logbook(s)
- Decontamination supplies - See FSP and Decontamination SOP
- Indelible markers
- Water level measure
- Sampling device such as a bailer, bucket, or surface water sampler
- Stakes/flagging (for marking on shore)
- Hammer - for pounding stakes
- 200 foot-length measuring tape
- If required, a hand held Global Positioning System (GPS) instrument
- Sample bottles (pre-preserved) and labels
- Chain-of-Custody forms - See Labeling, Packaging and Shipping Environmental Samples SOP
- Chain-of-Custody tape
- Sample Coolers
- Bubble wrap or other sample packing material
- Ice or pre-cooled "cold" packs - for sample preservation
- Shipping forms (not needed if hand delivered to lab or courier pickup arranged)
- Shipping tape (transparent)
- Duct tape
- Paper towels

6.2 SURFACE WATER PRE-SAMPLING ACTIVITIES

1. The task-specific SAP should be consulted to determine the sampling methods to be employed and the sampling and monitoring equipment necessary for field activities. The main considerations in determining the method of sampling the surface water should be: depth of water, means of access (boat, dock, from shore, wading into water, etc.), and type of water body (e.g., still water vs. rapidly flowing river).

2. In accordance with the SSHP, a general site survey should be performed prior to site entry. If a boat is to be used for sampling, it is important to note access points - docks, boat ramps, etc.

3. All sampling equipment should be decontaminated prior to each sampling episode. Decontamination procedures are detailed in the Decontamination SOP.

4. As appropriate, all sampling locations should be marked in some manner with stakes and/or flagging. Stakes/flagging are useful in some settings (small stream, swamp/wetlands).

Photographs should be taken of shore reference points if using stakes is not practical, e.g., sampling in middle of a river or lake. A detailed sketch of the sample location and location on a map/drawing should also be noted. If available, a GPS should be used to locate unmarkable sampling points.

5. Measure the depth of the water from which the sample will be taken.

6. Any in-situ measurements, e.g. water pH, dissolved oxygen content, etc., should be taken prior to sampling activities.

7. If sediment samples will be taken at the same location, the surface water sampling should be performed prior to sediment sampling, because the sediment sampling activities will suspend fine sediments into the water column

6.3 SURFACE WATER SAMPLING

Appropriate field procedures are as follows:

1. Label the sample bottle with the appropriate sample tag. Complete all chain-of-custody documents. Refer to the Labeling, Packaging and Shipping Environmental Samples SOP for specific requirements.

2. Collect sample by the appropriate method as described in Section 6.4 from an undisturbed area. Allow time for water to clear or sediment to settle if you have just waded into an area or dropped anchor.

3. Surface water samples shall be collected in the following order unless specifically superseded by the task-specific SAP. If a particular task does not require the collection of a particular analyte on the following list, proceed down to the next sample on the list that you are specified to collect.

   a. Volatile organic compounds (VOC)
   b. Semivolatile organic compounds (SVOC)
   c. Total Recoverable Petroleum Hydrocarbons (TRPH)
   d. PCBs/pesticides
   e. Metals
   f. Radionuclides

4. Add preservative, as required by analytical methods, to samples immediately after they are collected if the sample containers are not pre-preserved. Check analytical methods (e.g., EPA SW-846) for additional information on preservation. Check pH for all samples requiring pH adjustment to assure proper pH value. For VOC samples, this will require that a test sample be collected to determine the amount of preservative that needs to be added to the sample containers prior to sampling. Label each sample as collected. Samples requiring cooling (volatile organics, etc) will be placed into a cooler with ice or refrigerant for delivery to the laboratory. Metal samples will not be filtered.

See Attachment A for the container and preservative requirements for water samples anticipated to be collected. Additional special sample collection considerations are as follows:

VOCs

a. Fill the sample vial slowly from sampler, minimizing air entrainment, until vial overflows (a meniscus should be present on the top of the sample bottle). Cap vial.

b. Invert bottle and tap to check for air bubbles. If bubbles are present, open bottle, add additional water, and repeat this process until no air bubbles are present. If bubbles cannot be removed, the sampler should sample again using a different vial.

ELEVATED RADIONUCLIDES

In surface water locations with elevated radionuclides, dedicated sampling equipment may be appropriate.

5. Record sampling event in the field log book and on a sample log, if dictated by the task-specific SAP.

6. Decontaminate equipment after use and between sample locations. Also, decontaminate sample containers and/or isolate them (such as sealing in Ziploc bags). Refer to the Decontamination SOP for specific requirements.

6.4 METHOD SPECIFIC SURFACE WATER SAMPLING PROCEDURES

6.4.1 Surface Water Sampling in Shallow Water Bodies (Wetlands, Brooks, Small Streams)

In these settings, the most appropriate method for obtaining surface water samples is likely wading in and obtaining a sample using a bailer, bucket, or certified clean sample bottle. Proper safety equipment should be worn at all times, including a life jacket, a secured line to the shore, and a "buddy" who remains on the shore. Equipment should be tied off to shore if possible, to ease retrieval if anything is dropped.

Samples should be collected by measuring the depth of the water, determining how deep a sample is appropriate, and collecting the sample. Sample bottles should be filled directly from the sampler. This will likely necessitate frequent trips to shore. Decontamination of equipment should take place on shore.

Samples shall be collected downstream to upstream, so that any suspended particles from activities in the water body will be transported away from the next sample point.

For surveying purposes, if possible, stakes or markers should be placed either at the sample location itself or on each bank or both on the same bank so that the sample point is on the line between the two stakes. The precise location of the sample point can then be specified by measuring the distance from one of the stakes.

6.4.2 Surface Water Sampling in Deeper Water Bodies (Lakes, Rivers)

In these settings, the most appropriate method for obtaining surface water samples will be from a dock or bridge, if available, or more likely, a boat. If the water is shallow enough, (less than 3 feet deep), the same methods as specified in Section 6.4.1 may be used. For water depths greater than approximately 3 feet deep, a surface water sampler should be used to obtain the surface water sample. Surface water samplers are open at both ends, with end caps held open by a strong elastic. A remote weight is sent down the line to depress the catch which is holding the elastic. This closes both ends of the sampler. The sample is collected from a spout located on the sampler.

Proper safety equipment should be worn at all times, including a life jacket. Equipment should be tied off to the boat if possible, to ease retrieval if anything is dropped.

The boat should be properly anchored before sampling activities commence. Bow and stern anchors may be required to properly position the boat.

Samples should be collected by tying the sampler to a dedicated rope and dropping the sampling equipment over the side of the boat. Depending on the equipment being used, a weight may need to be sent down the line to close the sampler. The rope should be marked at the water surface before withdrawing the sampler. The depth of the sample should then be determined by measuring the length of rope deployed.

Samples shall be collected downstream to upstream, so that any suspended particles will be transported away from the next sample point. Sediment will be disturbed by the anchors and other activities.

If multiple surface water samples are being collected from a lake or pond (i.e. a relatively still body of water), sample collection should start with deeper points and move to shallower points.

It is also important to size the boat appropriately. If the work is to be in a fairly small area, it may be best to locate as many operations as possible on shore. If all sampling and decontamination activities must be contained within the boat, care should be taken to minimize the amount of equipment required.

If it is not possible to mark the sample location, photographic evidence of the location (shots of landmarks on shore), GPS coordinates, and precise locations on maps should be obtained.

6.5 GLOSSARY OF TERMS

<u>FSP</u> Field Sampling Plan

<u>GPS</u> Global Positioning System

<u>SAP</u> Sampling and Analysis Plan

<u>SOP</u> Standard Operating Procedure

SSHP Site Safety and Health Plan

7.0 ATTACHMENTS

Attachment A – Container Requirements for Water Samples

ATTACHMENT A
CONTAINER REQUIREMENTS FOR WATER SAMPLES

Analyte Group	Container	Preservative
Volatile Organic Compounds	3 - 40 ml glass vials with Teflon®-lined septum (no headspace)	HCL to pH <2 Cool, 4°C
Semivolatile Organic Compounds	2 - 1L amber glass bottle with Teflon®-lined lid	Cool, 4°C
Pesticides/PCBs	2 - 1L amber glass bottle with Teflon®-lined lid	Cool, 4°C
Metals and Rare Earth Elements	1 – 1000 ml plastic or glass bottle	HNO_3 to pH <2
TRPH	2 – 1000 ml glass bottle	HCl to pH<2 Cool, 4°C
Radionuclides	1 – 1000 ml plastic or glass bottle per readionuclide test, typ.	HNO_3 to pH <2

APPROVED:

2/28/00
Project Manager

Richard Skrynesa 2/29/00
Project Engineer

1.0 PURPOSE

This Standard Operating Procedure (SOP) - **Surface and Shallow Subsurface Soil Sampling** is to be employed when hand-collecting (without machines or power tools) soil samples from a depth of one foot or less at sites with known or suspected environmental contamination.

This SOP describes the procedures for collecting representative environmental and/or geotechnical samples from the surface or shallow subsurface soils. The following sections describe various methods and equipment used to collect disturbed soil samples. A disturbed soil sample is a representative sample of a selected geologic unit which has undergone structural alteration as a result of the sampling operation. These types of samples can be used for soil classification, soil index testing, and analytical testing purposes.

2.0 SCOPE

This procedure serves as general guidance on the proper methods of collecting both discrete and composite surface and shallow subsurface soil samples. This procedure can be used in most soil types but is limited to sampling depths of one foot or less below ground surface. Accurate, representative samples can be collected with this procedure depending on the care and precision demonstrated by the sampling team member. The use of a flat, pointed mason trowel to cut a block of the desired soil can be helpful when undisturbed profiles are required. A stainless steel scoop or lab spoon will suffice in most other applications. Selection of site-specific sampling locations and specific sampling technique(s) is dependent on the objectives of the environmental assessment. Consult the task-specific Maywood Sampling and Analysis Plan for soil sampling locations and techniques. Always consult state-specific or program-specific requirements as well as manufacturer's instructions for equipment use to ensure compatibility of this SOP with project requirements. **Field changes to this SOP shall be discussed with the Project Superintendent prior to implementation and shall be documented in project field log books.**

3.0 REFERENCES

1. SOP – Cuttings and Fluids Management
2. SOP - Decontamination
3. SOP – Labeling, Packaging and Shipping Environmental Samples

U.S. Environmental Protection Agency, Compendium of ERT Soil Sampling and Surface Geophysics Procedures, EPA/540/P-91/006, January 1991.

U.S. Environmental Protection Agency, Characterization of Hazardous Waste Sites - A Methods Manual, Volume II: Available Sampling Methods, EPA/600/X-83/018, March 1983.

4.0 DEFINITIONS

None.

5.0 RESPONSIBILITIES

5.1 PROJECT MANAGER

Sets technical capability requirement criteria for personnel and ensures that personnel assigned to project tasks are properly qualified for the needed work.

5.2 PROJECT ENVIRONMENTAL ENGINEER

Translates client's requirements into technical direction of project. Reviews and approves technical progress, ensures that the Project Superintendent has been properly briefed and is prepared for soil sampling task.

5.3 PROJECT SUPERINTENDENT

The Project Superintendent is the individual designated by the project manager to supervise investigative activities by Stone & Webster and related subcontracting personnel at a given site for the designated tasks. The Project Superintendent is responsible for ensuring that the field personnel have been briefed in conducting the method of soil sampling chosen in accordance with the project requirements, this SOP and related SOPs. The Project Superintendent assures that all necessary equipment including safety equipment is available and functioning properly before project operations begin. The Project Superintendent assures that all necessary personnel are mobilized on time and maintains a daily log of activities each workday.

The Project Superintendent coordinates and consults with the Project Manager on decisions relative to unexpected occurrences during soil sampling and deviation from this SOP.

5.4 SITE SAFETY & HEALTH OFFICER

All field activities must be carried out in accordance with a Site Safety and Health Plan (SSHP). The Site Safety and Health Officer (who may also serve as a soil sampler) is responsible for ensuring that all site workers (Stone & Webster and subcontractors) have read, signed and are familiar with the requirements of the SSHP and that the requirements of the SSHP are met during site activities.

5.5 PROJECT CHEMIST

The Project Chemist shall ensure that site personnel use this SOP and the quality requirements described in the Chemical Data Quality Management Plan and the Contractor Quality Control Plan while carrying out surface soil sampling activities. He will inform the laboratory in advance of the number of samples to be shipped and for what parameters they must be analyzed. He will act as the interface between the site personnel and the laboratory.

5.6 SITE PERSONNEL

All employees who are engaging in soil sampling activities are required to read and sign the Site Safety and Health Plan (SSHP) and to follow the procedures in this SOP, unless superseded by project-specific requirements. All soil sampling activities, including deviations from this SOP, will be recorded in field logbooks during on-site activities.

6.0 PROCEDURE

6.1 GENERAL EQUIPMENT & MATERIAL REQUIREMENTS FOR SURFACE SOIL SAMPLING

The following is a list of equipment & material which is commonly used on all surface soil sampling projects. Refer also to related SOP equipment & material requirements to ensure completeness.

- Field Sampling Plan (FSP)
- Site Safety and Health Plan (SSHP). **To be read and signed by all site personnel prior to site activities.**
- Personal Protective Equipment
- Field logbook(s)
- Volatile organic compound (VOC) vapor meter
- Decontamination supplies - **See SOP – Decontamination, and FSP**
- Indelible markers
- Tape measure
- Stainless steel or plastic trowel or shovel
- "T"-handled hollow stem bucket auger or hand corer, if collecting soil samples below a depth of one foot below ground surface
- Surveyors stakes
- Hammer
- Flagging Tape
- Spray paint
- Stainless steel mixing bowls

- Sample bottles and labels
- Chain-of-Custody forms - Labeling, Packaging, and Shipping Environmental Samples
- Chain-of-Custody tape
- Sample Coolers
- Sample packing material
- Ice or pre-cooled "cold" packs - for sample preservation
- Shipping forms (not needed if hand delivered to lab or courier pickup arranged)
- Shipping tape (transparent)
- Duct tape
- Paper towels

Avoid the use of devices plated with chrome or other materials if collecting soil samples for metals analysis. Plating is particularly common with garden implements such as potting trowels.

6.2 PRE-SAMPLING ACTIVITIES

1. The task-specific Sampling and Analysis Plan should be consulted to determine the sampling methods to be employed and the sampling and monitoring equipment necessary for field activities.

2. In accordance with a Site Safety and Health Plan, a general site survey should be performed prior to site entry.

3. All sampling equipment should be decontaminated prior to each sampling episode. Decontamination procedures are detailed in a separate SOP.

4. As appropriate, all utilities in the vicinity of sampling locations should be clearly marked in some manner with stakes and flagging or spray paint.

6.3 SURFACE SOIL SAMPLING

Appropriate field procedures are as follows:

1. Carefully remove the top layer of soil to the desired sample depth with a decontaminated tool.

2. If applicable, screen the area to be sampled using a VOC vapor analyzing meter and record readings in the field log. The VOC screen is used as a field safety procedure. The VOC readings should be compared to action levels presented in the project Health and Safety Plan. The VOC screen can also be used or selecting potentially contaminated soil samples.

3. Obtain a discrete soil sample. If analyzing samples for VOCs using the EnCore sampler tool, collect the appropriate sample volume in the manner discussed in Attachment A.

4. For the remainder of the parameters, place the sample into a stainless steel mixing bowl. Homogenize the sample and place into appropriate sample containers using a stainless steel lab spoon or its equivalent.

5. If required by the Field Sampling Plan, check that a Teflon liner is present in the cap of all analytical sample jars. Secure all caps tightly. Although chemical preservation of solids is

generally not required, samples for chemical analysis shall be refrigerated because of the SW-846 requirement to refrigerate samples designated for mercury analysis (normally in iced coolers to approach approximately 4°C). Radiochemical soil samples do not require refrigeration. Refer to **SOP - Labeling, Packaging, and Shipping Environmental Samples** for procedure-specific requirements.

6. Label the sample bottle with the appropriate sample tag. Complete all chain-of-custody documents. Refer to **SOP - Labeling, Packaging, and Shipping Environmental Samples** for procedure-specific requirements.

7. Record sampling event in the field log book and on a sample log, if dictated by the Sampling and Analysis Plan.

8. Decontaminate equipment after use and between sample locations. Also, decontaminate sample containers and/or isolate them (such as sealing in Ziploc bags). Refer to **SOP - Decontamination** for procedure-specific requirements.

6.4 SHALLOW SUBSURFACE SOIL SAMPLING

A bucket auger or hand corer, can be advanced to obtain soil samples up to approximately 5 feet below the surface when soil conditions allow. The method is less effective with coarse, granular soils or soils containing cobbles or boulders. Appropriate field procedures are as follows:

1. To make a hand auger borehole, attach the auger bit to a drill rod extension, and attach a "T" handle to the drill rod.

2. Clear the area to be sampled of any surface debris (twigs, rocks, or litter). It may be necessary to remove the first three to six inches of surface soil for an area approximately six inches in radius around the auger location. .

3. Begin augering by pressing down on the handle while manually rotating it. Periodically remove soil cuttings that accumulate on the ground around the auger stem with a decontaminated tool. This will prevent loose material from falling back down into the borehole when removing the auger or adding drill rods. If necessary, the cuttings from each foot of advancement should be screened for VOCs with a photoionization detector (PID) or for other parameters, as appropriate.

4. Compare PID readings to action levels presented in the project Site Safety and Health Plan. The operator of the PID must be experienced in its use and aware of such factors as temperature, humidity, and methane on the readings provided by the PID.

5. After reaching the desired depth, carefully remove the auger/corer from the hole.

6. If analyzing samples for VOCs, using the EnCore sampler tool, collect the appropriate sample volume in the manner discussed in Attachment A.

7. For the remainder of the parameters place the soil sample into a stainless steel mixing bowl and homogenize it. Obtain a discrete soil sample using a stainless steel lab spoon or its equivalent and place in appropriate sample jars. **See Section 6.5 for discussion of discrete vs. composite sample collection.**

8. If required by the Field Sampling Plan, check that a Teflon liner is present in the cap of all analytical sample jars. Secure all caps tightly. Although chemical preservation of solids is generally not required, samples for chemical analysis shall be refrigerated because of the SW-846 requirement to refrigerate samples designated for mercury analysis (normally in iced coolers to approach approximately 4°C). Radiochemical soil samples do not require refrigeration. Refer to **SOP - Labeling, Packaging, and Shipping Environmental Samples** for procedure-specific requirements.

9. Label the sample bottle with the appropriate sample tag. Complete all chain-of-custody documents. Refer to **SOP - Labeling, Packaging, and Shipping Environmental Samples** for procedure-specific requirements.

10. Record in the field log book and on a sample log, if dictated by the Sampling and Analysis Plan.

11. Decontaminate equipment after use and between sample locations. Also, decontaminate sample containers and/or isolate them (such as sealing in Ziploc bags). Refer to **SOP - Decontamination** for procedure-specific requirements.

6.5 PREPARATION OF COMPOSITE SAMPLES

Soil samples may be either discrete or composite fragments (refer to your Field Sampling Plan for designated sampling intervals). A discrete sample represents a single sample location within a vertical soil column and at a single horizontal area point. A composite sample represents a mixture of soil from more than one discrete location, either vertically, within the same soil column or horizontally, across an area. If a composite sample is to be obtained, it can be mixed in a shallow high density polyethylene pan, lined with aluminum foil, or in a stainless steel pan. Stainless steel sieves may be used to remove larger rocks. Compositing procedures are not appropriate for samples obtained for analysis for VOCs because the agitation of the sample results in a loss of volatiles from the sample.

The sequence of sample collection (after collection of VOCs) shall be as follows:

a. Semivolatile organic compounds (SVOC)
b. Total Recoverable Petroleum Hydrocarbons (TRPH)
c. PCBs/pesticides
d. Metals
e. Radionuclides

Procedure outlined in Attachment B shall be followed for soil compositing.

6.6 GLOSSARY OF TERMS

Composite Sample - represents a mixture of soil from more than one discrete location.

Discrete Sample - A discrete sample represents a single sample location within a vertical soil column and at a single horizontal area point. Discrete sampling must be used when collecting soil samples for VOC analyses.

Trowel - Resembles a small shovel. To be constructed of steel for sampling purposes. The blade of a trowel is generally flat and 5 to 6 inches in length. A scoop (blade has curved edges versus flat) may be substituted if necessary. Both can be purchased with volume calibrations.

Hand Corer - A hollow metal tube with a detachable, hardened metal cutting nose and a plastic "core catcher" fitting. This tube can be attached to a short spiral-bladed hollow metal rod (auger) attached to a "T" handle for hand-advancement. Clockwise rotation of the T handle with simultaneously applied downward pressure initiates the cutting process. Most of the soil is discharged upwards through the auger as it moves downwards. When the desired sampling interval is reached, rotation is stopped and the auger is withdrawn from the hole with the soil of interest inside it. If soil is extremely uncohesive (e.g. dry sand), a hand corer should be considered for use.

Hollow-Stem Bucket Auger - a short spiral-bladed hollow metal rod (auger) attached to a "T" handle for hand-advancement. Clockwise rotation of the T handle with simultaneously applied downward pressure initiates the cutting process. Most of the soil is discharged upwards through the auger as it moves downwards. When the desired sampling interval is reached, rotation is stopped and the auger is withdrawn from the hole with the soil of interest inside it. If soil is extremely uncohesive (e.g. dry sand), a hand corer should be considered for use.

7.0 ATTACHMENTS

Attachment A – Disposal EnCore Sampler, Extrusion Procedures

Attachment B – Soil Compositing Procedure

ATTACHMENT A

Disposable En Core™ Sampler

EXTRUSION PROCEDURES

USING THE En Core™ EXTRUSION TOOL

CAUTION! Always use the Extrusion Tool to extrude soil from the En Core Sampler. If the Extrusion Tool is not used, the Sampler may fragment, causing injury.

1. Use a pliers to break locking arms on cap of En Core Sampler. Do not remove cap at this time. **(CAUTION: Broken edges will be sharp.)**
2. To attach En Core Sampler to En Core Extrusion Tool: Depress locking lever on Extrusion Tool and place Sampler, plunger end first, into open end of Extrusion Tool, *aligning slots on coring body with pins in Extrusion Tool*. Turn coring body clockwise until it locks into place. Release locking lever.
3. Rotate and gently push Extrusion Tool plunger knob clockwise until plunger slides over wings of coring body. (When properly positioned plunger will not rotate further.)
4. Hold Extrusion Tool with capped Sampler pointed upward so soil does not fall out when cap is removed. To release soil core, remove cap from Sampler and push down on plunger knob of En Core Extrusion Tool. Remove and properly dispose of En Core Sampler.

Warranty and Disclaimers

IMPORTANT: FAILURE TO USE THE EN CORE™ SAMPLER IN COMPLIANCE WITH THE WRITTEN INSTRUCTIONS PROVIDED HEREIN VOIDS ALL EXPRESS AND IMPLIED WARRANTIES, INCLUDING WARRANTY OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

PRINCIPLE OF USE. The En Core Sampler Cartridge System is a *volumetric sampling system designed to collect, store and deliver a soil sample.* The En Core Sampler comes in two sizes for sample volumes of approximately 25 or 5 grams. There are four components: the cartridge with a movable plunger, a cap with two locking arms; a T-handle (purchased separately); and an extrusion handle (purchased seperately). NOTE: The En Core Sampler is designed to store soil. It is not designed to store solvent or free product.

The soil is stored in a sealed headspace-free state. The seals are achieved by three special *Viton®* * o-rings, two located on the plunger and one on the cap of the Sampler. **At no time and under no condition should these o-rings be removed or disturbed.**

QUALITY CONTROL. The cartridge is sealed in an airtight package to prevent contamination prior to use. Due to the stringent quality control requirements associated with the use of this system, the disposable cartridge is designed to be used only once.

WARRANTY. En Novative Technologies, Inc. ("En Novative Technologies") warrants that the En Core Sampler shall perform consistent with the research conducted under *En Novative Technologies'* approval, within thirty (30) days from the date of delivery, provided that the Customer gives En Novative Technologies prompt notice of any defect or failure to perform and satisfactory proof thereof. THIS WARRANTY DOES NOT APPLY TO THE FOLLOWING, AS SOLELY DETERMINED BY EN NOVATIVE TECHNOLOGIES: (a) Damage caused by accident, abuse, mishandling or dropping; (b) Samplers that have been opened, taken apart or mishandled; (c) Samplers not used in accordance with the directions; and (d) Damages exceeding the cost of the sampler. Seller warrants that all En Core Samplers shall be free from defects in title. THE FOREGOING WARRANTIES ARE IN LIEU OF ALL OTHER WARRANTIES, WHETHER ORAL, WRITTEN, EXPRESSED, IMPLIED OR STATUTORY, INCLUDING ANY INFORMATION PROVIDED BY SALES REPRESENTATIVES OR IN MARKETING LITERATURE. IMPLIED WARRANTIES OF FITNESS AND MERCHANTABILITY SHALL NOT APPLY. En Novative Technologies' warranty obligations and Customer's remedies, except as to title, are solely and exclusively as stated herein.

LIMITATION OF LIABILITY. IN NO EVENT SHALL EN NOVATIVE TECHNOLOGIES BE LIABLE FOR ANTICIPATED PROFITS, INCIDENTAL, SPECIAL OR CONSEQUENTIAL DAMAGES, INCLUDING, BUT NOT LIMITED TO, DAMAGES FOR LOSS OF REVENUE, DOWN TIME, REMEDIATION ACTIVITIES, REMOBILIZATION OR RESAMPLING, COST OF CAPITAL, SERVICE INTERRUPTION OR FAILURE OF SUPPLY, LIABILITY OF CUSTOMER TO A THIRD PARTY, OR FOR LABOR, OVERHEAD, TRANSPORTATION, SUBSTITUTE SUPPLY SOURCES OR ANY OTHER EXPENSE, DAMAGE OR LOSS, INCLUDING PERSONAL INJURY OR PROPERTY DAMAGE. En Novative Technologies' liability on any claim of any kind shall be replacement of the En Core Sampler or refund of the purchase price. En Novative Technologies *shall not be liable for penalties of any* description whatsoever. In the event the En Core Sampler will be utilized by Customer on behalf of a third party, such third party shall not occupy the position of a third-party beneficiary of the obligation or warranty provided by En Novative Technologies, and no such third party shall have the right to enforce same. All claims must be brought within one (1) year of shipment, regardless of their nature.

En Novative Technologies, Inc.
1241 Bellevue St.
Green Bay, WI 54302
Telephone: 920-465-3960 • Toll Free: 1-888-411-0757
Fax: 920-465-3963

The En Core™ Sampler is covered by One or More of the Following U.S. Patents: 5,343,771; 5,505,098; 5,517,868; 5,522,271. Other U.S. and Foreign Patents Pending.

* Viton® is a registered trademark of DuPont Dow Elastomers.

Disposable En Core™ Sampler

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Fax: 920-465-3963

SAMPLING PROCEDURES

USING THE En Core™ T-HANDLE

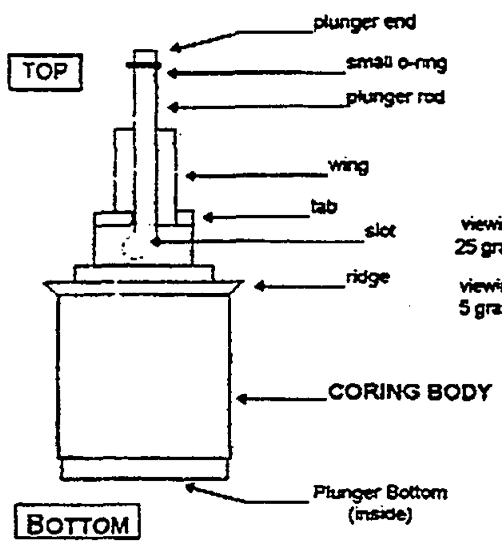
NOTE:

1. En Core Sampler is a SINGLE USE device. It cannot be cleaned and/or reused.

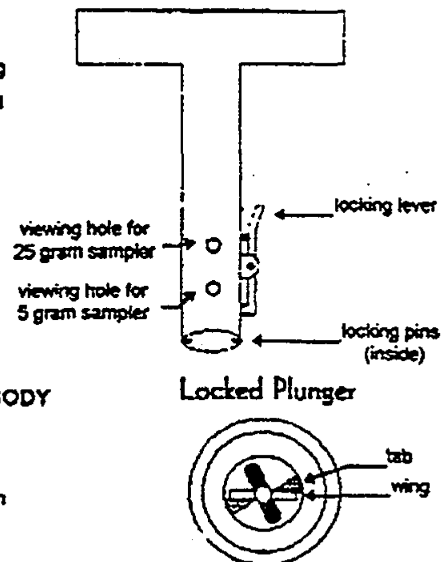
2. En Core Sampler is designed to store soil. Do not use En Core Sampler to store solvent or free product!

3. En Core Sampler must be used with En Core™ T-Handle and/or En Core™ Extrusion Tool exclusively. (These items are sold separately.)

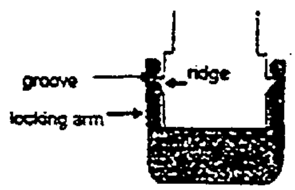
En Core Sampler



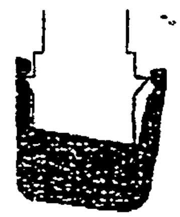
En Core T-Handle



Sampler Correctly Capped
(Locking Arm Grooves Seated Over Coring Body Ridge)



Sampler Incorrectly Capped
Cap Appears Crooked. Locking Arm Grooves Not Fully Seated Over Coring Body Ridge



BEFORE TAKING SAMPLE:

1. Hold coring body and push plunger rod down until small o-ring rests against tabs. This will assure that plunger moves freely.

2. Depress locking lever on En Core T-Handle. Place coring body, plunger end first, into open end of T-Handle, *aligning the (2) slots on the coring body with the (2) locking pins in the T-Handle*. Twist coring body clockwise to lock pins in slots. Check to ensure Sampler is locked in place. Sampler is ready for use.

TAKING SAMPLE:

3. Turn T-Handle with T-up and coring body down. This positions plunger bottom flush with bottom of coring body (ensure that plunger bottom is in position). Using T-Handle, push Sampler into soil until coring body is completely full. When full, small o-ring will be centered in T-Handle viewing hole. Remove Sampler from soil. Wipe excess soil from coring body exterior.

4. Cap coring body while it is still on T-handle. *Push and twist* cap over bottom until grooves on locking arms seat over ridge on coring body. CAP MUST BE SEATED TO SEAL SAMPLER (see diagram).

PREPARING SAMPLER FOR SHIPMENT:

5. Remove the capped Sampler by depressing locking lever on T-Handle while twisting and pulling Sampler from T-Handle.

6. Lock plunger by rotating extended plunger rod fully counter-clockwise until wings rest firmly against tabs (see plunger diagram).

7. Attach completed circular label (from En Core Sampler bag) to cap on coring body.

8. Return full En Core Sampler to zipper bag. Seal bag and put on ice.

ATTACHMENT B

SOIL COMPOSITING PROCEDURE

The following procedure will be used for compositing grab samples from the soil piles.

1. Empty the soil container(s) into stainless steel mixing bowls.
2. Inspect the material for large stones and other objects which are not representative of the sample matrix and remove them from the bowl.
3. Homogenize the remaining sample material by breaking up any large clumps and thoroughly mixing with stainless steel spatula.
4. Fill the sample container(s) using a spatula.

STANDARD OPERATING PROCEDURE FUSRAP MAYWOOD SUPERFUND SITE STONE & WEBSTER ENGINEERING CORPORATION		
TITLE: Wipe Sampling Procedures	NO.:	SW-MWD-312-0
	PAGE	1 of 7
	DATE:	May 1999
APPROVED: 2/29/00 Project Manager Richard Skryness 2/29/00 Project Engineer		

1.0 PURPOSE

This procedure presents the method for taking wipe samples at the FUSRAP Maywood Superfund Site.

2.0 SCOPE

Wipe sampling techniques are used to indicate contamination on hard surfaces such as stone, metal, concrete, brick, tile, and wood surfaces that are characteristic of manmade structures.

3.0 REFERENCES

Midwest Research Institute's Field Manual For Grid Sampling of PCB Spill Sites to Verify Cleanup.

40 CFR part 761 Polychlorinated Biphenyls Spill Cleanup Policy, Subpart G, Sec.761.123 Definitions.

Decontamination SOP (see Appendix A of the Maywood Field Sampling Plan (FSP), second part of Chemical Data Quality Management Plan (CDQMP)).

4.0 DEFINITIONS

Wipe Sample - A sample taken over a known area (usually 10cm x 10cm) on a hard surface with a wiping of known size partially saturated with known solvent.

Template - An outline of the area to be sampled usually made of paper or other non-contaminating materials.

5.0 RESPONSIBILITIES

5.1 Project Manager

Sets technical capability requirement criteria for personnel and ensures that personnel assigned to project tasks are properly qualified to perform wipe sampling.

5.2 Project Engineer

Translates client's requirements into technical direction of project. Reviews and approves technical progress, ensures that the Project Superintendent has been properly briefed and is prepared for the wipe sampling task.

5.3 Site Safety and Health Officer

All field activities must be carried out in accordance with a site-specific SSHP. The Site Safety and Health Officer (who may also serve as a wipe sampler) is responsible for ensuring that all site workers (Stone & Webster and subcontractors) have read, signed and are familiar with the requirements of the SSHP and that the requirements of the SSHP are met during site activities.

5.4 Project Superintendent

The Project Superintendent is the individual designated by the project manager to supervise investigative activities by Stone & Webster and related subcontracting personnel at a given site for the designated tasks. The Project Superintendent is responsible for ensuring that the field personnel have been briefed on conducting wipe sampling in accordance with the project requirements, this SOP, and related SOPs. He or she assures that all necessary equipment including safety equipment is available and functioning properly before project operations begin, and that all necessary personnel are mobilized on time. The Project Superintendent maintains a daily log of activities each work day.

The Project Superintendent coordinates and consults with the Project Manager on decisions relative to unexpected encounters during field investigations and deviations from this SOP.

5.5 Site Personnel

Site personnel assigned to perform the wipe sampling activities will be trained in the proper techniques for conducting the work. All site personnel have the responsibility for correctly creating or generating documentation, maps, sample point locations, chains-of-custody and related items. Wipe Samples are documented the same as other samples except the matrix of a sample is "wipe" instead of liquid or solid. The description should include the size such as "100 cm^2 Wipe".

They are required to read and sign the site-specific SSHP and to follow the procedures in this SOP, unless superseded by other project-specific requirements. All wipe sampling activities, including deviations to this SOP, will be recorded in field logbooks during on-site activities.

6.0 GENERAL INFORMATION

Surface sampling techniques are not as reproducible as most other sampling techniques. Contaminant recovery varies widely, depending on the technique of the sampler and the texture of the surface. The results are reported as a two-dimensional matrix and not as a three dimensional matrix. The results are reported as $\mu g/m^2$ instead of $\mu g/m^3$ (or ppm). Since the cleanup criteria are typically specified in parts per million (ppm), the clean-up levels of $\mu g/m^2$ must be verified prior to collection of the samples.

An advantage of wipe samples is that they can be obtained quickly and easily without compromising the integrity of the area of surface under investigation.

7.0 PROCEDURE

7.1 Preliminary Site Assessment

A preliminary assessment of existing data should be consulted in planning a wipe sampling operation. Of special importance are items that can be used to characterize the types of hazardous materials present at the site (e.g. previous field logs for the site, generator records, manifests, inventories, personal interviews, and monitoring data). This is also the time to check with the Project Superintendent to get any questions answered and to confirm information that relates to the sampling activity:

- Is the site location accurate (can you get there)?
- Is wipe sampling going to accomplish the goals of the project?
- Are all phone numbers complete and correct?
- Are the wipe solvents correct for the analyte under investigation?
- Is all equipment on the equipment list needed?
- Is the site accessible to personnel at the scheduled time period?
- Do other special conditions exist?
- Are site maps of drawings available?

Equipment should be checked and inventory logs completed at this time. There should be enough sample jars, gloves, solvent etc. to get the job done, allowing for breakage or failures. If a vehicle will be used, have it reserved, checked out mechanically, and FULLY fueled.

In general, the preliminary site assessment should be completed prior to leaving for the site to make sure everything goes smoothly on the project. A field characterization should help to establish ambient conditions and identify potential hot spots. This information must be plotted on a site sketch. Observations from maps and aerial photographs can also be used in compiling the site sketch.

7.2 General Equipment and Material Requirements

The following equipment is needed for proper wipe sampling:

- Non-powdered latex or nitrile sample gloves
- Teflon-coated forceps
- Templates (usually 10cm x 10cm)
- 11.0 cm diameter Whatman GF/A filter paper (glass microfibre)
- 8 ounce glass sample container with Teflon-lined bakelite cap
- Hexane (pesticide reagent grade) or other applicable and appropriate solvent
- Teflon squeeze bottles
- Sample label
- Absorbent pads (spill diapers)
- Field log book
- Indelible ink markers
- Tape measures
- Garbage bags
- Blue ice for the cooler

7.3 Preparation for Sampling

Preparation for sampling includes obtaining measurements from fixed reference points (such as telephone poles, buildings, or benchmarks) to accurately establish the sampling point locations. Three reference points per sample point should be used. Setting up a decontamination area for people and or equipment may be necessary depending on the level of protection required. Decontaminating equipment before sampling begins must also be done (see Stone & Webster Decontamination SOP).

A grid system is usually the best way to make and record measurements. These measurements are recorded on a site map and in the sampler's notebook. Measurements are made according to the guidelines, and in such a fashion that relocating the exact sampling locations at a later time can readily be accomplished.

If sampling is done in Level D the only decontamination will be for the forceps which can be done over a sample jar. If the sampling is taking place in Level C or higher a decontamination area will have to be set up. Decontamination of the Teflon squeeze bottle and forceps can be accomplished by rinsing with hexane (or the solvent in use) prior to first use. Gloves, filter pads, and sample bottles should already be clean.

7.4 Wipe Sampling Precautions

Excessive dust can interfere with wipe sampling by absorbing the solvent and preventing proper wetting of the surface. To reduce this problem, the filter may be held over the sample jar and carefully rinsed during the sampling process. Care should be taken when using the sampling area outline templates, especially in dusty areas, to avoid contaminating the sample field with falling dust.

Rough surfaces are very difficult to sample representatively. The texture of the sampled surface should always be noted in the field log. If cotton or gauze are used, care must be taken so that the material does not tear or shred and remain on the sampling surface.

Make sure that the template being used will not react with the sample material or solvent used and that the proper solvent is being used for the desired analyte (See Attachment A for solvent data).

7.5 Sample Collection

The steps to be followed in wipe sampling are as follows:

1) Don a clean pair of disposable latex sample gloves.

2) Remove the lid of the sample jar and place it upside down on an absorbent pad.

3) Don a second clean pair of disposable latex sample gloves.

4) Remove one GF/A filter from the filter box and fold the GF/A filter paper in half three times.

5) Place hexane (or solvent being used) rinsed forceps onto the GF/A filter in such a manner that the forceps hold the filter paper approximately 1 cm away from and parallel to the triple-folded edge of the filter.

6) Saturate the filter paper as much as possible with the appropriate solvent from a Teflon squeeze bottle.

7) Carefully place the template on the area to be sampled.

8) Wipe the sample surface 10 times horizontally and 10 times vertically in two swaths each direction. Each swath is approximately 5.5 cm wide, overlap 0.5 cm, and approximately 9.5 cm long (This method of wiping a surface area provides for a consistent sample area of 100 cm^2).

9) Dab any torn fragments from the GF/A filter from the sample surface with the filter to prevent loss of recovery from the sample area.

a) Place the filter into an 8 ounce sample container. Hold the forceps over the container and rinse with the appropriate solvent (removing any residual surface contamination that the forceps may have picked up).

b) Replace the Teflon-lined lid on the sample container, and label and seal the sample properly.

c) Dispose of template.

d) Repeat steps 1 through 9 as necessary until all the samples have been collected. Pack samples in cooler for shipping as appropriate

10) Discard all disposables in appropriate container.

7.6 Wipe Sampling QA/QC

A field blank should always be collected with the sampling batch to ensure the quality of the data. This consists of a filter pad wet with the chosen solvent and placed into a prepared sample container. This will help identify potential introduction of contaminants through the sampling method and contributions from the pad, solvent, or sample container.

Spiked samples may also be collected to better assess the data being generated. Spikes may be prepared by spiking a piece of foil of known area with a known amount of the standard of the analyte under investigation. The solvent containing the standard is allowed to evaporate and the foil is wiped in a manner identical to Sec. 7.4 steps 1 through 9.

8.0 ATTACHMENTS

ATTACHMENT A: Solvent Selection

ATTACHMENT A

SOLVENT SELECTION	
ANALYTE	SOLVENT
Semi- and nonvolatile organics (PCBs, Dioxin, Dibenzofurans, Pesticides)	Hexane
Metals (Except Hexavalent Chromium - CR^{+6})	1:1 Nitric Acid (10% HNO_3)
Hexavalent Chromium (CR^{+6})	D.I. Water
Cyanide	1% Sodium Hydroxide ($NaOH$)

APPROVED:

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Project Manager

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Project Engineer

1.0 PURPOSE

This Standard Operating Procedure (SOP) – **Stockpile Sampling** is to be employed when hand-collecting (without machines or power tools) soil samples from stockpiles at sites with known or suspected environmental contamination.

This SOP describes the procedures for collecting representative environmental and/or geotechnical samples from stockpiled soils. The following sections describe various methods and equipment used to collect disturbed soil samples. A disturbed soil sample is a representative sample of a selected geologic unit which has undergone structural alteration as a result of an excavation operation. These types of samples can be used for soil classification, soil index testing, and analytical testing purposes

2.0 SCOPE

This procedure serves as general guidance on the proper methods of collecting both discrete and composite soil samples from stockpiles. This procedure can be used in most soil types. Accurate, representative samples can be collected with this procedure depending on the care and precision demonstrated by the sampling team member. The use of a flat, pointed mason trowel to cut a block of the desired soil can be helpful when undisturbed profiles are required. A stainless steel hand auger will suffice in most other applications.

Piles vary in size, shape, composition, and compactness, and may vary in distribution of hazardous constituents and characteristics (strata). Samples should be taken at various levels and locations on the stockpile. As a general rule, do not sample the bottom or exposed surfaces of the stockpile because the coarser and finer particles may have segregated to a greater degree at these locations. Individual samples may be combined for a representative sample or placed in separate containers to evaluate the variability of the material in the stockpile. Selection of specific sampling locations, quantities, and specific sampling technique(s) is dependent on the objectives of the environmental assessment. Consult the task-specific Sampling and Analysis Plan for sampling locations and techniques. Always consult state-specific or program-specific requirements as well as manufacturer's instructions for equipment use to ensure compatibility of this SOP with project requirements. **Field changes to this SOP shall be discussed with the Project Manager prior to implementation and shall be documented in project field log books.**

3.0 REFERENCES

1. SOP 505 – Cuttings and Fluids Management

2. SOP 506 - Decontamination

3. SOP 504 – Labeling, Packaging and Shipping Environmental Samples

4. SOP 307 – Surface and Shallow Subsurface Soil Sampling

U.S. Army Corps of Engineers, Engineering and Design – Soil Sampling, EM 1110-1-1906, 30 September 1996.

U.S. Army Corps of Engineers, Requirements for the Preparation of Sampling and Analysis Plans, EM 200-1-3, 1 September 1994.

U.S. Environmental Protection Agency, Region 4, Environmental Investigations Standard Operating Procedures and Quality Assurance Manual, May 1996.

4.0 DEFINITIONS

None.

5.0 RESPONSIBILITIES

5.1 Project Manager

Sets technical capability requirement criteria for personnel and ensures that personnel assigned to project tasks are properly qualified for the needed work.

5.2 Project Environmental Engineer

Translates client's requirements into technical direction of project. Reviews and approves technical progress, ensures that the Project Superintendent has been properly briefed and is prepared for soil sampling task.

5.3 Project Superintendent

The Project Superintendent is the individual designated by the project manager to supervise investigative activities by Stone & Webster and related subcontracting personnel at a given site for the designated tasks. The Project Superintendent is responsible for ensuring that the field personnel have been briefed in conducting the method of soil sampling chosen in accordance with the project requirements, this SOP and related SOPs. The Project Superintendent assures that all necessary equipment including safety equipment is available and functioning properly before project operations begin. The Project Superintendent assures that all necessary personnel are mobilized on time and maintains a daily log of activities each work day.

The Project Superintendent coordinates and consults with the Project Manager on decisions relative to unexpected occurrences during soil sampling and deviation from this SOP.

5.4 Site Safety & Health Officer

All field activities must be carried out in accordance with a Site Safety and Health Plan (SSHP). The Site Safety & Health Officer (who may also serve as a soil sampler) is responsible for ensuring that all site workers (Stone & Webster and subcontractors) have read, signed and are familiar with the requirements of the SSHP and that the requirements of the SSHP are met during site activities.

5.5 Project Chemist

The Project Chemist shall ensure that site personnel use this SOP and the quality requirements described in the Chemical Data Quality Management Plan and the Contractor Quality Control Plan while carrying out soil stockpile sampling activities. The Project Chemist will inform the laboratory in advance of the number of samples to be shipped and for what parameters they must be analyzed. The Project Chemist will act as the interface between site personnel and the laboratory.

5.6 Site Personnel

All employees who are engaging in soil sampling activities are required to read and sign the Site Safety and Health Plan (SSHP) and to follow the procedures in this SOP, unless superseded by project-specific requirements. All soil sampling activities, including deviations from this SOP, will be recorded in field logbooks during on-site activities.

6.0 PROCEDURE

6.1 General Equipment & Material Requirements for Stockpile Sampling

The following is a list of equipment & material which is commonly used on all surface soil sampling projects. Refer also to related SOP equipment & material requirements to ensure completeness.

- Field Sampling Plan (FSP)
- Site Safety and Health Plan (SSHP). **To be read and signed by all site personnel prior to site activities.**
- Personal Protective Equipment
- Field logbook(s)
- Volatile organic compound (VOC) vapor meter
- Decontamination supplies - **See SOP – Decontamination, and FSP**
- Indelible markers
- Tape measure
- Stainless steel or plastic spoon, trowel, or shovel
- "T"-handled hollow stem hand auger, hand corer, or push tube, if collecting soil samples below a depth of one foot into the stockpile
- Surveyors stakes
- Hammer
- Flagging Tape
- Spray paint
- Stainless steel mixing bowls

- Sample bottles and labels
- Chain-of-Custody forms – **see SOP - Labeling, Packaging and Shipping Environmental Samples**
- Chain-of-Custody tape
- Sample Coolers
- Sample packing material
- Ice or pre-cooled "cold" packs - for sample preservation
- Shipping forms (not needed if hand delivered to lab or courier pickup arranged)
- Shipping tape (transparent)
- Duct tape
- Paper towels

Avoid the use of devices plated with chrome or other materials if collecting soil samples for metals analysis. Plating is particularly common with garden implements such as potting trowels.

6.2 Pre-Sampling Activities

1. The task-specific Sampling and Analysis Plan should be consulted to determine the sampling methods to be employed and the sampling and monitoring equipment necessary for field activities.

2. In accordance with a Site Safety and Health Plan, a general site survey should be performed prior to site entry.

3. All sampling equipment should be decontaminated prior to each sampling episode. Decontamination procedures are detailed in a separate SOP.

6.3 Surficial Stockpile Sampling

Appropriate field procedures are as follows:

1. Select a sample location along the periphery of the stockpile at some point away from the bottom of the pile.

2. Place a form or several boards vertically into the stockpile just above the location to be sampled to help prevent material from raveling down the side of the stockpile onto the material to be sampled.

3. Carefully remove the material from the surface of the stockpile to a depth of 1 to 2 feet with a decontaminated stainless steel tool.

4. If applicable, screen the area to be sampled using a VOC vapor analyzing meter and record readings in the field log. The VOC screen is used as a field safety procedure. The VOC readings should be compared to action levels presented in the Site Safety and Health Plan. The VOC screen can also be used for selecting potentially contaminated soil samples.

5. Obtain a discrete soil sample using a stainless steel instrument. If analyzing samples for VOCs using the EnCore sampler tool, collect the appropriate sample volume in the manner discussed in Attachment A.

6. For the remainder of the parameters, place the sample into a stainless steel mixing bowl. Homogenize the sample and place into appropriate sample containers using a stainless steel lab spoon or its equivalent.

7. If required by the Field Sampling Plan, check that a Teflon liner is present in the cap of all analytical sample jars. Secure all caps tightly. Although chemical preservation of solids is generally not required, the samples shall be refrigerated (normally in iced coolers to approach approximately 4°C). Refer to **SOP – Labeling, Packaging, and Shipping of Environmental Samples** for procedure-specific requirements.

8. Label the sample bottle with the appropriate sample tag. Complete all chain-of-custody documents. Refer to **SOP – Labeling, Packaging, and Shipping of Environmental Samples** for procedure-specific requirements.

9. Record sampling event in the field log book and on a sample log, if dictated by the Sampling and Analysis Plan.

10. Decontaminate equipment after use and between sample locations. Also, decontaminate sample containers and/or isolate them (such as sealing in Ziploc bags). Refer to **SOP - Equipment Decontamination** for procedure-specific requirements.

6.4 Shallow Subsurface Stockpile Sampling

A hand auger, hand corer, or push tube can be advanced to obtain soil samples up to approximately 5 feet below the surface of the stockpile when conditions allow. The method is less effective with coarse, granular soils or soils containing cobbles or boulders. Appropriate field procedures are as follows:

1. If making a hand auger or hand corer borehole, attach the auger bit or corer to a drill rod extension, and attach a "T" handle to the drill rod.

2. Select a sample location along the periphery of the stockpile at some point away from the bottom of the pile.

3. Place a form or several boards vertically into the stockpile just above the location to be sampled to help prevent material from raveling down the side of the stockpile onto the material to be sampled.

4. Carefully remove the material from the surface of the stockpile to a depth of 1 to 2 feet with a decontaminated stainless steel tool. It may be necessary to remove this material for an area approximately six inches in radius around the auger location.

5. If augering, begin augering by pressing down on the handle while manually rotating it into the stockpile. Periodically remove soil cuttings that accumulate around the auger stem with a decontaminated tool. This will prevent loose material from falling back down into the borehole when removing the auger or adding drill rods. If necessary, the cuttings from each foot of advancement should be screened for VOCs with a photoionization detector (PID) or for other parameters, as appropriate. Compare PID readings to action levels presented in the Site Safety and Health Plan. The operator of the PID must be experienced in its use and aware of such factors as temperature, humidity, and methane on the readings provided by the PID.

6. If using a push tube, insert the tube down into the stockpile at a 0 to 45 degree angle from horizontal and rotate the sampler two or three times in order to cut a core of the material.

7. Once the apparatus is full, carefully remove the auger or push tube from the hole.

8. If analyzing samples for VOCs, using the EnCore sampler tool, collect the appropriate sample volume in the manner discussed in Attachment A.

9. For the remainder of the parameters place the soil sample into a stainless steel mixing bowl and homogenize it. Obtain a discrete soil sample using a stainless steel lab spoon or its equivalent and place in appropriate sample jars. **See Section 6.5 for discussion of discrete vs. composite sample collection.**

10. If required by the Field Sampling Plan, check that a Teflon liner is present in the cap of all analytical sample jars. Secure all caps tightly. Although chemical preservation of solids is generally not required, the samples shall be refrigerated (normally in iced coolers to approach approximately 4°C). Refer to **SOP - Packaging and Shipping of Environmental Samples** for procedure-specific requirements.

11. Label the sample bottle with the appropriate sample tag. Complete all chain-of-custody documents. Refer to **SOP – Labeling, Packaging, and Shipping of Environmental Samples** for procedure-specific requirements.

12. Record in the field log book and on a sample log, if dictated by the Sampling and Analysis Plan.

13. Decontaminate equipment after use and between sample locations. Also, decontaminate sample containers and/or isolate them (such as sealing in Ziploc bags). Refer to **SOP - Decontamination** for procedure-specific requirements.

6.5 Preparation of Composite Samples

Stockpile samples may be either discrete or composite fragments (refer to your Field Sampling Plan for designated sampling intervals). A discrete sample represents a single sample location within a vertical soil column and at a single horizontal area point. A composite sample represents a mixture of soil from more than one discrete location, either vertically, within the same soil column or horizontally, across an area. If a composite sample is to be obtained, it can be mixed in a shallow high density polyethylene pan, lined with aluminum foil, or in a stainless steel pan. Stainless steel sieves may be used to remove larger rocks. Compositing procedures are not appropriate for samples obtained for analysis for VOCs because the agitation of the sample results in a loss of volatiles from the sample.

Procedure outlined in Attachment B shall be followed for soil compositing.

6.6 Glossary of Terms

<u>Composite Sample</u> - represents a mixture of soil from more than one discrete location.

<u>Discrete Sample</u> - A discrete sample represents a single sample location within a vertical soil column and at a single horizontal area point. Discrete sampling must be used when collecting soil samples for VOC analyses.

Trowel - Resembles a small shovel. To be constructed of steel for sampling purposes. The blade of a trowel is generally flat and 5 to 6 inches in length. A scoop (blade has curved edges versus flat) may be substituted if necessary. Both can be purchased with volume calibrations.

Hand Corer - A hollow metal tube with a detachable, hardened metal cutting nose and a plastic "core catcher" fitting. This tube can be attached to a short spiral-bladed hollow metal rod (auger) attached to a "T" handle for hand-advancement. Clockwise rotation of the T handle with simultaneously applied downward pressure initiates the cutting process. Most of the soil is discharged upwards through the auger as it moves downwards. When the desired sampling interval is reached, rotation is stopped and the auger is withdrawn from the hole with the soil of interest inside it. If soil is extremely uncohesive (e.g. dry sand), a hand corer should be considered for use.

Hand Auger - a short spiral-bladed hollow metal rod (auger) attached to a "T" handle for hand-advancement. Clockwise rotation of the T handle with simultaneously applied downward pressure initiates the cutting process. Most of the soil is discharged upwards through the auger as it moves downwards. When the desired sampling interval is reached, rotation is stopped and the auger is withdrawn from the hole with the soil of interest inside it. If soil is extremely uncohesive (e.g. dry sand), a hand corer should be considered for use.

Push Tube – a large hollow tube open on one side along its length. A sample is collected by inserting the device, rotating it, and retracting the core of material which results. If soil is extremely uncohesive (e.g. dry sand), a hand corer should be considered for use.

7.0 ATTACHMENTS

Attachment A – Disposable EnCore Sampler, Extrusion Procedures

Attachment B – Soil Compositing Procedure

ATTACHMENT A

Disposable En Core™ Sampler

EXTRUSION PROCEDURES

USING THE En Core™ EXTRUSION TOOL

CAUTION! Always use the Extrusion Tool to extrude soil from the En Core Sampler. If the Extrusion Tool is not used, the Sampler may fragment, causing injury.

1. Use a pliers to break locking arms on cap of En Core Sampler. Do not remove cap at this time. **(CAUTION: Broken edges will be sharp.)**
2. To attach En Core Sampler to En Core Extrusion Tool: Depress locking lever on Extrusion Tool and place Sampler, plunger end first, into open end of Extrusion Tool, *aligning slots on coring body with pins in Extrusion Tool.* Turn coring body clockwise until it locks into place. Release locking lever.
3. Rotate and gently push Extrusion Tool plunger knob clockwise until plunger slides over wings of coring body. (When properly positioned plunger will not rotate further.)
4. Hold Extrusion Tool with capped Sampler pointed upward so soil does not fall out when cap is removed. To release soil core, remove cap from Sampler and push down on plunger knob of En Core Extrusion Tool. Remove and properly dispose of En Core Sampler.

Warranty and Disclaimers

IMPORTANT: FAILURE TO USE THE EN CORE™ SAMPLER IN COMPLIANCE WITH THE WRITTEN INSTRUCTIONS PROVIDED HEREIN VOIDS ALL EXPRESS AND IMPLIED WARRANTIES, INCLUDING WARRANTY OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

PRINCIPLE OF USE. The En Core Sampler Cartridge System is a volumetric sampling system designed to collect, store and deliver a soil sample. The En Core Sampler comes in two sizes for sample volumes of approximately 25 or 5 grams. There are four components: the cartridge with a movable plunger; a cap with two locking arms; a T-handle (purchased separately); and an extrusion handle (purchased separately). NOTE: The En Core Sampler is designed to store soil. It is not designed to store solvent or free product.

The soil is stored in a sealed headspace-free state. The seals are achieved by three special Viton® * o-rings, two located on the plunger and one on the cap of the Sampler. **At no time and under no condition should these o-rings be removed or disturbed.**

QUALITY CONTROL. The cartridge is sealed in an airtight package to prevent contamination prior to use. Due to the stringent quality control requirements associated with the use of this system, the disposable cartridge is designed to be used only once.

WARRANTY. En Novative Technologies, Inc. ("En Novative Technologies") warrants that the En Core Sampler shall perform consistent with the research conducted under En Novative Technologies' approval, within thirty (30) days from the date of delivery, provided that the Customer gives En Novative Technologies prompt notice of any defect or failure to perform and satisfactory proof thereof. THIS WARRANTY DOES NOT APPLY TO THE FOLLOWING, AS SOLELY DETERMINED BY EN NOVATIVE TECHNOLOGIES: (a) Damage caused by accident, abuse, mishandling or dropping; (b) Samplers that have been opened, taken apart or mishandled; (c) Samplers not used in accordance with the directions; and (d) Damages exceeding the cost of the sampler. Seller warrants that all En Core Samplers shall be free from defects in title. THE FOREGOING WARRANTIES ARE IN LIEU OF ALL OTHER WARRANTIES, WHETHER ORAL, WRITTEN, EXPRESSED, IMPLIED OR STATUTORY, INCLUDING ANY INFORMATION PROVIDED BY SALES REPRESENTATIVES OR IN MARKETING LITERATURE. IMPLIED WARRANTIES OF FITNESS AND MERCHANTABILITY SHALL NOT APPLY. En Novative Technologies' warranty obligations and Customer's remedies, except as to title, are solely and exclusively as stated herein.

LIMITATION OF LIABILITY. IN NO EVENT SHALL EN NOVATIVE TECHNOLOGIES BE LIABLE FOR ANTICIPATED PROFITS, INCIDENTAL, SPECIAL OR CONSEQUENTIAL DAMAGES, INCLUDING, BUT NOT LIMITED TO, DAMAGES FOR LOSS OF REVENUE, DOWN TIME, REMEDIATION ACTIVITIES, REMOBILIZATION OR RESAMPLING, COST OF CAPITAL, SERVICE INTERRUPTION OR FAILURE OF SUPPLY, LIABILITY OF CUSTOMER TO A THIRD PARTY, OR FOR LABOR, OVERHEAD, TRANSPORTATION, SUBSTITUTE SUPPLY SOURCES OR ANY OTHER EXPENSE, DAMAGE OR LOSS, INCLUDING PERSONAL INJURY OR PROPERTY DAMAGE. En Novative Technologies' liability on any claim of any kind shall be replacement of the En Core Sampler or refund of the purchase price. En Novative Technologies shall not be liable for penalties of any description whatsoever. In the event the En Core Sampler will be utilized by Customer on behalf of a third party, such third party shall not occupy the position of a third-party beneficiary of the obligation or warranty provided by En Novative Technologies, and no such third party shall have the right to enforce same. All claims must be brought within one (1) year of shipment, regardless of their nature.

En Novative Technologies, Inc.
1241 Bellevue St.
Green Bay, WI 54302
Telephone: 920-465-3960 • Toll Free: 1-888-411-0757
Fax: 920-465-3963

The En Core™ Sampler is covered by One or More of the Following U.S. Patents: 5,343,771; 5,505,098; 5,517,868; 5,522,271. Other U.S. and Foreign Patents Pending.

* Viton® is a registered trademark of DuPont Dow Elastomers.

Disposable
En Core™ Sampler

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SAMPLING PROCEDURES

USING THE
En Core™ T-HANDLE

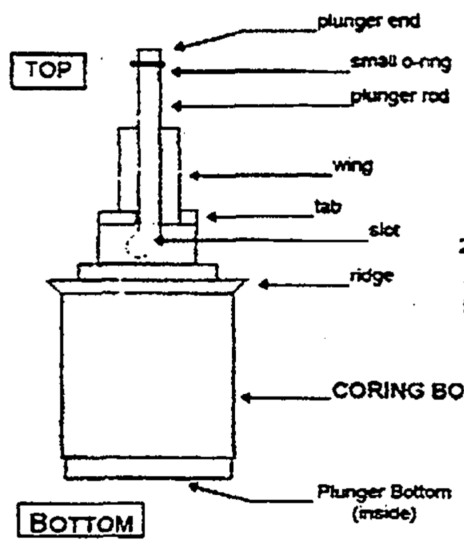
NOTE:

1. En Core Sampler is a SINGLE USE device. It cannot be cleaned and/or reused.

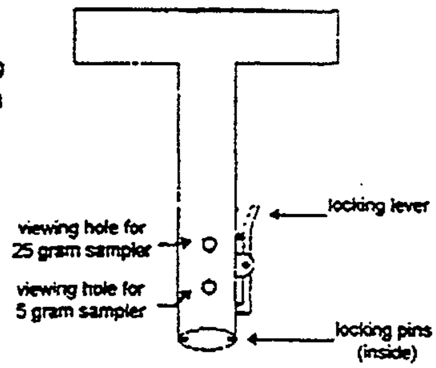
2. En Core Sampler is designed to store soil. Do not use En Core Sampler to store solvent or free product!

3. En Core Sampler must be used with En Core™ T-Handle and/or En Core™ Extrusion Tool exclusively. (These items are sold separately.)

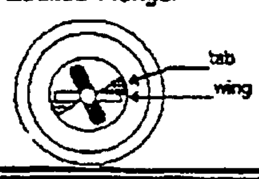
En Core Sampler



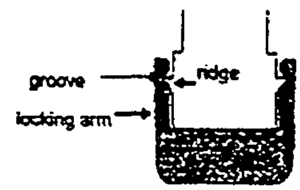
En Core T-Handle



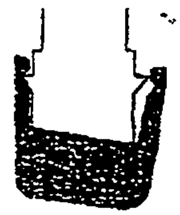
Locked Plunger



Sampler Correctly Capped
(Locking Arm Grooves Seated Over Coring Body Ridge)



Sampler Incorrectly Capped
Cap Appears Crooked, Locking Arm Grooves Not Fully Seated Over Coring Body Ridge



BEFORE TAKING SAMPLE:

1. Hold coring body and push plunger rod down until small o-ring rests against tabs. This will assure that plunger moves freely.

2. Depress locking lever on En Core T-Handle. Place coring body, plunger end first, into open end of T-Handle, *aligning the (2) slots on the coring body with the (2) locking pins in the T-Handle*. Twist coring body clockwise to lock pins in slots. Check to ensure Sampler is locked in place. Sampler is ready for use.

TAKING SAMPLE:

3. Turn T-Handle with T-up and coring body down. This positions plunger bottom flush with bottom of coring body (ensure that plunger bottom is in position). Using T-Handle, push Sampler into soil until coring body is completely full. When full, small o-ring will be centered in T-Handle viewing hole. Remove Sampler from soil. Wipe excess soil from coring body exterior.

4. Cap coring body while it is still on T-handle. ***Push and twist*** cap over bottom until grooves on locking arms seat over ridge on coring body. CAP MUST BE SEATED TO SEAL SAMPLER (see diagram).

PREPARING SAMPLER FOR SHIPMENT:

5. Remove the capped Sampler by depressing locking lever on T-Handle while twisting and pulling Sampler from T-Handle.

6. Lock plunger by rotating extended plunger rod fully counter-clockwise until wings rest firmly against tabs (see plunger diagram).

7. Attach completed circular label (from En Core Sampler bag) to cap on coring body.

8. Return full En Core Sampler to zipper bag. Seal bag and put on ice.

ATTACHMENT B

SOIL COMPOSITING PROCEDURE

The following procedure will be used for compositing grab samples from the soil piles.

1. Empty the soil container(s) into stainless steel mixing bowls.

2. Inspect the material for large stones and other objects which are not representative of the sample matrix and remove them from the bowl.

3. Homogenize the remaining sample material by breaking up any large clumps and thoroughly mixing with stainless steel spatula.

4. Fill the sample container(s) using a spatula.

STANDARD OPERATING PROCEDURE **FUSRAP MAYWOOD SUPERFUND SITE** **STONE & WEBSTER ENGINEERING CORPORATION**		
TITLE: **Labeling, Packaging, and Shipping Environmental Samples**	**NO.:**	SW-MWD-504-0
	PAGE	1 of 10 plus two attachment pages
	DATE:	May 1999
APPROVED: 2/28/00 Project Manager Richard Skryness 2/29/00 Project Engineer		

1.0 PURPOSE

This Standard Operating Procedure (SOP) - **Labeling, Packaging, and Shipping Environmental Samples** is to be employed at the FUSRAP Maywood Superfund site when samples are to be collected for laboratory analysis.

The purpose of this SOP is to provide detailed guidance on how to label, package and ship samples of various matrices for analysis by a fixed-based laboratory. It also provides guidance on how the samples should be labeled and how the Chain-Of-Custody (COC) form that accompanies the samples should be filled out.

2.0 SCOPE

This SOP details the materials, equipment, and methods common to all sample labeling, chain-of-custody, packaging, and shipping activities for groundwater, surface water, soil, and sediment samples. Actual sample collection or addition of chemical preservatives to samples are not addressed in this SOP. See the Maywood task-specific Sampling and Analysis Plan (SAP) for this information. For guidance on shipment of radioactive samples, see Maywood SOP 508, Procedure for Shipping Radiologically Contaminated Environmental Samples. Always consult program-specific requirements for labeling, packaging, and shipping (see Section 3.1.6 of the Maywood Field Sampling Plan (part of the Chemical Data Quality Management Plan) to ensure compatibility of this SOP with project requirements. **Field changes to this SOP shall be discussed with the Project Manager or Project Chemist prior to implementation and shall be documented in project field logbooks.**

Samples classified as Poison A, Poison B, radioactive, corrosive, or oxidizer, or remediation wastes are not covered in this SOP.

3.0 REFERENCES

FUSRAP Maywood Superfund Site Chemical Data Quality Management Plan, Stone & Webster, May, 1999.

4.0 DEFINITIONS

None.

5.0 RESPONSIBILITIES

5.1 PROJECT MANAGER

Sets technical capability requirement criteria for personnel and ensures that personnel assigned to project tasks are properly qualified for the needed work.

5.2 PROJECT ENVIRONMENTAL ENGINEER

Translates the USACE's requirements into technical direction of project. Reviews and approves technical progress, ensures that the CQCSM has been properly briefed and is prepared for packaging and shipping task.

5.3 CONTRACTOR QUALITY CONTROL SYSTEM MANAGER (CQCSM)

The CQCSM, or his designee ensures that field personnel have been briefed in chain-of-custody, sample packaging and shipping in accordance with the project requirements, this SOP and related SOPs. Assures that all necessary equipment including safety equipment is available and functioning properly before project operations begin. Assures that all necessary personnel are mobilized on time. Maintains daily log of activities during each day of fieldwork.

The CQCSM, Project Chemist, or their designee is also responsible for determining that samples are properly packaged and shipped, and for determining that chain-of-custody procedures are implemented from the time the samples are collected to their release to the shippers.

Should field conditions necessitate changes in the number and/or type of samples collected, or changes in sample shipment dates, the CQCSM must notify the Project Manager and the Project Chemist of the changes prior to completion of field activities.

The CQCSM coordinates and consults with the Task Manager or Project Superintendent on decisions relative to unexpected occurrences or deviations from this SOP during the packaging and shipping phase.

The CQCSM shall notify the Project Chemist of the number and type of samples and approximate collection, shipment, and delivery dates for all samples prior to leaving for the field.

5.4 SITE SAFETY & HEALTH OFFICER

All field activities must be carried out in accordance with the Maywood General Site Safety and Health Plan (SSHP). Ensuring the fulfillment of the requirements of the SSHP is the responsibility of the Site Safety and Health Officer (who may also serve as a sample packer and shipper).

5.5 PROJECT CHEMIST

The Project Chemist is responsible for coordinating sample shipment with the laboratories to minimize holding times and assure proper handling of all samples.

The Project Chemist shares responsibility with the CQCSM for determining that samples are properly packaged and shipped, and that chain-of-custody procedures are implemented from the time the samples are collected to their release to the shippers.

5.6 SITE PERSONNEL

All employees who are engaging in sample packaging and shipping activities are required to read and sign the task-specific Site Safety and Health Plan (SSHP) and to follow the procedures in this SOP, unless superseded by project-specific requirements. All sample packaging and shipping activities, including deviations to this SOP, will be recorded in field logbooks during on-site activities.

Field sampling personnel are expected to carry out the sample packaging and shipping activities. They are responsible for the care and custody of the samples collected until they are properly disposed or dispatched. The CQCSM or Project Chemist should be contacted if any problems arise during this phase of the sample collection process.

Personnel assigned to a project team with the task of collecting and shipping samples will be trained in specific techniques of sample collection and shipment.

6.0 PROCEDURE

6.1 EQUIPMENT

The following is a list of equipment & material commonly used for labeling, packaging and shipping samples.

- Nylon filament tape
- COC forms
- COC seals
- Vermiculite, Styrofoam, and/or bubble wrap
- Resealable plastic bags
- Permanent felt tip marker
- Pen (black permanent ink)
- Ice
- Shipping coolers
- Labels
- Metal cans (if high hazard samples are anticipated)
- Absorbent pads
- Transparent shipping tape
- Trash bags
- Duct tape (seals off openings in coolers)
- Knife or scissors to cut tape

6.2 SAMPLE LABELING

Prior to sample removal from the sampling location and packaging and shipment to an offsite laboratory, all sample containers will be assigned a permanent sample label. All notations on the label will be marked using indelible ink. Use prepared sample labels (whenever possible) to document all information necessary for effective sample tracking. In the case of soil samples, the boring number and the depth at which the sample was taken should also be included on the label. The information on the label will include the following:

- Date and time of sample collection (use military 24-hour format for the time)
- Sample ID number
- Project identification
- Type(s) of analysis to be performed
- Preservation method used for sample

The sample label can be modified to satisfy USACE/project specific requirements. For example, all sample labels and COCs associated with samples shipped to the USACE QA laboratory shall have a Chemical Quality Assurance Branch (CQAB) assigned number corresponding to the numbering sequence in the CQAB laboratory's Laboratory Information Management System (LIMS).

A set of labels will be prepared and numbered to correspond with unique samples to be collected. **For certain projects requiring strict quality control, blank, duplicate, or field spikes, the QC sample type shall not be identified as such on the label as this may compromise the quality control function. In those instances, assign a unique sample number to each QC sample and record the type of QC sample collected in the field logbook. In all other instances, assign a sample number using the Sample ID System for all Maywood Sites (from Table 3-1 of the Maywood FSP) as follows:**

XXXX-AAAmmNNNNn-##### - to be used for data base reporting

XXXX##### - to be used for sample collection and delivery to lab

<u>XXXX = Site Designator</u>
Maywood Interim Storage Site = MISS
Stepan Property = STEP
Sears Property = SEAR
New Jersey Vehicle Inspection Station = NJVS
etc. (others as needed)

<u>AAA = Area/Activity Designator</u>
Pilot Test = PT1
Burial Pit 1 = BP1
Background = BKG
etc. (others as needed)

<u>mm = Media</u>
Surface Soil = SS
Subsurface Soil Boring = SB
Sediment = SD
Ground Water = GW
Surface Water = SW
Storm Water = ST
Aquatic Biota = AB
Terrestrial Biota = TB
Air Filter = AF
Radon Detector = RD
TLDs = TD
Quality Control = QC
etc. (as new media types are identified)

<u>NNNN = Station Number</u>
Unique station identifier

<u>n = Sample Type</u>

Regular = 0, Trip Blank = 3, Duplicate = 1,
Equipment Rinsate = 4, Split = 2, Site Source Water Blank = 5

= Sequential Sample Number
Unique to each site

6.3 CHAIN-OF-CUSTODY

Stone & Webster has established a program of sample custody that shall be followed during sample handling activities from the particular Maywood property to the laboratory. This program is designed to ensure that each sample is accounted for at all times.

The objective of the sample custody identification and control system is to ensure, to the extent practicable, that the following conditions are met:

- Samples scheduled for collection are uniquely identified
- The correct samples are analyzed and are traceable to their records
- Important sample characteristics are preserved
- Samples are protected from loss or damage
- Any alteration of samples (e.g., filtration, preservation) is documented
- USACE confidentiality is maintained
- Sample COC shall be maintained through sample collection, shipment, storage, and analysis as a legal record and auditable trail of sample possession.
- Possession will be traceable by means of a COC record. The COC bears the signatures of the persons in possession of the samples. **The COC shall remain with the samples at all times until receipt by the laboratory.**

The appropriate sampling and laboratory personnel shall complete COC records for each sample. The following COC protocol shall be employed by sampling crews and recorded on the COC for each sample:

- Maywood Sample ID number (as described in the Labeling Section of this SOP). Use a separate column (or line depending on the configuration of the particular COC being used) for each parameter to be tested for a given sample number.
- Bottle types and sizes

- Analytical test parameters or test parameter method (in Analysis/Remarks Section); e.g., EPA Method 8270. Also indicate lab QC sample, if applicable; e.g., MS/MSD
- Specific instructions to the lab; e.g., unique turnaround times, specific analytes or other special instructions for analysis
- Number of containers corresponding to each sample ID number and parameter,
- Preservatives used (if any),
- Specific sample collection method (grab or composite)
- Type of matrix
- Date and time of each sample collection
- Name(s) of the sampler(s) and signature of the person shipping the samples
- Date and time that the samples were sealed for delivery
- Names of those responsible for receiving the samples at the laboratory (to be filled out at the laboratory)

The COC record shall be completed in triplicate using black waterproof ink. If any changes or corrections are made, they should be made by drawing a single line through the entry, initialing and dating the change, and entering the correct information. One copy shall accompany the samples to the laboratory, another is kept by the sample crew chief and transferred to the Project Chemist, and the last copy shall be maintained in the project file. A copy of the chain-of-custody form will also be forwarded via facsimile to the USACE Contracting Officer (CO) whenever samples are shipped from the field site. Additional copies shall be provided as needed for the project. Whenever collocated or split samples are collected for comparison analysis by the USACE QA Laboratory or a government agency, a separate chain-of-custody is prepared for those samples and marked to indicate with whom the samples are being split.

After shipment, the laboratory sample receiver signs and records the date and time of receipt on the COC, completing the sample transfer process.

6.4 SAMPLE PACKAGING

Sample containers are generally packed in insulated coolers for shipment. Appropriate packing materials are bubble wrap and vermiculite. Bottles are packed tight so that they cannot move during shipment. The following steps shall be followed:

- To eliminate the chance of breakage during shipment, approximately one inch of inert cushioning material shall be placed in the bottom of the cooler.

- Place each sample container tightly inside its own plastic bag and seal, as a precaution against cross-contaminationdue to leakage or breakage.

- Place containers upright in the cooler in such a way that they will not touch during transport.

- After samples have been packed, ice shall be placed in double Ziplock bags and added to the cooler. Use enough ice to ensure that the temperature of the cooler contents are $\leq 4^{\circ}C$. Also make sure the entire cooler is packed tightly so no containers shift during shipping, thus avoiding breakage.

- Include all paperwork in a separate Ziplock bag taped to the inside lid of the cooler.

Chain-of-Custody documents will accompany all shipped samples

For courier pickup - COC forms will be completed by the sampler and courier and placed in the cooler (see Sections 6.3 and 6.5).

For sample shipment - COC forms will be completed by the sampler and placed in the cooler (see Section 6.3).

1. Duct-tape cooler lid seal and drains. Tape the cooler shut with strapping tape.

2. Affix numbered, signed, and dated custody seals to ensure that samples have not been disturbed during transport. Cover custody seals with clear tape.

3. If not already there, the lab address will be written on the top of the cooler with indelible ink.

6.5 SAMPLE SHIPPING

After collection, all samples shall be transported to the contract laboratory in such a manner as to preserve their integrity. To maintain the required level of sample custody, overnight carrier shipping manifests are normally employed. Field samples that require shipment shall be sent to the laboratory by an overnight courier service within 24 hours of their collection. No sample shall remain on site for more than 24 hours after collection unless previous arrangements have been made with the laboratory, i.e., weekend sampling.

Courier Pickup of Environmental Samples

If the laboratory is located within a reasonable distance from the site, arrangements may be made to have the laboratory pick up the samples. Most laboratories have their own courier service and will pick up samples if the site is within 200 miles of their facility. **Coordinate with the receiving laboratory**

prior to sample collection events to ensure that the desired pick-up will occur on time.

When the samples are transferred to a laboratory courier, the sampler shall:

- Sign, date, and enter the time in the "Relinquished by" entry location of the COC form.
- Make sure that the courier receiving the sample signs the "Received by" entry of the COC form.

Shipping Environmental Samples

Environmental samples requiring shipment to a laboratory shall be sent next-day delivery by Federal Express or an equivalent overnight carrier. **The receiving laboratory shall be given advance notice by the Stone & Webster CQCSM no later than 48 hours before sample shipment.**

If Friday sampling is unavoidable and Saturday delivery is not possible, samples shall be properly stored (custody and sample preservation must be maintained) over the weekend. If prompt shipping and laboratory receipt of samples cannot be guaranteed, the samplers will be responsible for proper storage of samples until adequate transportation arrangements can be made or sample collection schedules will be modified by the CQCSM. If holding times would be exceeded by storing samples over the weekend (e.g., if there are 24 hour turnaround requirements), alternative arrangements must be made by the CQCSM for sample collection and shipment or pickup.

Note: Overnight carriers usually will not accept responsibility for signing COC forms. Therefore, the Sampler shall sign, date, enter the time in the "Relinquished by" entry location of the COC form, place inside a zip-lock bag inside the sample container, and seal the container as specified in Section 6.4 - Sample Packaging.

6.6 GLOSSARY OF TERMS

COC - Chain-Of-Custody form

Matrix - The physical description of the medium being sampled e.g. soil (solid), aqueous (liquid)

SOP - Standard Operating Procedure

QA - Quality Assurance

QC - Quality Control

<u>CQCSM</u> – Contractor Quality Control System Manager

<u>CQAB</u> – Chemical Quality Assurance Branch

<u>LIMS</u> – Laboratory Information Management System

ATTACHMENT A

SAMPLE LABEL

NAME OF SAMPLING ORGANIZATION STONE + WEBSTER

SAMPLE DESCRIPTION GROUNDWATER FROM MONITORING WELL #1 AT BAINBRIDGE SITE

JOB #: 0141032

DATE: 11/2/92

TIME: 10:40

PRESERVATIVE: HCl

SAMPLED BY: DAVID JONES DJ

SAMPLE ID NO.: BA - MW01GW-XX

REMARKS

ATTACHMENT B

ATTACHMENT B

Inchcape Testing Services Environmental Laboratories — 55 South Park Drive, Colchester, VT 05446 — TEL: (802) 655-1203 FAX: (802) 655-1246

PAGE 2 OF 2

COMPANY INFORMATION

Name: Stone & Webster
Address: 245 Summer St, Boston, MA 02210
Telephone: 617-589-1080
Facsimile: 617 589-2922
Contact Name: Tim Taylor

COMPANY'S PROJECT INFORMATION

Project Name: ANG-BURL
Project Number:
Sampler Name(s): Kevin Scully, Paul Groden

SHIPPING INFORMATION

Carrier:
Airbill Number:
Date Shipped:
Hand Delivered: ☐ yes ☐ no

INCHCAPE LABORATORY INFORMATION

Quote #:
Client Code:

SAMPLE IDENTIFICATION (NOTE 1)	COLLECTION DATE	COLLECTION TIME	GRAB	COMPOSITE	MATRIX	ANALYSIS/REMARKS (NOTE 2,3)	1 L / Amb GL / Cool	40 mL / GL / HCL	1 L / Amb GL / Cool	500 mL / NM PL / Cool	500 mL / NM PL / Cool
EQ1	8/21/96	13:20	✓		A	8270	1	—	—	—	—
MCW 101	8/22/96	0900	✓		A	8260	—	2 ~~1~~ KS	—	—	—
MCW 101	8/22	0910	✓		A	8270	—	—	1	—	—
MCW 101	8/22	0920	✓		A	Total Metals - 6010 As, Pb, Cr only	—	—	—	1	—
MCW 101 (B)	8/22	0925	✓		A	Dissolved Metals - 6010 As, Pb, Cr only	—	—	—	—	1

NUMBER OF CONTAINERS

Relinquished by: (signature)	DATE	TIME	Received by: (signature)
Kevin Scully	8/22/96	10:15	James P. Power
Relinquished by: (signature)	DATE	TIME	Received by: (signature)
Relinquished by: (signature)	DATE	TIME	Received for Laboratory by: (signature)
	8/27/96	1130	[signature]

NOTES TO SAMPLER(S): (1) Limit Sample Identification to 6 characters, if possible; (2) Indicate designated Lab Q.C. sample and type (e.g.: MS/MSD/REP) and provide sufficient sample; (3) Field duplicates are separate sample; (4) e.g.: 40 ml/glass/H_2SO_4

Notes to Lab: (B) Filter Sample & Run dissolved metals - Do Immediately

Distribution: Original Accompanies Shipment; Copy to Coordinator Field Files

STANDARD OPERATING PROCEDURE
FUSRAP MAYWOOD SUPERFUND SITE
STONE & WEBSTER ENGINEERING CORPORATION

TITLE: Cuttings and Fluids Management	NO.:	SW-MWD-505-0
	PAGE	1 of 4
	DATE:	May 1999

APPROVED:

2/28/00
Project Manager

Richard Skrypess 2/29/00
Project Engineer

1.0 PURPOSE

This standard operating procedure (SOP) presents the management options for handling investigation-derived waste (IDW) at the FUSRAP Maywood Superfund site.

2.0 REFERENCES

U.S. Environmental Protection Agency, Region IV, Engineering Support Branch Standard Operating Procedure and Quality Assurance Manual, 1986.

U.S. Environmental Protection Agency, A Compendium Superfund Field Operations Methods, EPA/540/P-87/001.1, 1987.

U.S. Environmental Protection Agency, Guide to Management Investigation-Derived Wastes, 9345.3-03FS, January 1992.

3.0 APPENDICES

None.

4.0 GENERAL

4.1 DEFINITIONS

Hazardous Waste - Waste that is a RCRA regulated listed waste, or waste that exhibits ignitability, corrosivity, reactivity, or toxicity.

4.2 RESPONSIBILITIES

The Project Superintendent is responsible for ensuring that all investigation derived waste (IDW) procedures are conducted in accordance with this SOP. The Project Superintendent is also responsible for ensuring that handling IDW is in accordance with site-specific requirements as per the Maywood Environmental Protection Plan (EPP).

4.3 APPLICABILITY

Field investigation activities result in the generation of waste materials that may be characterized as hazardous waste. IDW may include drilling muds, cuttings, and purge water from test pit and well installation; purge water, soil, and other materials generated from collection of samples; residues from testing treatment technologies and pump and treat systems; contaminated personal protective equipment (PPE); and solutions (aqueous or otherwise) used to decontaminate non-disposable protective clothing and equipment. The management of IDW must comply with (or waive) regulatory requirements that are applicable or relevant and appropriate requirements (ARARs), such as the Land Disposal Restriction Regulations and treatability study exemptions.

4.4 REQUIRED EQUIPMENT

IDW Containers

5.0 PROCEDURES

During site investigations where materials are known (via field instrumentation or visual observation) or suspected (historic information) to be contaminated, sampling activity (i.e., soil boring or installation monitoring wells) will produce waste intrinsic to the site. The activities associated with disposition of this material must not contribute further to environmental degradation or pose a threat to public health or safety.

The three general options for managing IDW are (1) collection and on-site disposal; (2) collection and off-site disposal; and (3) collection and storage. The option selected should take into account the following factors:

- type and quantity of IDW (soil, sludge, liquid, debris)
- IDW minimization, and consistency with the IDW remedy and the site remedy

5.1 ON-SITE DISPOSAL

For the Maywood project, significant on-site disposal is not anticipated.

5.2 OFF-SITE DISPOSAL

5.2.1 Soil/Sludge/Sediment

Soil/sludge/sediment will be field characterized as per Section 2.5.1 of the Chemical Data Quality Management Plan (CDQMP). This characterization may be used to determine disposal options.

Before sending offsite to a TSDF, analysis is required. Also manifests may be required. Confirm that the TSDF and transporter are permitted for the respective wastes.

5.2.2 Aqueous Liquids

Aqueous liquids will be field characterized. This characterization may be used to determine disposal options.

When the final site remedy requires off-site treatment/disposal, the IDW may be stored (e.g., mobile tank or drums) or returned to its source until final disposal. The management option selected should take into account other relevant site-specific factors including weather, storage space, and public concerns/perceptions).

Before sending offsite to a TSDF, analysis is required. Also manifests may be required. Confirm that the TSDF and transporter are permitted for the respective wastes. See the Maywood Material Handling/Transportation and Disposal Plan (MHTD) for further details.

5.2.3 Disposable PPE

Field judgement on level of contamination will be made and an appropriate disposal method will be selected. If offsite disposal at a regulated facility is required, analysis of soil and water in contact with PPE may be used to determine disposal options.

5.3 INTERIM MEASURES

A. Storing IDW on-site until the final action may be practical in the following situations:

1. Returning wastes (especially sludges and soils) to their on-site source area would require reexcavation for disposal in the final remediation alternative.

2. Interim storage in containers may be necessary to provide adequate protection to human health and the environment.

3. Off-site disposal options may trigger land disposal regulations under RCRA. Storing IDW (e.g. drummed, covered in a waste pile) until the final disposal of all wastes from the site will eliminate the need to address this issue more than once. The management option selected should take into account relevant site-specific factors including weather, storage space, and public concerns/perceptions.

B. Segregate and containerize all waste for future treatment and/or disposal.

1. Containment options for soil/sludge/sediment includes drums or covered waste pile in area of concern.

2. Containment options for aqueous liquids include mobile tank or drums.

3. Containment options for PPE include drums or roll-off boxes.

6.0 RESTRICTED/LIMITATIONS

The Project Superintendent shall determine the most appropriate disposal option for aqueous liquids.

Parameters to consider, especially in making the protectiveness decision, include the volume of IDW, the contaminants present in the groundwater, the presence of contaminants in the soil at the site, whether the groundwater or surface water is a drinking water supply, and whether the groundwater plume is contained or moving. Special disposal/handling may be needed for drilling fluids because they may contain significant components.

1.0 **PURPOSE**

To describe procedures for removing contamination from personnel and sampling equipment before and after sampling events at the FUSRAP Maywood Superfund Site. Decontamination is necessary to prevent spread of contaminants, to prevent cross-contamination of samples, and to protect the Safety and Health of site personnel.

2.0 **SCOPE**

This SOP provides information on the proper methods for decontamination of personnel and sampling equipment.

3.0 **REFERENCES**

Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities, NIOSH/OSHA/USCG/EPA, DHHS (NIOSH) 85-115, October 1985.

Field Standard Operating Procedures (FSOP) 7, "Decontamination of Response Personnel", USEPA, January 1995.

29 CFR Part 1910, "Hazardous Waste Operations and Emergency Response", March 1989.

U.S. Environmental Protection Agency, Compendium of ERT Soil Sampling and Surface Geophysics Procedures, EPA/540/P-91/006, January 1991.

4.0 **DEFINITIONS**

None.

5.0 **RESPONSIBILITIES**

Personnel requirements for decontamination activities will vary depending upon the size and scope of the sampling effort. Designated field personnel are responsible for implementing all aspects of this SOP. In addition, all field activities must be carried out in accordance with a Maywood Site Safety and Health Plan (SSHP). Ensuring the fulfillment of the requirements of the SSHP is the responsibility of the Site Safety and Health Officer (SSHO) who may also perform sampling and decontamination activities.

6.0 PROCEDURE

6.1 APPLICABILITY

This procedure serves as guidance on the proper methods of decontaminating personnel and sampling equipment. These procedures can be modified or expanded to meet specific Maywood project requirements. Such changes should be documented with the task-specific Sampling and Analysis Plan or Safety and Health Plan.

6.2 EQUIPMENT AND MATERIALS

In selecting decontamination equipment, consider whether the equipment itself can be decontaminated for reuse or can it be easily disposed. The recommended equipment for decontamination of personnel, PPE, and equipment are:

- Appropriate personnel protective clothing (as required by HASP),
- Field Sampling Plan (FSP)
- Health And Safety Plan (HASP). **To be read and signed by all site personnel prior to site activities.**
- Field logbook(s)
- Non-phosphate detergent,
- Selected solvents (e.g., nitric acid (for non-metallic equipment only), acetone, hexane, or methanol), deionized water and tap water,
- Brushes,
- Spray bottles for solvents and water;
- Wash basins,
- Plastic sheets,
- Emergency eyewash bottle,
- Trash containers and paper towels,

- Aluminum foil and Plastic garbage bags,
- Storage containers (e.g. DOT approved 55 gallon drums and 5 gallon buckets with lids) for storage and disposal of contaminants and contaminated soils

Steam cleaning and pressure washing equipment may be used for larger equipment and vehicles.

Additional equipment necessary for decontaminating personnel vary depending upon the level of personnel protection clothing and equipment used onsite. These additional items are identified in relevant sections of this Standard Operating Procedure.

6.3 PERSONNEL DECONTAMINATION

Care must be taken to avoid any decontamination techniques which might be harmful to the individual (using solvents or acids on the skin). When serious or life threatening wounds are involved, First Aid ALWAYS takes precedence over decontamination and associated contamination control measures.

6.3.1 Decontamination of personnel will be performed under the supervision of a project safety & health representative (e.g. SSHO, RSO, RPT)

6.3.2 The following agents and techniques should be used when decontaminating personnel.

- SOAP & WATER- Wash area thoroughly for 2-3 minutes with tepid water and a mild low Ph soap such as Phisoderm, Phisohex, Radcon, etc. Wash away from eyes, ears, nose, & mouth. The area should be resurveyed by a safety & health representative after each attempt to assess the effectiveness of the decontamination.
- SOFT BRISTLE BRUSH- Brushes may be used in conjunction with soap and water if soap & water alone do not adequately decontaminate the affected area. The pressure should not be great enough to bend the bristles out of shape. Avoid abrasing the skin in any way when using this technique. This technique should not be used on or in the vicinity of serious wounds.
- SWEATING- Wrap the contaminated area in plastic and place in warm water if possible for 20-30 minutes. Wash the area with soap & water after sweating. Use this technique if washing alone does not produce the satisfactory results. This technique shall not be used for the head, or serious wounds.
- FLUSHING- This is the only approved technique for decontaminating the eyes, ears, nose, mouth, and wounds.

6.4 EQUIPMENT DECONTAMINATION

6.4.1 General

Adequate supplies of all materials must be kept on hand. This includes all rinsing liquids and other required materials.

6.4.2 Engineering Controls to Minimize Equipment Contamination

Whenever practical, employ engineering controls to either prevent or minimize the exposure of equipment to site contamination. Steps such as placing monitoring equipment in plastic bags, exposing only sampling ports or sensors to the environment can reduce or eliminate the need for decontamination. Once equipment is decontaminated, covering equipment with an impermeable, strippable coating (e.g. aluminum foil) will maintain cleanliness for the next use.

6.4.3 Material Compatibility

The substances chosen for equipment decontamination must be effective in removing the known or suspected site chemicals of concern.

The chemical and physical compatibility of the decontamination solutions or other decontamination materials to both each other and the chemicals of concern must be determined before they are used. **Any decontamination method that: 1) poses a direct health hazard to workers (e.g., vapors form chemical decontamination solutions may be hazardous if inhaled, or they may be flammable); or 2) permeates, degrades, damages or otherwise impairs the safe functioning of the PPE is incompatible with such PPE and should not be used.**

6.4.4 Standard Procedure for Small Equipment Decontamination

The 9-step decontamination procedure listed below is the generic standard procedure for small equipment (e.g. split spoons, hand augers, bailers, etc.) decontamination which combines both physical and chemical removal steps. This procedure may be modified to address site-specific chemicals of concern and media being sampled. Solvent rinses are not necessarily required when organics are not a contaminant of concern and may be eliminated from the sequence specified below. Similarly, an acid rinse is not required if analysis does not include inorganics.

- Remove any solid particles from the equipment or material by brushing and then rinsing with available tap water. This initial step is performed to remove gross contamination.

- Wash equipment with a non–phosphate detergent solution.

- Rinse with distilled/deionized water.

- If metals are among site chemicals of concern - Rinse with 10% nitric acid and then rinse with distilled/deionized water. If no samples are being collected for metals analysis, skip this step.

- Use the appropriate solvent rinse(s) if the sample will be analyzed for organics. Refer to Attachment 1 for the appropriate decontamination steps for the known or suspected chemicals of concern cross-referenced by EPA SW 846 analytical numbers. **The decontamination procedure for EPA Method 8270 shall be employed as the organic compound**

decontamination procedure if samples are being collected for more than one type of organic analysis.

- Air dry the equipment completely.
- Rinse again with distilled/deionized water.
- Dispose of all rinse and decontamination fluids in an appropriate manner in accordance with specifications in the Remedial Action Work Plan.

Sampling equipment that requires the use of plastic tubing should be disassembled and the tubing replaced with clean tubing, before commencement of sampling and between sampling locations.

6.4.5 Standard Procedure for Large Equipment Decontamination

Steam cleaning is the method of choice for large equipment decontamination. The pressurized fluid stream provides effective physical contaminant removal that can be rapidly applied to both large areas and small, hard to reach areas. Detergents and water soluble solvents such as isopropanol can be added to the steam cleaning water reservoir as required for the chemicals of concern. The use of this procedure does require the use and/or construction of containment devices for the capture of the solids and rinsates generated during the process. Tubs such as plastic wading pools can be placed under smaller equipment to catch runoff.

The decontamination process for larger equipment such as drilling rigs require the construction of containment areas to capture the runoff. The design of this containment area can be as simple or as elaborate as frequency-of-use and chemicals of concern dictate. A simple containment area can be constructed from landscaping timbers and a waterproof pool tarp. A sloped, hard surface such as a paved portion of parking lot should be used to keep the tarp from tearing due to differential settling of the heavy equipment. The landscaping timbers should be arranged in a squared off "U" with the open side on the uphill side of the area. The "U" structure should be wide enough to allow decontamination workers to move freely around the equipment being decontaminated. The tarp is then draped over the timbers and pulled in tight against the inside side of the landscaping timbers to form a flat working area. Heavy duty staples can be used to secure the tarp to the outer sides of the landscaping timbers The heavy equipment or portion (such as the bucket of an excavator) that requires decontamination is placed in the area and steam cleaned as appropriate. Drill rigs are usually backed in since the rear of the truck normally requires the most decontamination. The solids and rinsate from the cleaning process will accumulate on the lower side of the tarp. Liquids can be bailed or pumped (using a sump pump) into the appropriate drum or tank. Solids can be shoveled into the appropriate drum or roll-off container. Plastic "walls" can be erected using wooden frames should more complete spray containment be required.

Should site conditions or traffic volume require, a more elaborate decontamination facility can be constructed by digging a sloped excavation, placing an impermeable liner and sump pump, and backfilling with gravel. The vehicles requiring decontamination can then be driven on from one end, cleaned, and driven out the other side.

It should be noted that steam cleaning can create exposure conditions for workers due to both splashing and inhalation. Refer to your health and safety plan for proper personal protection requirements.

6.4.6 Sanitizing Procedures

Reusable clothing and other personal articles must be decontaminated and sanitized before reuse. If practical, reusable protective clothing should be machine washed after a thorough decontamination. Otherwise, clean the clothing by hand.

6.5 QUALITY ASSURANCE

The effectiveness of any decontamination method used at a site should be assessed at the beginning of a project periodically throughout the life of a project. Visual observation, equipment blanks, and wipe sampling are the typical methods that can be employed to determine the effectiveness of decontamination. Equipment blanks are collected by capturing analyte free water which is poured over sampling equipment after decontamination. These samples are normally included in the task-specific SAP as part of the project Quality Control program. Refer to your Field Sampling Plan for equipment blank collection frequency.

The Site Safety & Health Officer shall monitor project procedures to determine their effectiveness.

The Project Chemist shall monitor the effectiveness of decontamination procedures by evaluating the results of equipment rinsate blanks. Equipment rinsate blanks are samples of analyte-free water that are brought into contact with decontaminated equipment prior to collection in sample bottles. If contaminants of concern are detected when equipment blanks are analyzed, insufficient equipment decontamination is indicated and procedures shall require modification.

If a decontamination method is not considered effective, the decontamination program must be revised.

Visual observation, wipe sampling, cleaning solution analysis, and permeation testing are the typical methods used to determine the effectiveness of decontamination.

6.6 DISPOSAL METHODS

All equipment used for decontamination must be decontaminated and/or disposed of properly. Buckets, brushes, PPE, tools, and other contaminated equipment should be collected, placed in containers, and labeled. All spent solutions and wash water should be collected and disposed of properly. PPE that is not completely decontaminated should be placed in plastic bags, pending further decontamination and/or disposal. Refer to SW-MWD-505-0, Cuttings and Fluids Management, for specific instructions regarding the handling and disposition of these materials.

7.0 ATTACHMENTS

Attachment 1 - DECONTAMINATION FOR ORGANICS BY ANALYTICAL METHOD

EPA ANALYTICAL METHOD NUMBER	DECONTAMINATION STEPS
8010 **HALOGENATED VOLATILES**	1. Rinse with mixture of 90% Hexane and 10% Ethyl Acetate 2. Rinse with solution of 90% Ethyl Acetate and 10% Isopropanol 3. Rinse with distilled/deionized water
8015 **NON-HALOGENATED VOLATILES**	1. Rinse with Isopropanol
8020 **AROMATIC VOLATILES**	1. Rinse with mixture of 90% Hexane and 10% MIBK 2. Rinse with Isopropanol 3. Rinse with distilled/deionized water
8080/8081 **ORGANOCHLORINE PESTICIDES/PCB**	1. Rinse with mixture of 90% Hexane and 10% Ethyl Acetate 2. Rinse with solution of 90% Ethyl Acetate and 10% Isopropanol 3. Rinse with distilled/deionized water
8100 **TOTAL PETROLEUM HYDROCARBONS**	1. Rinse with mixture of 90% Hexane and 10% Ethyl Acetate 2. Rinse with Isopropanol 3. Rinse with distilled/deionized water
8150 **CHLORINATED HERBICIDES**	1. Rinse with mixture of 90% Hexane and 10% Ethyl Acetate 2. Rinse with Isopropanol 3. Rinse with distilled/deionized water
8240/8260 **VOLATILE ORGANICS**	1. Rinse with mixture of 90% Hexane and 10% Ethyl Acetate 2. Rinse with Isopropanol 3. Rinse with distilled/deionized water
8250/8270 **SEMIVOLATILE EXTRACTABLE ORGANICS**	1. Rinse with mixture of 90% Hexane and 10% Ethyl Acetate 2. Rinse with solution of 90% Ethyl Acetate and 10% Isopropanol 3. Rinse with distilled/deionized water

STANDARD OPERATING PROCEDURE
FUSRAP MAYWOOD SUPERFUND SITE
STONE & WEBSTER ENGINEERING CORPORATION

TITLE: Field Notebook Content and Control	NO.:	SW-MWD-507-0
	PAGE	1 of 8
	DATE:	May 1999

APPROVED:

2/29/00
Project Manager

Richard Skrynecki 2/29/00
Project Engineer

1.0 PURPOSE

The objective of this Standard Operating Procedure (SOP) is to set criteria for content entry and form of field notebooks for the FUSRAP Maywood Superfund Site.

2.0 SCOPE

This procedure presents the proper methods of using and maintaining field notebooks for site operations for the Maywood Project.

3.0 REFERENCES

Nielsen Environmental Field School, Field Notebook Guidelines, 1997.

4.0 DEFINITIONS

Biota - The flora and fauna of a region.

Decontamination - To remove contaminants from field sampling equipment that might bias analytical results.

5.0 RESPONSIBILITIES

5.1 Project Manager

Sets technical capability requirement criteria for personnel and ensures that personnel assigned to project tasks are properly qualified to perform required work.

5.2 Project Engineer

Translates client's requirements into technical direction of project. Reviews and approves technical progress, ensures that the Project Superintendent has been properly briefed and is prepared for the task.

5.3 Site Safety and Health Officer

All field activities must be carried out in accordance with the SSHP. The Site Safety and Health Officer is responsible for ensuring that all site workers (Stone & Webster and subcontractors) have read, signed and are familiar with the requirements of the SSHP and that the requirements of the SSHP are met during site activities.

5.4 Project Superintendent

The Project Superintendent is the individual designated by the Project Manager to supervise investigative activities by Stone & Webster and related subcontracting personnel at a given site for the designated tasks. The Project Superintendent is responsible for ensuring that the field personnel have been briefed on maintenance of the field notebook in accordance with the project requirements, this SOP, and related SOPs. He or she assures that all necessary equipment including safety equipment is available and functioning properly before project operations begin, and that all necessary personnel are mobilized on time. The Project Superintendent maintains a daily log of activities each work day.

The Project Superintendent coordinates and consults with the Project Manager on decisions relative to unexpected encounters during field investigations and deviations from this SOP.

5.5 Site Personnel

Site personnel assigned to maintain the field notebook will be trained in the proper techniques for conducting the work. They are required to read and sign the site-specific SSHP and to follow the procedures in this SOP, unless superseded by other project-specific requirements. All site operations, including deviations to SOPs, will be recorded in field notebooks during on-site activities.

6.0 PROCEDURES

6.1 General

Each site or operation, as applicable, will have one current site logbook, which will serve as an index of all activities performed at the site. It is initiated at the start of the first on-site activity (e.g., initial reconnaissance survey). Summary entries are made for every day that on-site activities take place. The details of all field activities shall be recorded in a separate field notebook. These field notebooks and the site logbook shall be made part of the project files.

Information recorded in field notebooks include observations, data, calculations, time, weather, description of the data collection activity, methods, instruments, and results. Additionally, the field notebook may contain descriptions of wastes, biota, geologic material, and site features including sketches, maps, or drawings as appropriate.

6.2 Equipment and Materials

- Site logbook
- Site-specific plans
- Hard-covered, waterproof field notebook(s)
- Indelible black ink pen
- Ruler or similar scale (in some circumstances)

6.3 Preparation

In addition to this SOP, site personnel responsible for maintaining field notebooks must be familiar with other SOPs pertinent to the task at hand. These should be consulted as necessary to obtain specific information about equipment and supplies, health and safety, sample collection, packaging, decontamination, and documentation.

The field notebook is assigned to an individual responsible for its care and maintenance.

Field notebooks shall be bound with lined, consecutively numbered pages. All pages must be numbered prior to initial use of the field notebook. The following information shall be recorded inside the front cover of the field notebook:

- Person and organization to whom the book is assigned, and phone number(s)
- Start date
- Project Name
- Stone & Webster Job Number
- Project Superintendent's Name
- Sequential Book Number (if applicable)

The first five pages of the field notebook shall be reserved for a table of contents. Mark the first page with the heading and enter the following:

TABLE OF CONTENTS

The remaining pages of the Table of Contents will be designated as such with "TOC" written on the top center of each page.

6.4 Operation

The following is a list of requirements that must be followed when using a field notebook:

- Record work, observations, quantities of materials, calculations, drawings, and related information directly in the field notebook. If data-collection forms are specified by an activity-specific work plan, this information need not be duplicated in the field notebook. However, any forms used to record site information must be referenced in the field notebook.

- Information should be factual and unbiased.

- Do not start a new page until the previous one is full or has been marked with a single diagonal line so that additional entries cannot be made. Use both sides of each page.

- Write in black, indelible ink. Do not write in pencil unless working in wet conditions.

- Do not erase or blot out any entry at any time. Before an entry has been signed and dated, changes may be made but care must be taken not to obliterate what was written originally. Indicate any deletion by a single line through the material to be deleted. A change should be initiated and coded using one of the common data error codes shown in Table 1. All error codes should be circled.

- Do not remove any pages from the book.

- Do not use loose paper and copy into field notebook later.

- Record as much information as possible.

- All entries should be neat and legible.

Specific requirements for field notebook entries include:

- Initial and date each page.
- Sign and date the final page of entries for each day.
- Initial and date all changes.
- Multiple authors must sign out the field notebook by inserting the following:

  Above notes authored by:
  ______________________________ (Sign name)
  ______________________________ (Print name)
  ______________________________ (Date)

- A new author must sign and print his/her name before additional entries are made.
- Draw a diagonal line through the remainder of the final page at the end of the day.
- Record the following information on a daily basis:

  a) Date and time
  b) Name of individual making entry
  c) Description of activity being conducted including station (i.e., well, boring, sampling, location number) if appropriate
  d) Unusual site conditions
  e) Weather conditions (i.e., temperature, cloud cover, precipitation, wind direction, and speed) and other pertinent data
  f) People on site
  g) Level of personnel protection to be used
  h) Arrival/departure of site visitors
  i) Arrival/departure of equipment
  j) Sample pickup (chain-of-custody form numbers, carrier, time)
  k) Sampling activities/sample logsheet numbers
  l) Start or completion of borehole/trench/monitoring well installation or sampling activity
  m) Health and Safety issues
  n) Instrumentation calibration details

Entries into the field notebook shall be preceded with the time of the observation. The time should be recorded frequently and at the point of events or measurements that are critical to the activity being logged. All measurements made and samples collected must be recorded unless they are documented by automatic methods (e.g., data logger) or on a separate form required by an operating procedure. In these cases, the field notebook must reference the automatic data record or form.

While sampling, record observations such as color and odor. Indicate the locations from which samples are being taken, sample identification numbers, the order of filling bottles, sample volumes, and parameters to be analyzed.

A sketch of the station location may be warranted. All maps or sketches made in the field notebook should have descriptions of the features shown and a direction indicator. It is preferred that maps and sketches be oriented so that north is towards the top of the page.

Other events and observations that should be recorded include (but are not limited to):

- Changes in weather that impact field activities
- Subcontractor activities
- Deviations from procedures outlined in any governing documents. Also record the reason for any noted deviation.
- Problems, downtime, or delays.
- Upgrade or downgrade of personnel protective equipment.

6.5 Post-Operation

To guard against loss of data due to damage or disappearance of field notebooks, copies of completed pages shall be periodically and securely stored by the project. Documents which are separate from the field notebook shall be copied and submitted regularly and as promptly as possible to the project files. This includes all automatic data recording media (print-outs, logs, disks or tapes) and activity-specific data collection forms required by other SOPs.

At the conclusion of each activity or phase of site work, the individual responsible for the field notebook will ensure that all entries have been appropriately signed and dated, and that corrections were made properly (single lines drawn through incorrect information, then initialed, coded, and dated). The completed field notebook shall be submitted to the project records file.

7.0 RESTRICTIONS/LIMITATIONS

Field notebooks constitute the official record of on-site technical work, investigations, and data collection activities. Their use, control, and ownership is restricted to activities pertaining to specific field operations carried out by Stone & Webster personnel and their subcontractors. They are documents that may be used in court to indicate and defend dates, personnel, procedures, and techniques employed during site activities. Entries made in these notebooks should be factual, clear, precise, and as non-subjective as possible. Field notebooks, and entries within, are not to be utilized for personal use.

TABLE 1 COMMON DATA ERROR CODES

RE	Recording Error
CE	Calculation Error
TE	Transcription Error
SE	Spelling Error
CL	Changed for Clarity
DC	Original Sample Description Changed After Further Evaluation
WO	Write Over
NI	Not Initialed and Dated at Time of Entry
OB	Not Recorded at the Time of Initial Observation

All Error Codes should be circled

STANDARD OPERATING PROCEDURE **FUSRAP MAYWOOD SUPERFUND SITE** **STONE & WEBSTER ENGINEERING CORPORATION**		
TITLE: **Procedure for Shipping Radiologically Contaminated Environmental Samples**	**NO.:**	SW-MWD-508-0
	PAGE	1 of 4
	DATE:	February 2000
APPROVED: 2/29/00 Project Manager 2/11/2000 Project Engineer		

1.0 PURPOSE

This procedure presents the proper method for shipping low level radiologically contaminated environmental samples at the FUSRAP Maywood Superfund Site.

2.0 SCOPE

This procedure applies to excepted packages for limited quantities of radioactive materials as defined in 49 CFR 173.421.

3.0 REFERENCES

49 CFR Parts 171 and 173 of the Transportation Regulations

4.0 DEFINITIONS

None

5.0 RESPONSIBILITIES

5.1 Project Manager

Sets technical capability requirement criteria for personnel and ensures that personnel assigned to project tasks are properly qualified to perform required work.

5.2 Project Engineer

Translates client's requirements into technical direction of project. Reviews and approves technical progress, ensures that the Project Superintendent has been properly briefed and is prepared for the task.

5.3 Site Safety and Health Officer

All field activities must be carried out in accordance with a site-specific SSHP. The Site Safety and Health Officer is responsible for ensuring that all site workers (Stone & Webster and subcontractors) have read, signed and are familiar with the requirements of the SSHP and that the requirements of the SSHP are met during site activities.

5.4 Project Superintendent

The Project Superintendent is the individual designated by the Project Manager to supervise investigative activities by Stone & Webster and related subcontracting personnel at a given site for the designated tasks. The Project Superintendent is responsible for ensuring that the field personnel have been briefed on shipping samples in accordance with the project requirements, this SOP, and related SOPs. He or she assures that all necessary equipment including safety equipment is available and functioning properly before project operations begin, and that all necessary personnel are mobilized on time. The Project Superintendent maintains a daily log of activities each work day.

The Project Superintendent coordinates and consults with the Project Manager on decisions relative to unexpected encounters during field investigations and deviations from this SOP.

5.5 Site Personnel

Site personnel assigned to ship radiologically contaminated environmental samples will be trained in the proper techniques for conducting the work. They are required to read and sign the site-specific SSHP and to follow the procedures in this SOP, unless superseded by other project-specific requirements. All shipping activities, including deviations to this SOP, will be recorded in field logbooks during on-site activities.

6.0 PROCEDURES

This section outlines the method for shipping limited quantities of radioactive materials as defined in 49 CFR 173.421.

6.1 Determining if the Package is an Excepted Package for Limited Quantities of Radioactive Materials

A package can be shipped as an excepted package for limited quantities of radioactive materials if the following requirements are met:

1) The activity does not exceed the limits specified in 49 CFR 173.421.
2) The package meets the general design requirements specified in 49 CFR 173.410.
3) The exposure rate at any point on the external surface of the package does not exceed 0.5 mR/hour.
4) The removable radioactive surface contamination on the external surface of the package does not exceed 22 dpm/cm^2 for beta, gamma, and low toxicity alpha emitters, or 2.2 dpm/cm^2 for all other alpha emitting radionuclides.
5) The package does not contain more than 15 grams of ^{235}U.

6.2 Package Shipment

Package shipment consists of the following steps:

1) A cooler which conforms to the general design requirements in 49 CFR 173.410 will be used for shipment. Prior to shipment, the cooler must be prepared so that no leakage during shipment can occur. All valves on the cooler will be securely duct taped, both inside and outside the cooler and the cooler will be lined with either plastic or a large garbage bag.

2) All sample bottles will be placed in separate zip-lock bags before being placed in the cooler.

3) When placing sample bottles in the cooler, the less contaminated samples will be placed toward the outside of the cooler, and the more contaminated samples will be placed near the center of the cooler. Packing material will be placed above and below the samples.

4) When shipping more than one cooler, the more highly contaminated samples will be distributed among several coolers.

5) After the cooler is filled, the plastic or garbage bag will be closed and securely taped. A sticker which reads "Radioactive" will be placed on the outside of the garbage bag (or plastic).

6) A notice with the following information will be placed inside a zip-lock bag and taped to the inside of every cooler:

"This package conforms to the conditions and limitations specified in 49 CFR 173.421 for excepted radioactive materials, limited quantity, N.O.S., UN 2910. If you have questions, call ________." (The cosigner's or consignee's name, address, and phone number will follow this statement.)

If the activities of the samples being shipped are known, this data shall be used to determine the activity in the package and then compared to the Limited Quantity Table.

7) Once the cooler is completely packed, the outside of the cooler will be thoroughly wiped with damp paper towels. The cooler will be surveyed to ensure removable radioactive surface contamination on the external surface of the package does not exceed 22 dpm/cm^2 for beta, gamma, and low toxicity alpha emitters, or 2.2 dpm/cm^2 for all other alpha emitting radionuclides and; surveyed with a calibrated exposure rate instrument (e.g.Eberline RO2, Ludlum Model 12S) to ensure that the exposure rate along the external surface of the package does not exceed 0.5 mR/hour @ contact. All external surfaces of the cooler will be scanned including the top, sides, and bottom.

8) If the exposure rate at the surface of any cooler exceeds 0.5 mR/hour @ contact, the cooler will be repacked with additional packing material and/or the samples bottles will be further segregated so that more highly contaminated samples are placed into separate coolers. If the surface activity still exceeds 0.5 mR/hour @ contact, the cooler will not be shipped and the Radiation Safety Officer will be consulted for assistance.

The Draft Construction Quality Control Plan (CQCP) was submitted to the U.S. Army Corps of Engineers (USACE) for review as a separate submittal. The Final CQCP will be issued later following the resolution of all USACE comments.

FINAL
PILOT DEMONSTRATION WORK PLAN

VOLUME 4
SAFETY AND HEALTH PLAN

FUSRAP MAYWOOD SUPERFUND SITE
MAYWOOD, NEW JERSEY

SITE-SPECIFIC ENVIRONMENTAL RESTORATION
CONTRACT NO. DACW41-99-D-9001
WAD 06 WBS 07

Submitted to:

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TABLE OF CONTENTS

VOLUME 4
SAFETY AND HEALTH PLAN

List of Tables

List of Figures

Appendices

LIST OF ACRONYMS AND ABBREVIATIONS

ACP	Access Control Point
AHA	Activity Hazard Analysis
ALARA	As Low As Reasonably Achievable
CDQMP	Chemical Data Quality Management Plan
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CFR	Code of Federal Regulations
CHP	Certified Health Physicist
CIH	Certified Industrial Hygienist
cpm	counts per minute
CQCP	Contractor Quality Control Plan
DAC	Derived Air Concentration
dpm	disintegrations per minute
FMSS	FUSRAP Maywood Superfund Site
FUSRAP	Formerly Utilized Sites Remedial Action Program
GEPP	General Environmental Protection Plan
GFCI	Ground Fault Circuit Interrupter
HWP	Hazardous Work Permit
LEL	Lower Explosive Limit
μCi	microcurie
MISS	Maywood Interim Storage Site
NCP	National Oil and Hazardous Substances Contingency Plan
NJDEP	New Jersey Department of Environmental Protection
OSHA	Occupational Safety and Health Administration
PCB	polychlorinated biphenyl
pCi	picocurie
PEL	Permissible Exposure Limit
PPE	personal protective equipment
RMA	Radioactive Materials Area
RPT	Radiation Protection Technician
RSO	Radiation Safety Officer
SHP	Safety and Health Plan

SOP	Standard Operating Procedure
SSERC	Site-Specific Environmental Restoration Contract
SSHO	Site Safety and Health Officer
SSHP	Site Safety and Health Plan
SVOC	Semivolatile Organic Compound
TLD	Thermoluminescent Dosimeter
USACE	U.S. Army Corps of Engineers
USEPA	U.S. Environmental Protection Agency
VOC	Volatile Organic Compound

1.0 INTRODUCTION

The United States Army Corps of Engineers (USACE), under Site-Specific Environmental Restoration Contract (SSERC) No. DACW41-99-D-9001, has contracted Stone & Webster Environmental Technology & Services (Stone & Webster), a division of Stone & Webster Engineering Corporation, to perform remediation of the FUSRAP Maywood Superfund Site (FMSS), in Maywood, Lodi, and Rochelle Park, New Jersey (Figure 1-1). As discussed in the Pilot Demonstration Work Plan Overview in Volume 1, gravel separation and radiological soil sorting technologies offer promise in substantially reducing the volume of soil requiring disposal as radioactive waste. Technologies which result in permanent and significant volume reduction are a statutory preference under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) and the National Oil and Hazardous Substances Contingency Plan (NCP). A pilot study, involving the demonstration of these technologies utilizing two separate processing systems, is proposed to be carried out at the Maywood Interim Storage Site (MISS) to further evaluate the viability of full-scale implementation of the technologies at the FMSS.

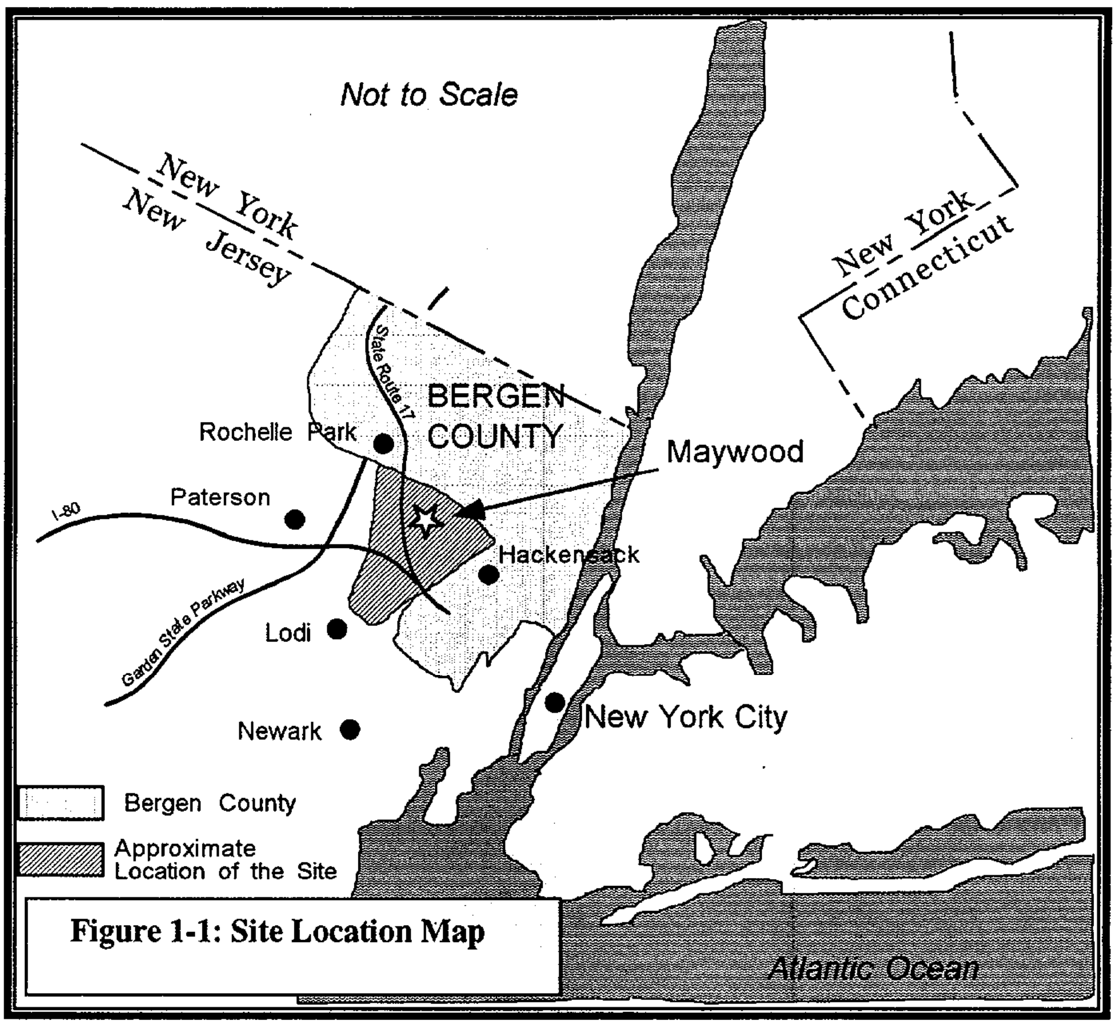


Figure 1-1: Site Location Map

This pilot demonstration will be used to assess the operational, technical and economic feasibility of applying particle separation and radiological sorting to the soils at the FMSS. The primary objectives of the pilot demonstration are to:

- ➢ Determine the applicability of gravel separation of the FMSS site soils for the purpose of achieving volume reduction and remediation cost savings.
- ➢ Determine the applicability of radiological sorting of the FMSS site soils for the purpose of achieving volume reduction and remediation cost savings.

The secondary objective of the pilot demonstration is to quantify or qualify the benefits of employing soil processing technology at the FMSS for the purposes of volume reduction of radiologically contaminated soils. The benefits, which are statutory, economic, and community oriented, may include:

- ➢ Utilizing soil processing technologies during the remedial action, pursuant to CERCLA's preference for treatment, and satisfying the mandate of the NCP that technologies be evaluated as remedial options;
- ➢ Satisfying the preference of CERCLA and the NCP that selected remedies reduce the volume of contaminants, pollutants or hazardous substances through treatment;
- ➢ Reducing the number of trucks hauling material on local roads;
- ➢ Potential time savings by preventing an overburdening of transportation routes;
- ➢ Utilizing technology that allows bulk excavation thereby reducing the amount of time individual property owners are impacted by remediation;
- ➢ Cost savings from potentially reducing the volume of material requiring off-site disposal or that must go to more expensive disposal facilities capable of handling higher level radiologically contaminated material;
- ➢ Cost savings through reducing the volume of fill material required from off-site sources.

The technologies selected and the configuration of the demonstration are based on the recognition that the bulk of the soils at Maywood are not uniformly contaminated. Rather, the radiologically contaminated soil is likely surrounded by soil that is "clean" (below criteria). It is also recognized that the radiological contamination is concentrated in the finer fractions of the soil mass. These principles were demonstrated in the Engineering Test Pits at MISS Program (see Volume 5). Physical separation of the coarse fraction (greater than 3/8 inch diameter) from the soil mass will result in a soil volume reduction that will be proportional to the percentage of coarse material. A radiological sort of the material which is less than 3/8 inch diameter will then create two streams: above criteria and below criteria. The criteria used in the radiological sort will be based on either reuse or disposal requirements.

This Safety and Health Plan (SHP) describes the safety and health guidelines developed to protect onsite personnel, visitors, and the public from physical harm and exposure to hazardous materials during the project activities at the FMSS during the pilot demonstration. This SHP is prepared in accordance with the standards established by the United States Occupational Safety and Health Administration (OSHA) for regulated sites. Specifically, this SHP complies with the appropriate standards contained in 29 CFR 1910.120 and 29 CFR 1926.65 *Hazardous Waste Operations and Emergency Response*, 10 CFR 20 *Standards for Protection Against Radiation,* and The U.S. Army Corps of Engineers (USACE) (1996), *Safety and Health Requirements Manual*, EM 385-1-1. The safety and health measures presented herein are in effect for the duration of the project.

This document must be used in conjunction with the General Site Safety and Health Plan (SSHP) and is intended for field use by Stone & Webster personnel, subcontractors, the USACE, and visitors. Only those sections where additional information pertaining to the pilot demonstration has been added to the information contained in the General SSHP are included in this document. All project personnel are required to abide by these measures. Where not specifically mentioned, all project personnel are required to comply with the applicable regulations contained in 29 CFR 1910, 29 CFR 1926, 10 CFR 20, and the USACE (1996), *Safety and Health Requirements Manual*, EM 385-1-1, while conducting this work. The procedures and guidelines contained herein are based upon the best available information at the time of the plan's preparation and apply only to the pilot demonstration activities. Specific requirements may be revised if new information is received or site conditions change. Any revisions to this SHP will be made with the knowledge and concurrence of both Stone & Webster and the USACE. Any work that is not specifically covered by the SSHP will be coordinated with the Maywood Site Safety and Health Officer (SSHO)/Radiation Safety Officer (RSO) and will be conducted under a Hazardous Work Permit (HWP). The SHP and the general SSHP have precedence over the safety and health programs of all vendors or subcontractors. Vendor safety and health documentation is provided in Attachments A and B of the Pilot Plant Operation Plan (Volume 3).

This SHP is one plan within the Pilot Demonstration Work Plan. Since this plan is intended to be a "stand alone" document, essential information from other plans is repeated. For specific details regarding the pilot demonstration, the reader is directed to the appropriate plan. The Pilot Demonstration Work Plan is comprised of the following volumes:

Pilot Demonstration Work Plan Outline		
Volume	**Section/Title**	**Description**
1	Overview	Provides description and justification for overall effort. Provides a summary of the work plan and road map to associated volumes. Presents the elements of the Pilot Demonstration Report.
2	Soil Acquisition Work Plan and Pilot Plant Pad Design	Provides design and detailed drawings for the host site pad. Provides description, drawings and staging for the soil acquisition effort, including excavation stabilization plan and procedures.
	Processed Material Soil Reuse Evaluation Plan	Evaluates the potential for reusing soil on the FMSS. Soil reuse is not proposed for the pilot demonstration.
3	Pilot Plant Operation Plan	Contains technical details and operational procedures for the pilot plant.
	Attachment A: Gravel Separation System	This information, supplied by the gravel separation system vendor, provides equipment mobilization, safety and health, system operation and maintenance information.
	Attachment B: Radiological Sorting System	This information, supplied by the radiological sorting system vendor provides equipment mobilization, safety and health, system operation and maintenance information.
4	Sampling and Analysis Plan	The SAP implements the project Chemical Data Quality Management Plan (CDQMP), and provides the details on frequency, parameters, and locations for all sampling under the pilot demonstration. This includes the soil acquisition, pilot plant operation, and final survey of the soil acquisition area.
	Construction Quality Control Plan	This plan details how the project Contractor Quality Control Plan (CQCP) will be implemented on this task.
	Safety and Health Plan	This plan implements the project Site Safety and Health Plan and provides the task-specific safety and health considerations.
5	Results of Engineering Test Pits Program at MISS	This volume reports the results of the Engineering Test Pits at MISS program, which was performed as a precursor to the pilot demonstration.

2.0 STAFF ORGANIZATION AND RESPONSIBILITIES

2.1 Site Safety and Health Officer / Project CIH

The SSHO for the pilot demonstration will be Shawn Andrews. The SSHO will perform portions of the pilot demonstration orientation training, coordinate all safety-training activities, and maintain the training records and certifications. The SSHO will perform and/or provide oversight to all air monitoring performed during the course of the pilot demonstration activities. The Project Certified Industrial Hygienist (CIH), James Skrabak or his designee, will be onsite during start-up operations and periodically throughout pilot operations to ensure compliance with all aspects of the SSHP and this SHP.

2.2 Site Radiation Safety Officer / Project CHP

The RSO for the pilot demonstration activities will be Eric Laning. The RSO is responsible for ensuring that the Radiation Protection Program is properly implemented. The Project Certified Health Physicist (CHP), Alan Fellman or his designee, will be onsite during start-up operations and periodically throughout pilot demonstration operations to ensure compliance with all aspects of the SSHP and this SHP.

3.0 ACCIDENT PREVENTION PLAN

3.1 Scope of Work

Stone & Webster will be performing the following activities as part of the pilot demonstration:

1. Mobilize personnel, equipment, and materials;
2. Install temporary facilities, such as supplementary utilities and equipment decontamination facility;
3. Prepare work areas (install geotextile liner, crushed stone, fencing, signage, etc.);
4. Excavate soil and perform sampling.
5. Conduct gravel separation and gravel rinse.
6. Sort soil into below and above criteria waste streams using a radiological sorting system.
7. Assay process streams.
8. Replace soil and perform area restoration (backfill).

3.2 Activity Hazard Analysis (AHA)

An AHA identifies potential safety, health, and environmental hazards associated with specific tasks and provides protective measures for personnel, the community, and the environment.

Appendix A of this SHP contains the AHAs covering pilot demonstration activities. AHAs will be utilized in the development of the HWPs. AHAs will also be prepared and/or revised when new tasks are added, job situations change, or when it becomes necessary to alter safety requirements. Work will not proceed on a particular task/work area until the AHA has been approved and site personnel briefed.

4.0 PROJECT HAZARDS AND HAZARD CONTROL MEASURES

There are numerous radiological, chemical, physical, and environmental hazards potentially present at the FMSS project. These hazards, if not properly controlled, can cause harm to project personnel, visitors, and the public. This SHP is designed to address hazards associated with the performance of the pilot demonstration. All remediation project work activities and each element of the Radiation Protection Program shall be specifically defined and implemented using written procedures and instructions. The anticipated hazards of the pilot demonstration activities and the recommended control measures are presented in this section. The pilot demonstration As Low As Reasonably Achievable (ALARA) goal for exposure to any individual has been set at 20 mrem/yr. A summary of known radiological and chemical contaminants in the vicinity of the pilot demonstration activities is provided in Table 4.1 of the General SSHP. Hazards and Hazard Control Measures are detailed in the AHA included in this plan. An HWP is required for all work within radiological areas. Radiological surveys will be conducted at the frequencies described in Standard Operating Procedure (SOP) FMSS 805.

5.0 PERSONNEL PROTECTIVE EQUIPMENT

5.1 Activity-Specific Levels of Protection

The required level of personal protection is specific to the pilot demonstration activity being conducted. Based on the available information reviewed at the time of the generation of this SHP, the activities being performed, and the projected engineering/administrative controls, the initial levels of personal protective equipment (PPE) have been established as shown in Table 5-1.

As site activities progress, levels of PPE are subject to change or to modification. Additional site information, actual site conditions, or site monitoring (real-time and time-integrated) will be used to confirm or adjust the selected levels of PPE as authorized by the Project CIH with concurrence from the RSO/CHP. This can occur when action levels or exposure limits are reached, when exposure levels are confirmed below action levels for PPE in use, or when the need arises to increase the levels of protection for site personnel (see Table 5-1). Levels of PPE will not be downgraded without prior approval from the Project CIH.

Table 5-1
Personal Protective Equipment, Monitoring, and Action Level Summary

Activity	Levels of Protection		Air Monitoring		Action Levels		Response/ Prevention Action
	Standard	Upgrade	PID/FID	Other	Upgrade	Stop Work	
Management	D	None	None	None	None	None	
Mobilization (Including pilot demonstration systems set up)	D	Modified D	None	None	None	None	
Install temporary facilities	D	Modified D	None	None	None	None	
Prepare work area/unload and set up gravel rinsing and sorting equipment	D	Modified D	None	None	None	None	
Excavate and remove contaminated soils	Modified Level D	Level C	Yes	RAD, radon, CGI/O_2, Dust	AT EXCAVATION: 1 mg/m^3 dust, 5 ppm VOC or per OSHA Standard, ≥ 50% of a DAC, 10 CFR 20 App. B Table 1, Col. 3. Th-232 ≥5E-13 µCi/ml Ra-226 ≥1.5E-10 µCi/ml U-238 ≥1E-11 µCi/ml	AT EXCAVATION: 10 ppm VOC, 4 mg/m^3 dust >10% LEL, < 20% O_2 AT SITE PERIMETER: 0.05 mg/m^3 dust ≥ 0.5 pCi/L (radon) Adjusted 10CFR20 App. B Table 2, Col. 1. Concentrations (see §8.1.3 of General SSHP) Th-232 ≥1.2E-15 µCi/ml Ra-226 ≥1.8E-13 µCi/ml U-238 ≥ 1.2E-14 µCi/ml See also GEPP	Dust suppression measures will be implemented, if not successful after 30 minutes, then stop work, evacuate nonessential personnel, upgrade PPE and continue dust suppression.

Table 5-1
Personal Protective Equipment, Monitoring, and Action Level Summary

Activity	Levels of Protection		Air Monitoring		Action Levels		Response/ Prevention Action
	Standard	Upgrade	PID/FID	Other	Upgrade	Stop Work	
Gravel Separation System Radiological Sorting System	Modified Level D	Level C	Yes	RAD, radon, CGI/O_2, Dust	AT SYSTEM : 1 mg/m^3 dust, 5 ppm or per OSHA Standard, ≥ 50% of a DAC, 10 CFR 20 App. B Table 1, Col. 3. Th-232 ≥5E-13 μCi/ml Ra-226 ≥1.5E-10 μCi/ml U-238 ≥1E-11 μCi/ml	AT SYSTEM: 10 ppm, 4 mg/m^3 dust >10% LEL, < 20% O_2 AT RMA PERIMETER: 0.05 mg/m^3 dust ≥ 0.5 pCi/L (radon) Adjusted 10CFR20 App. B Table 2, Col. 1. Concentrations (see §8.1.3 of General SSHP) Th-232 ≥1.2E-15 μCi/ml Ra-226 ≥1.8E-13 μCi/ml U-238 ≥ 1.2E-14 μCi/ml See also GEPP	Dust suppression measures will be implemented, if not successful after 30 minutes, then stop work, evacuate nonessential personnel, upgrade PPE and continue dust suppression
Dry Material Handling	See Excavate and remove contaminated soils above						
Area restoration	D	Modified D	None	None	None	None	
Equipment decontamination	Modified D	C	No	None	Pressure washing	NA	
Demobilization	D	Modified D	None	None	None	NA	

Action Levels:
- Action Level using PID/FID based on benzene exposure limits. Benzene will be confirmed with a detector tube.
- Action Level using real-time aerosol monitor (dust) is based on combining the potential constituent contaminants found at their highest concentration and formulating a mixture PEL with a safety factor of 1 (see calculation sheet in General SSHP Appendix H).
- PID monitoring (if used) will be conducted with an 11.7-eV lamp calibrated to isobutylene. The benzene response is 0.7.
- If airborne contamination exceeds 50 percent of the applicable derived air concentration (DAC) (10 CFR 20 Appendix B, Table 1, Column 3), then the area shall be posted as an Airborne Radioactivity Area.

Frequency and duration of air monitoring:

- PID/FID will be used daily when intrusive activities are in progress and/or when strange odors are present. The duration of PID/FID use will generally be at least 5 minutes or as determined by the SSHO.
- Monitoring for radiation shall be in accordance with section 8.0 – 8.1.4 of the General SSHP.
- Dust monitors (TSI DustTrak)will be used daily and continuous monitoring will be conducted when dry material handling is in progress. The duration of dust monitor use will be for as long as activity is in progress.
- CGI/O_2/CO meter will be used at least once daily. The duration of CGI/O_2/CO meter use will generally be at least 5 minutes or as determined by the SSHO.

STOP WORK CONDITIONS

Immediately cease excavation if:

Any fluid phase or groundwater seepage is encountered ;

Any drums, or other potential waste containers are encountered;

Distinct changes of material are encountered; or

The inspecting Stone & Webster representative
directs the operator to cease digging.

*Excavation shall resume upon authorization of the
Stone & Webster Field Operations Leader*

6.0 SITE CONTROL AND WORK ZONES

The purpose of site control is to minimize potential radiological and chemical exposures to workers, protect the public from the hazards of site activities, and prevent vandalism. The work areas that pose radiological, chemical, and physical hazards to personnel may be regarded as regulated or restricted. To prevent both exposure to unprotected personnel and migration of contamination from tracking by personnel or equipment, work areas known to contain radioactive and/or chemical contamination will be clearly identified. See Figure 11-1 for the location of control and work zones.

6.1 Radioactive Materials Area

The Radioactive Materials Area (RMA) is, in general, the area where radiological, chemical, physical, or other hazards occur/exist during project work. All employees are required to follow established procedures, such as wearing the proper PPE, when working in these areas. The perimeter of the pilot demonstration RMA will be surrounded by yellow and magenta rope and orange construction fencing. It will be posted as a "Radioactive Materials Area." An entry log is kept daily that records the time of entry and exit from the RMA for each person. Unauthorized personnel will not be allowed in the RMA.

6.2 Access Control Point

Access and egress to the RMA will be through the Access Control Point (ACP). All personnel and small equipment entering or leaving the RMA will pass through the ACP in order to prevent cross-contamination and to allow for accountability. PPE will be removed at the ACP, cleaned, and properly stored or disposed of. Drums for handling radioactively contaminated trash and reusable PPE will be maintained in the ACP. Each drum will be labeled as to the appropriate contents of the drum. All water generated from equipment and personal decontamination will be contained onsite and disposed of in an appropriate manner.

At each ACP, appropriate monitoring equipment, such as an alpha scintillation detector, will be available for personnel to frisk themselves for the presence of radioactive contamination prior to their leaving the ACP. Note: If site background radiation precludes performing a frisk, that is the instrument background is high, the frisking station can be moved from the ACP to a low background area. In this case, the ACP should be extended to a low background area. If personnel are found to be contaminated, they shall not leave the ACP until decontaminated.

For large equipment, an equivalent ACP will be designated where the equipment will be monitored by a Radiation Protection Technician (RPT) for radioactive contamination and decontaminated as required, prior to leaving the Contaminated Area. For large equipment the ACP will include a decontamination pad. The eyewash station will be located at the RMA/ACP boundary.

6.3 Support Area

The Support Area, will be the area outside the RMA, and the ACP. The Support Area is used for staging of materials, parking of vehicles, office facilities, sanitation facilities, and receipt of deliveries. Eating, drinking, and smoking will be allowed only in this area.

6.4 Emergency Entry and Exit

In the event an emergency entry is required, emergency responders will be escorted. Training is not required unless the responder makes several site visits for the purpose of training or other none emergency events. Emergency response takes precedence over decontamination, if serious illness or injury is involved.

During an emergency, personnel will evacuate to the MISS assembly point closest to the pilot demonstration. (Refer to Figure 11-1). If conditions such as wind direction or physical hazards do not allow access to the prescribed evacuation routes, personnel are to evacuate by the safest means available. If possible, personnel should doff their PPE in the ACP when leaving the area. However, if this is not possible, personnel should remove their foot protection (e.g., shoe covers or booties) and exit to the rally point. At the rally point, the remaining PPE can be doffed and personnel frisked for contamination. Additional emergency procedures can be found in Section 11.

6.5 Hazardous Work Permit

HWPs will be used for the administrative control of work activities within various properties of the FMSS that have or potentially have radiological and/or safety and health hazards present. HWPs are used to summarize the radiation protection and industrial hygiene controls established as part of AHA process and are detailed enough to deal with changing (or potentially changing) conditions expected during the course of the work. The Project Superintendent, SSHO or RSO will initiate the HWP. The site RSO will review and approve HWPs. For HWPs which involve chemical or other safety and health hazards the SSHO will also approve the HWP. The RSO will be responsible for implementation of the HWP. The RSO may delegate this responsibility to Radiation Protection Technicians (RPTs). The RSO will track implementation and completion of the HWP.

6.6 Posting Site

Stone & Webster will designate work zones at the FMSS project as restricted areas. Access to these areas will be limited for the purpose of protecting individuals against undue risks from exposure to radiation and radioactive materials. These areas and materials within these areas may be posted as required by 10 CFR 20 Subpart J, specifically 1901, *Caution Signs,* 1902, *Posting Requirements,* and 1904, *Labeling of Containers.* Work areas where radioactively contaminated soils are being excavated, stored, washed, sorted or loaded for transport or disposal will be posted as "Caution, Radioactive Material(s)". Surface contamination criteria for the site is divided into two categories; removable and average (total of removable and fixed). The removable limit is 200 dpm/100 cm^2; The average limit is 1000 dpm/100 cm^2 (see Table 6-1). Although each of the three site contaminants have separate surface criteria, the Thorium 232 limit is recognized since it is the predominant isotope. Any area with removable surface radioactivity exceeding the removable limit referenced above will also be posted as a "Contaminated Area." If airborne contamination exceeds 50 percent of the applicable derived air concentration (DAC) or if exposure reaches 12 DAC hours per week (10 CFR 20 Appendix B, Table 1, Column 3), the area shall be posted as an "Airborne Radioactivity Area." The concentrations for Ra-226, Th-232 and U-238 are 1.5E-10, 5E-13 and 1E-11 µCi/ml respectively. Areas where radioactive materials are stored or used shall be posted as a Radioactive Materials Area. Drummed PPE or other radioactively contaminated materials will be labeled as required in 10 CFR 20.1904.

TABLE 6-1
Pilot Demonstration
Acceptable Surface Contamination Levels
(EM 385-1-80 Table 6-4)

NUCLIDE[a]	AVERAGE[b c] dpm/100 cm^2	MAXIMUM[b d] dpm/100 cm^2	REMOVABLE[b e] dpm/100 cm^2
U-238 and associated decay products	5,000	15,000	1,000
Ra-226	100	300	20
Th-232	1,000	3,000	200
Beta-gamma emitters (nuclides with decay modes other than alpha emission or spontaneous fission) except Sr-90 and others noted above.	5,000	15,000	1,000

[a] Where surface contamination by both alpha- and beta-gamma-emitting nuclides exists, the limits established for alpha- and beta-gamma-emitting nuclides should apply independently.

[b] As used in this table, dpm (disintegrations per minute) means the rate of emission by radioactive material as determined by correcting the counts per minute observed by an appropriate detector for background, efficiency, and geometric factors associated with the instrumentation.

[c] Measurements of average contaminant should not be averaged over more than 1 square meter. For objects of less surface area, the average should be derived for each object. (Note: Measurements of average contaminants shall be the sum of fixed plus removable contamination.)

[d] The maximum contaminated level applies to an area of not more than 100 cm^2. (Note: Measurements of maximum contaminants shall be the sum of fixed plus removable contamination.)

[e] The amount of removable radioactive material per 100 cm^2 of surface area should be determined by wiping that area with dry filter or soft absorbent paper, applying moderate pressure, and assessing the amount of radioactive material on the wipe with an appropriate instrument of known efficiency. When removable contamination on objects of less surface area is determined, the pertinent levels should be reduced proportionally and the entire surface should be wiped.

7.0 CONTAMINATION CONTROL/DECONTAMINATION

7.1 Dust Control

All excavations, embankments, stockpiles, access and haul roads, waste areas, and other work areas will be maintained with no visible dust. Surfaces and stockpiles that could produce fugitive dust will be watered at intervals as necessary.

Continuous dust monitoring will be implemented. Dust monitoring will be performed in both the immediate work area and along the site perimeter using a "real-time" aerosol monitor. Correlations between dust and the various radiological and chemical contaminants have been pre-established. Stop-work values have also been established for both the work area and site perimeter. They are:

Work Area	> 4mg/m3
Perimeter	> 0.05 mg/m3

8.0 AIR MONITORING PROGRAM

The following air monitoring will be performed during the pilot demonstration:

8.1 Radiological

8.1.1 Personnel

Personnel exposures will be monitored using lapel air samplers. Lapel air samples will be collected at the end of each work shift, or upon completion of a specific task. Lapel air samples will be screened on site for gross alpha/beta activity using a low background counting system equipped with a gas flow proportional detector. Samples exceeding the minimum detectable activity of the screening instrument will be sent to an off site laboratory for analysis by alpha spectroscopy. Results of the alpha spectroscopy analyses will be used to assign personnel exposures when compared to the DAC values outlined in 10 CFR 20 Appendix B, Table 1, Column 3

8.1.2 Work Area

At a minimum, four (4) low volume air samplers will be strategically placed within the work area to assess airborne radioactivity as it pertains to radiological posting. These samplers will be placed downwind of suspected airborne generating components when practical. The samples will be collected at the end of each work shift. These air samples will be analyzed on site for gross alpha/beta activity using a low background counting system equipped with a gas flow proportional detector. Results of these samples will be compared to the DAC values outlined in 10 CFR 20 Appendix B, Table 1, Column 3

8.1.3 Perimeter

At a minimum, four (4) low volume air samples will be placed around the site perimeter to assess airborne radioactivity as it pertains to off site release. These air samples will be collected twice per week. These air samples will be screened on site for gross alpha/beta activity using a low background counting system equipped with a gas flow proportional detector. Samples exceeding the minimum detectable activity of the screening instrument will be sent to an off site laboratory for analysis by alpha spectroscopy. Results of these samples will be compared to the DAC values outlined in 10 CFR 20 Appendix B, Table 2, Column 1.

8.2 Industrial Hygiene

In addition to the dust monitoring discussed in Section 7.0, air monitoring for volatile organics, lower explosive limit, oxygen, carbon monoxide, and hydrogen sulfide will be performed throughout the excavation process and intermittently during processing of the material. This monitoring will be accomplished using a real-time combination PID/4-GAS meter.

9.0 TRAINING REQUIREMENT

No task specific changes. General SSHP applies.

10.0 MEDICAL SURVEILLANCE

No task specific changes. General SSHP applies.

11.0 EMERGENCY RESPONSE PLAN AND CONTINGENCY PROCEDURES

11.1 Fire Control

A 10-A:B:C fire extinguisher will be kept at the field office, on all heavy machinery and at the pilot demonstration RMAs, at a minimum. In the event of a fire or explosion at the site, the following actions will be implemented:

- Evacuate all personnel to a safe location upwind or crosswind of the incident. Contact the Project Superintendent and SSHO.
- If personnel are present who have had training in the use of fire extinguishers, use available fire extinguishers to extinguish fires in their incipient stages.
- Alert the local hospital of the possibility of fire victims, as appropriate.
- Document the incident in the field logbook and follow the procedures for incident reporting in General SSHP Section 12.4.

11.2 Site Evacuation Procedures

In the event that site evacuation is required, an air horn will be sounded. Air horns will be located in the site office trailer, each active work area, and on all heavy equipment. The evacuation signals are as follows:

1 short blast = radiological emergency
2 short blasts = chemical emergency
3 short blasts = fire emergency
The appropriate signal is repeated every minute.

In the event of an emergency at the Stepan Chemical Company, FMSS personnel will be notified by telephone. The above evacuation signals would then be used. Radio communication may also be used to alert site workers and provide special instructions. Refer to Figure 11-1 for evacuation routes.

Personnel working in the RMA or ACP will immediately make their way to the designated area (the existing assembly point in the MISS) at the support trailer area for a "head count." Depending on the severity of the event and allowable time, personnel exiting the RMA and ACP may be instructed to forego or modify decontamination procedures.

Personnel in the Restricted Area will immediately report to the designated area for a "head count" and further instructions. The Project Superintendent and the SSHO will remain in contact to ensure that evacuation procedures are properly executed. If the office is inaccessible, personnel will evacuate to a designated upwind location and perform a "head count."

Situations requiring evacuation may include unusually severe weather conditions, fires, or significant chemical spills or releases. In the event of project evacuation, the USACE and the Maywood Fire Department will be notified immediately. A site emergency map that delineates evacuation routes, emergency air horn locations, first aid kit locations, rally point, and RMA perimeters is included in Figure 11-1. Exact locations of RMA perimeters, ACPs and emergency equipment may be modified by the SSHO. In the event changes are made, the site emergency map will be updated by the SSHO in the field and project personnel will be notified.

11.3 Hospital Information

The local hospital in the FMSS area is:

Hackensack University Medical Center
30 Prospect Avenue
Hackensack, NJ
201-996-2000

The hospital is within 3 miles of the USACE trailer complex at the MISS, adjacent to the Stepan Chemical Company in Maywood. To drive from the MISS trailer complex to Hackensack University Medical Center one exits the site on West Hunter Ave. At the intersection with Maywood Avenue, turn right and follow Maywood Avenue south to its intersection with Essex Street. Turn left on to Essex Street and travel east over Summit Avenue to Prospect Avenue in Hackensack. At Prospect Avenue turn left. The hospital is located at 30 Prospect Avenue in Hackensack. Detailed directions from each of the commercial properties are included with Figure 11-2.

Figure 11-2

**Maywood Properties
Hospital Route Map**

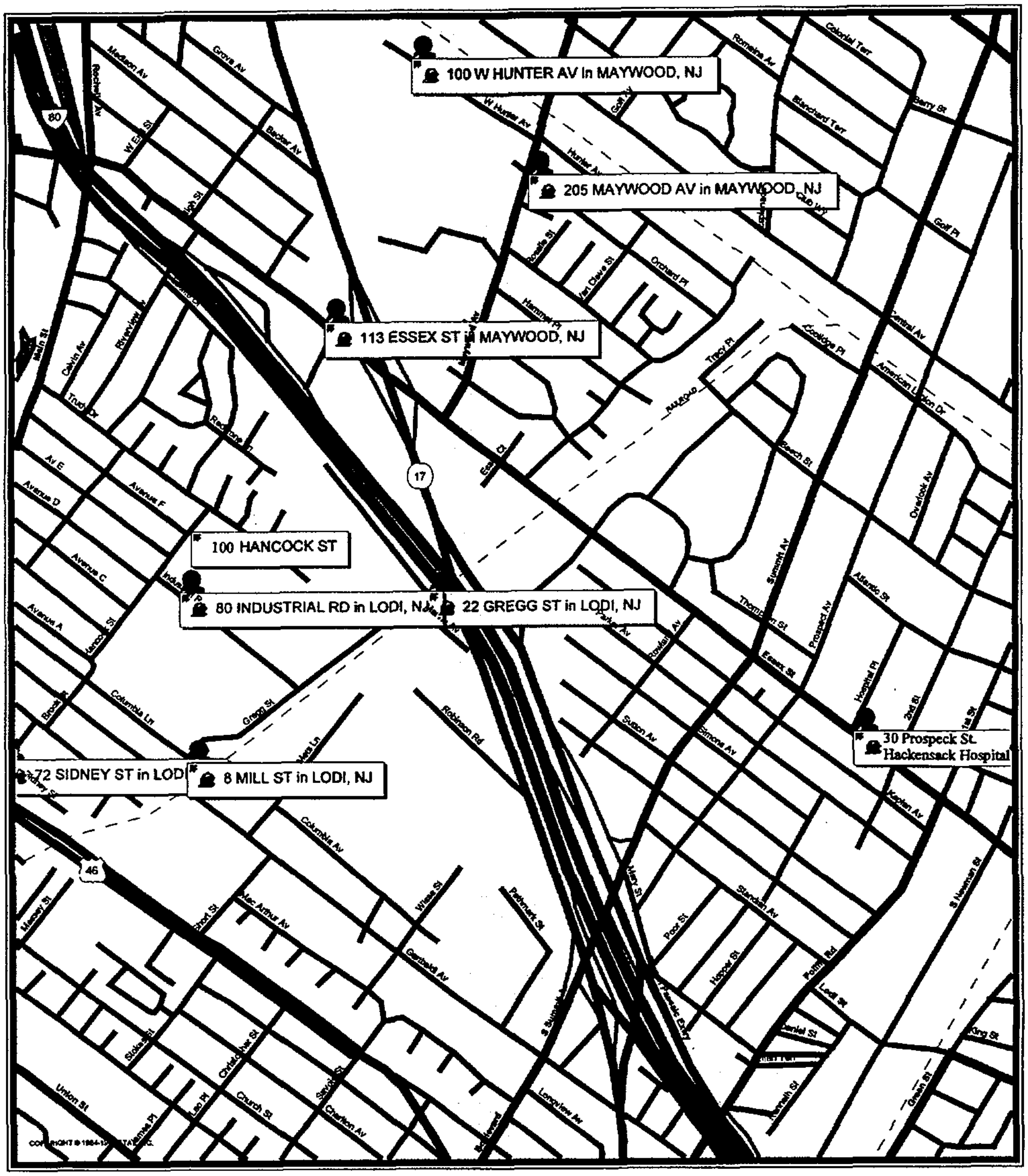


Table 11-1
PILOT DEMONSTRATION
EMERGENCY PHONE LIST

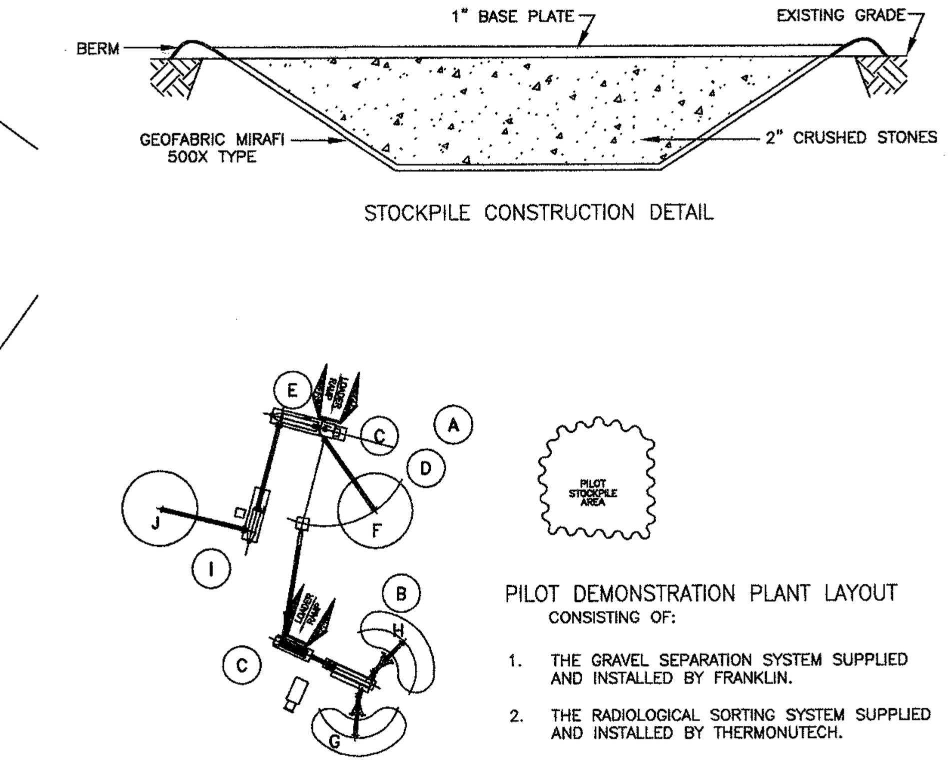
Name	Telephone Numbers
Fire/Police/Rescue Unit (Ambulance)	911
Hackensack University Medical Center	201-996-2000
Poison Control Center	800-366-8888
National Response Center	800-424-8802
Jay Green (Project Manager)	Site (201-226-6601)
	Home (201-493-7840)
Ron Edwards (V.P. of Corporate Safety)	Work (617-589-5854)
	Home (508-747-5111)
	Pager (800-358-6786)
SSHO – Shawn Andrews	Site (201-226-6634)
	Home (973-249-9933)
	Cell. (201-481-5996)
Kevin Donnelly (Project Environmental Engineer)	Site (201-226-6620)
	Cell. (201-819-6867)
RSO – Eric Laning*	Site (201-226-6630)
	Home (973-815-1992)
	Cell. (201-481-5993)
CHP – Alan Fellman*	Office (301-435-7953)
	Cell. (301-674-7447)
CIH – James Skrabak*	Office (617-589-1379)
Mary Murphy*	816-983-3907
Garden State Underground Plant Location Service (buried utilities)	1-800-272-1000
Occupational Physician Dr. Marino	201-836-7664
Contracting Officer Representative (USACE) – D. Lee	201-226-6602

* Designates individuals to be notified in the event of an emergency

12. LOGS, REPORTS, AND RECORD KEEPING

No task specific changes. General SSHP applies.

Figures



PILOT DEMONSTRATION PLANT LAYOUT
CONSISTING OF:

1. THE GRAVEL SEPARATION SYSTEM SUPPLIED AND INSTALLED BY FRANKLIN.
2. THE RADIOLOGICAL SORTING SYSTEM SUPPLIED AND INSTALLED BY THERMONUTECH.

K

LEGEND:

- LOCATION OF OVERBURDEN MONITORING WELL
- LOCATION OF BEDROCK MONITORING WELL
- UTILITY POLE OVERHEAD
- APPROXIMATE BOUNDARY OF SETTLING POND
- GROUND SURFACE 5-FOOT CONTOUR
- GROUND SURFACE 1-FOOT CONTOUR (EXISTING)
- x 63.7 EXISTING SPOT ELEVATION (MSL)
- GATE
- POSSIBLE LOCATION OF BURIED/ABANDONED FOUNDATION
- OFFICE TRAILER
- FIRST AID
- AIRHORN
- EYEWASH
- FIRE EXTINGUISHER
- 0 / 90 / 180 / 270 WINDSOCK
- M PERIMETER AIR MONITORING STATION (ONE UPWIND, TWO DOWNWIND)

A	MATERIAL NOT TO BE PROCESSED — OVERSIZED	G	ABOVE CRITERIA
B	RETENTION POND MATERIAL	H	BELOW CRITERIA
C	GRANULAR MATERIAL TO GRAVEL SEPARATION SYSTEM	I	FILTER CAKE
D	>1 1/2" OVERSIZED AND DEBRIS	J	3/8" TO 6" RINSED GRAVEL MATERIAL
E	MATERIAL GREATER THAN 6" OVERSIZE AND DEBRIS	K	BELOW CRITERIA MATERIAL NOT TO BE PROCESSED
F	OVERFLOW STOCKPILE MATERIAL LESS THAN 3/8" (9.38 mm)		

0 50 100 FEET
1" = 50'-0"

U.S. Army Corps of Engineers
NEW YORK DISTRICT

Symbol	Description	Date	Approved
A	ORIGINAL ISSUE	6/29/00	[signature]

Revisions

STONE & WEBSTER ENVIRONMENTAL TECHNOLOGY & SERVICES

Designed by: B MARQUIS	Date: 6/27/00	Approved: [signature]	Date: 6/28/00
Drawn by: K ANTHONY	Date: 6/28/00	File Name:	
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U.S. ARMY ENGINEER DIVISION
CORPS OF ENGINEERS
MAYWOOD, NEW JERSEY

FUSRAP

FUSRAP MAYWOOD SUPERFUND SITE
MAYWOOD, NEW JERSEY

SAFETY AND HEALTH FEATURES
EVACUATION ROUTE
JUNE 2000
FINAL

Contract Number: DACW41-99-D-9001
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Drawing Number: FIG 11-1

Appendix A

ACTIVITY HAZARD ANALYSIS

Activity: Pilot Demonstration: General Conditions
Reviewed by/date: Dirk Decker, CIH 2/25/00 Reviewed by/date: Alan Fellman, CHP 2/25/00

PRINCIPAL STEPS	POTENTIAL HAZARDS	RECOMMENDED CONTROLS
Travel to/at project site	Operation of motor vehicles and trucks	All site personnel operating motor vehicles at the pilot demonstration shall comply with all federal, state, and local traffic regulations. Personnel shall only use vehicles that are in good condition and safe to operate. Personnel shall inspect vehicles routinely used at pilot demonstration on a weekly basis and submit the inspection documentation to the SSHO. All personnel shall drive defensively and wear seatbelts while vehicles are in motion. All personnel will comply with approved site speed limits: 10 mph maximum; 5 mph when other traffic is present, or conditions warrant. Backing of vehicles shall be avoided when possible. Extra care shall be taken to back vehicles when unavoidable. When parking vehicles into head-in parking spaces, vehicles shall be backed into the space whenever possible. Before backing a vehicle that has been parked, the driver shall physically walk to the back of the vehicle to observe the area before entering the vehicle. Spotters shall be used to back vehicles whenever possible.
EQUIPMENT TO BE USED	**INSPECTION REQUIREMENTS**	**TRAINING REQUIREMENTS**
Vehicles Trucks/trailers	Vehicle inspections	Recommend defensive driving Licensed vehicle operators

PRINCIPAL STEPS	POTENTIAL HAZARDS	RECOMMENDED CONTROLS
Unload equipment and set up gravel separation and radiological sorting equipment	Unfamiliarity with: site, general site hazards, project safety rules, chain of command, emergency procedures	All personnel shall attend the site orientation training.
	Heavy lifting/strains, sprains	No individual employee is permitted to lift any object that weighs over 60 pounds. Proper lifting techniques shall be used. Multiple employees or the use of mechanical lifting devices are required for lifting objects over the 60-pound limit.
	Use of mechanical equipment	Only qualified personnel shall be permitted to operate equipment. Forklifts and mechanical equipment shall be inspected daily. Deficiencies in equipment shall be noted on the inspection form. Equipment found to be unsafe shall not be used. All equipment shall be operated at safe speeds and in a safe manner. Equipment operators shall wear safety belts and hearing protection. Ground personnel shall not position themselves between equipment and stationary objects and shall only approach equipment after a signal from the operator. Personnel shall maintain eye contact with the operator when approaching equipment. Personnel are prohibited from entering the swing radius of moving booms. Equipment load capacities shall not be exceeded. Personnel shall ensure all mechanical guards are in place and functioning properly. All equipment shall be shut down with energies dissipated prior to performing

PRINCIPAL STEPS	POTENTIAL HAZARDS	RECOMMENDED CONTROLS
		maintenance activities - lock out/tag out procedures may apply. Only qualified mechanics shall work on or repair heavy equipment.
EQUIPMENT TO BE USED	**INSPECTION REQUIREMENTS**	**TRAINING REQUIREMENTS**
Forklifts/heavy equipment Level D PPE Slings, chains, ropes	Site inspections (daily) Forklifts/heavy equipment (daily)	Site orientation; Forklift operation; Qualified operators; Lifting/back safety

PRINCIPAL STEPS	POTENTIAL HAZARDS	RECOMMENDED CONTROLS
Unload equipment (continued)	Mobilization of crane	The crane operator shall have had a physical examination in the last year. Only qualified personnel shall be permitted to operate the crane. The crane shall have had a periodic inspection, a preoperational inspection and must be inspected prior to each critical lift in compliance with EM 385-1-1. The crane operator shall ensure all mechanical guards are in place and functioning properly. All equipment must be shut down and energies dissipated and locked/tagged out prior to performing maintenance activities. Only qualified mechanics may repair the crane. All required tests are to be completed after crane maintenance. Personnel are prohibited from standing or working under the boom.
	Set-up and operation of crane	A lift plan shall be completed for each critical lift. It shall be adressed as part of the HWP. The operator shall direct all set-up and lifting operations. A tag line shall be used.
	Use of rigging	Rigging shall be inspected before each use. Deficiencies shall be noted on the inspection form. Rigging found to be unsafe shall not be used and shall be tagged and taken out of service.
	Overhead	Equipment operators must remain aware of overhead power lines and maintain safe clearances - use spotters when necessary. Personnel shall never stand under suspended loads.
	Slips, trips, falls	Keep work areas clear and maintain housekeeping. Personnel shall not jump from equipment or elevated surfaces. Unloaded equipment and materials shall be

PRINCIPAL STEPS	POTENTIAL HAZARDS	RECOMMENDED CONTROLS
		appropriately stored in an orderly fashion.
	Hand injuries	Items to be handled shall be inspected for sharp edges prior to being handled. Personnel shall wear leather gloves when handling sharp materials. Personnel shall be aware of and avoid pinch point hazards.
	Electrical	GFCIs shall be used on all power tools and extension cords. Extension cords, power tools, and lighting equipment shall be inspected before each use, protected from damage, and kept out of wet areas.
	Fire	Engines shall be shut off before refueling. A 20-pound ABC fire extinguisher shall be available at refueling areas. Smoking shall not be permitted near fueling areas.
EQUIPMENT TO BE USED	**INSPECTION REQUIREMENTS**	**TRAINING REQUIREMENTS**
Forklifts/heavy equipment Level D PPE Slings, chains, ropes Fire extinguisher Leather gloves GFCI	Site inspections (daily) Fire extinguisher (weekly) Forklifts/heavy equipment (daily) Slings, chains, ropes (before each use) Hand tools/extension cords (before each use)	Site orientation Fire extinguisher Lifting/back safety Rigging safety

ACTIVITY HAZARD ANALYSIS

Activity: Characterization of MISS during Pilot Demonstration Activities
Reviewed by/date: Dirk Decker, CIH 2/25/00 Reviewed by/date: Alan Fellman, CHP 2/25/00

PRINCIPAL STEPS	POTENTIAL HAZARDS	RECOMMENDED CONTROLS
Prepare site (install geotextile, crushed stone, fencing and signage)	Underground utilities.	Underground utilities shall be located and marked prior to commencing fencepost installation and/or excavation activity. The Intrusive Activity Clearance Procedure shall be followed – the Pilot Demonstration Intrusive Activity Clearance Request form must be completed and signed by the SSHO. All electrical, gas, and telephone utilities are to be hand dug within 3 feet of utility markings. Then a nonmetallic probe or magnetometer will be used to pinpoint utilities. See Section 4.3.11. The phone numbers for specific utilities shall be posted by telephones.
	Chemical/radiological contamination.	Should not be a problem since fencing will be installed outside of contaminated areas. When installation of fencing outside of contaminated areas may not be possible due to extension of contamination under public roads, RPTs will perform daily surveys and air monitoring to ensure levels are within acceptable levels.
	Heat/cold/severe weather.	Follow procedures outlined in General SSHP.
	Biological.	Follow procedures outlined in General SSHP.

PRINCIPAL STEPS	POTENTIAL HAZARDS	RECOMMENDED CONTROLS
Excavate contaminated soil	Chemical/radiological contamination.	RMA must be defined and ACP must be set up before beginning excavation, separation, rinsing, sorting or assay of contaminated soil. Initially, personnel shall wear Level-C PPE as required by the General SSHP and Hazardous Work Permit (HWP). TLDs shall be worn by personnel working in restricted area. Monitor for radiation upon exit from contaminated areas. Monitoring for chemicals shall be performed. Monitoring for radiation shall be performed by a RPT or RSO. Follow instructions given by SSHO, RSO, and RPT. See Table 5-1, Action Level Summary.
EQUIPMENT TO BE USED	**INSPECTION REQUIREMENTS**	**TRAINING REQUIREMENTS**
Hazard warning signs Thermoluminescent dosimeter (TLD) Ratemeter w/ alpha scintillation detector PID or FID, Level C and Level D-Modified PPE		Site orientation HAZWOPER Radiation worker training Biological hazard identification and control Personnel will wear PPE in accordance with General SSHP and HWP

PRINCIPAL STEPS	POTENTIAL HAZARDS	RECOMMENDED CONTROLS
Excavate contaminated soil (continued)	Use of heavy equipment	Only qualified personnel shall be permitted to operate equipment. Heavy equipment shall be inspected daily. Deficiencies in equipment shall be noted on the inspection form. Equipment found to be unsafe shall not be used. All equipment shall have backing alarms. All equipment shall be operated at safe speeds and in a safe manner. Equipment operators shall wear safety belts and hearing protection. Ground personnel shall not position themselves between equipment and stationary objects and only approach equipment after a signal from the operator. Personnel are prohibited from entering the swing radius of moving booms. Personnel shall ensure all mechanical guards are in place and functioning properly. All equipment shall be shut down with energies dissipated prior to performing maintenance activities – lock out/tag out procedures may apply. Only qualified mechanics shall work on or repair heavy equipment.
	Noise	Noise surveys shall be performed to determine the extent and limits of hazardous noise areas. Engineering controls shall be implemented where feasible. Noise in areas which cannot be controlled shall be posted as such and personnel shall wear hearing protection to reduce exposures to below the OSHA limits.

EQUIPMENT TO BE USED	INSPECTION REQUIREMENTS	TRAINING REQUIREMENTS
Heavy equipment; Fire extinguishers; Level D and C PPE; Sound level meter/noise dosimeter Hearing protection	Site inspections (daily) Heavy equipment (daily) Fire extinguishers (weekly)	Site orientation; HAZWOPER; Qualified operators; Air monitor; Fire extinguisher use; Lockout/tagout procedures; Hearing conservation

PRINCIPAL STEPS	POTENTIAL HAZARDS	RECOMMENDED CONTROLS
Excavate contaminated soil (continued)	Fire	Engines shall be shut off before refueling. A 20-pound ABC fire extinguisher shall be available at refueling areas. Smoking shall not be permitted near fueling areas.
	Overhead	Equipment operators must remain aware of overhead power lines and maintain safe clearances - use spotters when necessary.
	Excavation of soils	Excavations shall be inspected by a competent person a minimum of once per day. Personnel shall not enter excavations unless protective systems such as sloping/benching or shoring are in place. Soils, equipment, and materials shall be kept at least 2 feet from the face of excavations. Smoking shall not be permitted during excavation activity. If a natural gas line is damaged, the operator shall immediately shut off equipment, evacuate the area, and notify the Construction Manager and the SSHO. If an electrical line is disturbed, the operator shall release all controls and remain in cab (not touching metal surfaces) until power is confirmed to be off. All other personnel shall stay away from line and equipment until power is confirmed to be off.
	Dust	Visible dust shall be monitored and controlled.
	Radon	See Table 5-1, Action Level Summary.

PRINCIPAL STEPS	POTENTIAL HAZARDS	RECOMMENDED CONTROLS
	Confined Space Entry	Excavations that are greater than 4 feet deep shall not be entered without obtaining a confined space entry permit and implementation of confined space entry procedures.
EQUIPMENT TO BE USED	**INSPECTION REQUIREMENTS**	**TRAINING REQUIREMENTS**
Heavy equipment; Level C or D PPE Aerosol monitor Dust control equipment (water truck) Construction fencing Fire extinguishers	Site inspections (daily) Heavy equipment (daily) Excavation (daily) Fire Extinguishers (weekly)	Site orientation HAZWOPER Radiation worker training Qualified equipment operators; Fire extinguisher use Excavation competent person

PRINCIPAL STEPS	POTENTIAL HAZARDS	RECOMMENDED CONTROLS
Gravel separation system	Chemical/radiological contamination	RMA must be defined and ACP must be set up before beginning excavation, separation, and rinsing of contaminated soil. Sample filter cake when wet and wear gloves to prevent skin contact. Initially, personnel shall wear Level-C PPE as required by the General SSHP and Hazardous Work Permit (HWP). TLDs shall be worn by personnel working in restricted area. Monitor for radiation upon exit from contaminated areas. Monitoring for chemicals shall be performed. Monitoring for radiation shall be performed by a RPT or RSO. Follow instructions given by SSHO, RSO, and RPT. See Table 5-1, Action Level Summary.
	Gravel separation system and heavy equipment operation	Only qualified personnel shall be permitted to operate equipment. Equipment shall be inspected daily. Deficiencies in equipment shall be noted on the inspection form. Equipment found to be unsafe shall not be used. All equipment shall have backing alarms. All equipment shall be operated at safe speeds and in a safe manner. Equipment operators shall wear safety belts and hearing protection. Ground personnel shall not position themselves between equipment and stationary objects and only approach equipment after a signal from the operator. Personnel are prohibited from entering the swing radius of moving booms.

PRINCIPAL STEPS	POTENTIAL HAZARDS	RECOMMENDED CONTROLS
		Personnel shall ensure all mechanical guards are in place and functioning properly. All equipment shall be shut down with energies dissipated prior to performing maintenance activities – lock out/tag out procedures may apply. Only qualified mechanics shall work on or repair heavy equipment.
	Noise	Noise surveys shall be performed to determine the extent and limits of hazardous noise areas. Engineering controls shall be implemented where feasible. Noise in areas which cannot be controlled shall be posted as such and personnel shall wear hearing protection to reduce exposures to below the OSHA limits.
EQUIPMENT TO BE USED	**INSPECTION REQUIREMENTS**	**TRAINING REQUIREMENTS**
Radiation monitor CGI/O_2/CO meter	Site inspections (daily) Heavy Equipment (daily) Heavy Equipment decontamination (before leaving area) Excavation (daily)	Site orientation HAZWOPER

PRINCIPAL STEPS	POTENTIAL HAZARDS	RECOMMENDED CONTROLS
Gravel separation system (continued)	Fire	Engines shall be shut off before refueling. A 20-pound ABC fire extinguisher shall be available at refueling areas. Smoking shall not be permitted near fueling areas.
	Overhead	Equipment operators must remain aware of overhead power lines and maintain safe clearances - use spotters when necessary.
	Dust	Visible dust shall be monitored and controlled.
	Radon	See Table 5-1, Action Level Summary.
	Slips, trips, falls	Personnel shall be cautious when walking/working on slippery surfaces. Personnel lifts or scaffolding shall be used when access to the tops of equipment must be gained to clean. Fall protection shall be used when working at heights greater than 6 feet. Good housekeeping shall be maintained in decontamination area.
	Hand Injuries	Items to be handled shall be inspected for sharp edges prior to being handled. Personnel shall wear leather gloves when handling sharp materials. Personnel shall be aware of and avoid pinch point hazards.
	Electrical/Electrocution	GFCIs shall be used on all power tools, portable generators and extension cords. Extension cords power tools, generators and lighting equipment shall be inspected before each use, protected from damage, and kept out of wet areas. Only qualified electricians shall make electrical

PRINCIPAL STEPS	POTENTIAL HAZARDS	RECOMMENDED CONTROLS
		connections. All work shall comply with National Electrical Code standards. All circuit breakers must be labeled. Personnel shall be aware of main disconnect location.
	Caught between/crushed by equipment	All equipment shall be shut off with positive means taken to prevent its operation. All dump beds on trucks shall be blocked if bed is cleaned in raised position.
Radiological sorting system	See hazards above for Principal Step "Gravel separation system"	See controls above for Principal Step "Gravel separation system"
	Chemical/radiological	Sample above criteria material when wet and wear gloves to prevent skin contact
	Physical Hazards	Hydraulic oil powering the screening plant becomes hot. All adequate cooling time before maintenance. Hammer mill operation presents the potential for flying projectiles. No one is allowed on the deck area of the hammer mill until the mill is locked out and has stopped spinning. Isolate and discharge compressed air cylinders before any contact with the cylinders. Implement lockout/tagout procedures before removing guards which enclose rotating parts of the SGS system.
	Radiological sorting demobilization	See Principal Steps "Unload Equipment" and Principal Hazards "Mobilization of Crane"

PRINCIPAL STEPS	POTENTIAL HAZARDS	RECOMMENDED CONTROLS
Sorting of Fines Characterization Sampling	Chemical/radiological contamination. See hazards listed above for Principal Step 'Excavate contaminated soil".	RMA must be defined and ACP must be set up before beginning excavation, gravel separation, or radiological sorting of contaminated soil. Initially, personnel shall wear Level-C PPE as required by the General SSHP and HWP. TLDs shall be worn by personnel working in restricted area. Monitor for radiation upon exit from contaminated areas. Monitoring for chemicals shall be performed. Monitoring for radiation shall be performed by a RPT or RSO. Follow instructions given by SSHO, RSO, and RPT. See Table 5-1, Action Level Summary.
EQUIPMENT TO BE USED	**INSPECTION REQUIREMENTS**	**TRAINING REQUIREMENTS**
Thermoluminescent dosimeter (TLD); Level D PPE Radiation monitoring equipment; PID or FID	Site inspections (daily) Excavation (daily)	Site orientation HAZWOPER Excavation competent person

PRINCIPAL STEPS	POTENTIAL HAZARDS	RECOMMENDED CONTROLS
Equipment decontamination	Chemical/radiological contamination	Personnel shall wear Level-D Modified PPE as required by the General SSHP and Hazardous Work Permit (HWP). Personnel pressure washing equipment shall wear Level-C PPE as required by the General SSHP and HWP. TLDs shall be worn by personnel working in restricted area. Equipment shall be monitored for radiation after decontamination has been completed. Monitoring for radiation shall be performed by an RPT or RSO. All personnel shall follow instructions given by SSHO, RSO, and RPT. Air monitoring as required in Table 5-1. See Table 5-1 for Action Level Summary.
	Injury from steam/pressure washers	Personnel shall be trained in the use of steam/pressure washing equipment. The spray from such equipment shall only be directed at surfaces to be cleaned and never at body parts or other personnel. Face protection shall be worn by all personnel associated with the use of steam/pressure washers. Only wands that are 4 ft long will be used. Rain gear shall by worn be personnel in addition to other PPE.
	Slips, trips, falls	Personnel shall be cautious when walking/working on slippery surfaces. Personnel lifts or scaffolding shall be used when access to the tops of equipment must be gained to clean. Fall protection shall be used when working at heights greater than 6 feet. Good housekeeping shall be maintained in decontamination area.

PRINCIPAL STEPS	POTENTIAL HAZARDS	RECOMMENDED CONTROLS
	Electrocution	GFCI shall be used on all electrical equipment. Extension cords shall be inspected before each use, protected from damage, and kept from laying in puddles of water.
	Caught between/crushed by equipment	All equipment shall be shut off and a positive means taken to prevent its operation prior to decontamination. All dump beds on trucks shall be blocked if bed is cleaned in raised position.
EQUIPMENT TO BE USED	**INSPECTION REQUIREMENTS**	**TRAINING REQUIREMENTS**
Steam/pressure washers Level D PPE GFCI	Site inspections (daily) Excavation (daily) Equipment (post decontamination)	Site orientation HAZWOPER Steam/pressure washing

FINAL
PILOT DEMONSTRATION WORK PLAN

VOLUME 5
RESULTS OF ENGINEERING TEST PITS PROGRAM AT MISS

FUSRAP MAYWOOD SUPERFUND SITE
MAYWOOD, NEW JERSEY

CONTRACT NO. DACW41-99-D-9001
WAD 03 WBS 03

Submitted to:

Department of the Army
U.S. Army Engineer District, Kansas City
Corps of Engineers
700 Federal Building
Kansas City, Missouri 64106

Department of the Army
U.S. Army Engineer District, New York
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Submitted by:

Stone & Webster Environmental Technology & Services
245 Summer Street
Boston, Massachusetts 02210
June, 2000

Issued to: ______________________ **Date:** ______________________

Copy #: __________ ☐ **Controlled** ☐ **Uncontrolled**

FINAL
PILOT DEMONSTRATION WORK PLAN

VOLUME 5
RESULTS OF ENGINEERING TEST PITS PROGRAM AT MISS

FUSRAP MAYWOOD SUPERFUND SITE
MAYWOOD, NEW JERSEY

SITE-SPECIFIC ENVIRONMENTAL RESTORATION
CONTRACT NO. DACW41-99-D-9001
WAD 03 WBS 03

Submitted to:

Department of the Army
U.S. Army Engineer District, Kansas City
Corps of Engineers
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U.S. Army Engineer District, New York
Corps of Engineers
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Stone & Webster Environmental Technology & Services
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TABLE OF CONTENTS

VOLUME 5
RESULTS OF ENGINEERING TEST PITS PROGRAM AT MISS

List of Tables

List of Figures

Appendices

LIST OF ACRONYMS AND ABBREVIATIONS

ASTM	American Society for Testing and Materials
bgs	below ground surface
bkg	background
CDQMP	Chemical Data Quality Management Plan
COC	Chain of Custody
cpm	counts per minute
CQCP	Contractor Quality Control Plan
DQCR	Daily Quality Control Report
DQO	Data Quality Objectives
EM	Engineering Manager
FMSS	FUSRAP Maywood Superfund Site
FOL	Field Operations Leader
FUSRAP	Formerly Utilized Sites Remedial Action Program
MHTDP	Materials Handling, Transport and Disposal Plan
MISS	Maywood Interim Storage Site
MS	Matrix Spike
MSD	Matrix Spike Duplicate
MSS	Maywood Superfund Site
NCR	Nonconformance Report
NGVD	National Geodetic Vertical Datum
NJDEP	New Jersey Department of Environmental Protection
PCB	polychlorinated biphenyl
pCi	picocurie
PID	Photoionization Detector
PRGs	Preliminary Remediation Goals
QA	Quality Assurance
QC	Quality Control
RMA	Radioactive Materials Area
RSO	Radiation Safety Officer
SSHO	Site Safety and Health Officer
SSHP	Site Safety and Health Plan
SAP	Sampling and Analysis Plan

SC	Sampling Coordinator
SCC	Soil Cleanup Criteria
SOP	Standard Operating Procedure
SOR	Sum- of-the-Ratios
SSERC	Site-Specific Environmental Restoration Contract
SVOC	Semivolatile Organic Compound
TCLP	Toxicity Characteristic Leaching Procedure
TPWP	Test Pit Work Plan
USACE	U.S. Army Corps of Engineers
USCS	Unified Soil Classification System
USGS	U.S. Geological Survey
USEPA	U.S. Environmental Protection Agency
UTM	Universal Transverse Mercator
VOC	Volatile Organic Compound
VOD	VOC of the Day

EXECUTIVE SUMMARY

The United States Army Corps of Engineers (USACE), under Site-Specific Environmental Restoration Contract (SSERC) No. DACW41-99-D-9001, has contracted Stone & Webster Environmental Technology & Services (Stone & Webster), a division of Stone & Webster Engineering Corporation, to perform remediation of the FUSRAP Maywood Superfund Site (FMSS), in Maywood, Lodi, and Rochelle Park, New Jersey (see Site Location Map, Figure 1). A soil processing demonstration project has been proposed in support of the remediation effort. These soil processing technologies offer promise in substantially reducing the volume of soil requiring disposal as radioactive waste.

A Soil Sorting/Soil Washing Technology Evaluation Report (TER - Ref. 7) was prepared to recommend soil processing systems and to perform an initial evaluation of the viability of implementing these technologies at the FMSS. As part of this evaluation, an economic assessment was prepared that compared the total remediation cost for the site utilizing a variety of technologies. Due to the uncertainties in some key variables, including the fraction of material below cleanup criteria and soil grain sizes, a parametric study was performed to examine the potential cost savings for a wide range of values for these parameters. The results of the parametric study indicated that the economics of performing volume reduction on the FMSS soils were viable for a wide range of conditions. Nevertheless, the need to minimize the uncertainties related to soil and radioisotope relationships was defined by SWEC and a limited test pit program was performed to address data gaps in the existing site information. Gathering this supplemental information is required to facilitate an evaluation of the applicability of the technology.

The test pit program was approved by USACE, and performed in August and September of 1999. This report presents the results of the Engineering Test Pits field program at the Maywood Interim Storage Site (MISS).

The objectives of the Engineering Test Pit Program were as follows:

- Provide an engineering correlation between data from the test pits and previous data, which was generated from soil borings.
- Assess assumptions made in the TER (Ref. 7) and based on the engineering correlation results provide data to revise key assumptions as required. This was intended to allow for a more accurate assessment of the potential performance of the technologies.
- Provide more accurate design basis input to system selection/sequencing, based on the engineering correlation.
- Provide more accurate design basis input to soil acquisition for the demonstration project, based on the engineering correlation.

The Engineering Test Pit Program was not intended to be a characterization of the MISS. Rather, it provides detailed information for a limited portion of the site. By carefully selecting the locations, however, and by grouping the results into site wide zones, it has become possible to extrapolate the data collected to apply to a larger area, consisting of the MISS, Stepan and Sears properties.

The specific sampling plan, design and execution program for the Engineering Test Pit Program is presented in Appendix A of this report. The test pit sampling and testing developed analytical profiles that captured the horizontal and vertical distribution of radioactivity, and chemical and physical properties of the soils at the test pit locations.

Analysis of the data leads to the following conclusions:

Engineering correlation with previous data:

- Based on previous and engineering test pit data, the soils at the MISS can generally be divided into the following zones: overburden, retention pond, surrounding, and lower. The lower zone soils (below the retention pond level) generally appear to be both radiologically and chemically uncontaminated.
- Chemical contamination is present in samples analyzed during previous investigations and in the soils excavated during the Engineering Test Pit Program. Levels exceed the New Jersey Soil Cleanup Criteria in sixteen of the thirty-nine composite samples collected. The chemical contamination observed during the Engineering Test Pit Program is similar to that observed in the previous investigations. Chemical contamination is not expected to impact pilot demonstration operations.
- The distribution of radiological contamination showed a high degree of heterogeneity within each zone. This was a new finding, which enhances potential benefits of the applicability of the soil sorting system.

Assess Technology Evaluation Report parameters:

- Key TER parameters were reevaluated based on the results of the Engineering Test Pit Program. Most significantly, the percentage of coarse material (greater than 3/8" diameter) decreased from thirty-five percent in the TER to fifteen percent based on actual conditions. Also, the "sorting potential" increased from fifty percent in the TER to sixty-five percent based on actual conditions. Sorting potential is defined as the percent of soil having radioactivity below the cleanup criteria that can be segregated using soil sorting. Since the values were specifically obtained for the pilot demonstration project, the confidence level in the revised values for these parameters has increased compared to the previous values. Even with the revised values, the results of the system evaluation fall within the bounds of the parametric study conducted as part of the TER.

Design Basis for system selection/sequencing:

- Consistent with the TER, a gravel separation system is proposed as the initial system for the pilot demonstration. This system is expected to remove fifteen percent of the process flow as greater than 3/8" diameter material. The use of finer screen sizes will be investigated as part of the pilot demonstration. Retention pond material however, should not be processed through the gravel separation system, due to the uniform fine-grained nature of the retention pond material.
- As recommended in the TER, a radiological sorting system is proposed as the second system. It will receive the soils processed by the gravel separation system, and will be the only system for processing retention pond materials. The sorting efficiency for the proposed system is estimated to be 50 to 80 percent removal, assuming a setpoint equivalent to a Sum-of-the-Ratios (SOR) of one. This sorting efficiency is based on the percentage of "cells" (5 foot by 5 foot by 1 foot grids) with an SOR less than one within a given zone.
- A soil washing system was initially proposed in the TER. Deployment of the soil washing system for the pilot demonstration has been canceled. Concerns which result from the test pit program include the high fines contents in the soil (average of forty percent fines in the non-retention pond material), and radiological contamination (SOR greater than one) in the intermediate sand fractions (between #4 and #200 sieve).

Design Basis for soil acquisition:

- The soil for the demonstration project is proposed to be acquired from the area west of Building 76. This area has a combination of radioactive and chemical contamination, soil types, and accessibility, which are both representative of the overall site and likely to be processed effectively. Overburden, surrounding, and retention pond material will be excavated and processed. A soil pile at the MISS, which originated from the Stepan Company will also be processed.

In conclusion, given the data collected during the Engineering Test Pit Program, the economics of performing on-site volume reduction remain favorable. In addition to volume reduction, it is believed the system will assist in managing materials so that material unsuitable for on-site reuse may be disposed of at the most economical and appropriate location.

1. INTRODUCTION

The United States Army Corps of Engineers (USACE), under Site-Specific Environmental Restoration Contract (SSERC) No. DACW41-99-D-9001, has contracted Stone & Webster Environmental Technology & Services (Stone & Webster), a division of Stone & Webster Engineering Corporation, to perform remediation of the FUSRAP Maywood Superfund Site (FMSS), in Maywood, Lodi, and Rochelle Park, New Jersey (Figure 1). As discussed in the Pilot Demonstration Work Plan Overview in Volume 1, gravel separation and radiological soil sorting technologies offer promise in substantially reducing the volume of soil requiring disposal as radioactive waste. A pilot study, involving the demonstration of these technologies utilizing two separate processing systems, is proposed to be carried out at the Maywood Interim Storage Site (MISS) to further evaluate the viability of full-scale implementation of the technologies at the FMSS.

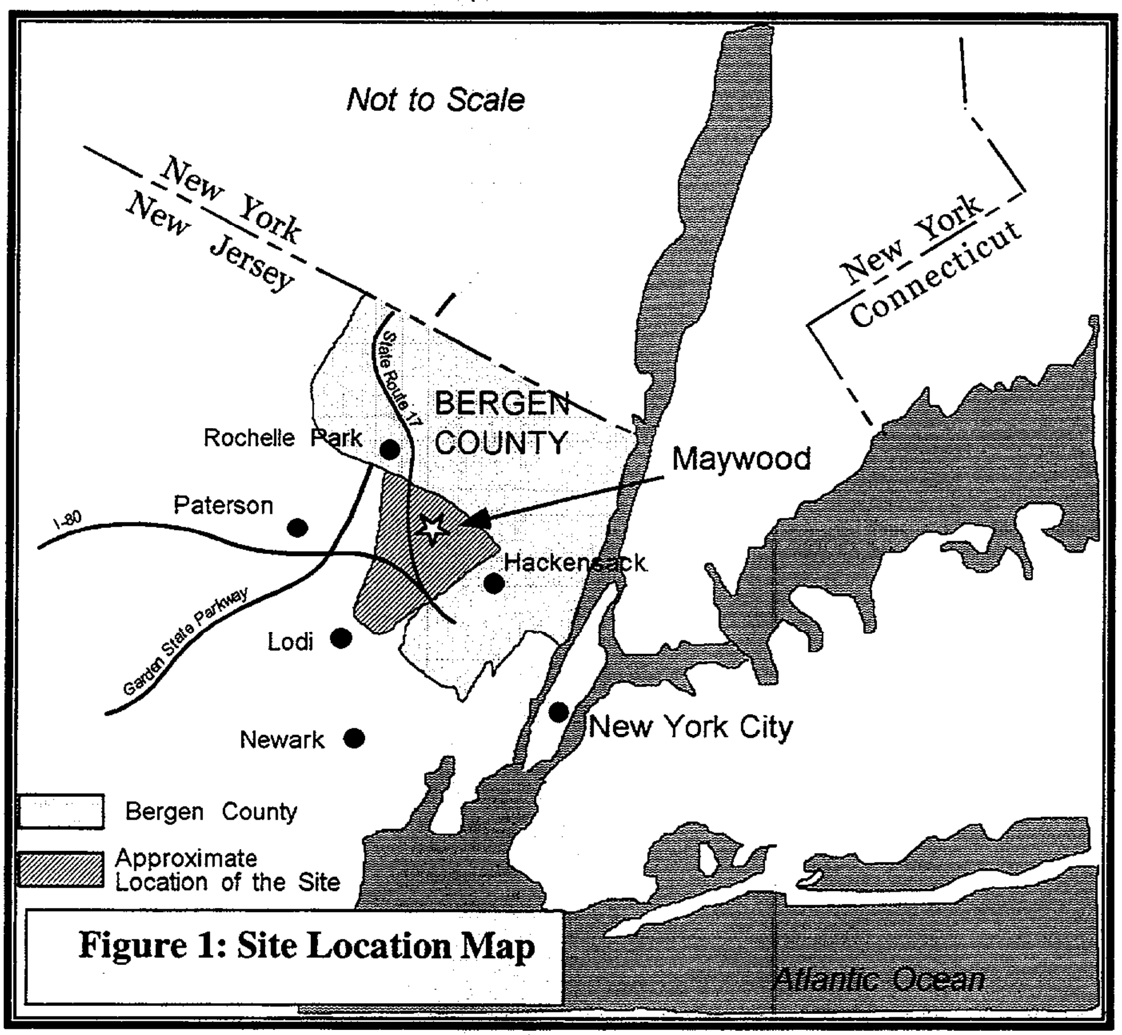


Figure 1: Site Location Map

The objective of this pilot demonstration is to demonstrate the operational, technical and economic feasibility of applying particle separation and radiological sorting to the soils at the FUSRAP Maywood Superfund Site.

1.1 Report Organization

This report presents the results of the Engineering Test Pits Program at MISS. The main body of this report describes the work performed, the field results, laboratory results, conclusions, and potential impact on the Pilot Plant. The appendices contain a description of the field program, field and laboratory data reports and narratives, and other supplemental information.

The Engineering Test Pits at MISS Report is a component of the Pilot Demonstration Work Plan. Table 1 contains a brief description of the contents of each of the different volumes included in the plan.

Table 1: Pilot Demonstration Work Plan Outline

Volume	Section/Title	Description
1	Overview	Provides description and justification for overall effort. Provides a summary of the work plan and road map to associated volumes. Presents the elements of the Pilot Demonstration Report.
2	Soil Acquisition Work Plan and Pilot Plant Pad Design	Provides design and detailed drawings for the host site pad. Provides description, drawings and staging for the soil acquisition effort, including excavation stabilization plan and procedures.
	Processed Material Soil Reuse Evaluation Plan	Evaluates the potential for reusing soil on the FMSS. Soil reuse is not proposed for the pilot demonstration.
3	Pilot Plant Operation Plan	Contains technical details and operational procedures for the pilot plant.
	Attachment A: Gravel Separation System	This information, supplied by the gravel separation system vendor, provides equipment mobilization, safety and health, system operation and maintenance information.
	Attachment B: Radiological Sorting System	This information, supplied by the radiological sorting system vendor provides equipment mobilization, safety and health, system operation and maintenance information.
4	Sampling and Analysis Plan	The Sampling and Analysis Plan implements the project Chemical Data Quality Management Plan, and provides the details on frequency, parameters, and locations for all sampling under the Pilot Demonstration. This includes the soil acquisition, pilot plant operation, and soil acquisition completion survey of the soil acquisition area.
	Construction Quality Control Plan	This plan details how the project Contractor Quality Control Plan will be implemented on this task.
	Safety and Health Plan	This plan implements the project Site Safety and Health Plan and provides the task-specific safety and health considerations.
5	Results of Engineering Test Pits Program at MISS	This volume reports the results of the Engineering Test Pits at MISS program, which was performed as a precursor to the pilot demonstration.

1.2 Background

As stated in Volume 1 – Overview, waste volume reduction is a national initiative for all remediation projects and has been a stated objective at the FMSS since the project was initiated. In support of this initiative, Stone & Webster has performed the following tasks:

- Reviewed previous laboratory, bench, and pilot treatability studies performed on Maywood soils. The majority of the soils used in the studies were collected during the subsurface investigation phase of the Remedial Investigation. The soils consisted of drill cuttings from subsurface drilling (hollow stem auger), excess soil from subsurface sampling, and special bulk sampling. The treatability studies primarily looked at the performance of soil washing.

- Performed an evaluation of proven and available technologies appropriate for a pilot demonstration at Maywood (TER, Ref. 7). The efforts focused on particle size separation since the earlier treatability studies on those technologies reported promising results. In addition, we evaluated radiological separation, a process that continuously assays a soil stream and directs soil that exceeds a selected threshold activity level to a "contaminated" stockpile. The remaining soil with radioactivity less than the selected threshold value is directed to a "non-contaminated" stockpile. Radiological separation is effective when the contamination is not homogeneously distributed in the soil mass. That is, within a given volume of soil there is likely to be measurable soil volume that is below the cleanup criteria as well as soil that exceeds the cleanup criteria.

- As part of this evaluation, an economic assessment was prepared which compared the total remediation cost for the site utilizing a variety of technologies. Due to the uncertainties in some key variables, including fraction of material below cleanup criteria and soil grain sizes, a parametric study was performed which examined the potential cost savings for a wide range of values for these parameters. The results of the parametric study indicated that the economics of performing volume reduction on the FMSS soils were viable for a wide range of conditions.

It became clear from the results of the tasks described above that the performance of volume reduction systems, specifically particle separation and radiological separation, will be governed by the physical characteristics of the soil (particle size distribution) and the distribution of the radiological contamination (degree of heterogeneity). As part of the effort to identify appropriate volume reduction systems for pilot demonstration at Maywood, Stone & Webster reviewed available site data to further evaluate the soil characteristics that will impact the performance of the selected technologies. The Soils Grouping Report (Ref. 9), which evaluated all previously collected subsurface data, was the principal source of information reviewed. The Soils Grouping Report suggested that the soils at the MISS, Stepan Chemical and Sears properties were similar and could be grouped into identifiable units (such as overburden, retention pond material, and surrounding soils). The Soils Grouping Report did not, however, contain enough detailed information on these soil groups to thoroughly evaluate the potential effectiveness of the systems proposed in the Technology Evaluation Report nor did that report have specific soil characteristics and contaminant distribution detail needed to assess the performance of volume reduction systems.

In order to develop a better understanding of the soil group characteristics, an engineering test pit plan was developed. The focus of the plan was to gather data to:

1) classify soil groups based on bulk physical characteristics, and
2) evaluate the degree of heterogeneity of the radiological contamination within the soil groups.

With the resultant data, Stone & Webster would then be able to more accurately judge the potential effectiveness of volume reduction for a large portion of the Maywood site. Specifically, that large portion could include the MISS, Stepan, and Sears properties, which represent approximately seventy percent of the potentially contaminated soils at the FUSRAP Maywood Superfund Site. Based on the observations made in the Soils Grouping Report, soil characteristics from the MISS property are transferable to the remaining two adjacent properties (Stepan and Sears). MISS was selected as the location for the engineering test pits because of convenient site access and the representativeness of the MISS soils.

1.3 Objectives

The objective of this report on the Engineering Test Pits at MISS is to present the information that was gathered during the field investigations, and to interpret those results with respect to their potential influence on the operation of the pilot plant. The Engineering Test Pit Program was executed under Stone & Webster's Final Work plan – Engineering Test Pits at MISS (TPWP, Ref. 1). The TPWP provided the task-specific information related to the performance of the subject field program, and invoked the Chemical Data Quality Management Plan (CDQMP, Ref. 2), Contractor Quality Control Plan (CQCP, Ref. 3), the Materials Handling/Transport, and Disposal Plan (MHTDP, Ref. 4), the Site Safety and Health Plan (SSHP, Ref. 5), and the General Environmental Protection Plan (GEPP, Ref. 6) by reference.

The objectives of the Engineering Test Pit Program were as follows:

- Provide an engineering correlation between data from the test pits and previous data, which was generated from soil borings.
- Assess assumptions made in theTER based on the engineering correlation results and provide data to revise key assumptions as required. This was intended to allow for a more accurate assessment of the feasibility of the technologies.
- Provide more accurate design basis input to system selection/sequencing, based on the engineering correlation.
- Provide more accurate design basis input to soil acquisition for the Pilot Plant, based on the engineering correlation.

The Engineering Test Pit Program was not intended to be a characterization of the MISS. It provides detailed information for a limited portion of the site. By carefully selecting the locations, however, and by grouping the results into site wide zones, it is possible to extrapolate the data collected to apply to an area consisting of the MISS, Stepan and Sears. This is sufficient for the purposes of evaluating the potential effectiveness of the proposed processing systems.

1.4 Approach

The execution of the Engineering Test Pit Program is presented in Appendix A of this report. The intended purpose of the test pit sampling and testing was to develop analytical profiles that captured the horizontal and vertical distribution of radioactivity, and chemical and physical properties of the soils. Since the objective was to establish approximate engineering correlations of radiological, chemical, and physical variability, statistical sampling was not used for the test pit sampling.

The Stone & Webster Field Operations Leader (FOL) directed the Field Team during excavations of the rough pits and engineered test pits. The Stone & Webster Sample Coordinator (SC) organized, directed and provided oversight for the sampling performed during the test pit program. Refer to Figure 2 for the task organization chart.

For each pit identified in the Work Plan, rough pits were excavated to locate the boundary between the retention pond material and the surrounding soil. The rough pits were used to evaluate groundwater depth as well as depth and magnitude of radiological contamination and in most cased the rough pits were excavated deeper that the engineering pits. After an evaluation by the FOL, the Field Team constructed engineered pits adjacent to the rough pits, as indicated in Appendix A.

The following tables provide a brief description of the rough pits. Upon completion of the scheduled rough and engineering test pits, two additional rough pits, AS-R6 and AS-R7, were excavated in the existing radioactive materials area (RMA) near retention ponds A and B (refer to Figure 8). The additional rough pits were located in areas not associated with any of the retention ponds. These additional pits were excavated as a means to gather information about soil types that *are not* associated with any of the retention pond but may be representative of overburden and surrounding soils in other areas of the FMSS. More detailed information concerning the pits is located in Appendix A and in Figures 3 to 8. The observations made in the additional scope rough pits confirmed the trends, which had been seen in the non-retention pond areas of other excavations.

Table 2 - Rough Pit Excavations				
Retention Pond	**Rough Pits**	**Depth (ft bgs)**	**Depth to Groundwater (ft bgs)**	**Figure**
A	1A	9	NE	3
	1B	12	NE	3
B	2A	22	18	4
	2B	13	NE	4
C	3A	14	NE	5
	3B	14	13	5
E	4A	4	NE	6
	4B	12	10	6
N/A	AS-R6	5	NE	8
N/A	AS-R7	7	NE	8
NE: Not Encountered bgs – below grade surface				

Engineering Test Pits were excavated as follows:

Table 3 - Engineering Test Pit Excavations					
Test Pit	**Location**	**Length (ft.)**	**Depth (ft. bgs)**	**Bottom of Pond (ft. bgs)**	**Figure**
TP-1	Retention Pond A	25	9	6	3
TP-2	Retention Pond B	30	10	8	4
TP-3	Retention Pond C	25	10	8	5
TP-4	Retention Pond E	25	9	7	6
TP-5	Building 76	15	10	NA	7
bgs – below grade surface					

Sampling and Field Screening

Prior to each engineered pit excavation, the FOL and SC reviewed data gathered during the rough pit excavation and planned the extent of the engineered pit, as well as the amount of samples required to support the Work Plan. Based on the extent of the excavation, a vertical grid system and preliminary zone profile were developed. The SC prepared the required material for the sampling effort, including necessary sampling containers and sampling equipment.

Each test pit was excavated in 1-foot cuts. The Field Team collected samples for each 5-foot length of the cut in accordance with the construction and sampling sequence presented the Work Plan. Each 1-foot by 5-foot cut comprised a "grid" in the overall engineered pit profile.

During the course of the excavation of each engineered pit, the Field Team collected chemical and radiological samples from each grid. Grid samples were analyzed as described in Table 4. Details on the sampling are provided in Appendix A.

Table 4 - Field Sampling Equipment and Analytical Procedures – Grid Samples

Parameter	Equipment/Container	Analytical Procedures
Volatile Organic Compounds	Plastic Syringe	One VOC sample per zone and one sample, corresponding to highest headspace, extracted in methanol and submitted to laboratory for analysis by EPA method SW 846 8260
Headspace	8 oz. glass jar with Teflon lined cap, aluminum foil inner seal, PID using Mini-Rae hand held field analyzer (10.6 eV bulb)	Partially fill glass jar with soil, cover with foil and cap. Allow to develop for 5 minutes in warm environment. Puncture foil with PID probe, record peak Reading.
G-M scan on excavator bucket	Geiger-Mueller tube (H-P 260 Probe coupled with Ludlum Model 2221 ratemeter/scaler)	Perform scan on excavator bucket
Volatile Organic Scan	Mini-Rae PID hand held field analyzer (10.6 eV bulb)	Perform scan on excavator bucket
Gross Gamma Count	NaI Scan – Eberline SPA-3 2x2 NaI detector coupled with Ludlum Model 2221 ratemeter/scaler)	Perform scan on top surface of 5-gallon pail containing sample from grid

After completion of each engineered pit excavation, the FOL and SC determined the allocation of each grid into the various compositing zones. The zone boundaries were selected based on field screening measurements and visual observations made during the course of the excavation. Zone composites were classified into one of nine different zones using the following system

Table 5 - Zone Compositing

Retention Pond Overburden (REOV)	Transition Overburden (TROV)	Surrounding Overburden (SUOV)
Retention Pond Upper (REUP)	Transition Upper (TRUP)	Surrounding Upper (SUUP)
Retention Pond Lower (RELO)	Transition Lower (TRLO)	Surrounding Lower (SULO)

For the Non-Retention Pond Test Pit, one composite sample each was prepared for the Overburden (0 to 2 feet bgs), Upper (2 to 5 feet bgs), and Lower (5 feet bgs to the lower limit of contamination or the groundwater table) zones.

The composite samples were comprised of an aliquot of soil from each grid within a particular zone, with the exception of the VOC samples. Due to the nature of VOC samples, compositing of VOC samples would destroy the samples' integrity. Therefore, a VOC sample representative of each zone was selected by the SC based on the headspace measurements taken during the excavation. Additionally, a VOC sample corresponding to the highest measured headspace reading for each test pit was also taken.

The field team composited samples for each zone, as described in the table below:

Table 6
Field Sampling Equipment and Analytical Procedures – Composite Samples

Parameter	Equipment/Container	Analytical Procedures
Chemical Samples		
Semi-Volatile Organic Compounds	1 Liter widemouth glass jar with Teflon lined cap	SW 846 3550B/8270C
Pesticides	Same container as SVOC	SW 846 3550B/8081A
PCBs	Same container as SVOC	SW 846 3550B/8082
PP-13 Metals	Same container as SVOC	SW 846 3050/6010B, 7471A
Volatile Organic Compounds	2 oz. Septum jar with methanol preservative	SW 846 5035/8260B
% Solids	50 mL plastic bottle	ASTM D2216
Geotechnical Samples		
Grain Size	5 gallon pail	ASTM D422, D136, D2487
Hydrometer Test	5 gallon pail	ASTM D422
Specific Gravity	5 gallon pail	ASTM D854
Radiological Samples		
Specific Activity - Thorium 232, Radium 228, Uranium 238	500 mL Marinelli (composites) Petri-dish (for analysis of grain-size fractions)	Gamma Spectroscopy using Canberra GC3020 detector, GENII-2000 software

Some geotechnical analyses, which were specified in the work plan (Ref. 1), were not performed. Atterberg limits tests were not performed on any samples because all the material encountered was non-plastic (no clays). As a result of the Atterberg limits not being performed, ASTM D2487, "Classification of Soils," which requires Atterberg limits, was not performed. Unified soil classification (USC) was also not performed. The original intent of this was to aid in determining the retention pond boundary. This boundary was readily apparent based on visual observations (refer to test pit picture in Section 2), and therefore USC was not necessary. No moisture contents were determined because the natural water content was altered when water was used for dust control. There is no reasonable way to separate or estimate the water used or added for dust control. The moisture content of the samples would not be indicative of the natural water content.

As a result of the field measurements and sampling performed, the radiological, chemical and geotechnical characteristics of soils at the MISS were developed.

2. FIELD INVESTIGATION RESULTS

This report summarizes the radiological results in terms of the Sum of the Rations (SOR), which is calculated by comparing the concentrations of the contaminants of concern to their individual criteria. The target cleanup criteria (action levels) for radiologically contaminated soils are defined as follows:

$$\text{Sum of the Ratios (SOR)} = \frac{\text{Th-232 concentration - Bkg}}{\text{Th-232 action level}} + \frac{\text{Ra-226 concentration - Bkg}}{\text{Ra-226 action level}} + \frac{\text{U-238 concentration - Bkg}}{\text{U-238 action level}} < 1$$

For surface soils (top six inches) at all properties, the action level of Th-232 and Ra-226 is 5 pCi/g. The action level is 15 pCi/g for Th-232 and Ra-226 for subsurface soil at the MISS and Stepan properties. The action level for U-238 is 50 pCi/g, regardless of depth or location. All comparisons at the MISS are to an SOR calculated based on 15 pCi/g, since clean overburden will be supplied across the site. The SOR values in this report do not subtract out background levels. Subtracting the currently utilized background levels would reduce all calculated SORs by approximately 0.17. Not accounting for background is, therefore, conservative.

The general results of the field investigation are presented below.

2.1 Physical Results

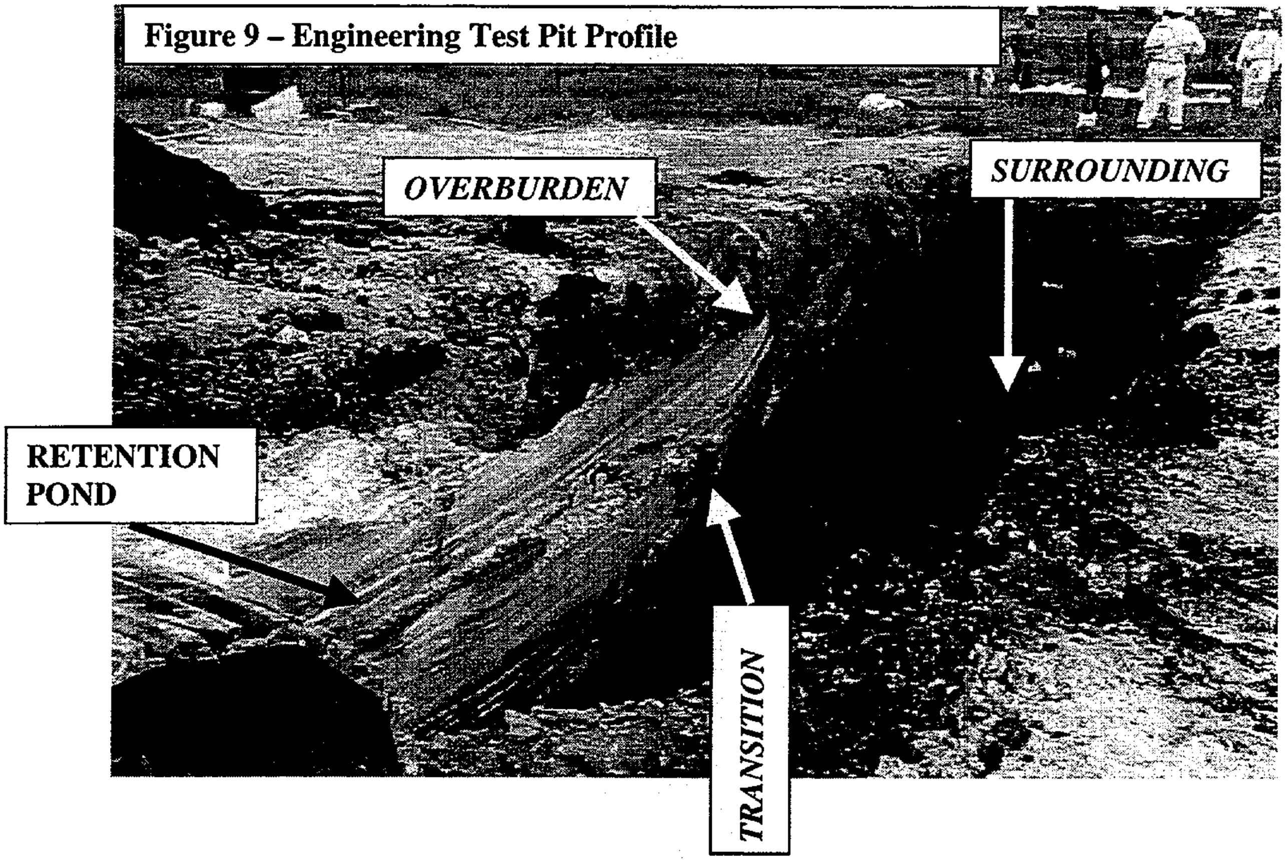
Throughout the test pit excavations, a discernible "overburden" zone was observed. This zone generally varied in depth from six inches to 3 feet. Below the zone, either retention pond material or surrounding material (e.g. – non-retention pond material) was encountered. The transition between retention pond and surrounding material was very distinct, resulting in a narrow "transition" zone. Underlying the retention pond material and surrounding soils was typically a native sand and sandstone. This material was classified as the "lower" zone. Graphically, a typical cross-section at the edge of the retention ponds reveals the following zones.

Typical Excavation Cross-Section

Overburden		
Retention Pond	**Transition**	**Surrounding**
Lower		

These zones can be observed in the photograph below (Figure 9), which shows the profile of Engineering Test Pit 3.

Figure 9 – Engineering Test Pit Profile



For the non-retention pond Test Pit (Test Pit 5) overburden, surrounding and lower zones were observed.

Geotechnical analyses were performed on composite samples from each of the zones identified in section 1.4. The overburden and surrounding soils had an arithmetic mean of fifteen percent coarse (greater than 3/8" diameter) soils, and an arithmetic mean of forty percent silt sized fines (passing #200 sieve). The retention pond soils had an arithmetic mean of five percent coarse (greater than 3/8" diameter) soils, and seventy percent fines (passing #200 sieve).

A detailed discussion of the physical results is provided in Appendix C.

2.2 Radiological Results

Radiological field screening was performed on each cell as the test pits were excavated. Radiological analyses (gamma spectroscopy) were performed on composite samples from each of the zones identified in section 1.4, and on the geotechnical split samples from each zone.

In general, the overburden material exceeds the SOR criterion most often. Retention pond (upper) and surrounding soil (upper) also exceed the SOR criterion in several instances.

In examining the SORs of the grave, sand, and silt fractions, it is observed that the gravel fraction, >1/4 inch, (retained on #4 sieve) is typically below the SOR criterion, with the exception of Test Pit 4 / Retention Pond E. The fines fractions (silt) almost all exceed the SOR criterion. The sand fraction, #4 sieve to #200 sieve, also appear to exceed the SOR criterion on a regular basis. It should be noted that the radiological results in this range are estimated high due to the small sample volume and corresponding high minimum detectable activity (MDA).

A detailed discussion of the radiological results is provided in Appendix D. SORs for each composite sample are presented in Figures 3 – 7. SORs on the grain size fractions are summarized in Section 4.2.

2.3 Chemical Results

Chemical contamination exceeding the New Jersey DEP Non-residential Soil Cleanup Criteria (SCC) was found in the overburden of all of the engineering test pits except for Test Pit 5. Chemical exceedances include arsenic, beryllium, thallium, copper, bis(2-chloroethyl) ether, benzo(a)pyrene, benzene, toluene, dieldrin, and lindane (gamma-BHC). Exceedances were encountered in sixteen of the thirty-nine zones investigated. Excluding the generally uncontaminated "lower" zones, sixteen of twenty-six zones had exceedances of the NJ Non-residential SCC. Arsenic contamination was the most common exceedance. Arsenic levels exceed the NJ Non-residential SCC in the overburden of Test Pits 1, 2, 3 and 4. Test Pit 5 had a Toluene concentration exceeding the SCC criteria in the "upper" zone.

Chemical results are summarized below in Table 7. Table 7 presents the exceedances of the NJ Non-residential SCC for each test pit. The zone in which the exceedance was encountered is also listed. In cases where there were multiple zones that exceeded the NJ Non-residential SCC within a single test pit, only the highest level is listed. A detailed discussion of the chemical results is provided in Appendix E.

Table 7 – Chemical Results Summary – Exceedances of NJ SCC

Contaminant	NJ SCC (Non-residential) (mg/kg)	Test Pit 1 (mg/kg)	Test Pit 2 (mg/kg)	Test Pit 3 (mg/kg)	Test Pit 4 (mg/kg)	Test Pit 5 (mg/kg)
Arsenic	20	37.3 (REUP)*	24.3 (TRUP)	90.9 (TRUP)	110 (TROV)	N/A
Beryllium	2	N/A**	N/A	2.32 (REOV)	3.15 (SUOV)	N/A
Thallium	2	N/A	N/A	N/A	4.48 (SUOV)	N/A
Copper	600	N/A	962 (TRUP)	N/A	N/A	889 (UPER)
Bis(2-choro-ethyl)ether	3	N/A	48 (TRUP)	N/A	N/A	N/A
Benzo(a) pyrene	0.66	0.74 (SUOV)	0.92 (SUOV)	N/A	N/A	N/A
Benzene	13	N/A	N/A	N/A	N/A	380 (UPER)
Toluene	1,000	N/A	N/A	N/A	N/A	73,000 (UPER)
Dieldrin	0.18	N/A	N/A	19 (SUOV)	N/A	N/A
Lindane	2.2	N/A	N/A	51 (SUOV)		N/A

* Zone in which maximum concentration in Test Pit was encountered
** N/A – Not Applicable. No exceedances in Test Pit for this contaminant.

3. CORRELATIONS WITH PREVIOUS DATA

The Engineering Test Pit Program collected geotechnical, chemical and radiological data from five areas at the MISS. This new data set supplements information that had been collected during the previous Remedial Investigation of the MISS, as well as other studies. The sections below compare the findings of the Engineering Test Pits at MISS program with previously collected data.

3.1 Data Sources

Radiological, chemical and geotechnical characteristics of soils for the MISS were compiled from existing documentation found in the Maywood Administrative Record. Previously collected data is in the form of analytical chemical sampling results, downhole gamma logging counts, and geologic borehole logs. The following documents are the primary sources of information used in the correlation:

- Engineering Test Pit Data from the MISS (this report)
- The Final Maywood Soils Grouping Report, SAIC, January 1998 (Ref. 9)
- Final Remedial Investigation Report, Stepan Company Property, CH2M Hill, November 1994 (Ref. 11)
- Remedial Investigation Report for the Maywood Site, Bechtel, December 1992 (Ref. 12)
- Characterization Report for the Maywood Interim Storage Site, Bechtel, June 1987 (Ref. 13)

An earlier test pit program (Reference 11) had been performed for the Stepan Company to investigate magnetic anomalies identified during previous surface geophysics investigations. Since the program focused on soils in disposal pits, and did not sample soil from areas adjacent to the disposal pits, the information was considered biased and was not considered applicable for correlation with data collected during the MISS Engineering Test Pit Program. Nevertheless, soil descriptions in the test pit logs are not inconsistent with soils data from the "Soils Grouping Report" (Ref. 9).

3.2 Methodology

Previously defined soil characteristics for the MISS were obtained from geologic borehole logs. These logs provided visual classifications of the soils identified during drilling activities. Typically, these boring logs did not specifically identify relative percentages of gravel, silt or clay. Downhole gamma logging results were not associated with any identifiable soil types. Rather, the gamma counts were recorded relative to depth from the surface.

The following approach was used in the correlation of engineering test pit data to data from previous investigations: First, a comparison is made between previously generated data for soils in the vicinity of the test pits and the test pit data. The intent of this comparison is to establish whether there is a similarity between the trends found in each data set. Both data sets were analyzed for general trends in terms of soil groupings, radiological contamination and chemical contamination. These trends were then compared to observe whether they were mutually supportive. Presumably, any similarities between the two data sets will validate any trends. Second, a comparison is made between the trends found in soils in the vicinity of the test pits and the soil characteristics of the rest of the site.

3.3 Trends in Soil Characteristics

3.3.1 Areal Distribution and Thickness

For soils in the vicinity of the test pits, there is *agreement* between spatial relationships (i.e., soil groups and zones) identified in the geologic boring logs from the previous investigations and the test pit data. The overall pattern of soils is consistent with distinct overburden, upper and lower layers of soils.

Throughout the test pit excavations, a discernible "overburden" layer was observed. This layer generally varies in depth from six inches to 3 feet. However, in some areas such as Test Pit 3, an overburden was not present above the retention pond material. Underlying the overburden located outside the retention ponds, another layer of fill material is found. This layer is approximately 3 to 4 feet in depth and was classified as "Upper" material. Below this material, dark red, or reddish brown sandstone and sand was found. This material was classified as "Lower".

3.3.2 Radiological Contamination

Trends in gamma counts for downhole gamma logs *agree* with engineering test pit sodium iodide measurements. Elevated gamma counts are found primarily in the overburden and upper zones, with measurements falling to background or below background in the lower region soils. The downhole gamma logs also show radiological contamination, which has been interpreted as discrete bands of continuous contamination. However, due to the nature of the downhole gamma logging method, the measured radiological contamination may be indicative of hot spots rather than widespread contamination. By its nature, downhole gamma logging "sees" a wider section of soil (up to a few feet in each direction). A single hot spot could appear to be a much wider area of contamination due to the distance at which the hot spot is "seen" by the detector. During the engineering test pits, sodium iodide scans were performed on samples collected from discrete 1-foot intervals. The result therefore corresponds to the interval at which the sample was collected.

3.3.3 Chemical Contamination

Chemical sampling data from previous remedial investigations was reviewed and compared to chemical contaminants in the test pit data that exceed soil screening criteria. Chemical contamination exceeding the New Jersey DEP Non-residential Soil Cleanup Criteria (SCC) was found in the overburden of all of the engineering test pits except for Test Pit 5. Chemical exceedances include arsenic, beryllium, thallium, copper, bis(2-chloroethyl) ether, benzo(a)pyrene, benzene, toluene, dieldrin, and lindane (gamma-BHC). Arsenic contamination was the most common exceedance. Arsenic levels exceed NJ DEP Non-residential SCC levels in the overburden of Test Pits 1, 2, 3 and 4. Test Pit 5 had a Toluene concentration exceeding screening criteria in the "upper" zone. Table 7 presents a summary of the exceedances of the NJ Non-residential SCC encountered during the test pit program.

No direct correlation was found in the frequency or location of contamination between the two data sets. However, chemical exceedances for arsenic and chromium contamination were documented during previous remedial investigations.

Chemical contamination appears to occur independently of soil type and soil depth.

3.3.4 Predictability of Characteristics within Zones

Review of both data groups at the MISS shows that it *is difficult to predict* the characteristics of soils. *Contamination distribution is indicative of random dumping and irregular deposition in the retention ponds.*

The grain size distribution of the pond material is consistent uniform fine. The retention pond material does contain varying quantities of coarse material. Outside the retention ponds, the test pit excavations encountered many areas of isolated pockets of gravel or debris. Debris unearthed during the test pit program included construction material (bricks, concrete fragments, lumber), shingles, metal ware, laboratory equipment, 55 gallon drums and piping.

Radiological contamination does not exist in large definable areas or bands of contamination. Rather, discrete areas of radiological exceedances were found in both Engineering Test Pit Program and earlier soil boring investigations. Mapping of radiological measurements for the test pit grid locations reveals that pockets of contamination are found next to grids where measurements are below background levels.

Similarly, chemical contamination exceeding soil screening levels also occurs as hot spots and contaminant concentrations vary. While the test pit data shows that chemical contamination exceedances appear primarily in the overburden and upper sections, chemical data from soil samples collected from previous test borings indicate that the chemical contamination also occurs in the lower soils zones. Chemical contaminants were frequently identified in areas of low (below SOR=1 criteria) radiological contamination.

Table 8, below, presents a listing of zones with chemical contamination in excess of the NJ DEP Non-residential SCC, and the corresponding SOR for that zone. As can be seen, there is no direct correlation between chemical and radiological contamination levels.

Table 8 – Chemical Exceedances and Corresponding SOR			
Test Pit	**Zone**	**Contaminants which Exceed NJ SCC**	**SOR***
1	REUP	Arsenic	0.17
1	SUOV	Arsenic, Benzo(a)pyrene	0.57
2	REOV	Bis(2-chloroethyl)ether	0.47
2	**REUP**	**Bis(2-chloroethyl)ether**	**1.09**
2	SUOV	Benzo(a)pyrene	0.87
2	**SUUP**	**Bis(2-chloroethyl)ether**	**1.06**
2	TRUP	Arsenic, Bis(2-chloroethyl)ether, Copper	0.87
3	**SUOV**	**Arsenic, Beryllium, Lindane, Dieldrin**	**1.45**
3	SUUP	Arsenic, Lindane	0.90
3	**TROV**	**Arsenic**	**1.51**
3	**TRUP**	**Arsenic**	**10.0**
4	**REOV**	**Arsenic, Thallium**	**44.4**
4	**REUP**	**Arsenic, Beryllium, Thallium**	**17.7**
4	**SUOV**	**Arsenic, Beryllium, Thallium**	**49.1**
4	**TROV**	**Arsenic, Beryllium, Thallium**	**101**
5	UPER	Benzene, Toluene, Copper	0.96
* SOR based on criteria of 15 pCi/g Th-232, 15 pCi/g Ra-226 and 50 pCi/g U-238 Zones with chemical exceedances of the NJ Non-residential SCC and SORs in excess of 1 are shaded.			

Note that several zones were found to have SORs greater than one, but had no chemical exceedances of the NJ Non-residential SCC. These zones are listed in Table 9, below:

Table 9 – Zones with No Exceedances of NJ SCC and SOR Greater than One		
Test Pit	**Zone**	**SOR***
2	TROV	1.03
3	REUP	1.05
4	SUUP	5.43
4	TRLO	1.23
5	OVER	1.61
* SOR based on criteria of 15 pCi/g Th-232, 15 pCi/g Ra-226 and 50 pCi/g U-238		

4. DESIGN BASIS FOR PILOT DEMONSTRATION

4.1 Soil Acquisition for the Pilot Plant

Based on an evaluation of the results of the test pit program, as well as additional factors such as overall site plan, access, and reuse, it is proposed that this soil be obtained from the following areas:

1. Onsite Soil Stockpile – Soil from the Stepan Company property which was excavated for the installation of a tank farm. This soil is reported by the Stepan Company to be radiologically contaminated. Processing of this soil will provide a correlation between soils from the MISS and from other properties. Depending on results of surveys to be performed on the Stepan soil pile during the pilot demonstration, the soil will be processed through both gravel separation and radiological sorting. The exact source of this soil will be determined prior to processing. Processing of this soil establishes a firm basis for extending the results of the pilot demonstration beyond the MISS and onto Stepan and Sears.

2. Overburden and Surrounding Soils – Soil from the area west of Building 76 to Retention Pond A. It is believed that the non-retention pond material from this area is representative of the bulk of the Maywood soil. The soil will be processed through the gravel separation and radiological sort equipment. Processing of this material will demonstrate the effectiveness of the process systems on the bulk of the soil present at the FMSS.

3. Retention Pond Material – Soil from the Retention Pond A area. Retention pond material constitutes a large fraction of the material on the MISS. Pond A is believe to be representative of the bulk of the retention pond material at MISS and its location is convenient for soil acquisition activities. Radiological sorting is the only option open for this material. Processing this material will demonstrate the effectiveness of sorting the below criteria soils (SOR<1) from the radiologically contaminated pond materials.

The pilot demonstration will process soil from the area defined in the Soil Acquisition Work Plan and Pilot Plant Pad Design, located in Volume 2. Further details on the soil acquisition for the pilot demonstration are provided in Volume 2.

4.2 Soil Processing

4.2.1 Radiological

The primary indicator of potential success of a radiological sorting system is the degree of heterogeneity of the site soils (e.g., the contamination is located in discrete intervals, and is not blended.) The degree of heterogeneity can be observed by examining the "Gross Counts Radiological Field Results" on Figures 3 (Test Pit 1), 4 (Test Pit 2), 5 (Test Pit 3), 6 (Test Pit 4), and 7 (Test Pit 5).

Some areas have rather uniform gross gamma counts, such as Test Pit 1, which is uniformly rather low, with a range of 14,000-21,000 cpm. Test Pit 4 displays heterogeneity, but the levels are all quite elevated. Other test pits exhibit significant heterogeneity, spread across the cleanup criteria level, as described below.

4.2.1.1 Overburden

Several overburden composite samples exceed the SOR criterion of 1. These samples include Test Pit 2 – TROV; Test Pit 3 - TROV, SUOV; and Test Pit 5 – OVER (refer to Figure 7). Examination of the gross gamma counts in each of these zones indicates a spread of radioactivity levels, which *would be conducive to radiological sorting.*

For example, in Test Pit 5 where the SOR is 1.61, the radioactivity levels range from 20,000 cpm to 62,000 cpm. It is likely that the samples from the top foot (NaI readings of 32,000 cpm, 34,000 cpm and 62,000 cpm) would exceed the SOR criterion, while the samples from the second foot (NaI readings of 20,000 cpm, 24,000 cpm and 23,000 cpm) would be below the SOR criterion. While it may be impractical to excavate at one-foot cuts for the remediation effort, a radiological sorting system could separate out material that is above the criterion versus material that is below the criterion. For this example (Test Pit 5 overburden), a "sorting potential" of 3/6, or 50 percent, is indicated. "Sorting potential" represents the percent of material, which would be determined as being below the SOR criterion when passed through a radiological sorting system, such as the system proposed for the pilot demonstration.

4.2.1.2 Retention Pond Material

The composite SORs for retention pond material in both Test Pits 2 and 3 exceed the criterion (i.e., 1.09 for Test Pit 2, 1.39 for Test Pit 3). Similar to the case for the overburden, examination of the gross gamma counts in each of these zones indicates a range of radioactivity levels, which would be conducive to sorting.

Gross gamma levels in Test Pit 2 Retention Pond material range from 17,000 cpm to 50,000 cpm (refer to Figure 4). The composite consists of thirty cells. Of these thirty cells, ten or 1/3, likely exceed the SOR criterion on an individual basis. The remaining twenty cells would then be below the SOR criterion. The "sorting potential" for this zone is therefore 20/30, or 67 percent.

Similarly for Test Pit 3 (Figure 5), where the retention pond zone consists of nineteen cells, the gross gamma counts range from 23,000 cpm to 50,000 cpm. Of these nineteen cells, four or twenty-one percent, likely exceed the SOR criterion on an individual basis. The remaining fifteen cells are likely below the SOR criterion. The "sorting potential" for this zone is therefore 15/19, or 79 percent.

4.2.1.3 Transition Material

Due to the distinct transition between retention pond and surrounding materials, the transition zone represents a very limited volume of material. The transition zone will not be considered separately, but will be addressed with the "surrounding" soils.

4.2.1.4 Surrounding Material

The composite SORs for surrounding material in both Test Pits 2 and 3 are near the criterion (i.e., 1.06 for Test Pit 2, 0.90 for Test Pit 3). For both these test pits, the discussion that follows includes the transition material (SORs for the transition zones are 0.87 and 10.04 for Test Pits 2 and 3, respectively). Similar to the case for the overburden and the retention pond material, examination of the gross gamma counts in each of these zones indicates a range of radioactivity levels, which *would be conducive* to sorting.

Gross gamma levels in Test Pit 2 Surrounding/Transition material range from 17,000 cpm to 33,000 cpm (refer to Figure 4). The two composites consist of eleven cells. Of these eleven cells, three likely exceed the SOR criterion on an individual basis. The remaining eight cells are likely below the SOR criterion. The "sorting potential" for these zones is therefore 8/11, or seventy-three (73) percent.

Gross gamma levels in Test Pit 3 Surrounding/Transition material range from 24,000 cpm to 195,000 cpm (refer to Figure 5). The two composites consist of eighteen cells. Of these eighteen cells, eight likely exceed the SOR criterion on an individual basis. The remaining ten cells are likely below the SOR criterion. The "sorting potential" for these zones is therefore 10/18, or fifty-six (56) percent.

4.2.1.5 Lower Material

The "lower" material is defined as being that which is below the retention ponds and the corresponding depth below the surrounding material. With the exception of Test Pit 4, all lower materials identified have been below the SOR criterion. No lower material is expected to be processed as part of the pilot demonstration, since it is anticipated that there will be limited remediation that involves lower material.

4.2.1.6 Summary

Levels of radiological contamination are sufficiently high in some locations (e.g. Test Pit 4) that direct transport and disposal of soil from those locations is the most appropriate course of action. In this case, sorting would not be effective. In other areas, however, use of a radiological sorting system offers the potential to remove significant quantities of material from the overburden, retention pond and surrounding soils which is below the SOR criterion. For the cases examined, sorting potential ranged from fifty to seventy-nine percent. The overall sorting potential for the MISS, Stepan and Sears, for the purposes of evaluating the radiological sorting system, is sixty-five (65) percent.

It is important to note that while the evaluation in this section was made using a criterion of SOR equal to one, the criterion could be any SOR level, or a level dictated by disposal options. Determination of the setpoint (or setpoints) for the soil sorting system will be made in the Pilot Study Work Plan.

4.2.2 Chemical

With the exception of the toluene encountered in Test Pit 5, none of the chemical contamination encountered will impact the soil processing systems. The toluene concentrations discovered in Test Pit 5 are sufficiently high (73,000 ppm) to present a potential worker safety issue during the operation of the system. Soil contaminated with high levels of volatile organic compounds will not be processed, due to the potential for volatile vapors evolving from the soil.

Chemical contamination may impact the disposition of the processed material. Unprocessed soil, if it exceeded both radiological and chemical (RCRA) criteria, might require disposal as a mixed waste. The planned pilot system will not separate chemical contamination. Thus, it may be possible to process soil and generate soil piles which are below the cleanup criteria for radioactive contaminants, but which would still exceed chemical cleanup criteria. The exception to this is the gravel separation system. It is anticipated that the clean output from the gravel separation system would be below both chemical and radiological criteria, since the contamination is bound up in the finer grained particles which will have been rinsed off. Composite samples from all five test pits had results that exceeded the New Jersey Non-residential Soil Cleanup Criteria (SCC).

The pilot demonstration will be instrumental in determining the impact of chemical contamination on disposal options, and in determining the effectiveness of the soil processing systems in isolating chemical contamination into specific waste streams.

4.2.3 Physical Characteristics

Site soils were analyzed for grain-size distribution, and for the radiological contamination present in various grain-size fractions. There is a significant fines content throughout the soils, including the overburden and surrounding soils. Mean fines content ranged from thirty-eight (38) percent for surrounding soils to 70 percent for retention pond material. The table below lists the arithmetic mean percent passing for various sieve sizes. Further details on the geotechnical analysis are provided in Appendix C.

Table 10 - Arithmetic Mean Grain Sizes (Percent Passing)

	¾"	#4	#8	#40	#200
Overburden	90	81	76	61	40
Surrounding	89	83	79	66	38
Retention Pond	96	94	92	85	70
Lower	95	93	92	81	34

The coarse material fraction includes the ¾" fraction and approximately half of the ¾" to #4 fraction, and is an estimate of the material that is > 3/8" diameter. The coarse material represents the fraction of soil that will be physically separated by the proposed gravel separation system. The use of finer screen sizes will be investigated as part of the pilot demonstration. As can be seen in the table above, surrounding and overburden soils have an arithmetic mean of fifteen percent coarse material (3/8" diameter and greater) that could be removed by the gravel separation system. The table below lists the range of percent passing for various sieve sizes.

Table 11 - Range of Grain Sizes (Percent Passing)

	¾"	#4	#8	#40	#200
Overburden	68-100	60-100	56-100	35-93	18-82
Surrounding	81-98	74-95	71-88	60-73	32-46
Retention Pond	84-100	81-100	79-99	72-92	58-77
Lower	69-100	66-100	65-100	61-93	25-45

Based on the high fines content, the retention pond material does not appear to be amenable to physical separation. It is recommended that this material undergo radiological sorting only. The radiological sorting system is equipped with a screen that will remove material greater than 1.5 inches. This screening is required so that the process stream does not exceed the height between the conveyor and the detector array.

All composite samples which had an SOR greater than 0.5 had their particle size fractions analyzed by gamma spectroscopy. The arithmetic mean results are presented in the table below. Test Pit 4 is reported separately due to the elevated levels there.

Table 12 - Arithmetic Mean SORs by Zone/Grain Size						
	>¾"	¾" - #4	#4 - #8	# 8 - #40	# 40 - #200	<#200
	Gravel	**Fine Gravel**	**Coarse Sand**	**Medium Sand**	**Fine Sand**	**Silts/Fines**
Overburden	0.33	0.44	0.54	1.18	1.13	4.62
Surrounding	0.31	0.33	0.70	1.36	1.03	1.79
Retention Pond	0.10	0.18	2.09	2.86	2.08	1.59
Lower	No Samples					
Test Pit 4	0.85	1.80	2.42	9.73	14.3	24.8

As can be seen in the table above, the coarse fractions (3/8" diameter and greater) have mean SORs well below the criterion. The SOR for the fines (less than #200 sieve) is typically the maximum for any zone. Interestingly, the intermediate sand fractions typically also have mean SORs exceeding 1. This is the size range into which a soil wash system would divide the soils. Even accounting for background in these samples, a significant fraction of the sand material may still exceed the SOR criteria. Given the consistency of the results showing contamination in the sand fractions, as well as the overall high fines content of the soils, the deployment of this system canceled.

4.3 Transport & Disposal

There are several factors that may impact transport and disposal of contaminated material from the FMSS. Factors include radiological and chemical characteristics. These are discussed below.

4.3.1 Radiological

The radiological content of the material is the most limiting disposal characteristic. There are substantially fewer disposal alternatives open for radiologically contaminated material than for chemically contaminated material. The radiological levels of the waste from the FMSS, while low, may preclude disposal at non-radioactive waste facilities. This is addressed in the MHTDP. Prior to launching the pilot demonstration, an assessment of disposal locations and their allowed radioactivity levels should be completed.

Some areas (e.g., Test Pit 4) have considerably elevated levels of radioactive contaminants. It is recommended that soils in these areas be directly disposed. This soil may be able to be blended with lower activity soil that is also being sent offsite to meet offsite disposal criteria, or to physically stabilize the retention pond material.

4.3.2 Chemical

Arsenic levels in the soil may impact disposal, since the maximum detected concentration of 110 mg/kg exceeds the 20x rule for TCLP (e.g., TCLP limit for arsenic is 5 mg/L – using the 20x rule. The maximum total arsenic concentration allowed would therefore be 100 mg/kg). As a minimum, TCLP analyses may be required prior to waste disposal.

An isolated area of toluene contamination was encountered in Test Pit 5. Soil from this area could possibly require RCRA disposal.

4.3.3 Physical Characteristics

Disposal of retention pond material may be difficult because of water content. This material releases water under shear conditions during transport. There is a potential for exceeding disposal site acceptance criteria. Further investigation of stabilization options is planned. Stabilization may also be required for material left in place.

4.4 Assessment of Technology Evaluation Report Assumptions

The assumptions listed in Table 13 were made as part of the economic analysis of the various systems and process sequences that were evaluated in the Technology Evaluation Report. Based on the results of the Test Pit program, these values have been revised (see "Revised Values" column in Table 13). Nevertheless, the economics of performing volume reduction at the FUSRAP Maywood Superfund Site remain favorable.

To illustrate the favorable economics, three scenarios are presented and compared to a Base Case. This comparison is intended to be an order-of-magnitude estimate of the potential cost savings which may be realized by implementing a full-scale volume reduction effort. A detailed economic assessment will be provided in the Pilot Demonstration Report, following the execution of the pilot demonstration. The Base Case assumes that all excavated soil (300,000 bulked c.y.) is disposed offsite as radiologically contaminated material at a transport and disposal (T&D) cost of $220/cubic yard. This is a quoted cost from an offsite radiologically contaminated material disposal facility.

Scenario 1 assumes 150,000 c.y. of excavated material is disposed offsite as radiologically contaminated material at $220/c.y. and 150,000 c.y. of processed soil is disposed at an alternative disposal site at $70/cubic yard T&D. This is a quoted cost from a RCRA Subtitle D landfill.

Scenario 2 assumes 150,000 c.y. of excavated material is disposed offsite offsite as radiologically contaminated material at $220/c.y., 75,000 c.y. of processed soil is disposed at an alternative RCRA Subtitle D disposal facility at $70/c.y. T&D, and 75,000 c.y. of process material meets the reuse criteria and is used as onsite backfill.

Scenario 3 assumes 150,000 c.y. of excavated material is disposed offsite offsite as radiologically contaminated material at $220/c.y. and 150,000 c.y. of processed soil meets the reuse criteria and is used as onsite backfill.

Approximately $14M is included in the above scenarios to account for soil processing, additional material handling, and additional analytical costs. The input parameters to the cost model are listed in Table 13.

A summary of the cost scenarios compared to the Base Case is presented below:

Table 14 – Scenario Costs Compared to Base Case

Cost Model	Base T&D	Alt. T&D	Processing	Total	Savings above Base
Base Case	$66M	0	0	$66M	0
Scenario 1	$33M	$10M	$14M	$57M	$9M
Scenario 2	$33M	$5M	$14M	$52M	$14M
Scenario 3	$33M	0	$14M	$47M	$19M

In addition to the economics, the test pit results have influenced the proposed pilot demonstration as follows:

- As specified in the TER, the gravel separation and radiological sorting systems remain recommended for use.
- The test pit program showed the soil has sufficient heterogeneity that segregation based on radiological properties remains viable. Whether this heterogeneity is maintained through the excavation and screening process will be evaluated as part of the pilot demonstration.
- The test pit program showed the soil contained high percentages of fines (silt). Additionally, radiological contamination in the sand fractions was found in excess of an SOR of one. Based on these results, the soil washing system will not be deployed as part of this demonstration.
- As a result of the test pit program, there is an increased level of confidence in the potential success of the volume reduction effort.

5. CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

Analysis of the data generated as part of the Engineering Test Pits at MISS program leads to the following conclusions:

Engineering correlation with previous data:

- Based on previous and engineering test pit data, the soils at the MISS can generally be divided into the following zones: overburden, retention pond, surrounding, and lower. The lower zone soils (below the retention pond level) generally appear to be both radiologically and chemically uncontaminated.
- Chemical contamination is present in samples analyzed during previous investigations and in the soils excavated during the Engineering Test Pit Program. Levels exceed the New Jersey Soil Cleanup Criteria in sixteen of the thirty-nine zones investigated. The chemical contamination observed during the Engineering Test Pit Program is similar to that observed in the previous investigations. Chemical contamination is not expected to impact pilot demonstration operations.
- The distribution of radiological contamination showed a high degree of heterogeneity within each zone. This was a new finding, which enhances potential benefits of the applicability of the soil sorting system.

Design Basis for System selection/sequencing:

- Consistent with the TER, a gravel separation system is proposed as the initial system for the pilot demonstration. This system is expected to remove fifteen percent of the process flow as greater than 3/8" diameter material. The use of finer screen sizes will be investigated as part of the pilot demonstration. Retention pond material however, should not be processed through the gravel separation system, due to the uniform fine-grained nature of the retention pond material.

  The Technology Evaluation Report had assumed a thirty-five percent coarse fraction. The revised value of fifteen percent therefore represents a significant decrease. It does not impact, however, the decision to deploy the gravel separation system. Assuming an alternate disposal location for coarse material, which can accept the coarse material for $70/cy transport and disposal, the gravel separation system would need to remove four percent of the process stream as coarse to break even. The fifteen percent coarse content derived from the test pit results substantially exceeds this minimum.
- Consistent with the TER, a radiological sorting system is proposed as the second system. It will receive the soils processed by the gravel separation system, and will be the only system for processing retention pond materials. The sorting efficiency for the proposed system is estimated to be 50 to 80 percent removal, assuming a setpoint equivalent to a Sum-of-the-Ratios (SOR) of one. This sorting efficiency is based on the percentage of "cells" (5 foot by 5 foot by 1 foot grids) with an SOR less than one within a given zone. A sorting potential of sixty-five percent is, therefore, assumed for the soil sorting system.

This is an increase over the previously assumed fifty percent sorting potential. Assuming an alternate disposal location for below criteria material which can accept the material for $70/cy transport and disposal, the soil sorting system would need to remove approximately twenty-three percent of the process stream to break even. The sixty-five percent coarse content derived from the test pit results substantially exceeds this minimum.

- A soil washing system was initially proposed in the TER. Deployment of the soil washing system has been put on hold. Concerns which result from the test pit program include the high fines contents in the soil (average of forty percent fines in the non-retention pond material), and radiological contamination (SOR greater than one) in the intermediate sand fractions (between #4 and #200 sieve).

Design Basis for soil acquisition:

- The soil for the pilot demonstration is proposed to be acquired from the area west of Building 76 (Test Pit 5 - Test Pit 1 area). This area has a combination of radioactive and chemical contamination, soil types, and accessibility which seem amenable to the proposed processing systems. Overburden, surrounding, and retention pond material will be excavated and processed. A soil pile at the MISS, which originated from Stepan Company, will also be processed.

Assess Technology Evaluation Report parameters:

- Key TER parameters were reevaluated based on the results of the Engineering Test Pit Program. Most significantly, the percentage of coarse material (greater than 3/8" diameter) decreased from thirty-five percent in the TER to fifteen percent based on actual conditions. Also, the "sorting potential" increased from fifty percent in the TER to sixty-five percent based on actual conditions, (sorting potential is defined as the percent of soil having radioactivity below the cleanup criteria that can be segregated using soil sorting). Since the values were specifically obtained for the pilot demonstration project, the confidence level in the revised values for these parameters has increased compared to the previous values. Even with the revised values, the results of the system evaluation fall within the bounds of the parametric study conducted as part of the TER.

In conclusion, given the data collected during the Engineering Test Pit Program, the economics of performing on-site volume reduction remain favorable. In addition to volume reduction, it is believed the system will assist in managing materials so that material unsuitable for on-site reuse, may be disposed of at the most economical and appropriate location.

As stated in the system selection bullets above, the revisions to the above parameters do not impact the fundamental conclusion that a materials management effort will achieve substantial cost savings compared to direct disposal.

5.2 Recommendations for Pilot Demonstration

The objectives of the pilot demonstration are to:

- Determine the applicability of gravel separation of the FMSS site soils for the purpose of achieving volume reduction and remediation cost savings.
- Determine the applicability of radiological sorting of the FMSS site soils for the purpose of achieving volume reduction and remediation cost savings.

In addition, the following investigations are recommended during the pilot demonstration, as they directly impact the objectives listed above. The resolution of these issues may impact assessment of the systems for any full-scale plant.

- *Investigation of chemical contamination*: Chemical contamination may limit onsite reuse of material and disposal at preferred alternative sites. Chemical contamination will be investigated during the pilot demonstration. Chemical contamination levels of output streams will also be investigated.
- *Detailed evaluation of disposal alternatives:* A detailed evaluation of alternative disposal locations based on radiological, chemical and physical characteristics of processed material observed during the demonstration, and the costs associated with the alternatives, is integral to the economic evaluation of soil processing. This is also important in determining the most appropriate setpoint for the soil sorting system.

6. REFERENCES

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11. CH2M Hill. *Final Remedial Investigation Report, Stepan Company Property,* November 1994

12. Bechtel. *Remedial Investigation Report for the Maywood Site*, December 1992

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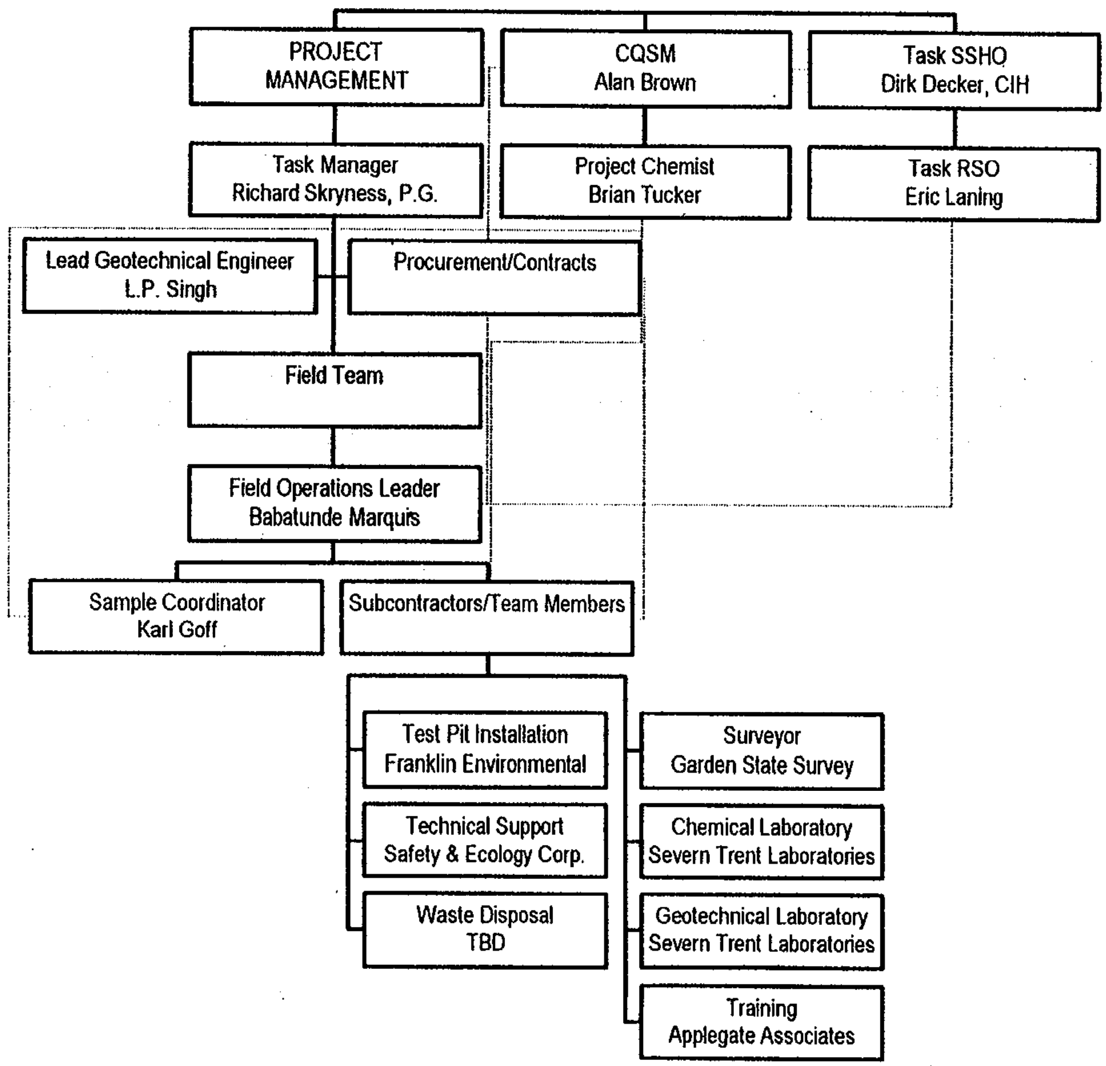
TABLES

TABLE 13
INPUT PARAMETERS FOR ECONOMIC EVALUATION

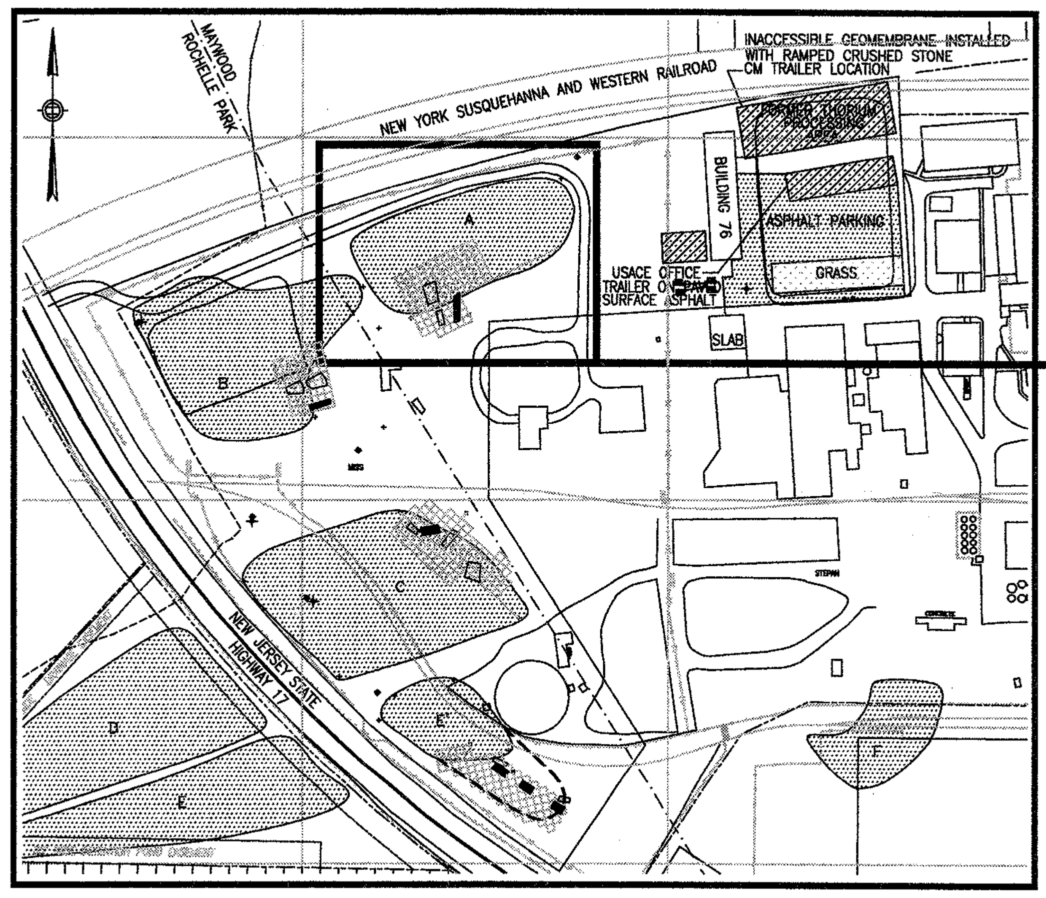
Parameter	Tech. Eval Rept. Value	Revised Value	Basis
Cubic yards of soil excavated	525,000 yd^3	300,000 yd^3	Technology Evaluation Report (TER) - Approximately 205,000 yd^3 [Ref. 1] of contaminated soil, 200,000 yd^3 of clean soil (excavated at limits of excavation or from above contaminated soil) and 30% bulking factor (Volume measured ex-situ). Revised – Approximately 205,000 yd^3 [Ref. 1] of contaminated soil, 20% overexcavation, and 25% bulking factor (FS) (Volume measured ex-situ).
Cubic yards of below criteria soil	262,500 yd^3	150,000 yd^3	TER - See above – ½ of soil excavated is clean Revised – 60,000 yd^3 will not be processed (see below). Of the remaining 240,000 yd^3, 65% clean
Cubic yards of soil with SOR greater than 1	262,500 yd^3	90,000 yd^3	TER – All remaining material. 30,000 cubic yards from this category fall into the "untreatable" category (see below). Revised - 35% of 240,000 yd^3
Cubic yards of unprocessable soil	50,000 yd^3	60,000 yd^3	TER – Some soil is assumed to be untreatable. This soil would be sent directly to a disposal site. Revised – Based on results, some soil is assumed to be untreatable. This also includes soil which may be direct shipped based on transportation issues (e.g., direct load to rail cars at vicinity properties).
Soil Size Distribution: Coarse/Oversize Medium (Sand) Fines	 35% 45% 20%	 15% 45% 40%	TER - Based on Soil Grouping Report, Revised – Based on overburden/ surrounding soil. Retention pond material will not be subjected to physical separation.
Transport & Disposal Costs: Radiological Alternate Landfill Reuse	 $220 /$yd^3$ $115 /$yd^3$ -$10 /$yd^3$	 $220 /$yd^3$ $70 /$yd^3$ $0	 Quoted T&D cost from Envirocare Quoted T&D cost from RCRA-D facility Credit for clean fill.

FIGURES

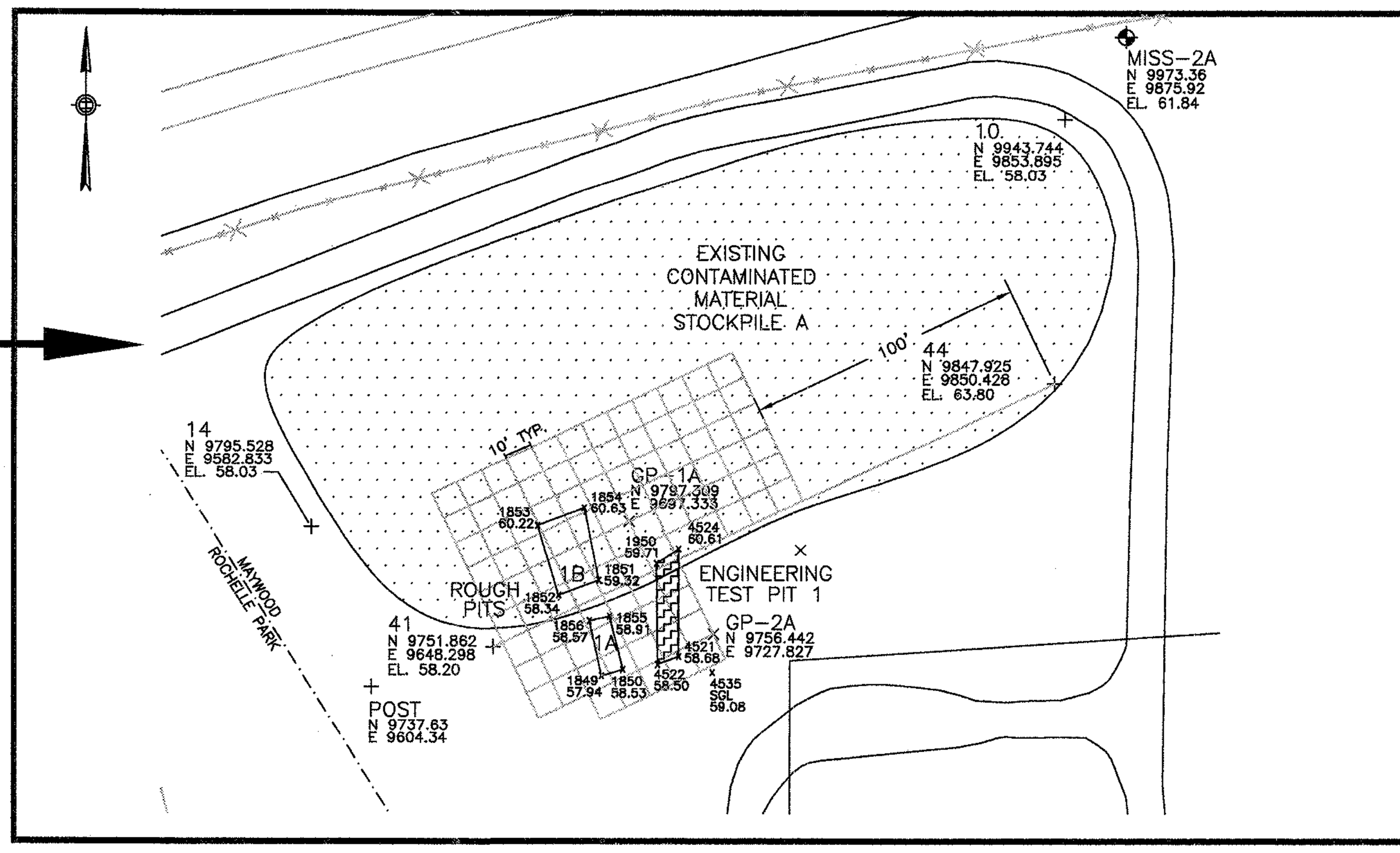
Figure 2
Engineering Test Pits at MISS
Task Organization Chart



U.S. Army Corps of Engineers
NEW YORK DISTRICT



0 200 400 FEET
1" = 200'-0"



0 50 100 FEET
1" = 50'-0"

LEGEND:

Symbol	Description
+ 44 N 9847.925 E 9850.428	LOCATION OF FIELD STAKEOUT PIT AREA POINTS BY GARDEN STATE
× GP-2A N 9756.442 E 9727.827	LOCATION POINTS, GAMMA WALKOVER GRID BY GARDEN STATE (GRID @ 10'x10' EXCEPT WHERE NOTED)
	LOCATION OF OVERBURDEN MONITORING WELL
R-1A R-1B	ROUGH PIT LOCATION A = EXTERIOR POND B = INTERIOR POND
	APPROXIMATE BOUNDARY OF SETTLING POND (ESTIMATED FROM HISTORICAL INFORMATION)
	SURVEYED LOCATION OF ENGINEERING TEST PIT
1853 60.22	SURVEYOR SHOT ID ELEVATION
	SURFACE SCAN GRID SEE APPENDIX B FOR DATA

LEGEND:

TASK COMPLETED PRIOR TO CONVERSION TO NEW JERSEY PLANE COORDINATE SYSTEM.

MATRIX – GRID/CELL IDENTIFICATION

ELEVATION (FEET)	E	D	C	B	A
58–57	MISS-TP1SS0E010 SP01	MISS-TP1SS0D010	MISS-TP1SS0C010	MISS-TP1SS0B010	MISS-TP1SS0A010
57–56	MISS-TP1SS0E020	MISS-TP1SS0D020	MISS-TP1SS0C020	MISS-TP1SS0B020	MISS-TP1SS0A020
56–55	MISS-TP1SS0E030 SP02	MISS-TP1SS0D030	MISS-TP1SS0C030	MISS-TP1SS0B030	MISS-TP1SS0A030 SP03
55–54	MISS-TP1SS0E040	MISS-TP1SS0D040	MISS-TP1SS0C040	MISS-TP1SS0B040	MISS-TP1SS0A040
54–53	MISS-TP1SS0E050	MISS-TP1SS0D050	MISS-TP1SS0C050	MISS-TP1SS0B050	MISS-TP1SS0A050
53–52	MISS-TP1SS0E060	MISS-TP1SS0D060	MISS-TP1SS0C060	MISS-TP1SS0B060	MISS-TP1SS0A060
52–51	MISS-TP1SS0E070 SP04	MISS-TP1SS0D070	MISS-TP1SS0C070	MISS-TP1SS0B070	MISS-TP1SS0A070
51–50	MISS-TP1SS0E080	MISS-TP1SS0D080	MISS-TP1SS0C080	MISS-TP1SS0B080	MISS-TP1SS0A080
50–49	MISS-TP1SS0E090	MISS-TP1SS0D090	MISS-TP1SS0C090	MISS-TP1SS0B090	MISS-TP1SS0A090

NOTES: MISS-TP1XXXXXXX — GRID/CELL ID
SPXX — SPECIAL SAMPLE ID (SEE TEST PIT MATRIX FOR SAMPLE DESCRIPTION)

GROSS COUNTS RADIOLOGICAL FIELD RESULTS – [NaI (cpm)]

ELEVATION (FEET)	E	D	C	B	A
58–57	18000	19000	18000	18000	21000
57–56	17000	16000	15000	18000	21000
56–55	17000	14000	17000	15000	16000
55–54	14000	13000	13000	15000	16000
54–53	14000	13000	13000	14000	13000
53–52	13000	13000	14000	14000	13000
52–51	14000	14000	13000	14000	14000
51–50	14000	14000	13000	14000	14000
50–49	14000	14000	14000	15000	14000

SUM OF RATIOS (SOR)* ON COMPOSITES – GAMMA SPECTROSCOPY

ELEVATION (FEET)	E–D	C	B–A
58–56	$REOV_D$ = 0.56, $REOV_W$ = 0.48	$TROV_D$ = 0.35, $TROV_W$ = 0.32	$SUOV_D$ = 0.57, $SUOV_W$ = 0.49
56–52	$REUP_D$ = 0.17, $REUP_W$ = 0.09	$TRUP_D$ = 0.34, $TRUP_W$ = 0.21	$SUUP_D$ = 0.23, $SUUP_W$ = 0.18
52–49	$RELO_D$ = 0.14, $RELO_W$ = 0.12	$TRLO_D$ = 0.14, $TRLO_W$ = 0.11	$SULO_D$ = 0.15, $SULO_W$ = 0.12

NOTES: $XXXX_D$ — SOR DRY; $XXXX_W$ — SOR WET

* SOR BASED ON LIMITS OF 15 pCi/g Th-232, Ra-226, 50 pCi/g U-238
SHADING PROVIDED FOR CONTRAST BETWEEN ZONES.

RE	TR	SU	
X	X	X	OV
X	X	X	UP
X	X	X	LO

LEGEND:

SU – SURROUNDING
TR – TRANSITION
RE – RETENTION
OV – OVERBURDEN (ABOVE)
UP – UPPER (POND)
LO – LOWER (BELOW)

TEST PIT MATRIX

ROUGH PIT 1B (INTERIOR)

EL. 58

FILL – REDDISH BROWN SAND, (DENSE) MISCELLANEOUS FILL CONSISTING OF DEBRIS, BOULDERS, BRICKS, GRAVEL AND GEOFABRIC.

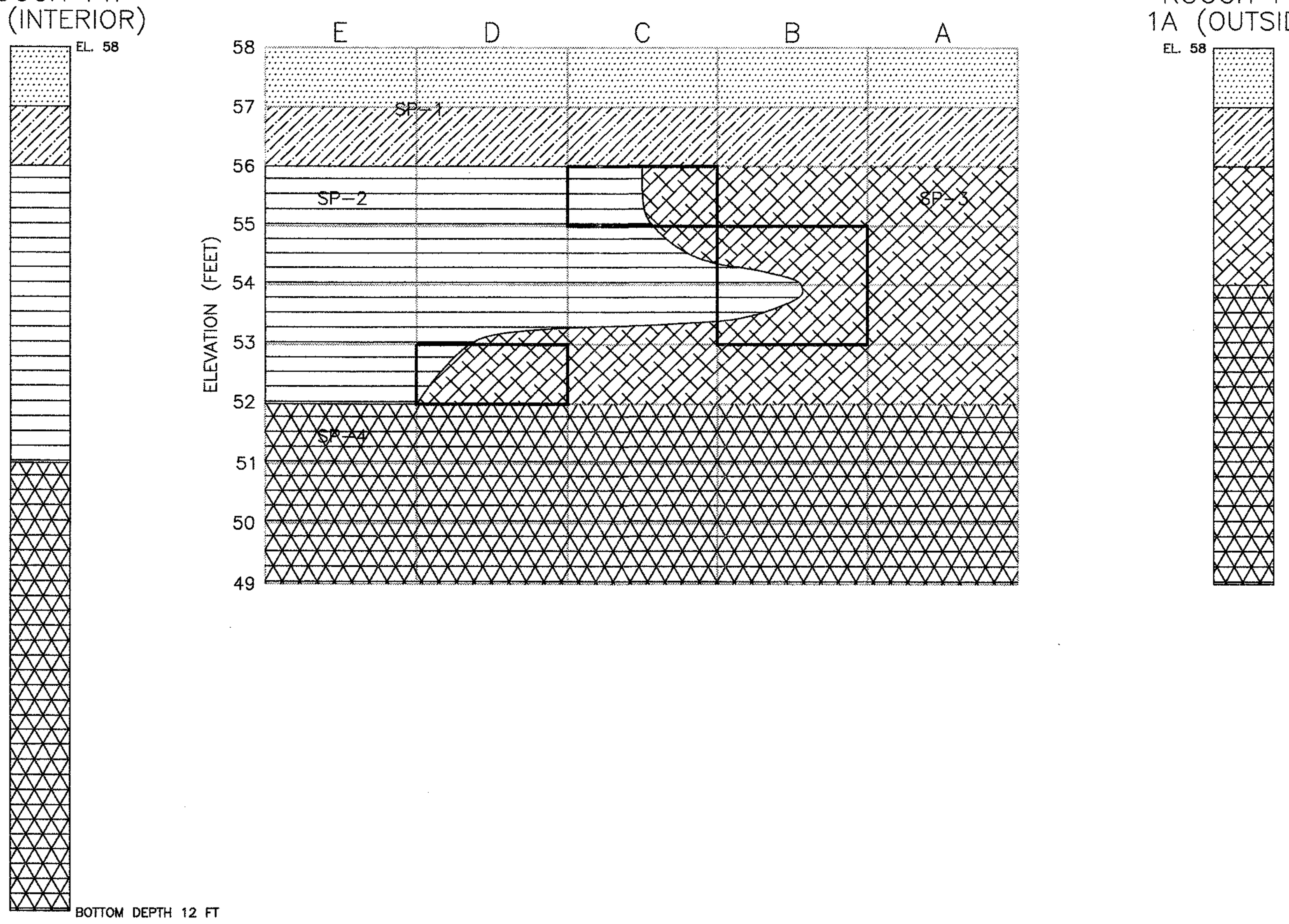
FILL – DARK COARSE ANGULAR SAND (DENSE) WITH ORGANICS – FOUL ODOR. SOME BRICKS.

WHITE AND SLIGHTLY BROWNISH POND SEDIMENTS STRATIFIED, EACH STRATUM LESS THAN 1" VARYING IN COLOR.

BROWNISH TO DARK RED ANGULAR SAND, MOSTLY WEATHERED FRAGMENTS OF SANDSTONE. LITTLE SILT.

BEDROCK HARD REDDISH SANDSTONE.

BOTTOM DEPTH 12 FT
NO GROUNDWATER ENCOUNTERED



ROUGH PIT 1A (OUTSIDE)

EL. 58

FILL – REDDISH BROWN SAND, (DENSE) MISCELLANEOUS FILL CONSISTING OF DEBRIS, BOULDERS, BRICKS, GRAVEL AND GEOFABRIC.

FILL – DARK COARSE ANGULAR SAND (DENSE) WITH ORGANICS – FOUL ODOR. SOME BRICKS.

FILL – BROWNISH SAND MIXED WITH GRAVEL, BRICKS AND VEGETATION.

REDDISH SAND WEATHERED SANDSTONE FRAGMENTS STAINED WITH WHITE SEDIMENTS (POND MATERIAL). SOME SILTY SAND.

BOTTOM DEPTH 9 FT
NO GROUNDWATER ENCOUNTERED

LEGEND:

- STRATIFIED POND SEDIMENT
- TRANSITION
- FILL – REDDISH BROWN SAND AND DEBRIS
- FILL – BROWNISH SAND MIXED WITH GRAVEL, BRICKS & VEGETATION
- BROWNISH TO DARK RED ANGULAR SAND
- BLACK GRAINY ANGULAR SAND WITH ORGANICS
- REDDISH SAND/WEATHERED SANDSTONE

NOTES:

SPECIAL SAMPLES ID & LOCATION	DESCRIPTION
SP-1-E1	BLACK SANDY HIGHLY COMPACTED SOIL WITH ORGANICS, FOUL ODOR
SP-2-E3	RETENTION POND A MATERIAL – WHITE TO LIGHT BROWN (STRATIFIED)
SP-3-A3	GREENISH REFLECTIVE POND MATERIAL
SP-4-E7	BROWNISH SOFT ORGANIC MATERIAL

HORIZONTAL 0 4 8
VERTICAL 0 2 4
SCALE IN FEET

Symbol	Description	Date	Approved
A	ORIGINAL ISSUE	6/28/00	

Revisions

STONE & WEBSTER ENVIRONMENTAL TECHNOLOGY & SERVICES

Designed by: B MARQUIS Date: 6/26/00
Drawn by: K ANTHONY Date: 6/28/00
Reviewed by: R SKRYNESS Date: 6/28/00
Approved: Date: 6/28/00
File Name:

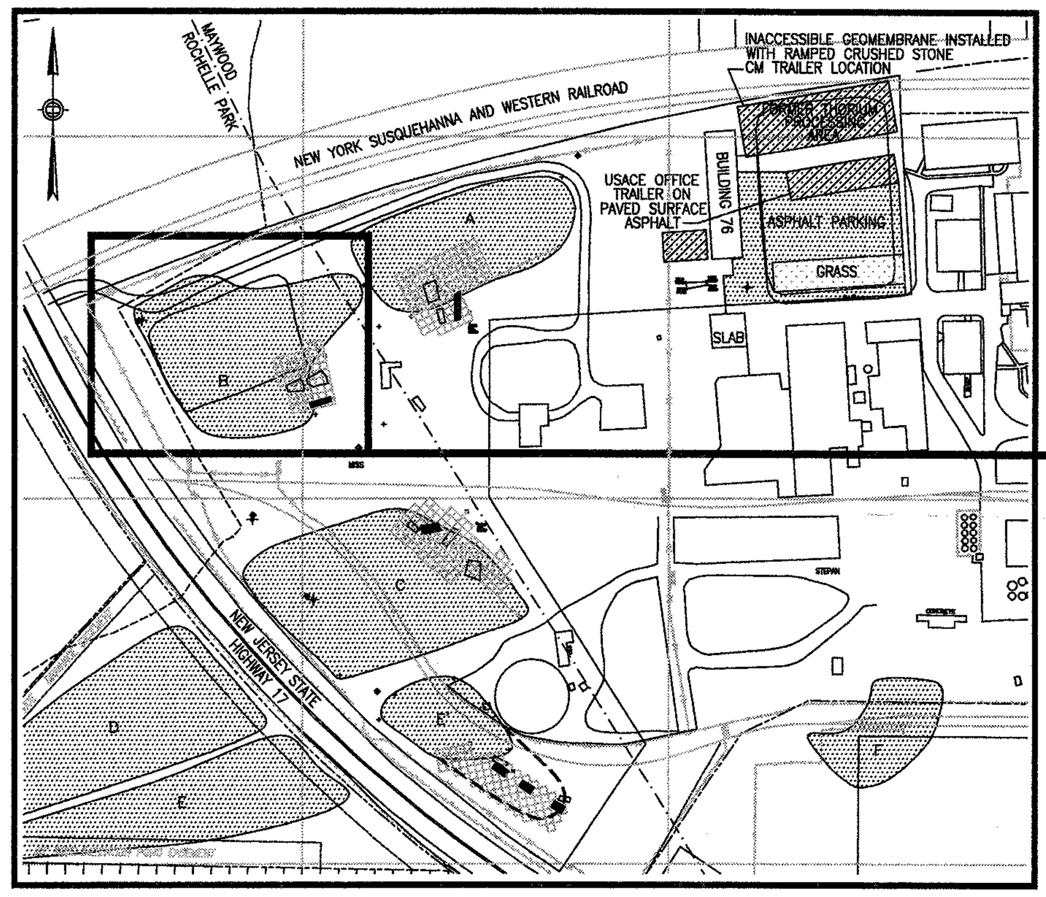
U.S. ARMY ENGINEER DIVISION
CORPS OF ENGINEERS
MAYWOOD, NEW JERSEY

FUSRAP

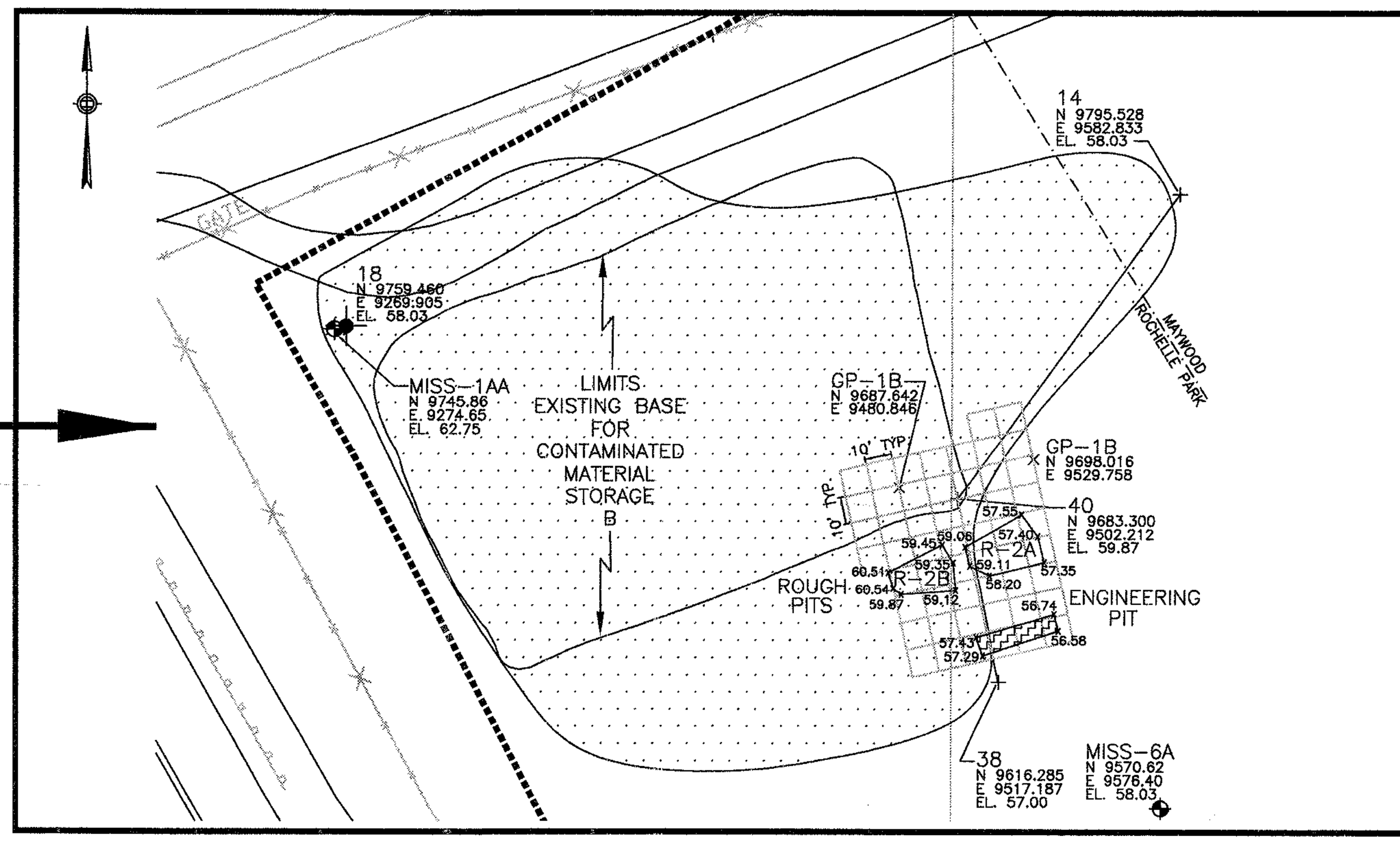
FUSRAP MAYWOOD SUPERFUND SITE
MAYWOOD, NEW JERSEY

ENGINEERING TEST PIT 1
JUNE 2000
FINAL

Contract Number: DACW41-99-D-9001
Delivery Order Number:
Project Number: 08575
Drawing Number: FIGURE 3



0 200 400 FEET
1" = 200'-0"



0 50 100 FEET
1" = 50'-0"

LEGEND:

+ 14 N 9795.528 E 9582.833	LOCATION OF FIELD STAKEOUT PIT AREA POINTS BY GARDEN STATE
× GP-1B N 9687.642 E 9480.846	LOCATION POINTS, GAMMA WALKOVER GRID BY GARDEN STATE (GRID @ 10'x10' EXCEPT WHERE NOTED)
	LOCATION OF OVERBURDEN MONITORING WELL
	LOCATION OF BEDROCK MONITORING WELL
R-2A R-2B	ROUGH PIT LOCATION A = EXTERIOR POND B = INTERIOR POND
	APPROXIMATE BOUNDARY OF SETTLING POND (ESTIMATED FROM HISTORICAL INFORMATION)
	SURVEYED LOCATION OF ENGINEERING PIT
56.74	ELEVATION
	SURFACE SCAN GRID SEE APPENDIX B FOR DATA

NOTE:

TASK COMPLETED PRIOR TO CONVERSION TO NEW JERSEY PLANE COORDINATE SYSTEM.

MATRIX – GRID/CELL IDENTIFICATION

ELEVATION (FEET)	F	E	D	C	B	A
57–56	MISS-TP2SS0F010 SP01 & SP02	MISS-TP2SS0E010	MISS-TP2SS0D010	MISS-TP2SS0C010	MISS-TP2SS0B010	MISS-TP2SS0A010
56–55	MISS-TP2SS0F020	MISS-TP2SS0E020	MISS-TP2SS0D020	MISS-TP2SS0C020	MISS-TP2SS0B020	MISS-TP2SS0A020
55–54	MISS-TP2SS0F030	MISS-TP2SS0E030	MISS-TP2SS0D030	MISS-TP2SS0C030	MISS-TP2SS0B030	MISS-TP2SS0A030 SP03
54–53	MISS-TP2SS0F040	MISS-TP2SS0E040	MISS-TP2SS0D040	MISS-TP2SS0C040	MISS-TP2SS0B040	MISS-TP2SS0A040 SP04
53–52	MISS-TP2SS0F050 SP06	MISS-TP2SS0E050	MISS-TP2SS0D050	MISS-TP2SS0C050	MISS-TP2SS0B050 SP05	MISS-TP2SS0A050
52–51	MISS-TP2SS0F060	MISS-TP2SS0E060	MISS-TP2SS0D060	SHINGLES-ASBESTOS SP08	MISS-TP2SS0B060	MISS-TP2SS0A060 SP07
51–50	MISS-TP2SS0F070	MISS-TP2SS0E070 SP09	MISS-TP2SS0D070	MISS-TP2SS0C070	MISS-TP2SS0B070	MISS-TP2SS0A070
50–49	MISS-TP2SS0F080	MISS-TP2SS0E080 SP10	MISS-TP2SS0D080	MISS-TP2SS0C080	MISS-TP2SS0B080	MISS-TP2SS0A080
49–48	MISS-TP2SS0F090	MISS-TP2SS0E090	MISS-TP2SS0D090	MISS-TP2SS0C090	MISS-TP2SS0B090	MISS-TP2SS0A090
48–47	MISS-TP2SS0F100	MISS-TP2SS0E100	MISS-TP2SS0D100	MISS-TP2SS0C100	MISS-TP2SS0B100	MISS-TP2SS0A100

NOTES: MISS-TP2XXXXXXX / SPXX — GRID/CELL ID / SPECIAL SAMPLE ID (SEE TEST PIT MATRIX FOR SAMPLE DESCRIPTION)

GROSS COUNTS RADIOLOGICAL FIELD RESULTS – [NaI (cpm)]

ELEVATION (FEET)	F	E	D	C	B	A
57–56	21000	19000	21000	22000	21000	22000
56–55	18000	23000	25000	22000	33000	22000
55–54	19000	25000	19000	20000	20000	19000
54–53	20000	50000	50000	26000	25000	17000
53–52	20000	21000	19000	24000	18000	20000
52–51	27000	18000	18000	N/A	18000	19000
51–50	17000	17000	17000	17000	18000	18000
50–49	17000	17000	17000	17000	17000	17000
49–48	17000	17000	17000	17000	17000	17000
48–47	17000	17000	17000	17000	17000	17000

NOTES: N/A – SUSPECTED CORRUGATED ASBESTOS SHINGLES – NO NaI READING TAKEN, SAMPLE EXCLUDED FROM SOIL COMPOSITION.
SHADING INDICATES LIKELY EXCEEDANCE OF SOR CRITERIA WITHIN CELL.

SUM OF RATIOS (SOR)* ON COMPOSITES – GAMMA SPECTROSCOPY

	Dry SOR	Wet SOR
REOV (F–D, 57–56)	$REOV_D$ = 0.47	$REOV_W$ = 0.25
TROV (C–B, 57–56)	$TROV_D$ = 1.03	$TROV_W$ = 0.54
SUOV (A, 57–56)	$SUOV_D$ = 0.87	$SUOV_W$ = 0.87
SUUP (A, 56–55)	$SUUP_D$ = 1.06	$SUUP_W$ = 0.71
REUP2 (F–B, 56–49)	$REUP2_D$ = 1.09	$REUP2_W$ = 0.72
TRUP (A, 55–50)	$TRUP_D$ = 0.87	$TRUP_W$ = 0.40
RELO (F–D, 49–47)	$RELO_D$ = 0.10	$RELO_W$ = 0.09
TRLO (C–B, 49–47)	$TRLO_D$ = 0.10	$TRLO_W$ = 0.08
SULO (A, 50–47)	$SULO_D$ = 0.16	$SULO_W$ = 0.11

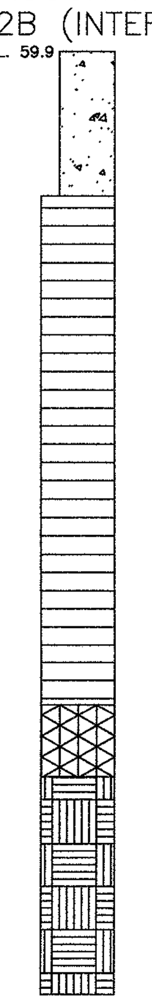
NOTES: $XXXX_D$ DRY SOR; $XXXX_W$ WET SOR
* SOR BASED ON LIMITS OF 15 pCi/g Th-232, Ra-226, 50 pCi/g U-238
SHADING PROVIDED FOR CONTRAST BETWEEN ZONES.

	RE	TR	SU
OV	X	X	X
UP	X	X	X
LO	X	X	X

LEGEND:

SU – SURROUNDING
TR – TRANSITION
RE – RETENTION
OV – OVERBURDEN (ABOVE)
UP – UPPER (POND)
LO – LOWER (BELOW)

ROUGH PIT R-2B (INTERIOR)



CRUSHED STONE 2", (LOOSE) DARK COARSE SAND, VEGETATION, AND DEBRIS.

POND SEDIMENT STRATIFIED EACH STRATUM LESS THAN 1 INCH AND VARYING IN COLOR (WHITE, TAN, GRAY ETC.)

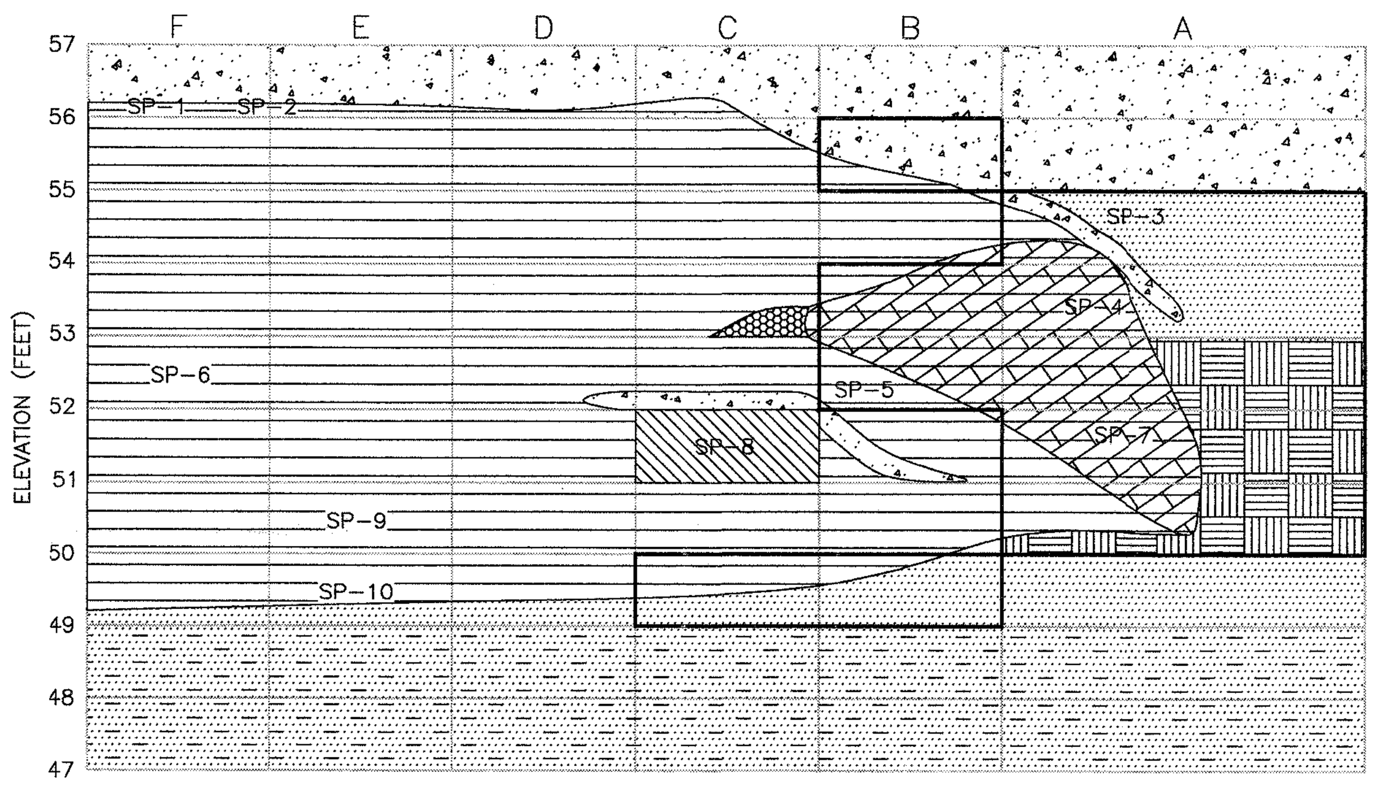
GRAYISH POND MATERIAL MIXED WITH FINE SAND, SLIGHT ORGANIC ODOR.

GRAVELLY SAND AND CINDER, LESS THAN 5% FINES AND CINDER.

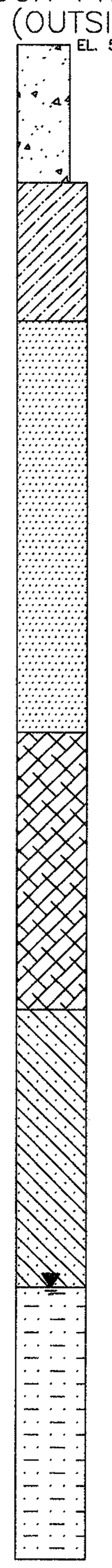
BOTTOM DEPTH 13 FT

NO GROUNDWATER ENCOUNTERED

TEST PIT MATRIX



ROUGH PIT R-2A (OUTSIDE)



CRUSHED STONE 2", (LOOSE) DARK COARSE SAND, VEGETATION AND DEBRIS.

DARK RED-BROWN COARSE SAND WITH SLIGHT ODOR.

FILL – LOOSE TO MEDIUM DENSE SAND (DARK BROWN). MISCELLANEOUS FILL CONSISTING OF DEBRIS (BRICKS, WOOD, PIPES, GLASS ETC.) TRACES OF POND MATERIAL.

FILL – DARK BROWN SAND ANGULAR, WITH ORGANICS, VARING QUANTITIES OF GRAVEL, TRACES OF GREENISH FINES AND FIBROUS STRANDS (DECAYING LEAVES).

FILL – DARK BROWN SAND, FINE TO COARSE, SATURATED.

DARK REDDISH FINE TO COARSE SAND, LITTLE SILT FRAGMENTS OF SANDSTONE, SLIGHT ODOR.

BOTTOM DEPTH 22 FT

LEGEND:

- POND MATERIAL MIXED WITH FINE SAND
- GRAVELLY SAND
- COARSE SAND COBBLES, LUMBER, CINDER
- FILL WITH MISCELLANEOUS DEBRIS
- FILL WITH ORGANICS, GRAVEL, FINES AND FIBROUS STRANDS
- FILL – FINE TO COARSE, SATURATED
- FINE TO COARSE SAND
- P-STONES (UNIFORM FINE GRAVEL)
- CRUSHED STONE WITH SAND
- DEBRIS – PREDOMINANTLY BURNT BRICKS, COBBLES, LUMBER, CINDER
- CORRUGATED SHEETS (ASBESTOS ROOF) EXCLUDED FROM COMPOSITE SAMPLES
- POND SEDIMENT
- TRANSITION

NOTES:

SPECIAL SAMPLES ID & LOCATION	DESCRIPTION
SP-1-F1	BROWN ORGANIC SUBSTANCE HIGH RADIOACTIVITY LEVEL
SP-2-F1	POND MATERIAL UPPER TAN TO BROWN IN COLOR
SP-3-A3	BLACK GLASSY CHUNKS (TAR OR COAL?)
SP-4-A4	DARK CINDERS WITH BURNT ODOR
SP-5-B5	MEDIUM HARD COAL-LIKE MATERIAL WITH RUSTY STAINING
SP-6-F5	CENTER OF POND MATERIAL INTERBEDDED WHITE AND LIGHT GRAY
SP-7-A6	BLACK SHEETING-LIKE ROOFING FELT
SP-8-C6	REDDISH CORRUGATED SHINGLES
SP-9-E7	TAN/WHITE/GRAY POND MATERIAL SOME CINDER, GRAYISH SAND
SP-10-E8	BROWN HAIR-LIKE FIBERS IN ASH-LIKE MATERIAL

HORIZONTAL 0 4 8
VERTICAL 0 2 4
SCALE IN FEET

U.S. Army Corps of Engineers
NEW YORK DISTRICT

Symbol	Description	Date	Approved
A	ORIGINAL ISSUE	6/28/00	

Revisions

STONE & WEBSTER ENVIRONMENTAL TECHNOLOGY & SERVICES

Designed by: B MARQUIS Date: 6/26/00
Drawn by: K ANTHONY Date: 6/28/00
Reviewed by: R SKRYNESS Date: 6/28/00
Approved: Richard Skryness 6/28/00 Date:
File Name:

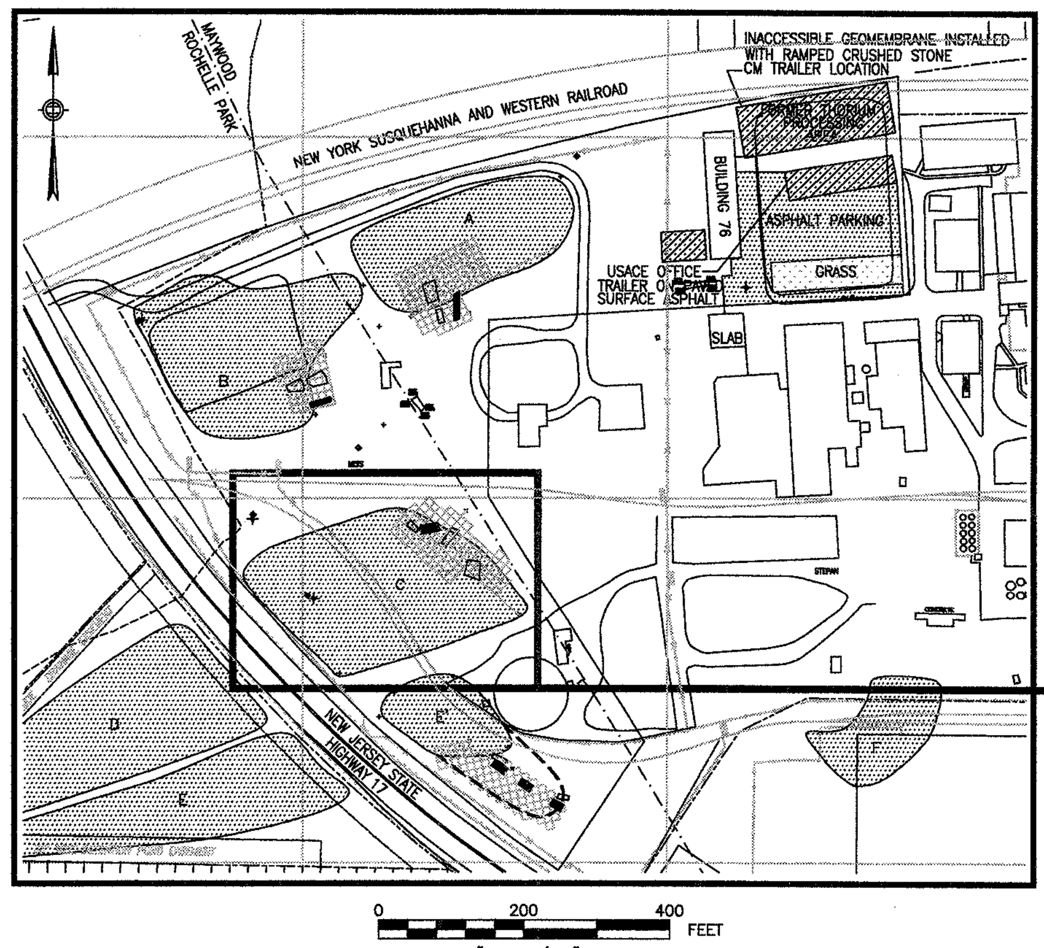
U.S. ARMY ENGINEER DIVISION
CORPS OF ENGINEERS
MAYWOOD, NEW JERSEY

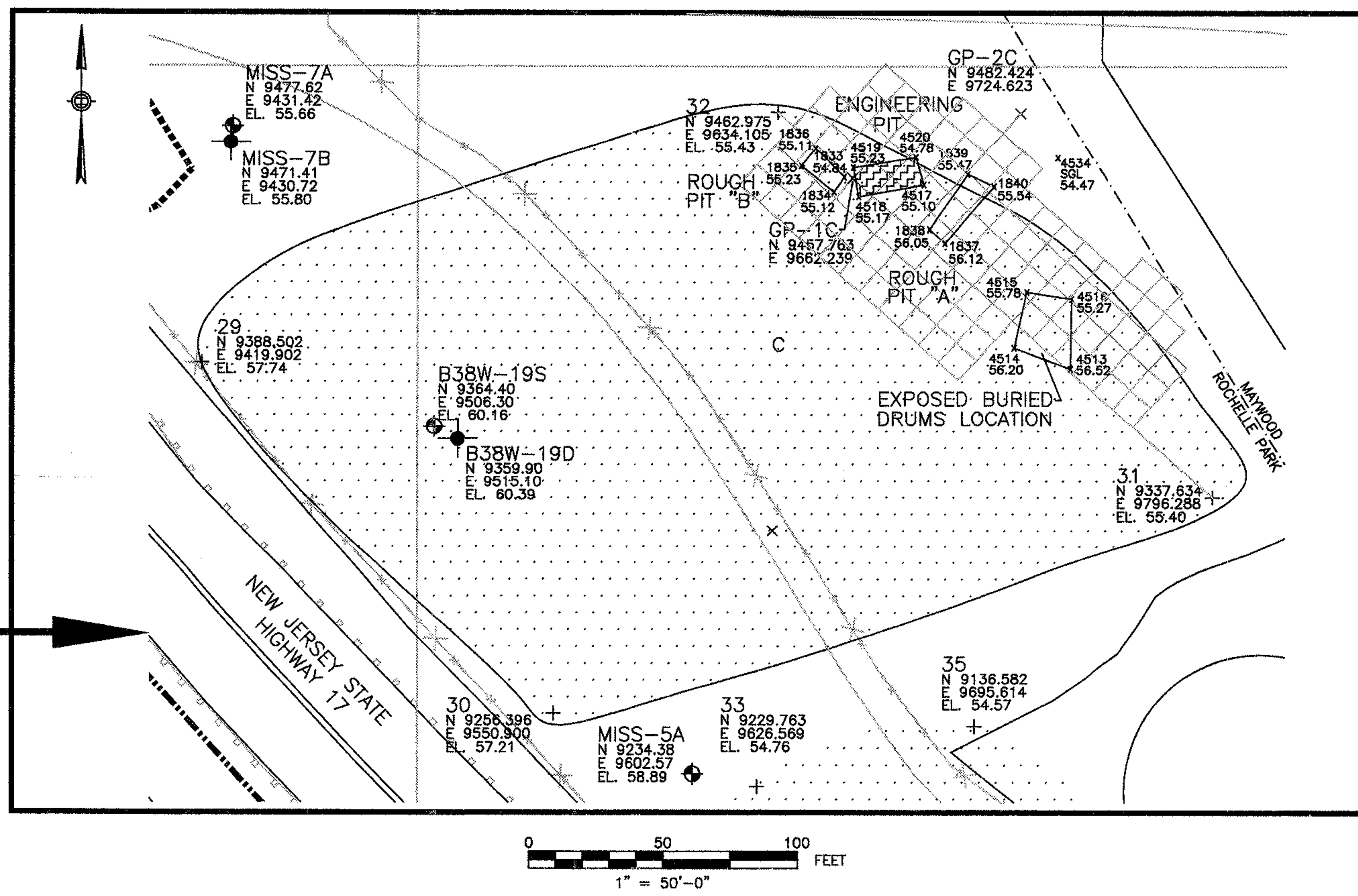
FUSRAP

FUSRAP MAYWOOD SUPERFUND SITE
MAYWOOD, NEW JERSEY

ENGINEERING TEST PIT 2
JUNE 2000
FINAL

Contract Number: DACW41-99-D-9001
Delivery Order Number: ——
Project Number: 08575
Drawing Number: FIGURE 4





LEGEND:

+ 31 N 9337.634 E 9796.288	LOCATION OF FIELD STAKEOUT PIT AREA POINTS BY GARDEN STATE
× GP-2C N 9482.424 E 9724.623	LOCATION POINTS, GAMMA WALKOVER GRID BY GARDEN STATE (GRID @ 10'x10' EXCEPT WHERE NOTED)
	LOCATION OF OVERBURDEN MONITORING WELL
	LOCATION OF BEDROCK MONITORING WELL
R-3A R-3B	ROUGH PIT LOCATION A = EXTERIOR POND B = INTERIOR POND
	APPROXIMATE BOUNDARY OF SETTLING POND (ESTIMATED FROM HISTORICAL INFORMATION)
	SURVEYED LOCATION OF ENGINEERING PIT
4520 54.78	SURVEYOR SHOT ID ELEVATION
	SURFACE SCAN GRID SEE APPENDIX B FOR DATA

NOTE:

TASK COMPLETED PRIOR TO CONVERSION TO NEW JERSEY PLANE COORDINATE SYSTEM.

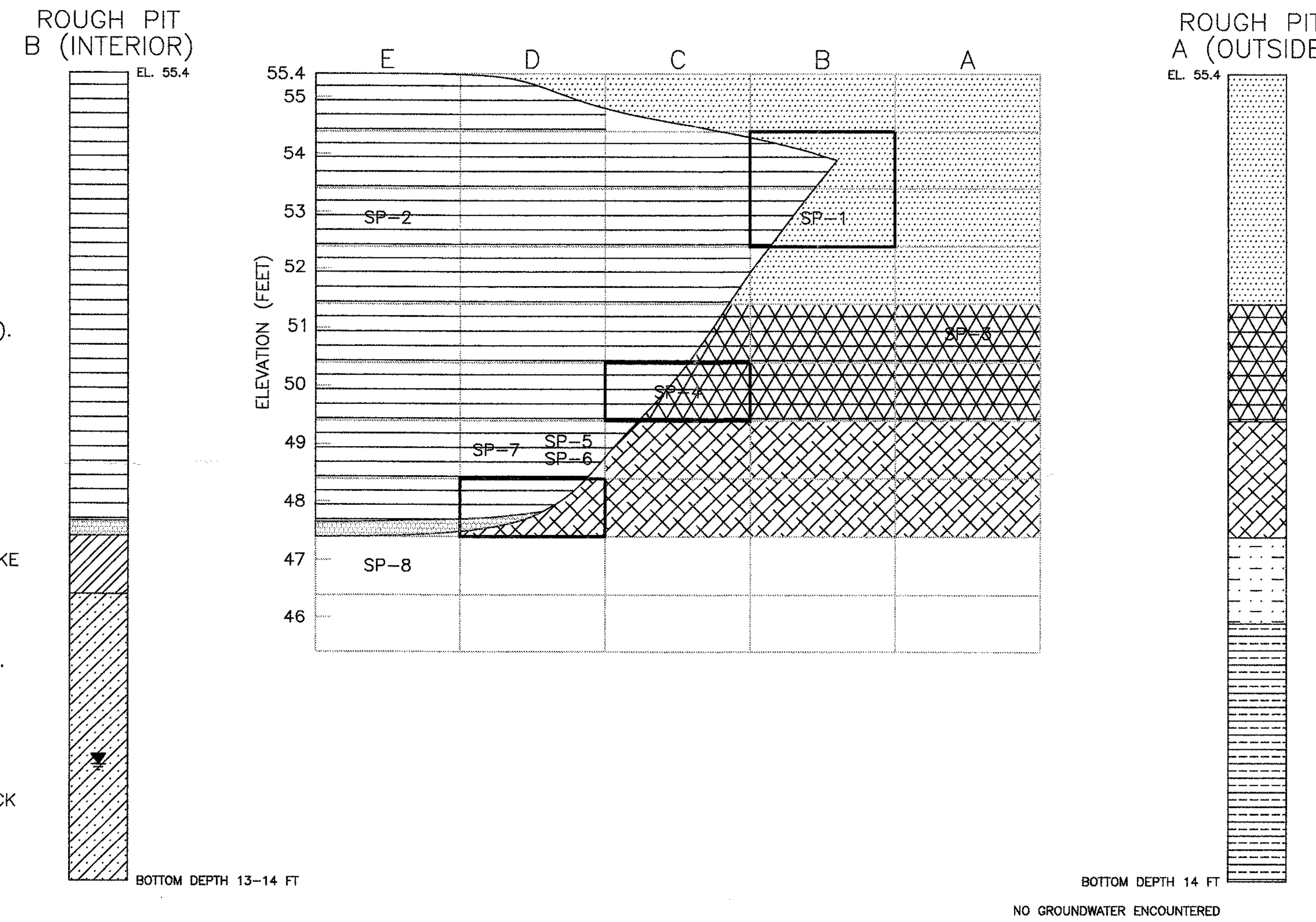
TEST PIT MATRIX

POND SEDIMENT STRATIFIED, EACH STRATUM LESS THAN 1 INCH AND VARYING IN COLOR (WHITE, TAN, GRAY PINK ETC.).

BOTTOM OF POND WITH LESS THAN 1 FOOT THICK CLAY-LIKE LENSE.

MEDIUM DENSE SAND WITH FINES, DARK AND WEATHERED.

HARD SOME RESISTANCE BLACK SAND, SATURATED AND UNSTABLE.



VEGETATION OUTSIDE OF POND 8" LOAM AND ORGANICS, MISCELLANEOUS FILL CONSISTING OF CONSTRUCTION DEBRIS PIPES, BURNT BRICKS AND SOME BOULDERS.

FILL - THIN LAYER OF SILTY SAND BROWNISH WITH SOME WHITISH POND SEDIMENTS.

BROWNISH TO GRAY SAND ANGULAR WITH P-STONE SIZE GRAVEL.

FILL - REDDISH BROWN WEATHERED SANDSTONE MEDIUM HARD.

DENSE/HARD REDDISH SAND SOME SILT.

BEDROCK IS AT 14= DUE TO BUCKET RESISTANCE, CONTINUOUS CAVE-IN FROM ABOVE (7-8') MADE IT DIFFICULT TO EXPOSE BEDROCK COMPLETELY.

LEGEND:

- STRATIFIED POND SEDIMENT
- TRANSITION
- FILL - REDDISH BROWN SAND AND DEBRIS
- FILL - BROWNISH SAND MIXED WITH GRAVEL, BRICKS & VEGETATION
- BROWNISH TO DARK RED ANGULAR SAND
- BLACK GRAINY ANGULAR SAND WITH ORGANICS
- REDDISH SAND/WEATHERED SANDSTONE
- PURPLE/PINK GLUEY BOTTOM OF POND MATERIAL

NOTES:

SPECIAL SAMPLES ID & LOCATION	DESCRIPTION
SP-1-B3	BROWN TO WHITE POND MATERIAL - HIGH RADIOACTIVITY
SP-2-E3	PURE WHITE POND MATERIAL
SP-3-A5	DARK COAL/TAR (GRAINY)
SP-4-C6	BLACK - HARD CRYSTAL LIKE MATERIAL WITH GLARE
SP-5-D7	STRAWBERRY PINK POND MATERIAL
SP-6-D7	GREENISH POND MATERIAL MIXED WITH COARSE ANGULAR SAND
SP-7-D7	DARK - BLACK SAND, ANGULAR - HIGH RADIOACTIVITY
SP-8-E9	PURPLE TO PINK CLAY-LIKE BOTTOM OF POND MATERIAL

HORIZONTAL 0 4 8
VERTICAL 0 2 4
SCALE IN FEET

MATRIX - GRID/CELL IDENTIFICATION

ELEVATION (FEET)	E	D	C	B	A
55	MISS-TP3SS0E010	MISS-TP3SS0D010	MISS-TP3SS0C010	MISS-TP3SS0B010	MISS-TP3SS0A010
54	MISS-TP3SS0E020	MISS-TP3SS0D020	MISS-TP3SS0C020	MISS-TP3SS0B020	MISS-TP3SS0A020
53	MISS-TP3SS0E030 SP02	MISS-TP3SS0D030	MISS-TP3SS0C030	MISS-TP3SS0B030 SP01	MISS-TP3SS0A030
52	MISS-TP3SS0E040	MISS-TP3SS0D040	MISS-TP3SS0C040	MISS-TP3SS0B040	MISS-TP3SS0A040
51	MISS-TPESS0E050	MISS-TP3SS0D050	MISS-TP3SS0C050	MISS-TP3SS0B050	MISS-TP3SS0A050 SP03
50	MISS-TP3SS0E060	MISS-TP3SS0D060	MISS-TP3SS0C060 SP04	MISS-TP3SS0B060	MISS-TP3SS0A060
49	MISS-TP3SS0E070	MISS-TP3SS0D070 SP05, SP06, SP07	MISS-TP3SS0C070	MISS-TP3SS0B070	MISS-TP3SS0A070
48	MISS-TP3SS0E080	MISS-TP3SS0D080	MISS-TP3SS0C080	MISS-TP3SS0B080	MISS-TP3SS0A080
47	MISS-TP3SS0E090 SP08	MISS-TP3SS0D090	MISS-TP3SS0C090	MISS-TP3SS0B090	MISS-TP3SS0A090
46	MISS-TP3SS0E100	MISS-TP3SS0D100	MISS-TP3SS0C100	MISS-TP3SS0B100	MISS-TP3SS0A100

55.4

NOTES: MISS-TP3XXXXXXX / SPXX — GRID/CELL ID / SPECIAL SAMPLE ID (SEE TEST PIT MATRIX FOR SAMPLE DESCRIPTION)

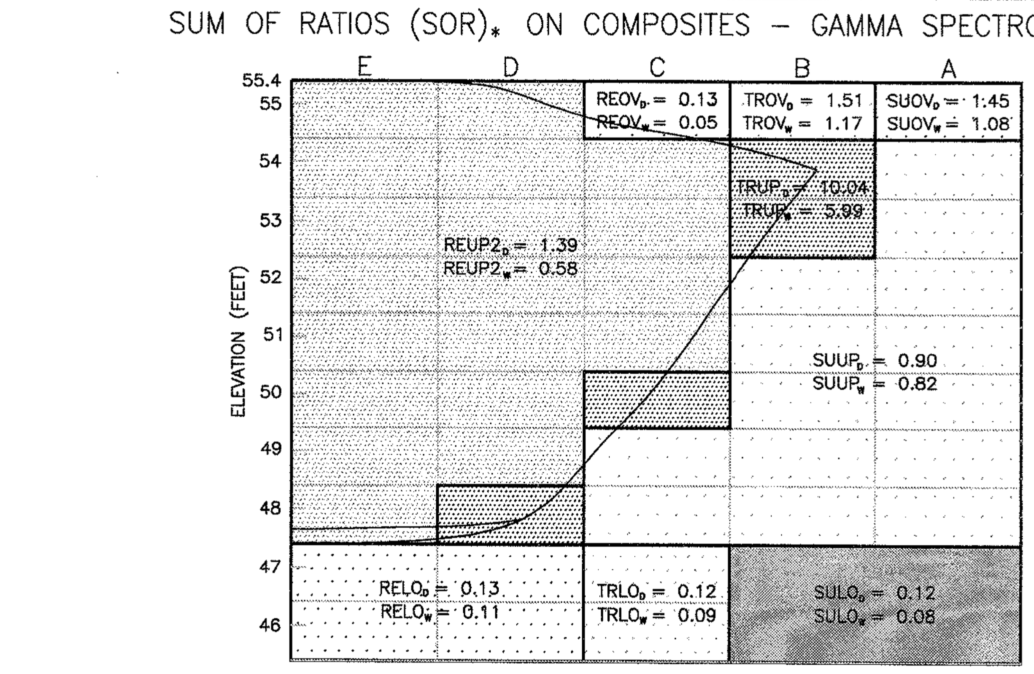
GROSS COUNTS RADIOLOGICAL FIELD RESULTS - [NaI (cpm)]

ELEVATION (FEET)	E	D	C	B	A
55	25000	25000	25000	33000	46000
54	23000	25000	28000	60000	75000
53	25000	22000	30000	195000	62000
52	25000	27000	60000	110000	32000
51	26000	26000	50000	28000	75000
50	26000	26000	28000	26000	26000
49	27000	50000	25000	24000	24000
48	25000	32000	25000	25000	26000
47	25000	23000	25000	25000	25000
46	23000	23000	22000	25000	25000

55.4

NOTE: SHADING INDICATES LIKELY EXCEEDANCE OF SOR CRITERIA WITHIN CELL.

SUM OF RATIOS (SOR)* ON COMPOSITES - GAMMA SPECTROSCOPY



NOTES: $XXXX_D$ DRY SOR; $XXXX_W$ WET SOR

* SOR BASED ON LIMITS OF 15 pCi/g Th-232, Ra-226, 50 pCi/g U-238
SHADING PROVIDED FOR CONTRAST BETWEEN ZONES.

RE	TR	SU	
X	X	X	OV
X	X	X	UP
X	X	X	LO

LEGEND:

- SU - SURROUNDING
- TR - TRANSITION
- RE - RETENTION
- OV - OVERBURDEN (ABOVE)
- UP - UPPER (POND)
- LO - LOWER (BELOW)

U.S. Army Corps of Engineers
NEW YORK DISTRICT

Symbol	Description	Date	Approved
A	ORIGINAL ISSUE	6/28/00	

Revisions

STONE & WEBSTER ENVIRONMENTAL TECHNOLOGY & SERVICES

Designed by: B MARQUIS Date: 6/26/00
Drawn by: K ANTHONY Date: 6/28/00
Reviewed by: R SKRYNESS Date: 6/28/00
Approved: Richard Skryness 6/28/00 Date:
File Name:

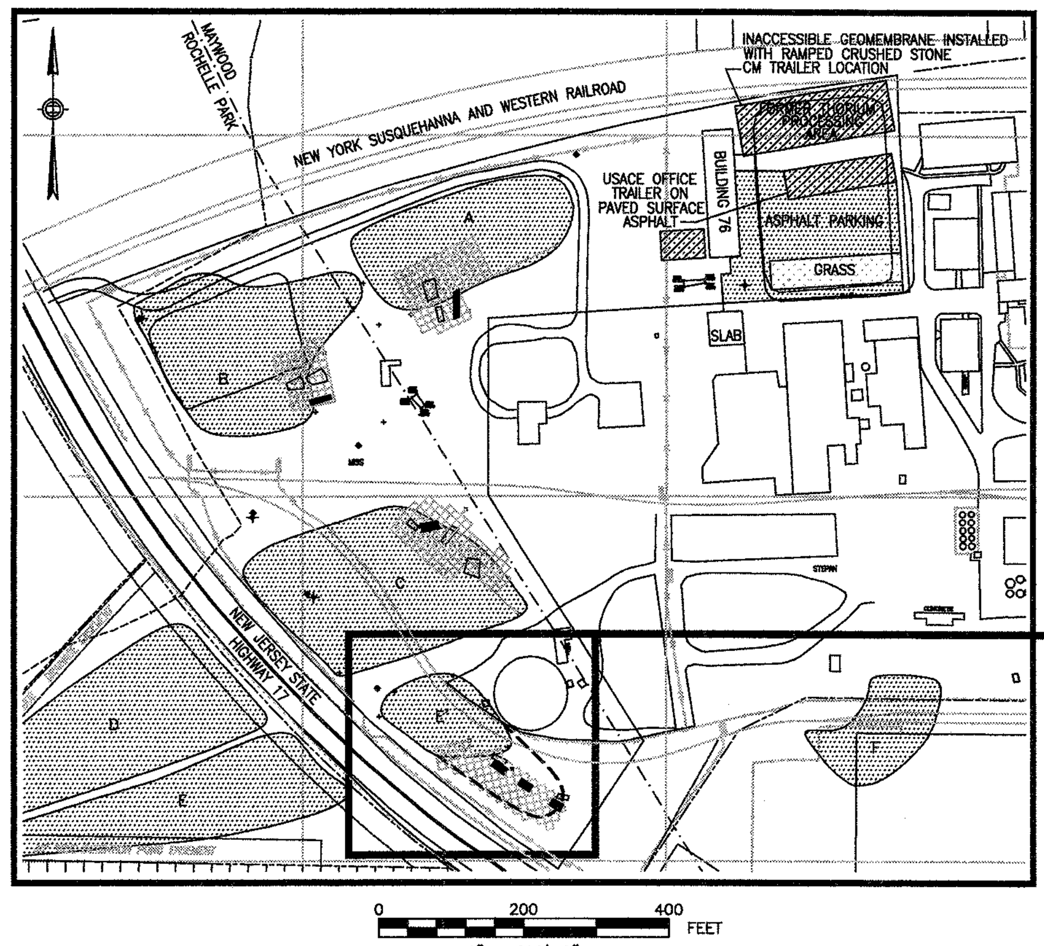
U.S. ARMY ENGINEER DIVISION
CORPS OF ENGINEERS
MAYWOOD, NEW JERSEY

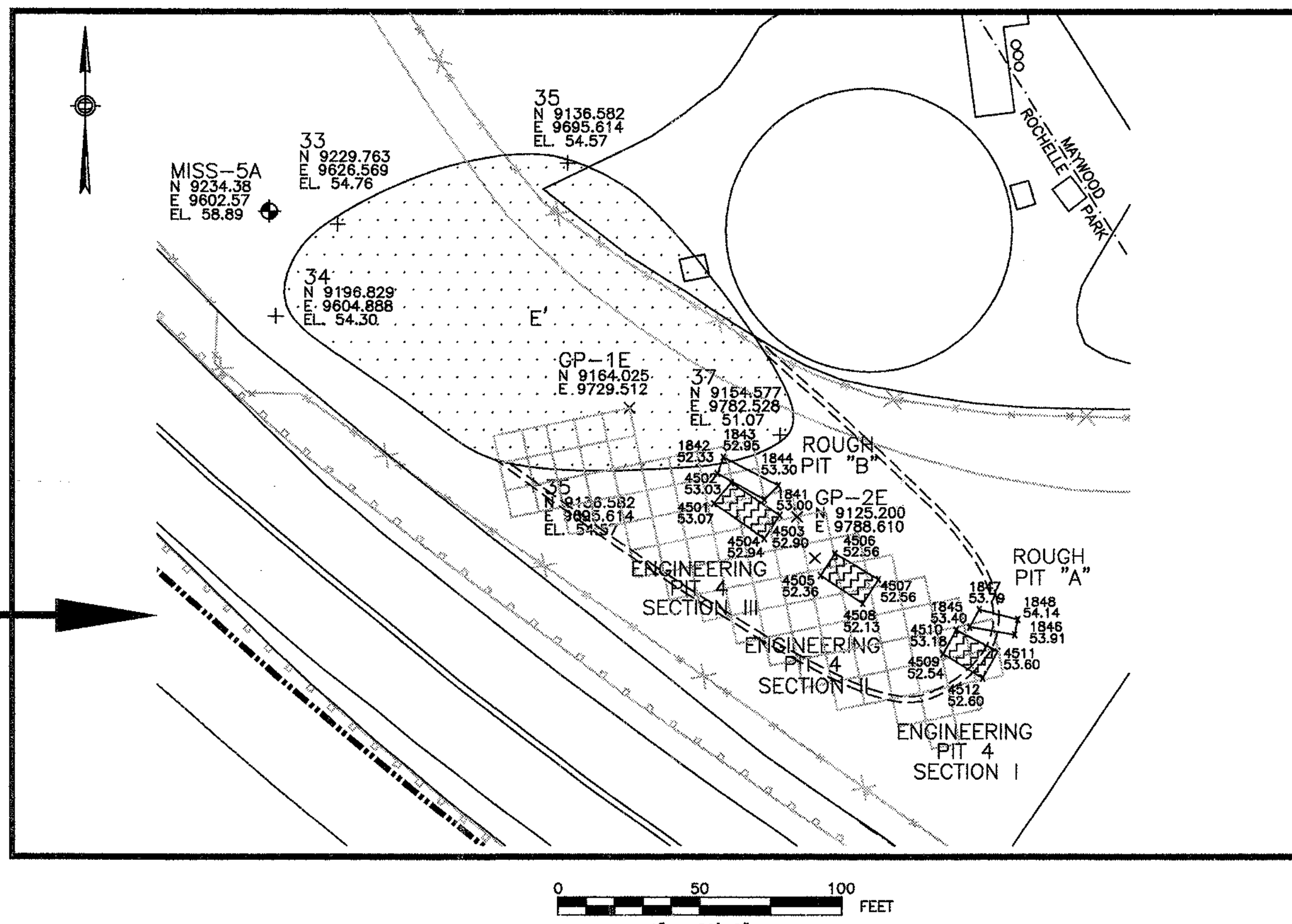
FUSRAP

FUSRAP MAYWOOD SUPERFUND SITE
MAYWOOD, NEW JERSEY

ENGINEERING TEST PIT 3
JUNE 2000
FINAL

Contract Number: DACW41-99-D-9001
Delivery Order Number:
Project Number: 08575
Drawing Number: FIGURE 5





LEGEND:

- + 35 N 9136.582 E 9695.614 — LOCATION OF FIELD STAKEOUT PIT AREA POINTS BY GARDEN STATE
- × GP-2E N 9125.200 E 9788.610 — LOCATION POINTS, GAMMA WALKOVER GRID BY GARDEN STATE (GRID @ 10'x10' EXCEPT WHERE NOTED)
- LOCATION OF OVERBURDEN MONITORING WELL
- R-4A R-4B — ROUGH PIT LOCATION A = EXTERIOR POND B = INTERIOR POND
- APPROXIMATE BOUNDARY OF SETTLING POND (ESTIMATED FROM HISTORICAL INFORMATION)
- SURVEYED LOCATIONS OF ENGINEERING PIT
- PROJECTED OUTLINE OF RETENTION POND "E". EXPOSED BOUNDARY IS 100+ FEET BEYOND PREVIOUSLY MAPPED LOCATION AS INDICATED IN HISTORICAL DATA.
- 4508 52.13 — SURVEYOR SHOT ID ELEVATION
- SURFACE SCAN GRID

NOTE:

TASK COMPLETED PRIOR TO CONVERSION TO NEW JERSEY PLANE COORDINATE SYSTEM.

TEST PIT MATRIX

ROUGH PIT B (INTERIOR)

FILL – DARK BROWN GRAVELY SAND (LOOSE) WITH VEGETATION.

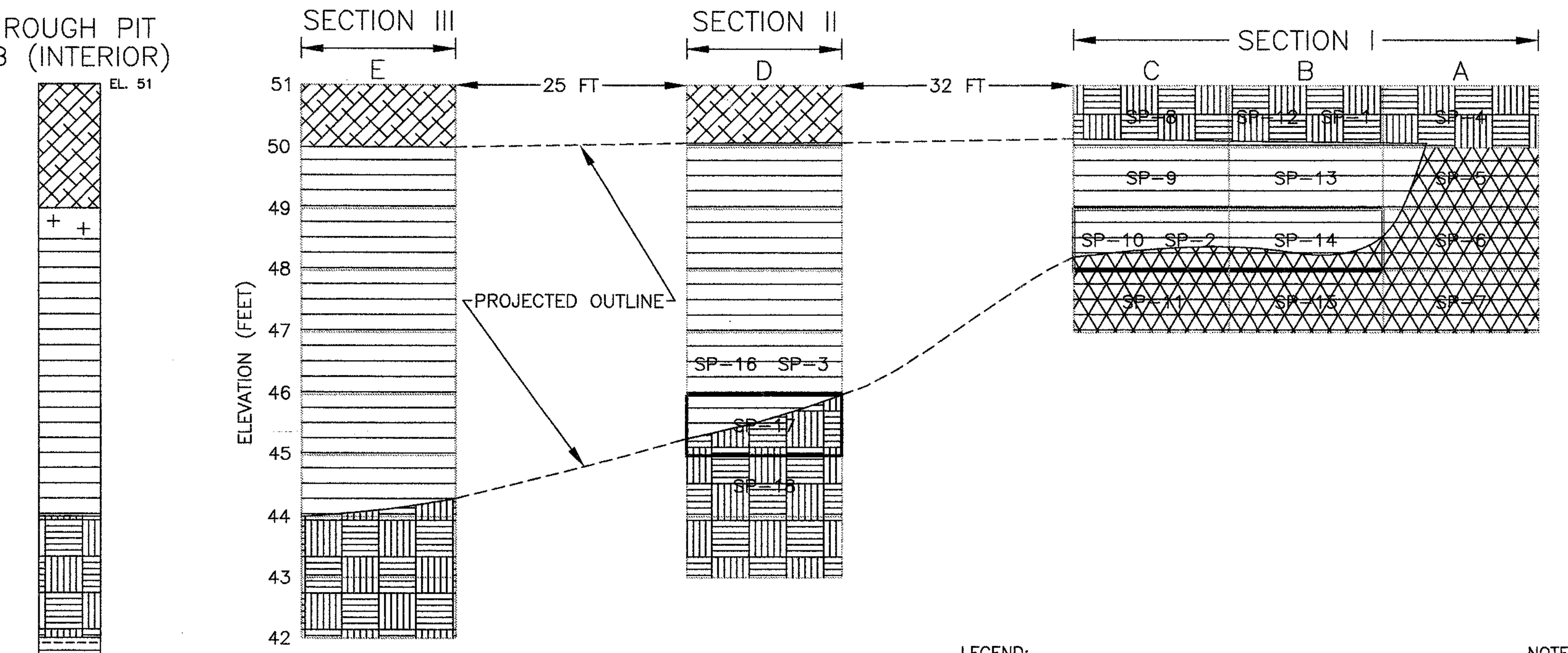
GREENISH REFLECTIVE POND MATERIAL.

POND SEDIMENT – STRATIFIED, EACH STRATUM LESS THAN 1 INCH AND VARYING IN COLOR (WHITE, TAN, GRAY, STRAWBERRY ETC.).

FILL – DARK ANGULAR COARSE SAND, 20% CRUSHED STONE AND CINDER ASH.

DARK BROWN SAND, MEDIUM FINE, TRACES OF SILT.

BOTTOM DEPTH 12 FT



ROUGH PIT A (OUTSIDE)

EL. 51

FILL – DARK BROWN SAND, MEDIUM FINE WITH CINDER.

FILL – DARK BROWN TO DARK RED SANDY SILT, MIXED WITH POND MATERIAL.

BOTTOM DEPTH 4 FT

NO GROUNDWATER ENCOUNTERED

LEGEND:

- STRATIFIED POND SEDIMENT
- TRANSITION
- REFLECTIVE POND MATERIAL
- FILL – LOOSE SAND MIXED WITH GRAVEL & VEGETATION
- FILL – ANGULAR COARSE SAND WITH CRUSHED STONE & CINDER
- SAND WITH SILT
- FILL – SANDY SILT MIXED WITH POND MATERIAL

NOTES:

SPECIAL SAMPLES ID & LOCATION	DESCRIPTION
SP-1-C1	CINDER, ASH, DARK AND ANGULAR PEBBLES
SP-2-E3	WHITE TO TAN POND MATERIAL
SP-3-A3	LEAF STRANDS, ORGANICS, REDDISH SANDY SILT
SP-4-A1	
SP-5-A2	
SP-6-A3	
SP-7-A4	
SP-8-B1	
SP-9-B2	
SP-10-B3	SP-4 THROUGH SP-18 ARE ADDITIONAL SPECIAL SAMPLES TAKEN AT COMPLETION OF TP-4 EXCAVATION. THESE SAMPLES WERE ORDERED AFTER SEC FIELD ANALYSIS DETECTED THE PRESENCE OF THORIUM (Th^{230}) IN SP-2-B3.
SP-11-B4	
SP-12-C1	
SP-13-C2	
SP-14-C3	
SP-15-C4	
SP-16-D5	
SP-17-D8	
SP-18-E9	

HORIZONTAL 0 4 8
VERTICAL 0 2 4
SCALE IN FEET

MATRIX – GRID/CELL IDENTIFICATION

E ←25 FT→ D ←32 FT→ C B A

ELEVATION (FEET)	E	D	C	B	A
51–50	MISS-TP4SS0E010	MISS-TP4SS0D010	MISS-TP4SS0C010 SP01 & SP12	MISS-TP4SS0B010 SP08	MISS-TP4SS0A010 SP04
50–49	MISS-TP4SS0E020	MISS-TP4SS0D020	MISS-TP4SS0C020 SP01 & SP12	MISS-TP4SS0B020 SP09	MISS-TP4SS0A020 SP05
49–48	MISS-TP4SS0E030	MISS-TP4SS0D030	MISS-TP4SS0C030 SP01 & SP12	MISS-TP4SS0B030 SP02 & SP10	MISS-TP4SS0A030 SP06
48–47	MISS-TP4SS0E040	MISS-TP4SS0D040	MISS-TP4SS0C040 SP01 & SP12	MISS-TP4SS0B040 SP11	MISS-TP4SS0A040 SP07
47–46	MISS-TP4SS0E050	MISS-TP4SS0D050 SP03 & SP16			
46–45	MISS-TP4SS0E060	MISS-TP4SS0D060 SP17			
45–44	MISS-TP4SS0E070	MISS-TP4SS0D070 SP18			
44–43	MISS-TP4SS0E080	MISS-TP4SS0D080			
43–42	MISS-TP4SS0E090				

NOTES: MISS-TP4XXXXXXX — GRID/CELL ID; SPXX — SPECIAL SAMPLE ID (SEE TEST PIT MATRIX FOR SAMPLE DESCRIPTION)

GROSS COUNTS RADIOLOGICAL FIELD RESULTS – [NaI (cpm)]

E ←25 FT→ D ←32 FT→ C B A

ELEVATION (FEET)	E	D	C	B	A
51–50	75000	320000	540000	480000	320000
50–49	185000	339000	192000	215000	128000
49–48	240000	152000	75000	60000	62000
48–47	115000	115000	84000	62000	60000
47–46	60000	67000			
46–45	89000	62000			
45–44	60000	51000			
44–43	83000	55000			
43–42	67000				

NOTE: SHADING INDICATES LIKELY EXCEEDANCE OF SOR CRITERIA WITHIN CELL.

SUM OF RATIOS (SOR) ON COMPOSITES – GAMMA SPECTROSCOPY

E ←25 FT→ D ←32 FT→ C B A

	D	C–B	A
Overburden	$REOV_D$ = 44.42 $REOV_W$ = 26.82	$TROV_D$ = 100.73 $TROV_W$ = 50.74	$SUOV_D$ = 49.07 $SUOV_W$ = 25.66
Upper		$REUP_D$ = 17.72 $REUP_W$ = 8.78 $TRUP_D$ = 0.58 $TRUP_W$ = 0.41	$SUUP_D$ = 5.50 $SUUP_W$ = 4.15
Lower	$RELO_D$ = 0.70 $RELO_W$ = 0.57	$TRLO_D$ = 1.23 $TRLO_W$ = 1.05	$SULO_D$ = 0.16 $SULO_W$ = 0.13

NOTES: $XXXX_D$ DRY SOR; $XXXX_W$ WET SOR

* SOR BASED ON LIMITS OF 15 pCi/g Th-232, Ra-226, 50 pCi/g U-238
SHADING PROVIDED FOR CONTRAST BETWEEN ZONES.

RE	TR	SU	
X	X	X	OV
X	X	X	UP
X	X	X	LO

LEGEND:

- SU – SURROUNDING
- TR – TRANSITION
- RE – RETENTION
- OV – OVERBURDEN (ABOVE)
- UP – UPPER (POND)
- LO – LOWER (BELOW)

U.S. Army Corps of Engineers
NEW YORK DISTRICT

Symbol	Description	Date	Approved
A	ORIGINAL ISSUE		

Revisions

STONE & WEBSTER ENVIRONMENTAL TECHNOLOGY & SERVICES

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Reviewed by: D SKRYNESS	Date: 6/28/00	

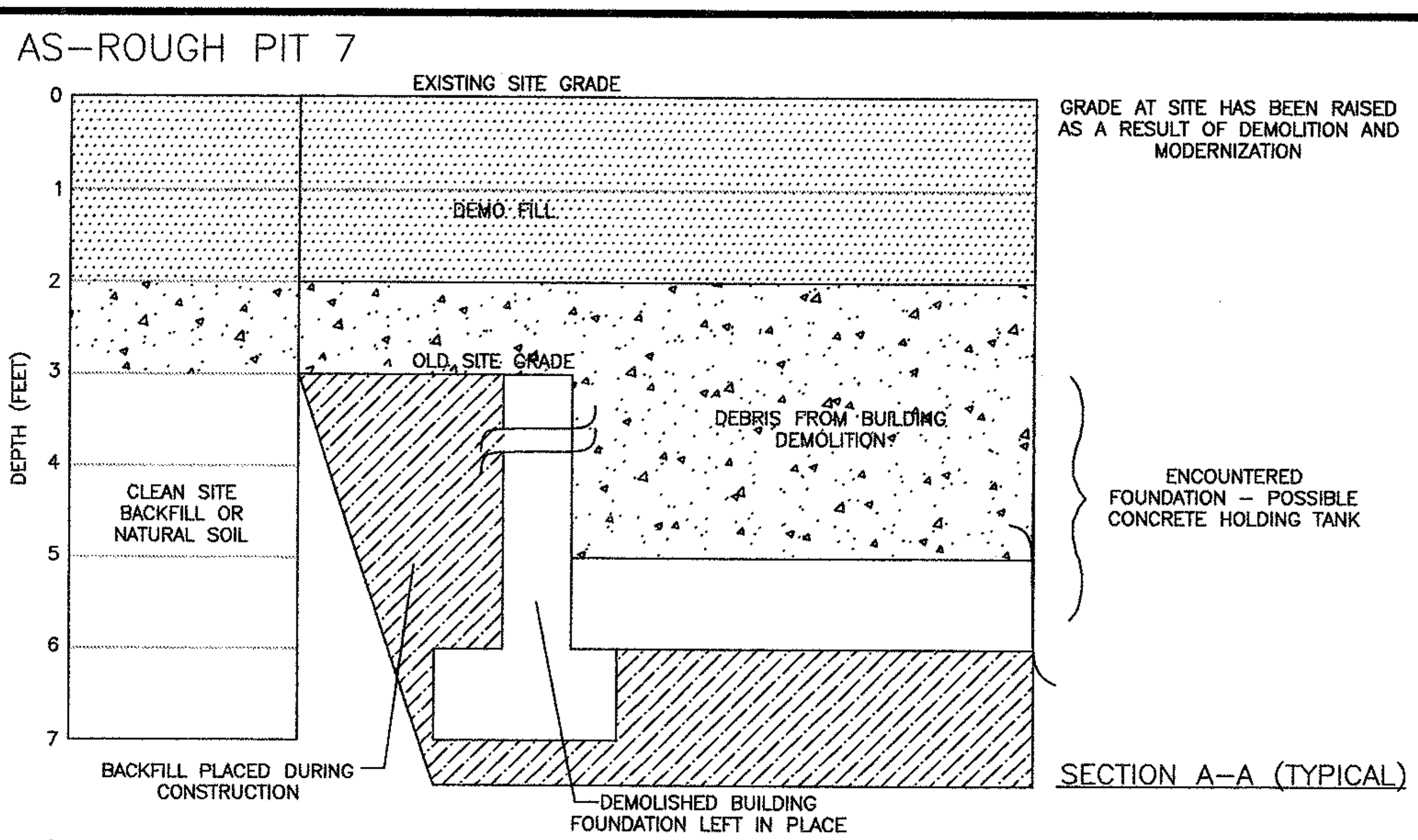
U.S. ARMY ENGINEER DIVISION
CORPS OF ENGINEERS
MAYWOOD, NEW JERSEY

FUSRAP

FUSRAP MAYWOOD SUPERFUND SITE
MAYWOOD, NEW JERSEY

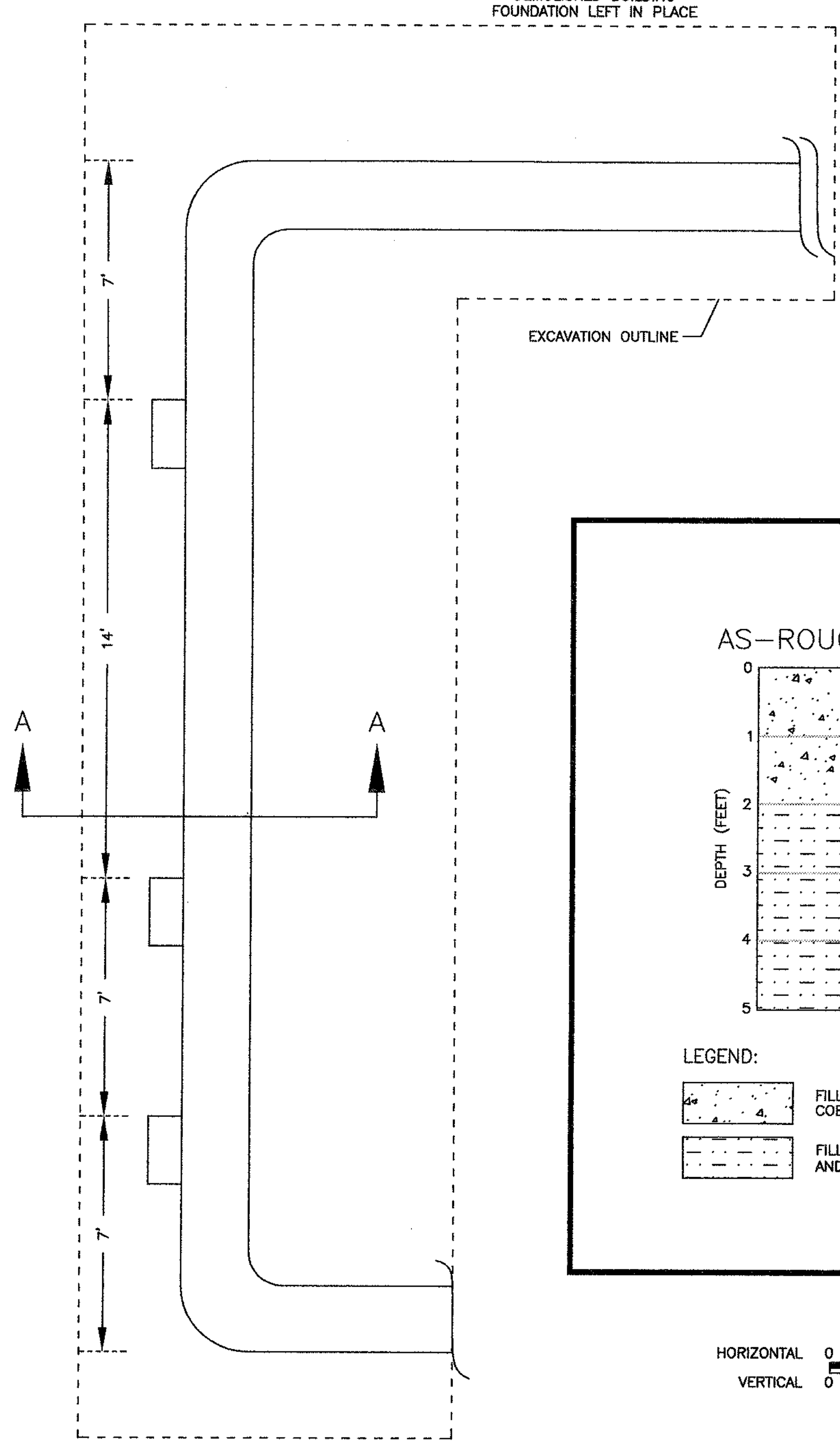
ENGINEERING TEST PIT 4
JUNE 2000
FINAL

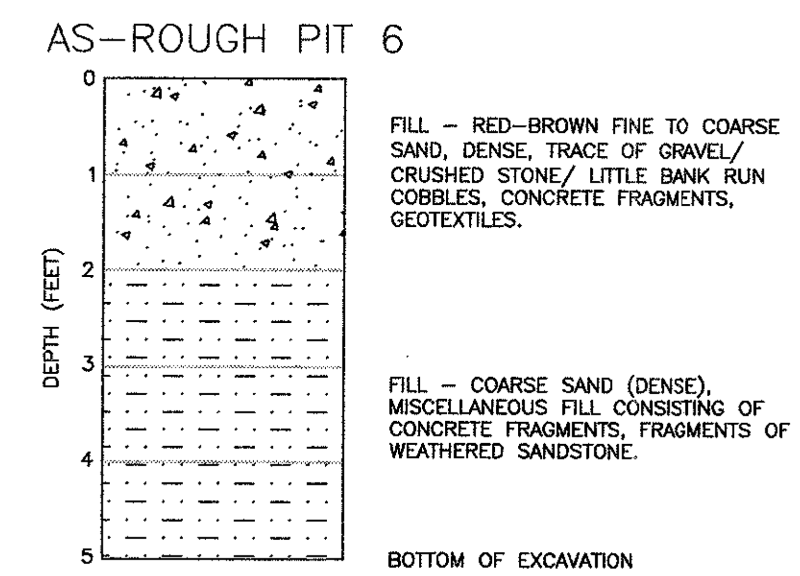
Contract Number: DACW41-99-D-9001
Delivery Order Number:
Project Number: 08575
Drawing Number: FIGURE 6



LEGEND:

- FILL WITH MISCELLANEOUS DEBRIS
- GRAVELLY SOIL MIXED WITH DEBRIS
- FOUNDATION BACKFILL

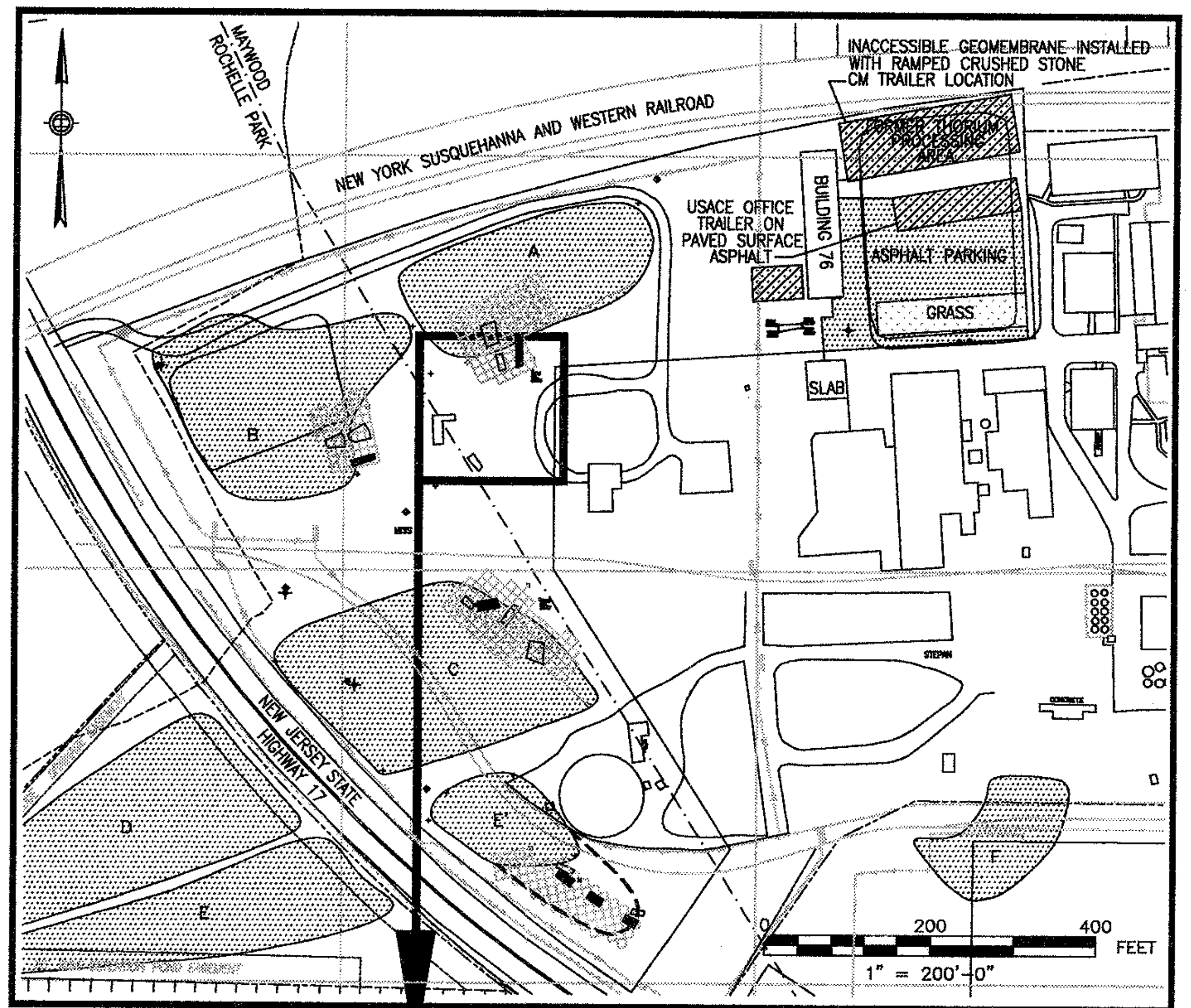


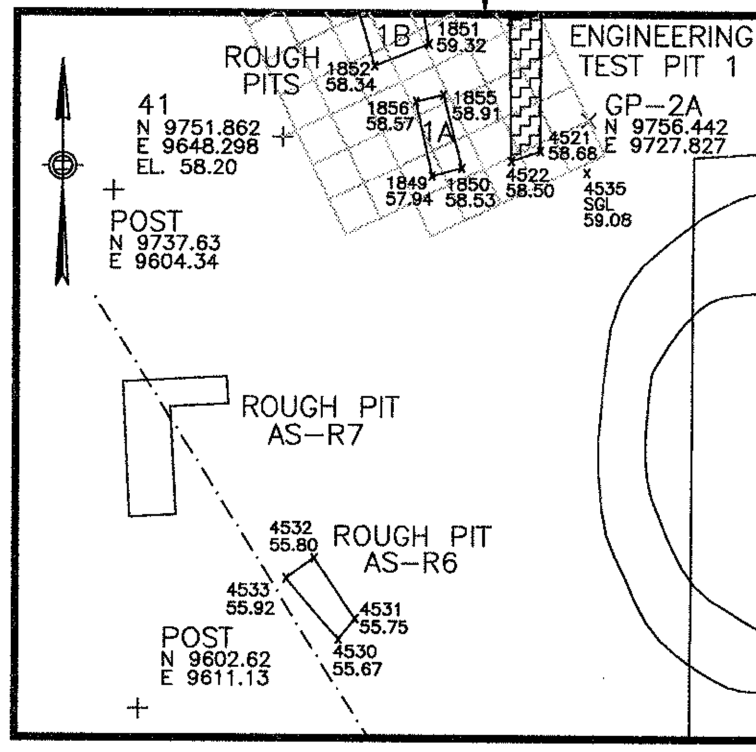


LEGEND:

- FILL – SAND WITH GRAVEL/CRUSHED STONE, COBBLES, CONCRETE FRAGMENTS, GEOTEXTILES
- FILL – MISCELLANEOUS FILL CONSISTING OF CONCRETE AND WEATHERED SANDSTONE FRAGMENTS

HORIZONTAL 0 4 8
VERTICAL 0 2 4
SCALE IN FEET





LEGEND:

+ 41 N 9751.862 E 9648.298	LOCATION OF FIELD STAKEOUT PIT AREA POINTS BY GARDEN STATE
× GP–2A N 9756.442 E 9727.827	LOCATION POINTS, GAMMA WALKOVER GRID BY GARDEN STATE (GRID @ 10'x10' EXCEPT WHERE NOTED)
R–1A R–1B	ROUGH PIT LOCATION A = EXTERIOR POND B = INTERIOR POND
	SURVEYED LOCATION OF ENGINEERING PIT
4533 55.92	SURVEYOR SHOT ID ELEVATION

NOTE:
TASK COMPLETED PRIOR TO CONVERSION TO NEW JERSEY PLANE COORDINATE SYSTEM.

0 50 100 FEET
1" = 50'–0"

NOTES:

SPECIAL SAMPLES ID & LOCATION	DESCRIPTION
SP–1–ASR7	WHITE GREASE-LIKE MATERIAL FROM CRUSHED DRUM SIMILAR TO WHITE POND MATERIAL
SP–2–ASR7	MATERIAL ADHERING TO EXPOSED CONTAINERS
SP–3–ASR7	SANDY DEBRIS WITH PETROLEUM ODOR
SP–4–ASR7	DARK SANDY MATERIAL PONDED IN CONCRETE STRUCTURE

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NEW YORK DISTRICT

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A	ORIGINAL ISSUE		

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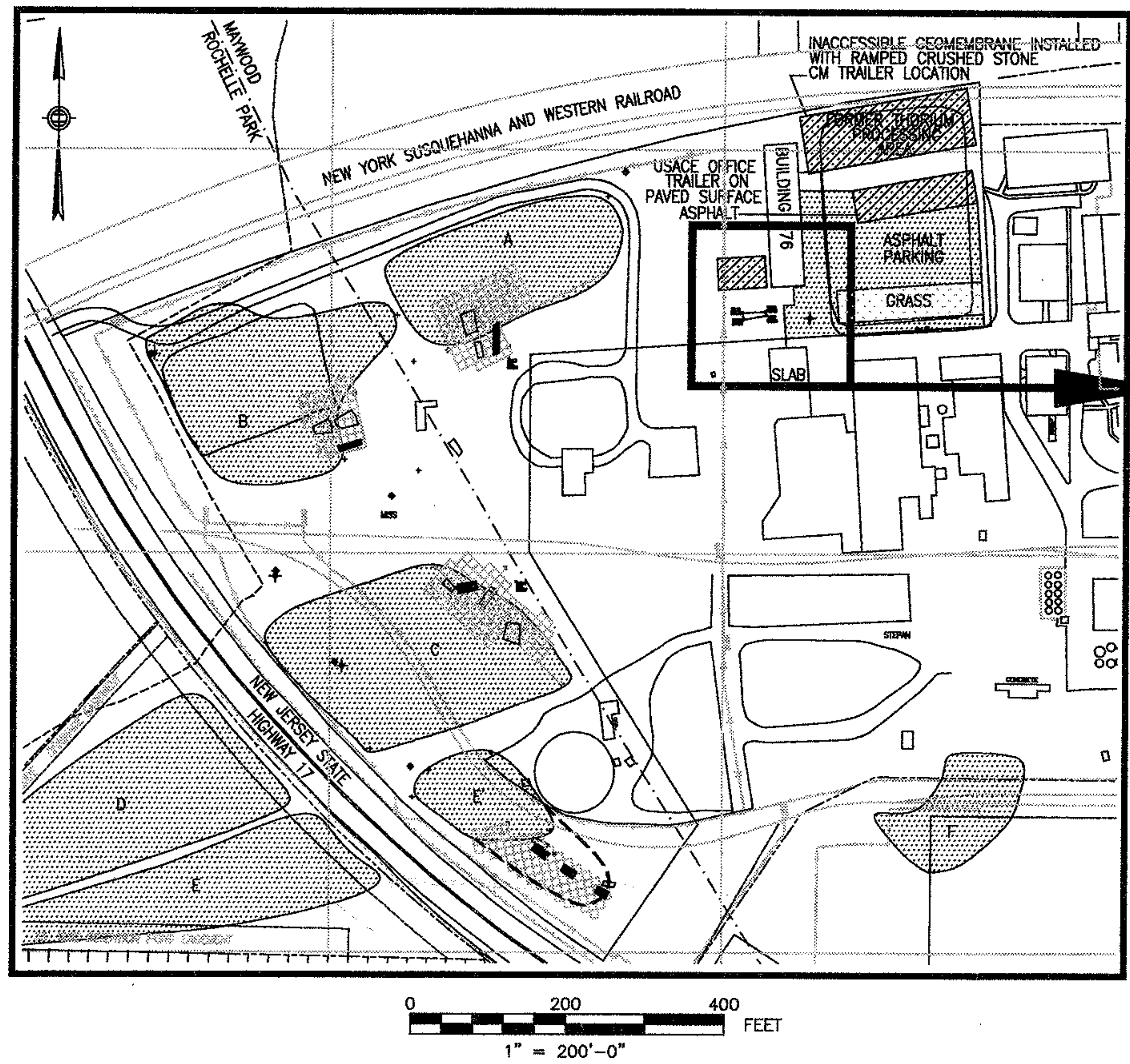
U.S. ARMY ENGINEER DIVISION CORPS OF ENGINEERS MAYWOOD, NEW JERSEY

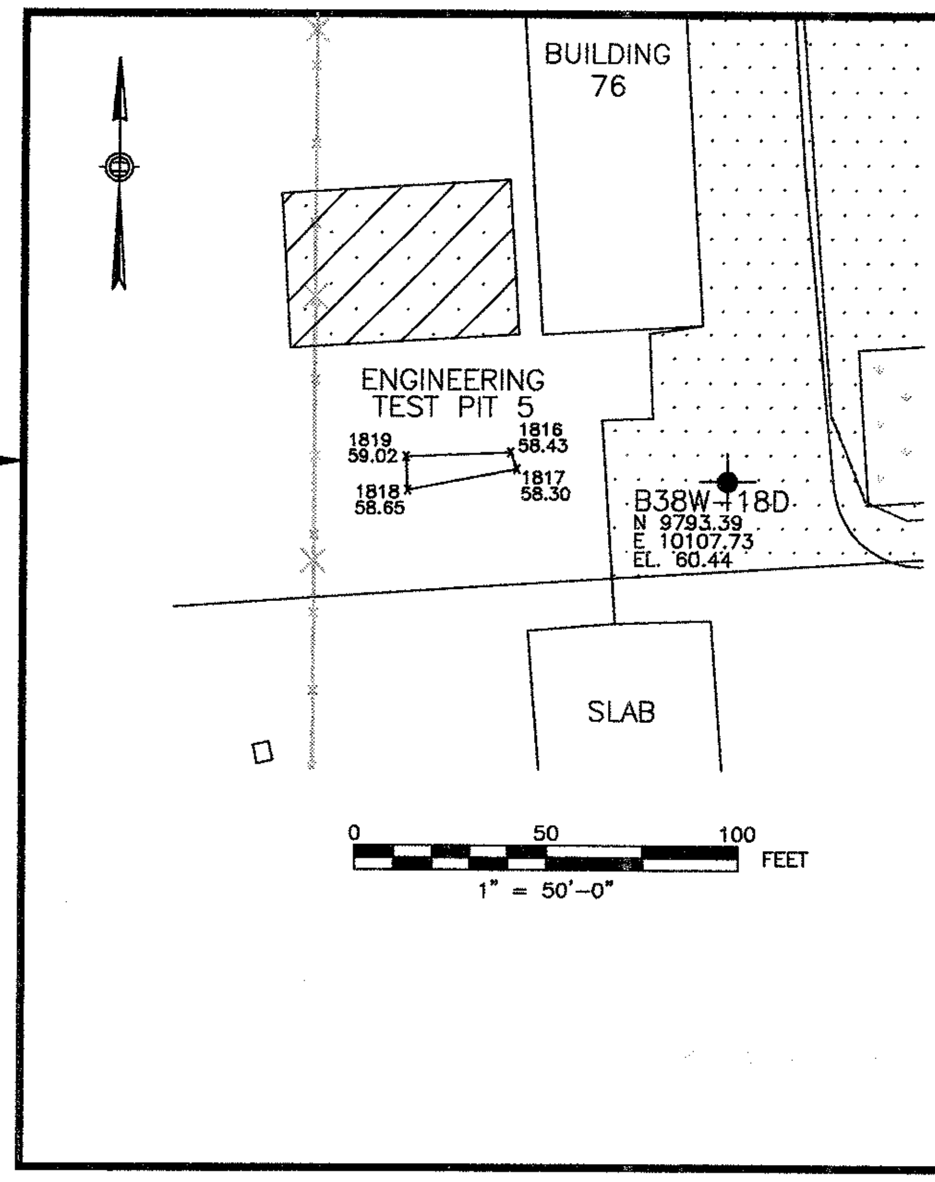
FUSRAP

FUSRAP MAYWOOD SUPERFUND SITE MAYWOOD, NEW JERSEY

ADDITIONAL SCOPE-R7 AND ADDITIONAL SCOPE-R6
JUNE 2000
FINAL

Contract Number: DACW41-99-D-9001
Project Number: 08575
Drawing Number: FIGURE 8





LEGEND:

LOCATION OF BEDROCK MONITORING WELL

1818 56.65 — SURVEYOR SHOT ID ELEVATION

NOTE:

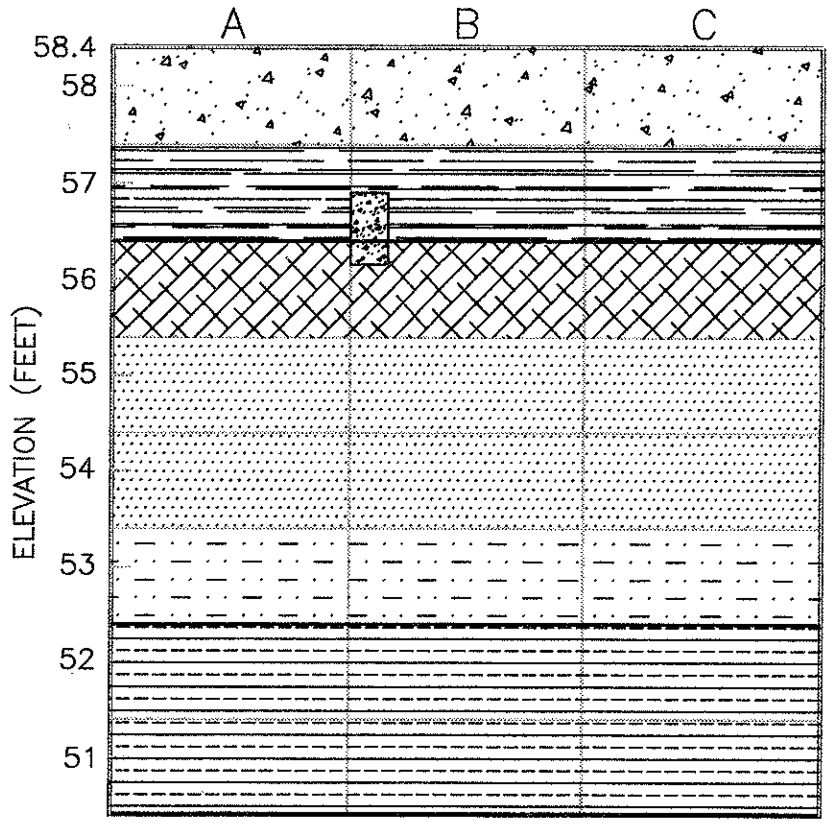
TASK COMPLETED PRIOR TO CONVERSION TO NEW JERSEY PLANE COORDINATE SYSTEM.

MATRIX GRID/CELL IDENTIFICATION

ELEVATION (FEET)	A	B	C
58.4–58	MISS-TP5SS0A010	MISS-TP5SS0B010	MISS-TP5SS0C010
57	MISS-TP5SS0A020	MISS-TP5SS0B020	MISS-TP5SS0C020
56	MISS-TP5SS0A030	MISS-TP5SS0B030	MISS-TP5SS0C030
55	MISS-TP5SS0A040	MISS-TP5SS0B040	MISS-TP5SS0C040
54	MISS-TP5SS0A050	MISS-TP5SS0B050	MISS-TP5SS0C050
53	MISS-TP5SS0A060	MISS-TP5SS0B060	MISS-TP5SS0C060
52	MISS-TP5SS0A070	MISS-TP5SS0B070	MISS-TP5SS0C070
51	MISS-TP5SS0A080	MISS-TP5SS0B080	MISS-TP5SS0C080

NOTES: MISS-TP5SS0C080 GRID/CELL ID

TEST PIT MATRIX



SAND – COARSE WITH SOME GRAVEL/CRUSHED STONE.

ASPHALT 4" THICK UNDERLAIN WITH GRANULAR MATERIAL TREATED WITH PETROLEUM PRODUCT.

FILL – SUBBASE TYPE MATERIAL, GRANULAR, DARK BROWN, BRICKS, FIBROUS MATERIAL AND DECOMPOSED LEAVES.

MISCELLANEOUS FILL CONSISTING OF CONSTRUCTION DEBRIS, WATER FILLED CERAMIC TUB, HYDROCARBON, SHEEN, ORGANICS, PETROLEUM ODOR. TRACES OF HARD BITUMEN (MELTS WHEN EXPOSED TO SUNLIGHT).

FILL – SILTY SAND, SOFT TEXTURED, HIGH PEAT, TRACE OF REDDISH SANDSTONE FRAGMENTS.

DARK BROWN TO REDDISH FINE TO MEDIUM SAND DAMP MEDIUM DENSE TO DENSE.

LEGEND:

- SAND WITH GRAVEL/ CRUSHED STONE
- ASPHALT
- SUBBASE MATERIAL, BRICKS, FIBROUS MATERIAL, ORGANICS
- DEMOLISHED CONCRETE WALL
- FILL WITH MISCELLANEOUS DEBRIS
- SILTY SAND, ORGANICS, TRACE OF SANDSTONE FRAGMENTS
- SAND

HORIZONTAL 0 4 8

VERTICAL 0 2 4

SCALE IN FEET

NOTES:

THERE ARE NO RETENTION PONDS ASSOCIATED WITH TEST PIT 5.

SPECIAL SAMPLES

ID & LOCATION	DESCRIPTION
SP-1-B4	DARK SANDY SOIL WITH PETROLEUM ODOR
SP-2-A4	DARK FIBROUS MATERIAL
SP-3-C3	POND-LIKE MATERIAL WITH PETROLEUM ODOR

GROSS COUNTS RADIOLOGICAL FIELD RESULTS – [NaI (cpm)]

ELEVATION (FEET)	A	B	C
58.4–58	32000	34000	62000
57	20000	24000	23000
56	14000	17000	25000
55	14000	15000	15000
54	13000	14000	14000
53	14000	15000	14000
52	14000	14000	13000
51	14000	14000	13000

NOTES:

SHADING INDICATES LIKELY EXCEEDANCE OF SOR CRITERIA WITHIN CELL.

SUM OF RATIOS (SOR) ON COMPOSITES – GAMMA SPECTROSCOPY

ELEVATION (FEET)	A	B	C
58.4–57		$OVER_D$ = 1.61 $OVER_W$ = 1.25	
56–53		$UPER_D$ = 0.96 $UPER_W$ = 0.62	
52–51		$LWER_D$ = 0.13 $LWER_W$ = 0.09	

NOTES: $XXXX_D$ DRY SOR; $XXXX_W$ WET SOR

U.S. Army Corps of Engineers
NEW YORK DISTRICT

Revisions: A — ORIGINAL ISSUE

STONE & WEBSTER ENVIRONMENTAL TECHNOLOGY & SERVICES

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Drawn by: K ANTHONY Date: 6/28/00
Reviewed by: R SKRYNESS Date: 6/28/00

U.S. ARMY ENGINEER DIVISION
CORPS OF ENGINEERS
MAYWOOD, NEW JERSEY

FUSRAP

FUSRAP MAYWOOD SUPERFUND SITE
MAYWOOD, NEW JERSEY

ENGINEERING TEST PIT 5
JUNE 2000
FINAL

Contract Number: DACW41-99-D-9001
Project Number: 08575
Drawing Number: FIGURE 7

APPENDICES

APPENDIX A

ENGINEERING TEST PITS AT MISS SAMPLING PLAN DESIGN & EXECUTION REPORT

FUSRAP MAYWOOD SUPERFUND SITE MAYWOOD, NEW JERSEY

TABLE OF CONTENTS

Tables

Figures

LIST OF ACRONYMS AND ABBREVIATIONS

ASTM	American Society for Testing and Materials
bgs	below ground surface
CDQMP	Chemical Data Quality Management Plan
COC	Chain of Custody
CQCP	Contractor Quality Control Plan
DQCR	Daily Quality Control Report
DQO	Data Quality Objectives
EM	Engineering Manager
FOL	Field Operations Leader
FUSRAP	Formerly Utilized Sites Remedial Action Program
LSA	Low Specific Activity
MHTDP	Materials Handling, Transport and Disposal Plan
MISS	Maywood Interim Storage Site
MS	Matrix Spike
MSD	Matrix Spike Duplicate
MSS	Maywood Superfund Site
NCR	Nonconformance Report
NGVD	National Geodetic Vertical Datum
NJDEP	New Jersey Department of Environmental Protection
PCB	polychlorinated biphenyl
pCi	picocurie
PID	Photoionization Detector
QA	Quality Assurance
QC	Quality Control
RSO	Radiation Safety Officer
SSHO	Site Safety and Health Officer
SSHP	Site Safety and Health Plan
SAP	Sampling and Analysis Plan
SC	Sampling Coordinator
SCC	Soil Cleanup Criteria
SOP	Standard Operating Procedure

SOR	Sum- of-the-Ratios
SSERC	Site-Specific Environmental Restoration Contract
SVOC	Semivolatile Organic Compound
TCLP	Toxicity Characteristic Leaching Procedure
TPWP	Test Pit Work Plan
USACE	U.S. Army Corps of Engineers
USCS	Unified Soil Classification System
USGS	U.S. Geological Survey
USEPA	U.S. Environmental Protection Agency
UTM	Universal Transverse Mercator
VOC	Volatile Organic Compound
VOD	VOC of the Day

Executive Summary

The United States Army Corps of Engineers (USACE), under Site-Specific Environmental Restoration Contract (SSERC) No. DACW41-99-D-9001, has contracted Stone & Webster Environmental Technology & Services (Stone & Webster), a division of Stone & Webster Engineering Corporation, to perform remediation of the FUSRAP Maywood Superfund Site, in Maywood, Lodi, and Rochelle Park, New Jersey (see Site Location Map, Figure 1). A soil washing/soil sorting demonstration project has been proposed. These technologies offer great promise in substantially reducing the volume of soil requiring disposal as radioactive waste, without performing any treatment on site. Due to gaps in the existing site information, a limited test pit program had been proposed prior to the demonstration plant. The objective of the proposed field work was to collect the data necessary to perform an engineering correlation between the previously collected test boring data and the soil characteristics that will influence the performance of the pilot demonstration.

To ensure the proper conduct of work, Stone & Webster developed a Test Pit Work Plan (TPWP – July, 1999). The TPWP satisfied the requirements of a Sampling and Analysis Plan (SAP) and incorporated the relevant elements of a Site Safety and Health Plan - Addenda as Appendix A to the plan. This Sampling Plan Design & Execution Report details the work performed under the Test Pit Work Plan. The results of this field investigation are reported in Engineering Test Pits at MISS Report.

1.0 INTRODUCTION

The objective of this Sampling Plan Design & Execution Report is to report on the execution of the Test Pit Work Plan (TPWP), performed at the MISS during July and August of 1999. The TPWP provided guidance for collecting field data required for the engineering evaluation of the site soils and their potential impact on the effectiveness of the pilot plant. The TPWP provided the task-specific information related to the performance of the subject field program. A Chemical Data Quality Management Plan (CDQMP) has been developed for the FUSRAP Maywood Superfund Site project. The CDQMP consists of a Quality Assurance Project Plan (QAPP) and a Field Sampling Plan (FSP). The intent of the CDQMP is to present the project-level sampling and analytical requirements for the FUSRAP Maywood Superfund Site. It presents procedures for sampling, chain of custody (COC), laboratory instrument calibration, laboratory analysis, reporting of data, internal quality control (QC), audits, preventive maintenance of field equipment, and corrective action. Other project work plans that are relevant to this task order are the Contractor Quality Control Plan (CQCP), the Materials Handling/Transport, and Disposal Plan (MHTDP), the Site Safety and Health Plan (SSHP), and the General Environmental Protection Plan (GEPP).

Much of the information required for a SAP has been previously addressed in other project level work plans. In order not to reiterate the content of these earlier work plans, the relevant plan was referenced where appropriate rather than repeating the information in the TPWP. Task-specific details not covered by the CDQMP or other project work plans or changes to procedures previously presented in these documents were discussed in the TPWP.

Overall, the TPWP provides guidance and specifications to ensure that:

- samples were obtained under controlled conditions using appropriate and documented procedures;
- samples were identified uniquely (see Subsection 5.5), and controlled through sample tracking systems and COC protocols;
- field determinations and laboratory analytical results were of known quality and were valid and consistent through the use of certified methods, preventive maintenance, calibration and analytical protocols, quality assurance (QA)/QC measurements, appropriate review methodologies, correction of noncompliant situations, and audits as necessary;
- calculations and evaluations were accurate, appropriate, and consistent throughout the project;
- generated data were validated and their use in calculations was documented;
- safety was maintained by implementing the safety and health program; and
- records were retained as documentary evidence of the quality of samples, applied processes, equipment, and results.

This Sampling Plan Design & Execution Report is provided as an Appendix to the Engineering Test Pits at MISS – Report. All results and conclusions generated as a result of the field program are contained in the main body of text and in the following Appendices:

Appendix	Description
Appendix B	Field Data
Appendix C	Geotechnical Data Results
Appendix D	Soil Radiological Data Results and SOR Calculation
Appendix E	Soil Chemical Data Summary
Appendix F	Groundwater Data Summary
Appendix G	Work Permits
Appendix H	Wetlands Delineation

2.0 TASK ORGANIZATION AND RESPONSIBILITIES

Figure 2 shows the task organization and its principal lines of communication and authority.

2.1 Task Manager

The Stone & Webster Task Manager was responsible for effective day-to-day management of all operations. The Task Manager responsibilities specifically included the following:

- preparing work plans, including approval of sampling locations, chemical analysis parameters, schedules, and labor allocations;
- managing all funds for labor and materials procurement;
- monitoring and controlling the schedule;
- managing the site team toward unified, productive project accomplishment;
- direct communication and liaison with the USACE Engineering Manager (EM); and
- providing oversight to the technical leaders and reviewing all deliverables.

2.2 Field Operations Leader

The Field Operations Leader (FOL) was responsible for the following items:

- the appropriateness, adequacy, and timeliness of the technical or engineering services provided;
- developing the technical approach and level of effort required to address each task/subtask;
- the day-to-day conduct of the work, including the integration of the input of supporting disciplines and subcontractors and ensuring all field documentation is completed properly (see Appendix B);
- ongoing QA/QC during performance of the work; and
- the technical integrity as well as the clarity and usefulness of all project work products.

2.3 Site Safety and Health Officer and Radiation Safety Officer

The responsibilities of the site safety and health personnel were discussed in the Site Safety and Health Plan - Addenda in the TPWP..

2.4 Sampling Coordinator

The Sampling Coordinator was responsible for overseeing all sampling and analysis activities, including preparing sample bottles for collection; managing field sampling records, laboratory chains-of-custody, and other sampling related documentation; coordinating laboratory sample pick-ups; and/or packaging and shipping samples. In particular, this individual documented the source of the material that comprises each composite sample analyzed for each zone of interest in the test pit. This ensured that results obtained from the laboratories could be correlated back to specific locations within each test pit.

2.5 Identified Individuals

The task order staff consisted of the following individuals:

Task Manager	Richard Skryness, P.G.
Lead Geotechnical Engineer	L.P. Singh, P.E
Field Operations Leader	Babatunde Marquis
Project Superintendent	Tom Farrell
Site Safety & Health Officer	Dirk Decker
Radiation Safety Officer	Eric Laning
Sampling Coordinator	Karl Goff
Contractor Quality Control System Manager	Alan Brown
Project Chemist	Brian Tucker

Subcontractors and Team Members that were used include the following:

Organization	Responsibility
Malcolm Pirnie	Certified Health Physicist
Garden State Survey	Civil Surveying
Franklin Environmental	Excavation Equipment, Operator and Labor
Safety and Ecology Corp.	Health and Safety Training
	Radiation Technicians
	Onsite Radiation Laboratory
Applegate Associates	Health and Safety Training
Severn Trent Laboratories	Chemical Laboratory and related supplies
Advanced Terra Testing, Inc.	Geotechnical Laboratory
TBD	Waste Disposal

All subcontractors and Team Members were required to comply with the project work plans.

3.0 PROJECT DESCRIPTION

Stone & Webster identified several soil characteristics in the Technology Evaluation Report (WAD1-WBS8), which will influence the performance of the pilot plant demonstration. These properties are based on split-spoon samples and drill cuttings from borings drilled throughout the FUSRAP Maywood Superfund Site. Much of the information is presented in the Soils Grouping Report (SAIC, 1998). Engineering Test Pits were proposed to observe the spatial relationship of representative soil characteristics and help identify a soil source for feeding the demonstration plant.

Five engineering test pits, approximately three feet wide and fifteen to thirty feet long, were installed. The locations were adjusted in the field to avoid buried utilities, and to minimize the interference with other on-site activities. Utilities were located using existing site drawings and information. A wetlands survey was performed which found no wetlands on the MISS. Four of the five test pits were located to intercept the boundaries of former retention ponds (A, B, C, and E). These excavated test pits provided the means to observe the soils that make-up the site overburden (surface soils), the retention pond residue, the soils surrounding the former retention ponds, and the transition soils (between the pond residue and surrounding soils.). Test pits were extended to the bottom of contamination, as determined by gamma surveys of the collected samples. For each Retention Pond Engineering Test Pit, two rough pits were installed. The rough pit excavations determined the location of the boundary and facilitated other field observations in preparation for excavating the engineering test pit. These rough pits were backfilled, and the engineering test pit was installed a short distance away. This method ensured that the boundaries of the retention ponds were captured within the planned test pit length.

The fifth test pit was installed to the southwest of Building 76 on the MISS. It was used to evaluate soils that are not associated with the retention ponds but may represent a significant volume of soil at the MISS. It was located so as to avoid the area to the east of Building 76 where a geomembrane was previously installed. Test pit locations were surveyed following the completion of the Engineering Test Pits.

Two additional rough pits AS-R6 and AS-R7 were excavated in the existing RMA outside of the retention ponds A and B.

3.1 Schedule

The general milestones for the test pit program were as follows:

Milestone	Date
Wetlands Delineation	July 28, 1999
Mobilize/Training	August 2 – 4, 1999
Start Rough Test Pit Excavations	August 5, 1999
Install Push-Pipes	August 16, 1999
Start Engineering Test Pits	August 16, 1999
Complete field work	September 3, 1999
Perform Survey of Test Pit Locations	September 7, 1999

3.2 Data Quality Objectives

The formal multi-step DQOs process described in the CDQMP was not followed for the test pit investigation. This is because the objective of the test pit work activities was not to make remedial design, remedial action, or soil management decisions, but rather to establish approximate engineering correlations of the variability of radiological and chemical contamination with spatial location, depth, and physical properties. Radiological and chemical measurements were made using a combination of field screening and offsite laboratory capabilities.

QC sample collection, testing methods, and control, as well as laboratory quality assurance (QA) protocol shall provide assurance to the data user that the data is of measurable quality. As a measure of quality, the data user shall use laboratory precision, accuracy and completeness criteria for the analytical methods of interest (see Section 7.0 of this report) as shown in Appendix B of the QAPP. Field blanks were collected as indicated in Tables 1 and 2 for the Contract and Onsite Laboratories and Quality Assurance Laboratory respectively.

Method detection limits and practical quantitation limits for the analytical methods of interest as presented in Appendix A of the QAPP were included in Attachment C of Volume II of the TPWP. The semivolatile organic, polychlorinated biphenyl, and pesticide limits were developed using the sonication extraction method. For this project, Stone & Webster will utilize the sonication method for all samples with the exception of those containing a clay matrix (i.e. cohesive). No clay soils were identified during the test pit program.

4.0 FIELD INVESTIGATION

4.1 Field Investigation and Report Organization

This segment of the report is organized in the order that the field investigation was conducted . The rough pits and engineering test pit excavation, groundwater, and soil sampling was conducted in accordance with the approved work plan. Components of the field investigation are described as follows:

- Pre-construction Planning and Coordination
- Training
- Mobilization
- Wetlands Delineation
- Survey and Excavation Stake out
- Site Clearing
- Surface Scan/Gamma Walkover
- Utility Mark-outs and Excavation Clearance/Permits
- General Excavation Procedure - Rough Pits
- General Observations – Rough Pits
- General Excavation procedure – Engineering Test Pits
- General Observations – Engineering Test Pits
- Laboratory Testing (Rad., Chem. and Geotech)
- Field Records (Compiled by Test Pits)
    - Test pit Photos
    - Test pit logs
    - Radiological, Chemical & Geotechnical
    - Soil Sample & Composite Listing
    - Chain of Custody

4.2 Pre-Construction and Coordination

Prior to initiation of field activity, a coordination and pre-construction meeting was held at the site with the project superintendent, health and safety personnel and sub-contractors. The meeting addressed the test pit investigation, excavation/construction sequence and technique, sampling procedure and protocol, and work hours. The meeting also identified concurrent activities on site and training requirements for the labor crew.

As part of the coordination meeting, a site walkdown was conducted to identify subcontractor's staging area and decontamination pad. Any modifications that may be required to make the existing decontamination pad suitable for the test pit use were also identified. Approximate locations of the test pits were noted, and access to the SW portion of the site across the railroad tracks onto Stepan property was identified.

4.3 Training

All personnel participating in the engineering test pit work received a General Employee Radworker Training (GERT) and site orientation. Upon completion of the GERT, field crews were fit tested with their respective respirator sizes in accordance with the SSHP. Medical baseline evaluation/testing was conducted prior to field investigation.

4.4 Mobilization

The Contractor's equipment was staged at the MISS prior to commencement of subsurface exploration. To document any previous radiological contamination, SEC surveyed the Contractor's equipment prior to excavation. Equipment brought on site by the contractor consisted of one 850 excavator, one F150 pick-up truck, small hand tools and a gas powered weed eater. Sampling equipment was shipped directly to site by the vendors

Appropriate personal protective equipment (PPE) such as gloves, tyveks, boots and personnel survey equipment were supplied by SEC in accordance with the Project Health and Safety Plan.

4.5 General Approach

4.5.1 Wetlands Delineation

A Wetlands delineation was performed at the MISS to identify and mark areas within the site so that excavation the engineered test pits were located outside of the wetland boundaries and buffer zones. It was determined that there are no wetlands within the MISS. Wetlands delineation documentation is included in Appendix H.

4.5.2 Survey

The retention pond boundaries were located using historical records and aerial photographs of the site. The boundaries of the retention ponds were located on the existing site plan using known points such as observation wells as reference points. The surveyor staked out the approximate locations of the retention pond boundaries. Two points along the boundary of the ponds were staked and a line was drawn to connect both points. One side of the line was identified the inside portion of the pond while the other was identified as the outside of the pond. This line was used as the basis for excavating the rough pits for each of the retention ponds.

4.5.3 Site Clearing

The rough pits and engineering tests pits were located to minimize the amount of clearing required. Any surface impediments such as shrubs and debris were removed prior to excavation. No trees were removed in the course of completing the test pit investigation.

4.5.4 Surface Scan/Gamma Walkover

A10 ft by 10 ft grid was located by the surveyor along the staked boundaries of the retention ponds. This area covered the rough pits' and engineering test pits' locations. A gamma surface scan was conducted to record the existing surface radioactivity levels prior to excavation. Upon completion of the test pit excavation, the 10 ft by 10 ft grid was reestablished to record the surface radioactivity levels after excavation. Pre and post excavation levels recorded are included in Appendix B. A gamma walkover was not performed for Test Pit 5.

4.5.5 Utility Mark-outs and Clearance

Prior to excavation, the location and marking of existing utilities at the MISS was performed. The approximate alignment of active sewer lines was established by locating manhole covers as shown in existing site drawings. Direction of flows was determined by opening manhole covers. In addition, a Dig Safe clearance/excavation permit was obtained for the different stages of the test pit investigation.

4.5.6 Excavations and Sampling

The Stone & Webster Field Operations Leader FOL directed the Field Team during excavations of the rough pits and engineered test pits. The Stone & Webster Sample Coordinator (SC) organized, directed and provided oversight for the sampling performed during the test pit program

The engineering test pit sampling and testing program was completed to develop analytical profiles that capture the horizontal and vertical distribution of radiological, chemical and geotechnical properties of the soils. Each 4ft wide by 5ft lengths and 1-ft thick lift of soil within the grid was sampled. Sampling procedures are discussed further in Section 5.0. Radiological data results are located in Appendix D. Geotechnical data results appear in Appendix C. The chemical data summary is in Appendix E.

Rough Pits were excavated as follows:

Rough Pit Excavation			
Retention Pond	Rough Pits	Depth (ft)	Depth to Groundwater (ft)
A	1A	9	NE
	1B	12	NE
B	2A	22	18
	2B	13	NE
C	3A	14	NE
	3B	14	13
E	4A	4	NE
	4B	12	10
NE: Not Encountered			

Upon completion of the scheduled rough and engineering test pits, two additional rough pits AS-R6 and AS-R7 were excavated in the existing RMA outside of retention ponds A and B. The additional rough pits were excavated to gather information about soil types that are not associated with any of the retention ponds, but rather are representative of the MISS. No engineering pits were associated with the additional rough pits.

Additional rough pits were excavated as follows:

Additional Rough Pit Excavations			
Additional Scope Rough Pits (AS-R#)	Depth (ft.)BGS	Depth to Groundwater (ft.) BGS	Dept to Bedrock (ft.) BGS
AS-R6	5	NE	NE
AS-R7	7	NE	NE

4.5.6.1 Rough Pit Excavation

Excavation of the rough pits were proposed to accomplish or determine the following:

- Locate and identify the inside of the retention ponds sediments and bottom of the retention ponds as close to the pond outline as possible.
- Locate and identify the outside of the retention ponds and surrounding material as close to the pond outline as possible.
- Capture the transition zone between the pond boundary and surrounding soil.
- Evaluate groundwater depths at the proposed test pit location.
- Determine the magnitude of radiological contamination relative to excavated depth.
- Facilitate the location of the engineering test pit alignment to capture the surrounding material, transition material and retention pond material.
- Determine depth to bedrock at the locations of the proposed test pits in the retention pond areas.

For each of the retention ponds located at the MISS, two rough pits (A and B) were excavated to identify the inside material of the pond and the surrounding material outside of the pond. The interval between the two rough pits captured the boundary of the pond and the transition of the pond to the surrounding soil.

To determine the approximate location of the rough pits, two points were located along the outline of each retention pond as shown in the existing records and site drawings. Two known locations (monitoring wells MISS-6A and MISS-2A) on the site plan were located by Garden State Survey on the ground surface in the area of the former retention ponds. Coordinates and control elevations were established at the rough pit location with reference to the nearest monitoring well.

With the exception of the marked locations for rough pits A and B, the ground surface was prepared in accordance with the work plan excavation sequence. A stockpile area was located adjacent to the rough pit excavation. In order to preserve the integrity of the surface soil, the top 1-2 ft of overburden in the stockpile area was remove to expose the presumed contaminated subsurface soil. This approach helped control and minimize the potential for contaminating the existing surface with subsurface spoils.

Rough Pit excavation proceeded downward and horizontally about the width of the excavator bucket in one-foot lifts. This method enabled the observation of layering, material composition, material boundaries and profiles as they were exposed. Cross sections and observations made are depicted in the individual test pit in Figures 3 through 7 of the test pit report

For each of the retention ponds, only one of the two rough pits was excavated to bedrock and groundwater, when possible. Prior to excavating rough pits 1 and 2 at retention Ponds A and B, there had been no rainfall for at least two months creating dry conditions and a lowered water table.

Dust Control and Dust Suppression

Prior to excavation, the area to be excavated was pre-soaked using site water delivered through a garden hose and spray nozzle. As excavation progressed, the soils were hosed down to mitigate airborne contamination. In addition, continuous air monitoring was implemented to monitor at the excavation perimeter. Records for the air monitoring program are included with the field records.

Rough Pit Excavation Observations	
Rough Pit 1 at Retention Pond "A"	• Retention Pond "A" boundary was located. The retention pond sediment varied in color ranging from white to tan, gray and greenish pond sediments with decaying leaves and plant shoots. • Groundwater was not encountered • Radiation levels measured as excavation progressed dropped with depth • A highly compacted coarse material with black organic substance was encountered at 2ft below ground surface with foul odor. • Depth to bottom of pond A was measured at 6ft below ground surface. • Bedrock (Dark-red sandstone) was encountered at 12-ft below ground surface.
Rough Pits 2 at Retention Pond "B"	• Retention Pond "B" boundary was located. Retention pond B sediments varied in color ranging from white to tan, gray and greenish pond sediments with decaying leaves and plant shoots. • Groundwater was encountered at 18-ft below ground surface. Percolation rate was less than 5 gpm (water sample was collected and processed for offsite chemical analysis) • Radiation levels measured as excavation progressed dropped with depth. • Depth to bottom of pond was measured at 8ft below ground surface • Debris encountered included miscellaneous fills such as demolished building debris, lumber, tree stumps, pipes, asbestos shingles/siding etc.

Rough Pit Excavation Observations	
Rough Pits 3 at Retention Pond "C"	• Retention Pond C boundary was located. The retention pond sediment varied in color ranging from white to tan, gray and greenish pond material with decaying leaves and plant shoots. • Groundwater was encountered at 12ft below ground surface (groundwater sample was collected and processed for offsite laboratory chemical analysis). • Radiation levels measured as excavation progressed dropped with depth. • Buried drums and fragments of a large glazed ceramic container were exposed close to the ground surface. Radiation levels recorded near the exposed drum and glazed ceramic fragments were significantly elevated (> 100,000 cpm). Rough pits at pond C were relocated and the exposed drum location was flagged and posted. • Depth to bottom of pond C was measured at 8ft below ground surface. • Magnetometer scan of the immediate area indicates several metallic anomalies. • A pink to purple thin layer (4-6 inches) of sticky material underlie Pond "C" • Bedrock (Dark red sandstone) encountered at 14-ft below ground surface. • Due to the heavy rains prior to excavation, the soil was unstable, undermining and cave-in below ground surface were common.
Rough Pits 4 at Retention Pond "E"	• Retention pond E boundary was located and found to be over 100ft beyond the outline shown in the existing site plan and aerial photo. Retention pond E sediment varied in color ranging from white to tan, gray and greenish pond material with decaying leaves and plant stems. • Radiation levels measured increased with depth up to 5ft below ground surface. • Groundwater was encountered at 10-ft below ground surface (Groundwater sample was collected and processed for offsite laboratory chemical analysis). • Depth to bottom of pond E was measured at 7ft below ground surface at the deepest section of the excavation. • Excavation to bedrock could not be accomplished due to continuous cave-in and undermining below ground surface as a result of the heavy rainfall prior to excavation.

Rough Pit Excavation Observations	
Additional Scope – Rough Pits 6 and 7	• Material and excavation profile observed in the additional rough pits are similar to those observed in the surrounding soils at test pit 1 retention pond "A", and test pit 2 retention pond B. Excavated materials are mostly FILL consisting of construction debris, geotextile, demolished building debris and fragments of weathered sand stone. • A partially demolished concrete structure was exposed while excavating AS-R7. The structure appears to be a holding or a containment structure. The interior was backfilled with miscellaneous wastes such as crushed drums, petroleum products, pieces of ceramic containers, grass wares, dishes, ashes etc. Only a portion of the structure was exposed. A sketch of the structure and excavation outline is shown in Figure 8 of the test pit report. The foundation coincides with a Toluene containment basin shown in drawing ________.

4.5.6.2 Engineering Test Pit Excavation

Based on the observations and the information gathered from the excavation of the rough pits, the length of the engineering test pits at each of the retention ponds were determined such that it captured the surrounding soils, the transition soils and the retention pond sediments. In addition, the number of columns and rows in the soil sample matrix logs were predetermined and the outlines of the ponds were predicted. The rough pits yielded valuable information that enabled on-site engineers to pre-plan the test pit excavation to the extent that the sample sequence and sampling containers were pre-labeled prior to excavation.

Reference elevations were established from known points to the axis of the engineering test pits. The test pit alignments were laid out at 5ft intervals to the pre-determined test pit lengths. A 10 ft extension was often added at both ends of the test pits for excavator bucket reach and sloping of the pit as depth increased in accordance with standard excavation practice.

Engineering Test Pits 1 through 4 were excavated as follows:

Engineering Test Pits' Excavation				
Test Pit	Location Retention Pond	Length (ft.)	Depth (ft.) BGS	Bottom of Pond (ft.) BGS
TP-1	A	25	9	6
TP-2	B	30	10	8
TP-3	C	25	10	8
TP-4	E	25	9	7
TP-5	BLDG 76	15	10	NA

With the exception of the staked alignments of the test pits, the ground surface was prepared in accordance with the work plan. The top soil 1-2ft from the are adjacent to the rough pits was removed and stockpiled. A presumed contaminated surface 2ft below the existing ground surface was exposed for excavated spoils from the test pit. This method provided a means to minimize the potential for spreading contamination from the subsurface to nearby surfaces.

Test pits were divided into the following zones:

Engineered Test Pit Zones		
Surrounding Overburden	Transition Overburden	Retention Overburden
Surrounding Upper	Transition Upper	Retention Upper
Surrounding Lower	Transition Lower	Retention Lower

Test Pits were excavated across the boundary of Retention Ponds A, B, C and E at the MISS. The as-built locations for Test Pits 1 through 5 are shown in Figures 3 through 7 of the test pit report. The test pit excavation proceeded in 1 ft lifts. Soil samples were collected in 5 gallon pails for each 5 ft lengths of 1 ft. lifts. Upon completion of the test pit and based on the visual observations, the profile of the pond and the surrounding soil was sketched and each of the nine zones were identified based on the zone designation. One composite sample was prepared for each of the zones in the retention pond test pits. For the non-retention pond test pit, one composite sample was prepared for the overburden, 0-2 ft below ground surface, the upper zone 2-5 ft below ground surface and the lower zone 5 ft below ground surface.

Exclusive of Test Pit 5 the composite samples comprised of soils from each excavated portion of the test pits within a particular zone. Each grid cell being 5 ft long by one excavator bucket width. The zone boundaries were selected based on field screening measurements and visual observations. Due to the distinct difference between the pond material and the surrounding soils the zones were easily identified by color without the use of the mussel color chart.

4.5.6.2.1 Test Pit 1 - Retention Pond A

A detailed graphic illustration is shown in Figure 3 of the test pit report. Test Pit 1 was excavated across the boundary of the former Retention Pond "A" in the existing RMA . Test Pit 1 was excavated at approximately 25 ft in length and excavated to 9ft below the existing ground surface. The bottom of the retention pond was measured at 6 ft below ground surface. There were no detectable values for the headspace taken.

Total gamma recorded in the 5 gallon pail ranged from 13,000-21,000 CPM. Higher radiation counts were recorded at the ground surface to about 2 ft below ground surface. As the excavation progressed downward, radiation counts dropped. A total of 45 soil samples were taken at Test Pit 1 in 5 gallon pails with 4 special samples of substances requiring further identification. Included in the special sample is the white powdery pond material.

General Observations

The overburden layer consisted of reddish brown sand, highly compacted. The ground surface in the area of test pit 1 was hard, dry and barren.

The surrounding soil consisted of miscellaneous fill that include reddish brown sand, construction debris, geofabric, gravel, decaying leaves and plant shoots.

The pond material is predominantly white-fine powder slightly damp, stratified with each stratum less than 1 inch and varied in color ranging from white to tan, brown and slightly gray.

The lower material underling the pond was observed to be mostly reddish brown sandy silt and weathered sand stone.

4.5.6.2.2 Test Pit 2 - Retention Pond "B"

A detailed graphic illustration is shown in Figure 4 of the test pit report. Test Pit 2 was excavated across the boundary of the former Retention Pond "B" outside the northern edge of the existing RMA. Test Pit 2 was excavated at approximately 30 ft in length and excavated to 10ft below the existing ground surface. The bottom of the retention pond was measured at 8ft below ground surface. Headspace reading taken did not register any values. The total Gamma recorded in the 5-gallon pails ranged from 17,000 CPM to 33,000 CPM. Higher radiation counts were recorded at the ground surface to about 2 ft below the existing ground surface. As the excavation progressed downward, radiation counts dropped. A total of 59 soil samples were taken at Test Pit 2 in 5 gallon pails with 10 special samples of substances requiring further identification. Included in the special sample is the pond sediment. There was no soil sample take from a grid at 6 ft. below ground surface because it contained predominantly red asbestos shingles.

General Observations

The overburden in the immediate vicinity of the test pit, consisted of loosely placed crushed stones mixed with granular material brought from vicinity properties. The crushed stone is placed on a geofabric. The surface area in the test pit 2 location was partially covered with grass and tall vegetation.

The surrounding soil consisted of miscellaneous fill that include construction debris, burnt brick from what appears to be remains of a demolished chimney or smokestack, corrugated asbestos shingles, pipes and lumber.

The pond material is predominantly white-fine powder damp, stratified with each stratum less than 1 in and varied in color from white to tan, gray and light green.

Mixed in the pond material were items such as pans, glass wares, decaying leaves with rich chocolate smell, leather strands and organics.

The lower material was observed to be dark coarse-fine sand and cinder.

4.5.6.2.3 Test Pit 3 - Retention Pond "C"

A detailed graphic illustration is shown in Figure 5 of the test pit report. Test Pit 3 was excavated across the boundary of the former Retention Pond "C" across the railroad spur. Test Pit 3 is approximately 25 ft in length and excavated to 10 ft below ground surface. Headspace reading taken did not register any value. Total gamma recorded in the 5 gallon bucket ranged from 22,000 CPM to 75,000 CPM. Higher radiation counts were recorded at the ground surface to about 2 ft below ground surface. As the excavation progressed downward, radiation levels dropped. A total of 50 soil samples were taken at Test Pit 3 in 5 gallon pails with 8 special samples of substances requiring further identification. Included in the special sample is the white pond sediment.

General Observations

The surface area of Retention Pond "C" had little or no overburden. Noticeable overburden is present in the surrounding soil material. The surface area of test pit 3 location was partially covered with grass.

The surrounding soil consisted of loam and miscellaneous fill that include construction debris, demolished building fragments, boulders and pieces of pipes.

The pond material is predominantly white-fine powder stratified with each stratum less than 1 inch thick and varied in color ranging from white to tan, brown to slightly gray. Underlying pond "C" is a pink to purple sticky material.

The lower material was observed to be mostly dark medium to loose coarse sand.

4.5.6.2.4 Test Pit 4 - Retention Pond "E"

A detailed graphic illustration is shown in Figure 6 of the test pit report.

Based on the observations and information gathered during the rough pit excavation at Pond E, Test Pit 4 was excavated in 3 segments. The boundary of Pond E was found to be over 100 ft beyond the limits shown in the existing site plan and area photograph. Furthermore, radiation levels increased with depth.

Test Pit 4 - Section I

Section I of Test Pit 4 is about 15 ft in length and excavated to 4 ft below ground surface. Section I captures the boundary of Pond E and the surrounding soils. The bottom of the pond was measured at 2.5 ft below ground surfaces in this section of the test pit 4 excavation.

Test Pit 4 - Section II

Section II was excavated about 32 ft behind Section I at 5 ft length and 8 ft below ground surface. This section captures the overburden, the pond and bottom of the pond that was measured at about 6 ft below ground surface. Section II provides a means to project the bottom of the pond to the bottom of the pond in Section I, and predict the change in slope.

Test Pit 4 - Section III

Section III was excavated about 25 ft behind Section II at the deepest end of the pond . Section III is 5 ft in length and excavated to 9 ft below ground surface. The bottom of the pond was measured at 7 ft below ground surface.

General Observations

The overburden at Retention Pond "E" consists of dark brown sand with cinder. Radioactivity counts were elevated. The surface area at the location of test pit 4 was covered with tall grass and shrubs prior to excavation.

The highest radiation levels during the engineering test pit program were encountered in Test Pit 4. Radiation levels averaged greater than 100,000 CPM. Retention pond material consisted of white-fine powder stratified with each stratum less than 1 inch and varied in color ranging from white to tan and light gray to dark ash.

The lower material consisted of dark-red sandy silt with traces of ash and hardened cinder.

A total of 20 samples were taken at test Pit 4 with 3 special samples.

Subsequently, 15 additional special samples were taken from the 5-gallon pails in Section I.

4.5.6.2.5 Test Pit 5 - Adjacent to Building 76

A detailed graphic illustration is shown in Figure 7 of the test pit report. Test Pit 5 was excavated adjacent to Building 76 in the former Thorium Processing area. Test Pit 5 is a non-retention pond excavation. Test Pit 5 is approximately 15 ft in length and excavated to 8 ft below the existing ground surface and to bedrock.

General Observations

The overburden consisted of coarse aggregate and crushed stones. Immediately below the crushed stone is a thin layer of asphalt about 4 inches thick. For the most part, test Pit 5 is predominantly miscellaneous fill consisting of bricks, hard bitumen that continued to melt when exposed to direct sunlight, laboratory utensils, metallic plates, ceramic tub, and petroleum wastes, partially demolished foundation and lumber. From 6 ft below ground surface to the bottom of the excavation comprised of reddish-brown sand and fragments of weathered sandstone.

4.5.6.3 Testing

The test pit investigation included field and laboratory testing to establish the range of engineering properties that the soil at MISS exhibit within the site and to determine the nature the soil material in the immediate edge of the former retention ponds.

Geotechnical laboratory-testing program included gradation analysis with hydrometer testing. Since there were no clay material sampled during the field investigation, Atterberg limits testing was excluded from the laboratory testing program. Prior to and during excavation, the ground surface in the area to be excavated was watered down with water delivered through fire hose and nozzle for dust control. Each successive lift was sprayed with water to the extent necessary to preclude airborne particulate before samples were taken from the bucket. Because of the additional water introduced for dust control, laboratory testing to determine natural water and moisture content were also excluded from the testing program

5.0 SAMPLING PROCESS DESIGN

The intended purpose of the engineering test pit sampling and testing is to develop analytical profiles that capture the horizontal and vertical distribution of radioactivity, chemical and physical properties of the soils. Since the objective is to establish approximate engineering correlations of radiological, chemical, and physical variability, statistical sampling was not used for the engineering test pit sampling.

5.1 Chemical Sampling

Prior to each engineered pit excavation, the FOL and SC reviewed data gathered during the rough pit excavation and planned the extent of the engineered pit, as well as the amount of samples required to support the Work Plan. Based on the extent of the excavation, a grid system and preliminary zone profile were developed. The SC prepared the required material for the sampling effort, including necessary sampling containers and sampling equipment.

Each test pit was excavated in 1 foot lifts. The Field Team collected samples for each 5 foot length of the lift in accordance with the construction and sampling sequence presented in Appendix D of the Work Plan. Each 1 foot x 5 foot lift comprised a "grid" in the overall engineered pit profile.

5.2 Grid Sampling and Field Screening

During the course of the excavation of each engineered pit, the Field Team collected chemical and radiological samples from each grid. As the excavator removed each "grid" from the test pits, designated members of the Field Team performed field screening of the excavated material and collected samples. Field screening performed at the excavator bucket consisted of gamma count and PID scanning of the excavated material. After the initial field screening, the Field Team collected a VOC sample using a disposable sampling syringe, a headspace sample, and a bulk sample in a 5 gallon pail for geotechnical and chemical analyses. The VOC syringe samplers used collected a specified amount of soil (approximately 10 grams) required by the New Jersey DEP sampling protocols for VOC samples using methanol preservation.

VOC samples collected were immediately placed on ice. Headspace samples were capped as soon as they were collected and placed aside for headspace measurements using a PID. The field team measured headspace readings approximately 5 minutes after sample collection.

The 5 gallon pails containing the bulk samples were moved to a covered sample preparation/compositing area after collection. Upon receipt of the bulk samples at the sample preparation area, a NaI scan was performed on the samples. The field team then collected chemical samples from each 5 gallon pail for each grid. Chemical samples were immediately placed on ice and stored until further chemical compositing could be performed. Remaining material in the 5 gallon pails was used for the geotechnical sample from each grid. Similar to the chemical samples, geotechnical samples were stored in the sample preparation/compositing area until compositing could be performed.

5.3 Sample Compositing

After completion of each engineered pit excavation, the FOL and SC determined the allocation of each grid into the various compositing zones. The zone boundaries were selected based on field screening measurements and visual observations made during the course of the excavation. Zone composites were classified into one of nine different zones using the following system:

Zone Compositing Descriptions		
Retention Pond Overburden	Transition Overburden	Surrounding Overburden
Upper Retention Pond	Upper Transition	Upper Surrounding
Lower Retention Pond	Lower Transition	Lower Surrounding

For the Non-Retention Pond Test Pit, one composite sample each was prepared for the Overburden (0 to 2 feet below ground surface (bgs)), Upper (2 to 5 feet bgs), and Lower (5 feet bgs to the lower limit of contamination or the groundwater table) zones.

The composite samples were comprised of soil from each excavated portion of the test pits within a particular zone, with the exception of the VOC samples. Due to the nature of VOC samples, compositing of VOC samples would destroy the samples' integrity. Therefore, a VOC sample representative of each zone was selected by the SC based on the headspace measurements taken during the excavation. Additionally, a VOC sample corresponding to the highest measured headspace reading for each test pit was taken.

VOC samples selected using the screening process were transferred from plastic syringes corresponding to the selected grids into pre-weighed sampling jars containing a pre-measured volume of methanol preservative. VOC samples were iced and sent to the Contract Laboratory for chemical Analysis.

The field team composited chemical samples for each zone. Chemical samples composited included Semi-volatile organics (SVOCs), Pesticides, PCBs, and Priority Pollutant Metals (PP-13). Chemical samples were iced and sent to the Contract Laboratory. Geotechnical samples from each grid were composited in a manner similar to the chemical samples. The field team performed all compositing of the chemical and geotechnical samples using quartering techniques in accordance with EPA soil sampling protocols.

The following table summarizes sampling equipment used and analytical procedures.

Field Sampling Equipment and Analytical Procedures		
Parameter	**Equipment/Container**	**Analytical Procedures**
Field Screening and Bulk Sample Collection (At Excavator)		
Volatile Organic Compounds	Plastic Syringe	One VOC sample per zone and one sample corresponding to highest headspace extracted in methanol and submitted to laboratory for analysis by EPA method SW 846 8260
Headspace	8 oz. glass jar with Teflon lined cap, aluminum foil inner seal, PID using Mini-Rae hand held field analyzer (10.6 eV bulb)	Partially fill glass jar with soil, cover with foil and cap. Allow to develop for 5 minutes in warm environment. Puncture foil with PID probe, record peak Reading.
G-M scan on excavator bucket	Geiger-Mueller tube (H-P 260 Probe coupled with Ludlum Model 2221 ratemeter/scaler)	Perform scan on excavator bucket
Volatile Organic Scan	Mini-Rae PID hand held field analyzer (10.6 eV bulb)	Perform scan on excavator bucket
Gross Gamma Count	NaI Scan – Eberline SPA-3 2x2 NaI detector coupled with Ludlum Model 2221 ratemeter/scaler)	Perform scan on top surface of 5-gallon bucket containing sample from grid
Sample Compositing for Laboratory Analysis		
Chemical Samples		
Semi-Volatile Organic Compounds	1 Liter widemouth glass jar with Teflon lined cap	SW 846 3550B/8270C
Pesticides	Same container as SVOC	SW 846 3550B/8081A
PCBs	Same container as SVOC	SW 846 3550B/8082
PP-13 Metals	Same container as SVOC	SW 846 3050/6010B, 7471A
Volatile Organic Compounds	2 oz. septum jar with methanol preservative	SW 846 5035/8260B
% Solids	50 mL plastic bottle	ASTM D2216
Geotechnical Samples		
Grain Size	5 gallon pail	ASTM D422, D136, D2487
Atterberg Limits		ASTM D4318
Specific Gravity		ASTM D854

Field Sampling Equipment and Analytical Procedures		
Parameter	Equipment/Container	Analytical Procedures
Radiological		
Specific Activity - Thorium 232, Radium 228, Uranium 238	500 mL Marinelli (composites) Petri-dish (for analysis of grain-size fractions)	Gamma Spectroscopy using Canberra GC3020 detector, GENII-2000 software

5.4 Sample Identification and Field Sample Numbering

Sample identification protocols were identified in the CDQMP (see Attachment C of Volume II of this TPWP). A 19-digit sample/site identification number was used. A sample/site identifier for data base reporting has the following format:

MISS-AAASSNNNNn-#####

For the test pit program, test pits are designated ("AAA" in above identifier) as follows:

- TP1 – Retention Pond A Test Pit
- TP2 – Retention Pond B Test Pit
- TP3 – Retention Pond C Test Pit
- TP4 – Retention Pond E Test Pit
- TP5 – Building 76 Test Pit

The media "SS" stands for surface soil.

The unique station number "NNNN" was identified as follows:

Digits 1, 2 - Used to indicate the horizontal control within the test pit. Samples were collected over 5 foot sections within the test pit. "A" was the outermost section. Lettering then proceeded incrementally into the former retention pond. A 30 foot test pit, therefore, was represented by 8 sections ("A" through "F").

Digits 3, 4 - Used to indicate the depth in feet below ground surface, from which the sample was obtained (e.g., 01 to 99).

For composited samples sent to the Contract Laboratory, the above four-digit designation reflected the zone that the sample represents:

REOV = Retention Pond Overburden
REUP = Retention Pond Upper
RELO = Retention Pond Lower
TROV = Transition Overburden
TRUP = Transition Upper
TRLO = Transition Lower

SUOV = Surrounding Overburden
SUUP = Surrounding Upper
SULO = Surrounding Lower

Intervals included in the composite were noted in the field notebook and on the Engineering Test Pit Log.

Thermo NUtech, the soil sorting vendor for the Field Demonstration, had requested that soil samples be provided to them for testing. These samples were collected from two vertical slices in Test Pit 4, and contained the character string "TN".

The number "n" for the sample type (i.e. regular (0), duplicate (1), split (2), etc.) was designated in the field, as was the sequential sample number "#####".

For example, sample identification number MISS-TP1SS0B060-00010 represents a regular soil sample collected from test pit number 1 on the MISS, in the second horizontal section (5-10'), at a depth of 6 feet. After compositing, the sample designation would have been MISS-TP1SSSUOV0-00010. The laboratory designation for this sample would have been MISS-00010.

5.5 Decontamination

Decontamination was performed in accordance with SOP 506. All sampling equipment was decontaminated between samples and all excavation equipment was decontaminated prior to arriving at or leaving the site and between test pits. The equipment subcontractor, using high-pressure water or steam, decontaminated excavation equipment. Decontamination was performed to the satisfaction of the onsite Stone & Webster representative. The onsite water supply (Maywood municipal water) was used. This water will be analyzed for contaminants of concern.

For heavy equipment decontamination, Stone & Webster will modified the existing equipment decontamination pad that is located adjacent to the contaminated soil staging area. Decontamination liquids were containerized for offsite disposal.

6.0 SAMPLING METHODS REQUIREMENTS

An overview of engineering test pit construction and sampling is presented below:

1. The FOL, Sampling Coordinator, and subcontractor (including the backhoe operator) planned the excavation.

2. After the area to be excavated was cleared, the backhoe operator excavated the engineering test pit proceeding in increments as planned.

3. After each increment, the operator waited while the FOL inspected the test pit to decide if conditions are appropriate for sampling.

4. The backhoe operator, who has the best view of the test pit, immediately ceased digging if:

   - Any fluid phase or groundwater seepage was encountered in the test pit;

   - Any drums, or other potential waste containers were encountered (a drum was encountered during the excavation of Test Pit 3);

   - Distinct changes of material were encountered (Distinct changes of material type were observed in Engineering Test Pits 1-4. Excavation resumed after photographs were taken and descriptions of the change were entered in the field notes); or

   - The inspecting Stone & Webster representative directed the operator to cease digging.

5. When open, test pits were secured by means of a physical barrier during the day and at the end of each day.

Soil for sampling was collected using a backhoe bucket at each 5 ft. length of each lift. Visual, radiological (NaI scan), and headspace measurements guided the selection of the soils for the sample. With the exception of VOC samples, compositing soil from several locations along the 5 ft. excavated strip was considered to be acceptable. Special samples of material were collected from the test pits as deemed appropriate.

For test pit sampling, samples were collected using SOP 307, Surface and Shallow Subsurface Soil Sampling, with the two modification discussed below. **Entry into the test pit was not permitted.**

- Samples were obtained from the backhoe bucket. The sampler directed the backhoe operator to remove material from the selected depth or location within the test pit. The bucket was brought to the surface and moved away from the pit. Health and safety protocols were followed, such as the operator laying the bucket on the ground prior to sampling. The sampler ensured that the operator was attentive of the sampling activities prior to approaching the bucket. The sampler approached the bucket and monitored its contents with the PID and a G-M detector and recorded the reading on the log. The sample was obtained directly from the bucket. The sample was collected from the center of the bucket and placed in sample jars using a clean trowel or spatula. Appropriate sample containers were be used as described in Table 4-1 of the QAPP.

Information regarding sample location, depth, and character was recorded on an Engineering Test Pit Log and a Sample Matrix Log (Appendix B). Further data and some of the preliminary COC information was also recorded on this form. Samples were prepared for shipping in accordance with SOP 504, Labeling, Packaging, and Shipping Environmental Samples.

7.0 ANALYTICAL METHODS SUMMARY

Tables 1 and 2 present the summary of samples analyzed by the Onsite and Contract Laboratories and the Quality Assurance Laboratory respectively. A comprehensive suite of analyses was performed for each test pit in order to obtain the most complete profiles for the correlations.

7.1 Radiological

A field laboratory was utilized to perform gamma spectroscopy. The field laboratory utilized a Canberra GC3020 detector coupled to an A Module. Data was analyzed by GENII 2000 and Procount 2000 software. The Procedures Manual for the field laboratory is located in Appendix H of the QAPP. For the onsite laboratory, a 500 ml sample was collected for analysis.

In addition, radiological analyses were performed on fractions of soil supplied by the geotechnical laboratory. Samples returned by the geotechnical laboratory were analyzed by gamma spectroscopy. Due to the reduced volume of soil returned in the soil fractions, these analyses were performed using petri-dish samples. Gamma spectroscopy using the same instrumentation as used on the composite samples was performed.

The soil fractions were analyzed as follows:

Soil Fraction Designations	
Sample Fraction Designation	*Soil Fractions in Sample*
A	+3"; 1.5" – 3"; 0.75" – 1.5"
B	3/8" – 0/75"; #4 – 3/8"
C	#8 - #4
D	#16 - #8; #30 - #16; #40 - #30
E	#50 - #40; #60 - #50; #100 - #60; #200 - #100
F	Below #200.

Results of the radiological analyses are provided in Appendix D.

7.2 Chemical

For the chemical analyses, the following methods were utilized:

Chemical Analysis Methods	
VOCs	SW 846 Method 5035/8260B
SVOCs	SW 846 Method 3540C, 3541, or 3550B/8270C
PP-13 Metals Mercury	SW 846 Method 3050B/6010B SW 846 Method 7471A
Pesticides	SW 846 Method 3540C, 3541, or 3550B /8081A
PCBs	SW 846 Method 3540C, 3541, or 3550B /8082

Stone & Webster utilized a sonication extraction method for all SVOC, pesticide, and PCB samples with the exception of those containing a clay matrix (cohesive). No clay soils were identified during the engineering test pit program.

Table 4-1 of the QAPP details the container, preservative, and holding time requirements for these analyses. Results of the chemical analyses are provided in Appendix E.

7.3 Geotechnical

For the geotechnical analyses, the following methods were utilized:

Geotechnical Analysis Methods	
Grain Size	ASTM Method D422
Atterberg Limits	ASTM Method D4318
Hydrometer Test	ASTM Method D422

Samples for these analyses were containerized in 5-gallon pails. There are no preservative or holding time requirements for these analyses. Results of the geotechnical analyses are provided in Appendix C.

After analysis, the geotechnical laboratory returned the analyzed soil fractions to the onsite radiological laboratory for analysis.

8.0 INVESTIGATION DERIVED WASTE

Soil, decontamination water, and PPE are the only investigation-derived wastes which were generated during these field activities. Soil was replaced into the excavation to the extent possible. Any soil which could not be placed back into the test pit due to bulking as a result of excavation was considered excess soil. All residuals, including excess soil, were handled in accordance with the MHTDP. All material – soil, PPE and decontamination water, is currently being temporarily stored on site pending disposal as radiological waste.

The following quantities of waste were generated as part of the Engineering Test Pit Program:

Investigation Derived Wastes	
Description	***Quantity***
Used PPE	2 each B25 LSA boxes
Decontamination Water	1 each 55 gallon drum
Excess Soil	0

9.0 POST-SAMPLING ACTIVITIES

Equipment was decontaminated in accordance with the TPWP before leaving the site. An exit radiological survey of the equipment was conducted to ensure that surface contamination levels were below those specified in the TPWP. Additional decontamination was not required. No equipment was required to be retained on site.

Locations of all excavations, including the rough pits, dewatering sumps, and engineering test pits, were surveyed and posted on a MISS site drawing.

10.0 QUALITY CONTROL

QC activities were performed in accordance with the CQCP and the CDQMP. This work was considered an advanced investigation activity and does not impact the final product or status or compliance with regulatory guidelines, therefore, it is not considered a Definable Feature of Work. As such, the three phase control system was executed as described below to meet the needs of the activity in an efficient and effective manner. In all cases, QC methods commensurate with the anticipated future use of the data being collected were employed.

10.1 Field Quality Control

The field QC process includes the use of checklists (as provided in the TPWP) to document performance of necessary tasks during field activities. In addition, field instrument QC check sheets are contained in the instrument SOPs included in the SSHP-Addenda, which was provided as part of the TPWP. The following checklists were utilized:

- Mobilization
- Utility Clearance
- Instrument Calibration
- Surveying
- Field Documentation
- Demobilization Decontamination
- Data Management
- Reports and Other Documents
- Field Safety
- Sample Collection
- Packing, Storing, and Shipment of Samples

Daily Quality Control Reports (DQCRs) were completed to document project activities. These reports were submitted daily to the USACE Kansas City District and any onsite USACE representatives. Field changes were documented utilizing a Field Change Record.

Field QC also involves the use of calibration standards and blanks for photo-ionization detector measurements and other field measurements. Special samples submitted to the laboratory included trip blanks, equipment rinsate blanks, and field duplicates. They were analyzed in the laboratory as samples, and their purpose was to assess transport, decontamination procedures, and sampling and testing procedures as possible sources of sample contamination and to document overall sampling and analytical precision. No additional samples were collected. Rigorous documentation of all field QC samples in the project logbooks was mandatory. Field notebooks were maintained in accordance with SOP 507, Field Notebook Content and Control.

10.2 Laboratory Quality Control/Quality Assurance

Laboratory QC is addressed in the CDQMP. The laboratory QC for chemical analyses is based on criteria developed for the QA elements of ER 1110-1-263. The analysis of control samples (e.g., surrogates and method blanks) is routinely done to monitor the performance of each analytical method. An important element of the Maywood effort will be the collection and analysis of samples to evaluate matrix effects on target compound response. These samples, designated matrix spike/matrix spike duplicates (MS/MSDs), were prepared in the laboratory by adding a known amount of pure compounds to an actual sample to determine potential interferences. MS/MSDs were collected in accordance with standard USEPA and SW-846 protocols.

The performance of QC samples are continually evaluated and plotted over time. Acceptable limits are established for each method as described in SW-846. The Contract Laboratory provided results of control sample analyses to Stone & Webster on an ongoing basis during the field/analytical program. The Contract Laboratory was responsible for identifying methods that did not meet established criteria.

During the program, several noncompliances were identified and addressed. The Contract Laboratory identified that the soil weights for volatile organic samples were not in compliance with NJDEP requirements. This was not felt to be a critical issue, so no change was made to the sampling protocol. Sampling labeling was also modified was also modified per the contract laboratory's request to make it easier to track VOA samples. (A "V" was added to the sample number).

QA procedures have been established by both the USACE and by Stone & Webster for this project. Contract Laboratory QA is further discussed in the CDQMP. The USACE QA program is outlined in ER 1110-1-263. One element of this program is the use of a QA laboratory. Splits of certain samples were sent to a QA laboratory designated by the USACE (see Table 2). This laboratory analyzed the samples independent of Stone & Webster's Contract Laboratory. Stone & Webster submitted the results from the contract laboratory to the QA laboratory for comparison.

11.0 REPORTS

Reports were prepared in accordance with Contract Number WAD 03, WBS 03. Reports were reviewed in accordance with the requirements of the CQCP.

11.1 Field Documentation

The field documentation completed for the test pit field work is detailed in the TPWP. These forms consist of the following:

DQCR - Completed daily. Summarized the field activities for that day, including QC activities; submitted daily to the USACE Kansas City District and any onsite USACE representatives.
Field Technical Report - Completed daily. Summarized technical issues, progress and tracking forms completed and by whom;
Engineering Test Pit Log - Completed per 5 foot wide vertical column of test pit. Documented visual observations of test pit material, stratification, classification and field screening levels (radiological and headspace) relative to excavation lifts;
Sample Matrix Log - Completed per test pit. Documented radiological, chemical, and geotechnical information for the individual excavation cells
Field Change Tracking Log - Used to track field changes (deviations from the work plan) over the duration of the test pit field work;
Field Change Record - Completed per field change. Used to document unanticipated problems encountered, resulting field change, reasons for the change/deviation from the work plan, and course of action taken;
Hazardous Work Permit Request - Completed prior to start of work. Used by field personnel to request that RPTs prepare an HWP.
Test Pits Perimeter Air Sampling Log – Completed daily. Tracked perimeter air sampling activities
Test Pits Integrated Air Sampling Log - Completed daily. Tracked integrated air sampling activities

A weekly report was prepared to summarize the activities performed during the week. It included progress made, problems encountered, and their resolution, as well as any outstanding questions requiring answers from the USACE. This report was also submitted to the Kansas City District as well as any onsite USACE representative.

12.0 REFERENCES

1. Stone & Webster. *Work Plan – Engineering Test Pits at MISS,* July 1999.

2. Stone & Webster. *Chemical Data Quality Management Plan*, Revision 1, February, 2000.

3. Stone & Webster. *Contractor Quality Control Plan*, October 1999.

4. Stone & Webster. *Materials Handling/Transport and Disposal Plan*, July 1999.

5. Stone & Webster. *Site Safety and Health Plan*, August 1999.

6. Stone & Webster. *General Environmental Protection Plan*, November 1999.

7. Stone & Webster. *FUSRAP Maywood Superfund Site Technology Evaluation Report, WBS 8, Task 1*, April, 1999.

8. USACE. *Chemical Data Management for Hazardous Waste Remedial Activities*, ER 1110-1-263, 30 April 1998.

9. USACE New York District Office. *Final Maywood Soils Grouping Report, Volume 1, Maywood, New Jersey, Final,* USACE/OR/DACA62-1032, January, 1998.

10. USEPA. *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, SW-846, Third Edition, Revision 1, Updates 1, 2, and 3.*

11. CH2M Hill. *Final Remedial Investigation Report, Stepan Company Property*, November 1994

12. Bechtel. *Remedial Investigation Report for the Maywood Site*, December 1992

13. Bechtel. *Characterization Report for the Maywood Interim Storage Site*, June 1987

TABLES

TABLE 1
CONTRACT AND ONSITE LABORATORIES ANALYTICAL SAMPLE SUMMARY

FUSRAP MAYWOOD SUPERFUND SITE
TEST PIT WORK PLAN

PARAMETER	REGULAR SAMPLES	REPLICATES	RINSATE BLANKS	MS/MSD	TRIP BLANKS	TOTAL NUMBER
VOLATILE ORGANICS						
(Soils)	39	4	10	4/4	10	71
(Groundwater)	6	1	6	1/1	3	18
SEMIVOLATILE ORGANICS						
(Soils)	39	4	10	4/4	0	61
(Groundwater)	6	1	6	1/1	0	15
METALS						
(Soil, PP-13)	39	4	10	4/4	0	61
(Groundwater, TAL)	6	1	6	1/1	0	15
PESTICIDES						
(Soils)	39	4	10	4/4	0	61
(Groundwater)	6	1	6	1/1	0	15
PCBs						
(Soils)	39	4	10	4/4	0	61
(Groundwater)	6	1	6	1/1	0	15
WET CHEMISTRY PARAMETERS[1]						
(Groundwater)	6	1	6	0	0	13
RADIOLOGICAL PARAMETERS[2]						
(Groundwater)	6	1	6	4/0	0	17
GEOTECHNICAL PARAMETERS (GRAIN SIZE, ATTERBERG LIMITS[3]**, HYDROMETER TESTING)**						
(Soils)	39	0	0	0	0	39
GAMMA SPECTROSCOPY (WET COUNT – ONSITE LABORATORY)						
(Soils)	39	4	4[4]	0	0	47

MS/MSD = matrix spike/matrix spike duplicate
PP-13 = Priority Pollutant 13
TAL = Target Analyte List
1. Wet Chemistry Parameters will consist of hexavalent chromium; cyanide; fluoride; lithium; phosphorous; sulfate; hardness (as $CaCO_3$); nitrate, nitrogen; nitrite, nitrogen; alkalinity (as $CaCO_3$); total dissolved solids; total suspended solids; total organic carbon; and ammonia, nitrogen.
2. Radiological Parameters analyzed by the Contract Laboratory will consist of gross alpha, gross beta, gross gamma, Ra-226, U-238, and Th-232.
3. Atterberg Limits will only be derived for cohesive soils. Determination will be made in the field as to whether to perform this test.
4. Decontamination Wipe Samples

TABLE 2
QUALITY ASSURANCE LABORATORY ANALYTICAL SAMPLE SUMMARY

FUSRAP MAYWOOD SUPERFUND SITE
TEST PIT WORK PLAN

PARAMETER	REPLICATES	TRIP BLANKS	TOTAL NUMBER
VOLATILE ORGANICS			
(Soils)	4	4	9
(Groundwater)	1	1	2
SEMIVOLATILE ORGANICS			
(Soils)	4	0	5
(Groundwater)	1	0	1
METALS			
(Soils, PP-13)	4	0	5
(Groundwater, TAL)	1	0	1
PESTICIDES			
(Soils)	4	0	5
(Groundwater)	1	0	1
PCBs			
(Soils)	4	0	5
(Groundwater)	1	0	1
RADIOLOGICAL PARAMETERS[1]			
(Soils)	4	0	5
(Groundwater)	1	0	1

MS/MSD = matrix spike/matrix spike duplicate
PP-13 = Priority Pollutant 13
TAL = Target Analyte List
1. Radiological Parameters will consist of gross alpha, gross beta, gross gamma, Ra-226, U-238, and Th-232.

FIGURES

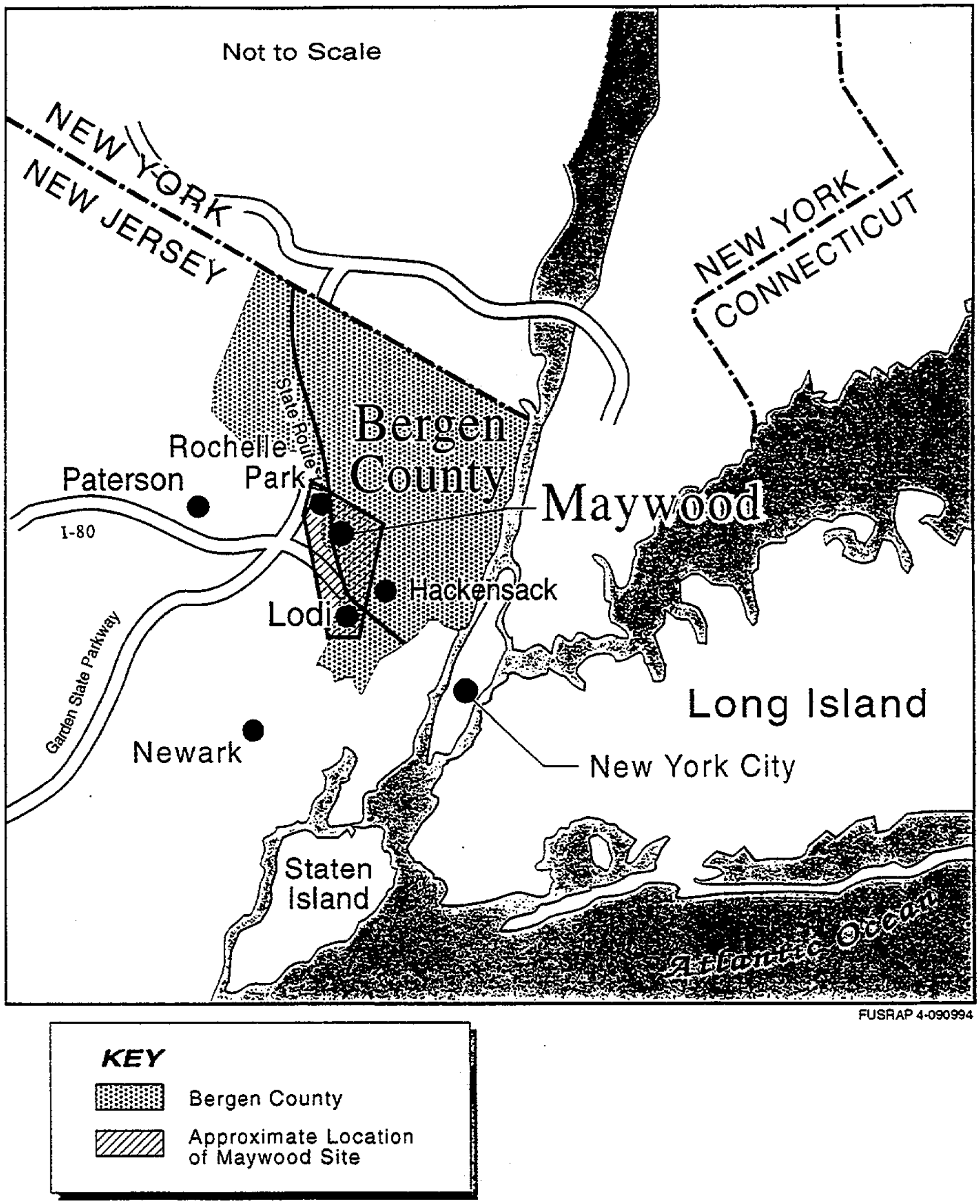
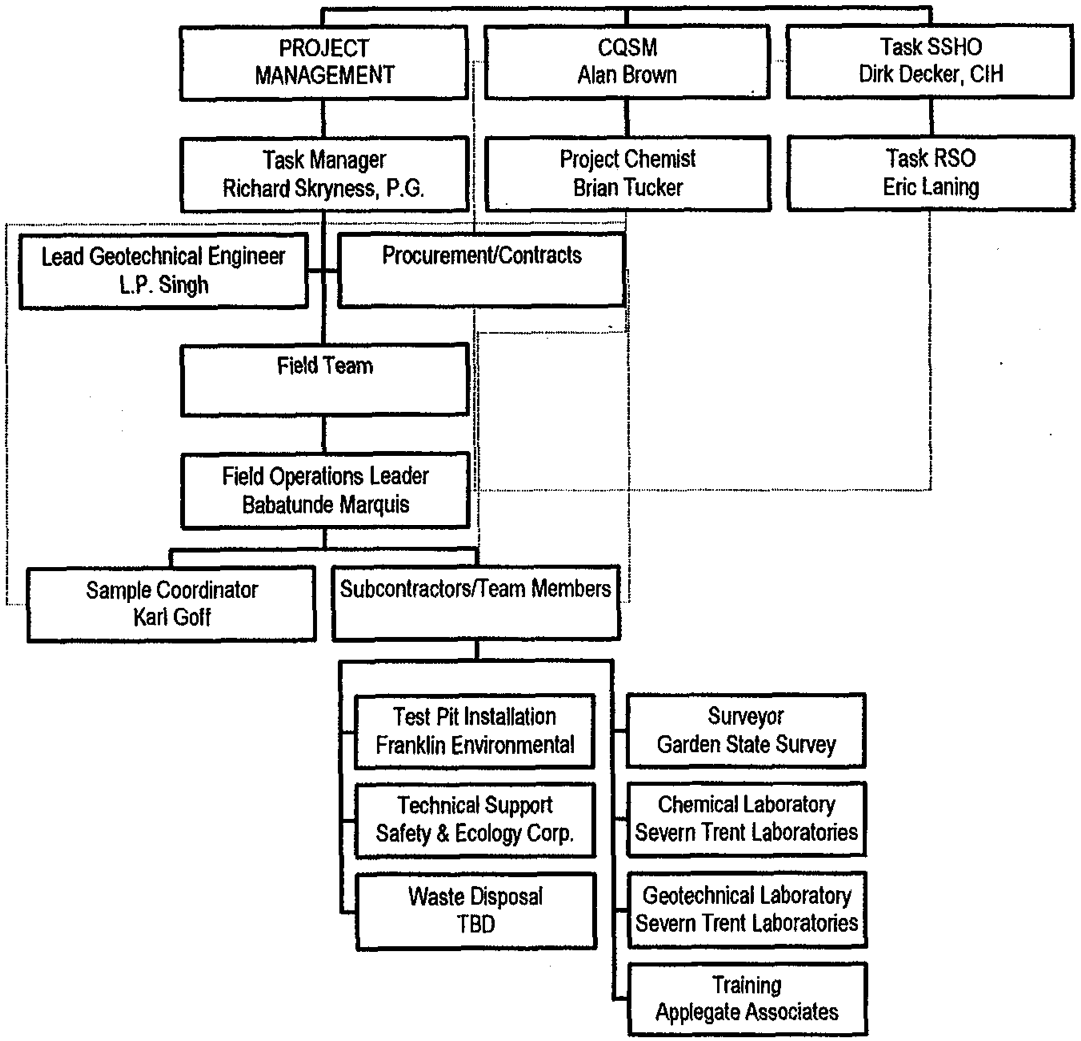
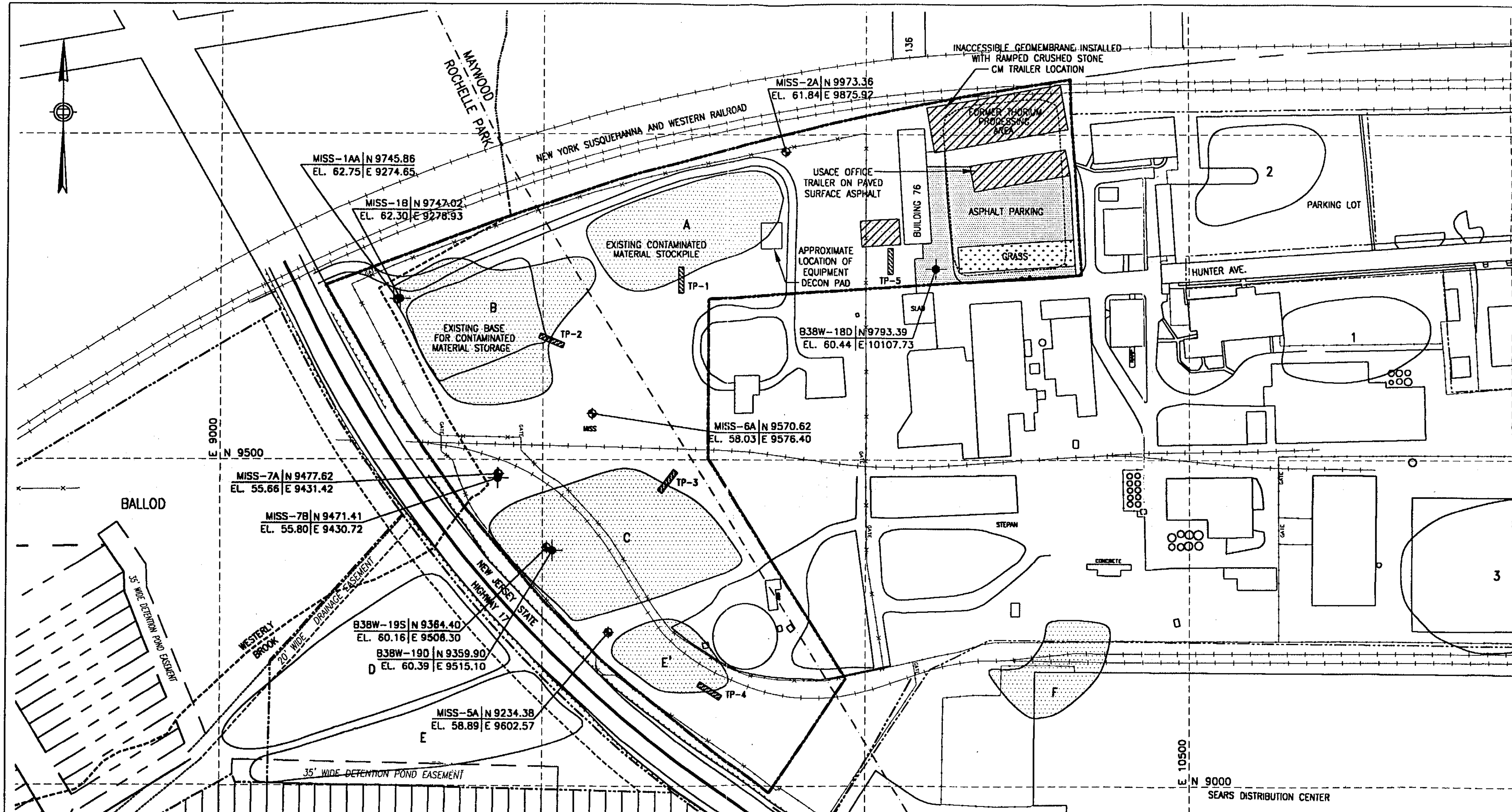


Figure 1

Site Location

Figure 2
Engineering Test Pits at MISS
Task Organization Chart





LEGEND:

- LOCATION OF OVERBURDEN MONITORING WELL
- LOCATION OF BEDROCK MONITORING WELL
- TP-1 — TEST PIT DESIGNATION AND APPROXIMATE LOCATION
- TRAILER
- A — LOCATION OF FORMER RETENTION POND

NOTE:

ELEVATIONS ARE TOP OF WELL CAPS.

0 150 300 FEET

1" = 150'-0"

FUSRAP MAYWOOD SUPERFUND SITE
MAYWOOD, NEW JERSEY

FIGURE 3
SITE LOCATION PLAN
PROPOSED TEST PIT LOCATIONS
JULY 1999

STONE & WEBSTER ENGINEERING CORPORATION
BOSTON, MASSACHUSETTS

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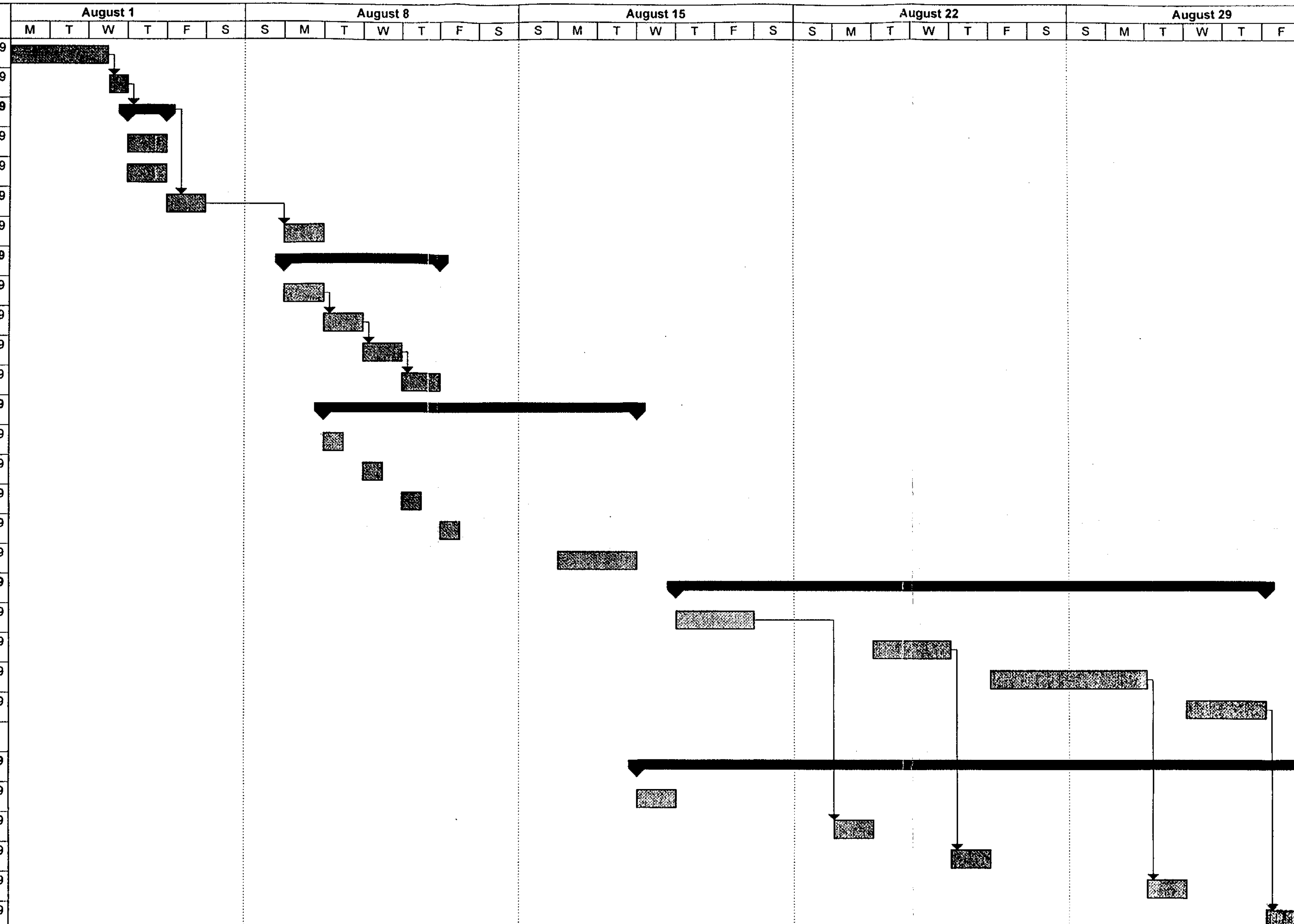
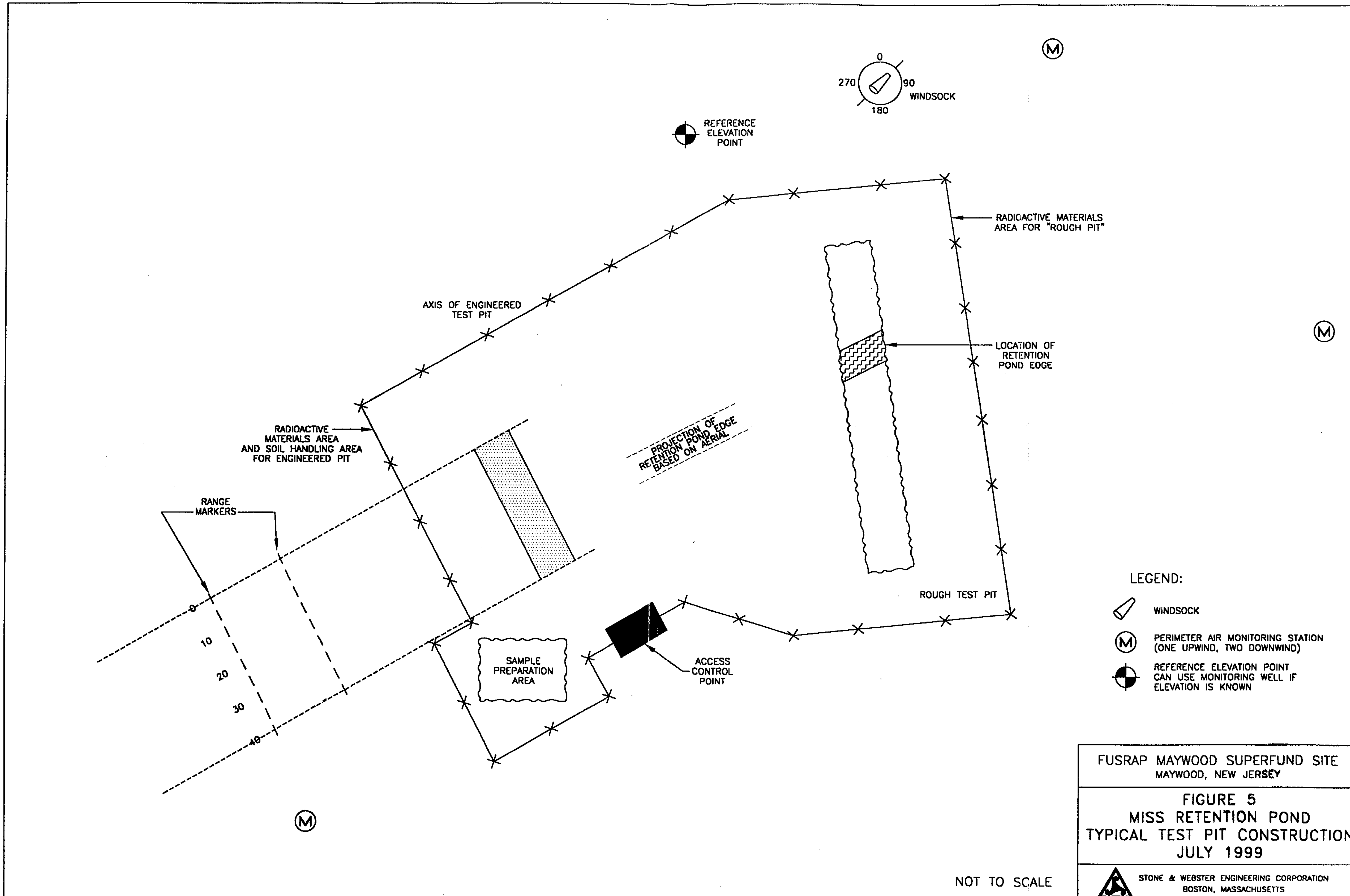
ID	Task Name	Duration	Start	Finish
1	Training	2.5d	Mon 8/2/99	Wed 8/4/99
2	Coord meeting	0.5d	Wed 8/4/99	Wed 8/4/99
3	**Field Locate**	**1d**	**Thu 8/5/99**	**Thu 8/5/99**
4	5-E	1d	Thu 8/5/99	Thu 8/5/99
5	1,2,3,4-R	1d	Thu 8/5/99	Thu 8/5/99
6	Field Set-up & Prep. Sites	1d	Fri 8/6/99	Fri 8/6/99
7	Additional Site Prep	1d	Mon 8/9/99	Mon 8/9/99
8	**Excavate**	**4d**	**Mon 8/9/99**	**Thu 8/12/99**
9	4-R	1d	Mon 8/9/99	Mon 8/9/99
10	1-R	1d	Tue 8/10/99	Tue 8/10/99
11	2-R	1d	Wed 8/11/99	Wed 8/11/99
12	3-R	1d	Thu 8/12/99	Thu 8/12/99
13	**Locate & Set-up E Pits**	**6d**	**Tue 8/10/99**	**Tue 8/17/99**
14	4-E	0.5d	Tue 8/10/99	Tue 8/10/99
15	3-E	0.5d	Wed 8/11/99	Wed 8/11/99
16	2-E	0.5d	Thu 8/12/99	Thu 8/12/99
17	1-E	0.5d	Fri 8/13/99	Fri 8/13/99
18	Excavate 5-E	2d	Mon 8/16/99	Tue 8/17/99
19	**Locate & Excavate**	**11d**	**Thu 8/19/99**	**Thu 9/2/99**
20	4-E	2d	Thu 8/19/99	Fri 8/20/99
21	3-E	2d	Tue 8/24/99	Wed 8/25/99
22	2-E	2d	Fri 8/27/99	Mon 8/30/99
23	1-E	2d	Wed 9/1/99	Thu 9/2/99
24				
25	**Backfill & Restore Sites**	**13d**	**Wed 8/18/99**	**Fri 9/3/99**
26	5-E	1d	Wed 8/18/99	Wed 8/18/99
27	4-E	1d	Mon 8/23/99	Mon 8/23/99
28	3-E	1d	Thu 8/26/99	Thu 8/26/99
29	2-E	1d	Tue 8/31/99	Tue 8/31/99
30	1-E	1d	Fri 9/3/99	Fri 9/3/99



Project: MISSPITS
Date: Tue 7/27/99

Task | Progress | Milestone | Summary | Rolled Up Task | Rolled Up Milestone | Rolled Up Progress

FIGURE 4
FUSRAP Maywood Superfund Site
Engineering Test Pits at MISS
Test Pit Field Schedule
Stone & Webster



FUSRAP MAYWOOD SUPERFUND SITE
MAYWOOD, NEW JERSEY

FIGURE 5
MISS RETENTION POND
TYPICAL TEST PIT CONSTRUCTION
JULY 1999

STONE & WEBSTER ENGINEERING CORPORATION
BOSTON, MASSACHUSETTS

28-July-99

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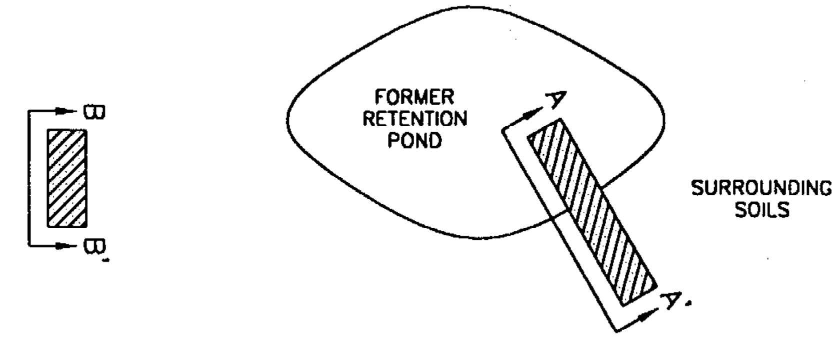
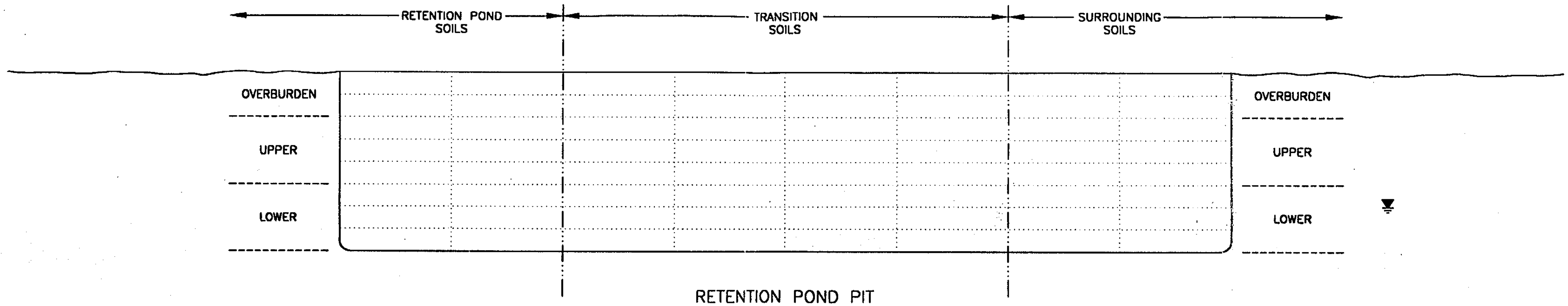
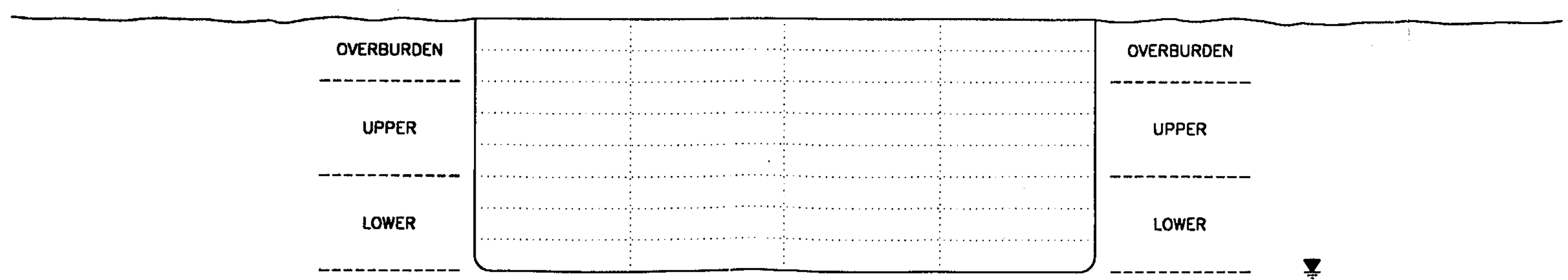
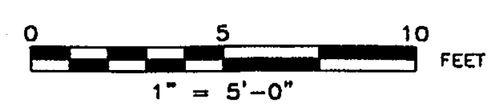




RETENTION POND PIT
SECTION A – A'



NON-RETENTION POND PIT
SECTION B – B'



FUSRAP MAYWOOD SUPERFUND SITE
MAYWOOD, NEW JERSEY

FIGURE 6
TYPICAL TEST PIT SAMPLING
JULY 1999

STONE & WEBSTER ENGINEERING CORPORATION
BOSTON, MASSACHUSETTS

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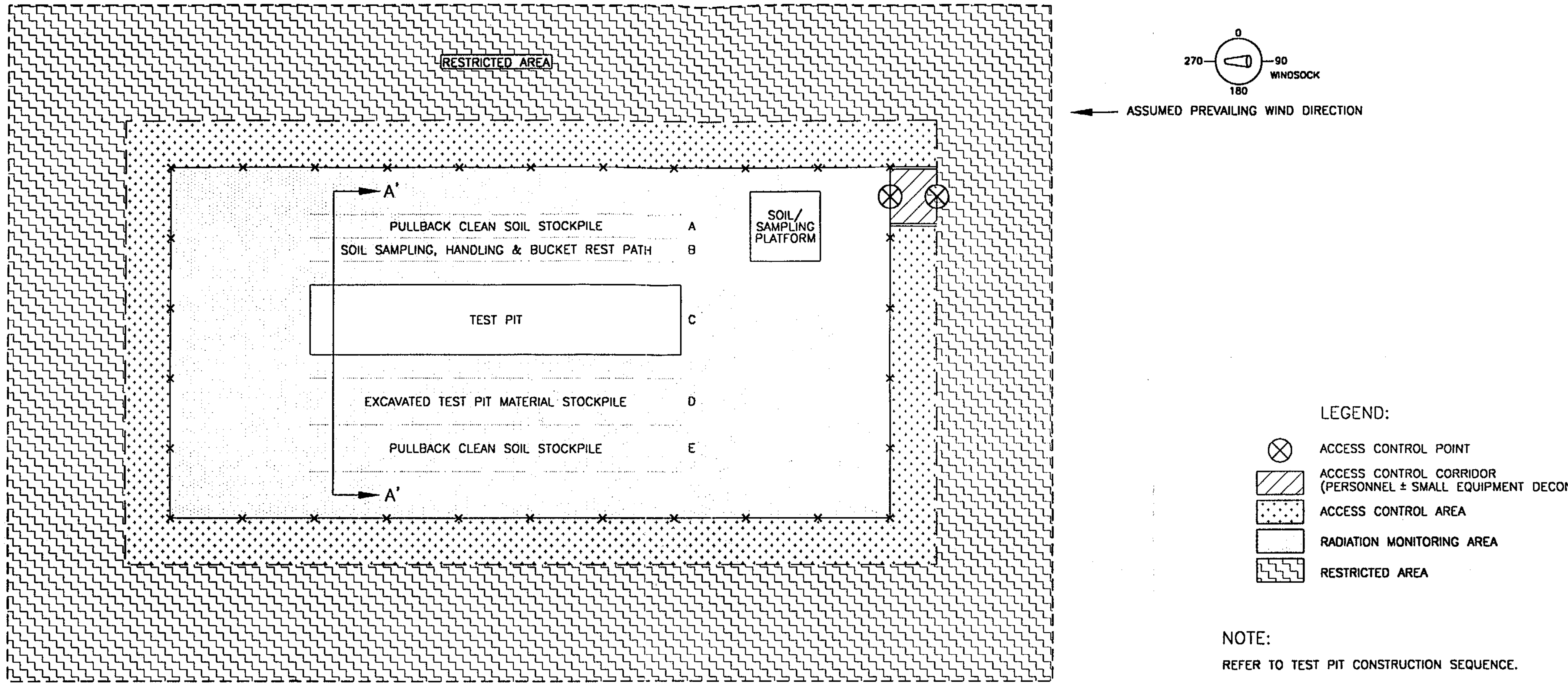
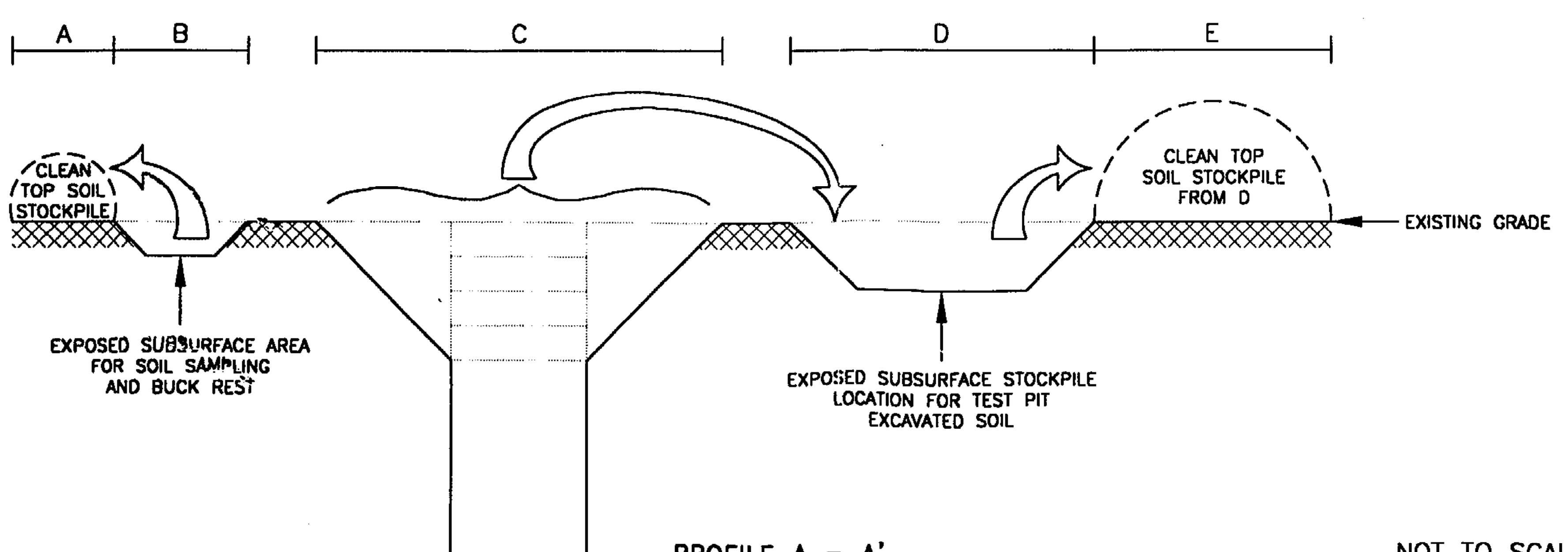


NOTE:

REFER TO TEST PIT CONSTRUCTION SEQUENCE.

PLAN VIEW



PROFILE A - A'

NOT TO SCALE

FUSRAP MAYWOOD SUPERFUND SITE
MAYWOOD, NEW JERSEY

FIGURE 7
TYPICAL SITE WORK ZONE
APPLICABLE TO ROUGH PIT/ENGINEERING TEST PIT
TYPICAL TEST PIT EXCAVATION PLAN
JULY 1999

STONE & WEBSTER ENGINEERING CORPORATION
BOSTON, MASSACHUSETTS

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21-July-99

APPENDIX B

ENGINEERING TEST PITS AT MISS FIELD DATA

FUSRAP MAYWOOD SUPERFUND SITE MAYWOOD, NEW JERSEY

EXCAVATOR BUCKET GM READINGS

ENGINEERING TEST PITS AT MISS
FIELD DATA

FUSRAP MAYWOOD SUPERFUND SITE
MAYWOOD, NEW JERSEY

FUSRAP Maywood Superfund Site
Sample Matrix Log
MISS
Stone & Webster Environmental Technology & Services

EXCAVATOR BUCKET G-M
BKG I/S : 42 cpm

SAMPLE MATRIX			Prepared By:	Checked By:	Date:
Test Pit ID: Test Pit 1	CHEMICAL		BRIAN MILLER	KARL GOFF	8/19/99
	GEOTECHNICAL				
	RADIOLOGICAL	X			

Range	A	B	C	D	E							
Depth												
1	85	170	120	190	80							
2	100	55	75	105	155							
3	95	105	95	55	50							
4	65	75	30	46	55							
5	55	45	40	30	30							
6	65	55	45	80	50							
7	80	40	75	55	80							
8	60	55	65	70	70							
9	60	70	70	35	65							
10												
11												
12												
13												
14												
15												
16												
17												
18												
19												

Comments:

Field Tests	Lab Testing							
						Extraction for Organics		
Head Space	Chemical - Soil	VOCs	SVOCs	PCBs	Pesticides	Sonication	Soxhlet	Metals (PP13)
Soil Classification	Chemical - GW	VOCs	SVOCs	PCBs	Pesticides	Gamma Spec	Other:	
Total Gamma (NaI)	Geotechnical	Grain Size	Atterberg Limit		Moisture Content		Hydrometer Test	
Unified Soil Classification	Radiological	Gamma Spec	Density					Pg ___ of ___

Utilize 1 copy of this sheet for samples for Chemical Analysis, 1 for Radiological, and 1 for Geotechnical

FUSRAP Maywood Superfund Site
Sample Matrix Log
MISS
Stone & Webster Environmental Technology & Services

EXCAVATOR Bucket GM
BKG 43 cpm

SAMPLE MATRIX	CHEMICAL		Prepared By:	Checked By:	Date:
Test Pit ID: Test Pit 2	GEOTECHNICAL		BRIAN MILLER	Karl Goff	8/24/99
	RADIOLOGICAL	X			

Range

Depth	A	B	C	D	E	F						
1	180	115	65	75	110	40						
2	305	215	115	120	105	80						
3	75	105	95	70	215	75						
4	70	150	235	540	260	140						
5	85	70	80	90	265	650						
6	45	60	100	65	40	105						
7	60	70	50	60	40	35						
8	40	65	65	55	105	30						
9	70	90	40	65	85	60						
10	60	50	90	70	60	55						
11												
12												
13												
14												
15												
16												
17												
18												
19												

Comments:

Field Tests	Lab Testing							
						Extraction for Organics		
Head Space	Chemical - Soil	VOCs	SVOCs	PCBs	Pesticides	Sonication	Soxhlet	Metals (PP13)
Soil Classification	Chemical - GW	VOCs	SVOCs	PCBs	Pesticides	Gamma Spec	Other:	
Total Gamma (NaI)	Geotechnical	Grain Size	Atterberg Limit		Moisture Content		Hydrometer Test	
Unified Soil Classification	Radiological	Gamma Spec	Density					Pg ___ of ___

Utilize 1 copy of this sheet for samples for Chemical Analysis, 1 for Radiological, and 1 for Geotechnical

FUSRAP Maywood Superfund Site

Sample Matrix Log

MISS

Stone & Webster Environmental Technology & Services

EXCAVATOR
Bucket GM
BKG: 160 cpm

SAMPLE MATRIX			Prepared By:	Checked By:	Date:
Test Pit ID: Test Pit 3	CHEMICAL		BRIAN MILLER	Karl Goff	8/30/99
	GEOTECHNICAL				
	RADIOLOGICAL	X			

Range

Depth	A	B	C	D	E							
1	755	320	70	70	80							
2	630	625	180	75	30							
3	670	2450	200	130	40							
4	185	740	375	560	120							
5	140	280	1000	170	70							
6	75	65	125	60	60							
7	50	80	70	270	75							
8	70	70	70	80	60							
9	50	50	65	60	50							
10	50	60	65	60	60							
11												
12												
13												
14												
15												
16												
17												
18												
19												

Comments:

Field Tests	Lab Testing							
						Extraction for Organics		
Head Space	Chemical - Soil	VOCs	SVOCs	PCBs	Pesticides	Sonication	Soxhlet	Metals (PP13)
Soil Classification	Chemical - GW	VOCs	SVOCs	PCBs	Pesticides	Gamma Spec	Other:	
Total Gamma (NaI)	Geotechnical	Grain Size	Atterberg Limit		Moisture Content		Hydrometer Test	
Unified Soil Classification	Radiological	Gamma Spec	Density					Pg ___ of ___

Utilize 1 copy of this sheet for samples for Chemical Analysis, 1 for Radiological, and 1 for Geotechnical

TPFORM-4

EXCAVATOR Bucket GM
BKG. 1080 cpm (empty bucket)

FUSRAP Maywood Superfund Site
Sample Matrix Log
MISS
Stone & Webster Environmental Technology & Services

SAMPLE MATRIX		Prepared By:	Checked By:	Date:
Test Pit ID: Test Pit 4	CHEMICAL	BRIAN MILLER	[signature]	8/31/99
	GEOTECHNICAL			
	RADIOLOGICAL X			

Range

Depth	A	B	C	D	E							
1	5280	4500	2080	1900	960							
2	1240	2840	1880	3000	1560							
3	350	450	720	1600	1440							
4	380	240	550	1020	1180							
5				1280	300							
6				180	580							
7				90	270							
8				150	240							
9					200							
10												
11												
12												
13												
14												
15												
16												
17												
18												
19												

Comments:

Field Tests	Lab Testing								
						Extraction for Organics			
Head Space	**Chemical - Soil**	VOCs	SVOCs	PCBs	Pesticides	Sonication	Soxhlet	Metals (PP13)	
Soil Classification	**Chemical - GW**	VOCs	SVOCs	PCBs	Pesticides	Gamma Spec	Other:		
Total Gamma (NaI)	**Geotechnical**	Grain Size	Atterberg Limit		Moisture Content		Hydrometer Test		
Unified Soil Classification	**Radiological**	Gamma Spec	Density						Pg ___ of ___

Utilize 1 copy of this sheet for samples for Chemical Analysis, 1 for Radiological, and 1 for Geotechnical

FUSRAP Maywood Superfund Site

Sample Matrix Log

MISS

Stone & Webster Environmental Technology & Services

~~NaI Scan~~
G-M Scan
Bkg 128

SAMPLE MATRIX		CHEMICAL		Prepared By:	Checked By:	Date:
Test Pit ID:	TEST PIT 5	GEOTECHNICAL		B. Miller	[illegible]	8/17/99
		RADIOLOGICAL	X			

Range	A	B	C									
Depth												
1	310 ~~120~~ ~~183~~	320	210									
2	260	200	250									
3	100	170	240									
4	100	70	150									
5	60	50	40									
6	60	30	80									
7	50	70	50									
8												
9												
10												
11												
12												
13												
14												
15												
16												
17												
18												
19												

Comments:

Field Tests	Lab Testing							
						Extraction for Organics		
Head Space	Chemical - Soil	VOCs	SVOCs	PCBs	Pesticides	Sonication	Soxhlet	Metals (PP13)
Soil Classification	Chemical - GW	VOCs	SVOCs	PCBs	Pesticides	Gamma Spec	Other:	
Total Gamma (NaI)	Geotechnical	Grain Size	Atterberg Limit		Moisture Content		Hydrometer Test	
Unified Soil Classification	Radiological	Gamma Spec	Density				Pg ___ of ___	

Utilize 1 copy of this sheet for samples for Chemical Analysis, 1 for Radiological, and 1 for Geotechnical

SAMPLE BUCKET PID SCAN READINGS

ENGINEERING TEST PITS AT MISS
FIELD DATA

FUSRAP MAYWOOD SUPERFUND SITE
MAYWOOD, NEW JERSEY

PFORM-4

FUSRAP Maywood Superfund Site
Sample Matrix Log
MISS
Stone & Webster Environmental Technology & Services

EXCAVATOR BUCKET PID
BKG: 0.0 ppm

SAMPLE MATRIX	CHEMICAL	X	Prepared By:	Checked By:	Date:
Test Pit ID: TP-1 BJM	GEOTECHNICAL		BRIAN MILLER BJM	Babs	8/19/99
	RADIOLOGICAL				

Range	A	B	C	D	E	~~F~~						
Depth												
1	0.0	0.0	0.0	0.0	0.0							
2	0.1	0.0	0.0	0.0	0.0							
3	0.1	0.0	0.0	0.0	0.0							
4	0.0	0.0	0.0	0.0	0.0							
5	0.0	0.0	0.0	0.0	0.0							
6	0.0	0.0	0.0	0.0	0.0							
7	0.0	0.0	0.0	0.0	0.0							
8	0.0	0.0	0.0	0.0	0.0							
9	0.0	0.0	0.0	0.0	0.0							
10												
11												
12												
13												
14												
15												
16												
17												
18												
19												

Comments: A02: Very foul odor C02: Foul odor

Field Tests	Lab Testing								
						Extraction for Organics			
Head Space	Chemical - Soil	VOCs	SVOCs	PCBs	Pesticides	Sonication	Soxhlet	Metals (PP13)	
Soil Classification	Chemical - GW	VOCs	SVOCs	PCBs	Pesticides	Gamma Spec	Other:		
Total Gamma (NaI)	Geotechnical	Grain Size	Atterberg Limit		Moisture Content		Hydrometer Test		
Unified Soil Classification	Radiological	Gamma Spec	Density						Pg __ of __

Utilize 1 copy of this sheet for samples for Chemical Analysis, 1 for Radiological, and 1 for Geotechnical

TPFORM-4

FUSRAP Maywood Superfund Site

Sample Matrix Log

MISS

Stone & Webster Environmental Technology & Services

EXCAVATOR PID
0.0 ppm BKG

SAMPLE MATRIX	CHEMICAL	X	Prepared By:	Checked By:	Date:
Test Pit ID: TEST PIT 2	GEOTECHNICAL		BRIAN MILLER	KARL GOFF	8/24/99
	RADIOLOGICAL				

Range

Depth	A	B	C	D	E	F					
1	0.5	0.4	0.0	0.0	0.0	0.0					
2	0.0	0.0	0.0	0.0	0.0	0.0					
3	0.0	0.0	0.0	0.0	0.0	0.0					
4	0.0	0.0	0.0	0.0	0.0	0.0					
5	0.0	0.0	0.0	0.0	0.0	0.0					
6	0.0	0.0	0.0	0.0	0.0	0.0					
7	0.0	0.0	0.0	0.0	0.0	0.0					
8	0.0	0.0	0.0	0.0	0.0	0.0					
9	0.0	0.0	0.0	0.0	0.0	0.0					
10	0.0	0.0	0.0	0.0	0.0	0.0					
11											
12											
13											
14											
15											
16											
17											
18											
19											

Comments:

Field Tests	Lab Testing								
						Extraction for Organics			
Head Space	**Chemical - Soil**	VOCs	SVOCs	PCBs	Pesticides	Sonication	Soxhlet	Metals (PP13)	
Soil Classification	**Chemical - GW**	VOCs	SVOCs	PCBs	Pesticides	Gamma Spec	Other:		
Total Gamma (NaI)	**Geotechnical**	Grain Size	Atterberg Limit		Moisture Content		Hydrometer Test		
Unified Soil Classification	**Radiological**	Gamma Spec	Density						Pg ___ of ___

Utilize 1 copy of this sheet for samples for Chemical Analysis, 1 for Radiological, and 1 for Geotechnical

ORM-4

Excavator Bucket PID

BKG : 0.0 ppm

FUSRAP Maywood Superfund Site

Sample Matrix Log

MISS

Stone & Webster Environmental Technology & Services

SAMPLE MATRIX					
Test Pit ID: Test Pit 3	CHEMICAL: X	Prepared By: Brian Miller	Checked By: BEM	Date: 8/30/99	
	GEOTECHNICAL				
	RADIOLOGICAL				

Range														
Depth	A	B	C	D	E									
1	0.0	0.0	0.0	0.0	0.0									
2	0.3	0.0	0.0	0.0	0.0									
3	0.0	0.0	0.3	0.0	0.0									
4	0.0	0.0	0.0	0.0	0.0									
5	0.0	0.0	0.0	0.0	0.0									
6	0.0	0.0	0.0	0.0	0.0									
7	0.0	0.0	0.0	0.0	0.0									
8	0.0	0.0 *	0.0	0.0	0.0 **									
9	0.0	0.0	0.0	0.0	0.0									
10	0.0	0.0	0.0	0.0	0.0									
11														
12														
13														
14														
15														
16														
17														
18														
19														

Comments: * BOB: Slightly foul organic odor ** Foul "hydrogen sulfide-like" odor

Field Tests	Lab Testing								
						Extraction for Organics			
Head Space	Chemical - Soil	VOCs	SVOCs	PCBs	Pesticides	Sonication	Soxhlet	Metals (PP13)	
Soil Classification	Chemical - GW	VOCs	SVOCs	PCBs	Pesticides	Gamma Spec	Other:		
Total Gamma (NaI)	Geotechnical	Grain Size	Atterberg Limit		Moisture Content		Hydrometer Test		
Unified Soil Classification	Radiological	Gamma Spec	Density						Pg ___ of ___

Utilize 1 copy of this sheet for samples for Chemical Analysis, 1 for Radiological, and 1 for Geotechnical

TPFORM-4

FUSRAP Maywood Superfund Site
Sample Matrix Log
MISS
Stone & Webster Environmental Technology & Services

Excavator Bucket PID
Bkg: 0.0 ppm

SAMPLE MATRIX			Prepared By:	Checked By:	Date:
Test Pit ID: Test Pit 4	CHEMICAL	X	Brian Miller	BM	8/31/99
	GEOTECHNICAL				
	RADIOLOGICAL				

Range

Depth	A	B	C	D	E								
1	0.0	0.0	0.0	0.2	0.0								
2	0.0	0.0	0.0	0.0	0.0								
3	0.0	0.0	0.0	0.3	0.0								
4	0.0	0.0	0.0	0.0	0.0								
5				0.0	0.0								
6				0.0	0.0								
7				0.0	0.0								
8				0.0	0.0								
9					0.3*								
10													
11													
12													
13													
14													
15													
16													
17													
18													
19													

Comments: * Distinct petroleum family odor

Field Tests	Lab Testing								
						Extraction for Organics			
Head Space	**Chemical - Soil**	VOCs	SVOCs	PCBs	Pesticides	Sonication	Soxhlet	Metals (PP13)	
Soil Classification	**Chemical - GW**	VOCs	SVOCs	PCBs	Pesticides	Gamma Spec	Other:		
Total Gamma (NaI)	**Geotechnical**	Grain Size	Alterberg Limit		Moisture Content		Hydrometer Test		
Unified Soil Classification	**Radiological**	Gamma Spec	Density						Pg ___ of ___

Utilize 1 copy of this sheet for samples for Chemical Analysis, 1 for Radiological, and 1 for Geotechnical

TPFORM-4

FUSRAP Maywood Superfund Site

Sample Matrix Log

MISS

Stone & Webster Environmental Technology & Services

BUCKET PID
0.0 BKG

SAMPLE MATRIX	CHEMICAL	X	Prepared By:	Checked By:	Date:
Test Pit ID: TEST PIT 5	GEOTECHNICAL		BRIAN MILLER	Karl Goff	8/17/99
	RADIOLOGICAL				

Range	A	B	C									
Depth												
1	0.0	0.0	0.0									
2	0.0	0.9	0.0									
3	0.1	0.0	0.0 ~~125~~									
4	0.5*	0.2	0.1									
5	0.0	0.0	0.0									
6	0.0	0.0	0.0									
7	0.0	0.0	0.0									
8												
9												
10												
11												
12												
13												
14												
15												
16												
17												
18												
19												

Comments: A04: Strong hydrocarbon odor A05: Strong Chemical odor B05"

Field Tests	Lab Testing									
						Extraction for Organics				
Head Space	Chemical - Soil	VOCs	SVOCs	PCBs	Pesticides	Sonication	Soxhlet	Metals (PP13)		
Soil Classification	Chemical - GW	VOCs	SVOCs	PCBs	Pesticides	Gamma Spec	Other:			
Total Gamma (NaI)	Geotechnical	Grain Size	Atterberg Limit		Moisture Content		Hydrometer Test			
Unified Soil Classification	Radiological	Gamma Spec	Density						Pg ___ of ___	

Utilize 1 copy of this sheet for samples for Chemical Analysis, 1 for Radiological, and 1 for Geotechnical

HEADSPACE READINGS

ENGINEERING TEST PITS AT MISS
FIELD DATA

FUSRAP MAYWOOD SUPERFUND SITE
MAYWOOD, NEW JERSEY

FUSRAP Maywood Superfund Site

Sample Matrix Log

MISS

Stone & Webster Environmental Technology & Services

Headspace
BKG: 0.0 ppm

SAMPLE MATRIX		Prepared By:	Checked By:	Date:
Test Pit ID: Test Pit 1	CHEMICAL: X GEOTECHNICAL: RADIOLOGICAL:	Brian Miller	Karl Goff	8/19/99

Range	A	B	C	D	E							
Depth												
1	0.0	0.0	0.0	0.0	0.0							
2	0.0	0.0	0.0	0.0	0.0							
3	0.0	0.0	0.0	0.0	0.0							
4	0.0	0.0	0.0	0.0	0.0							
5	0.0	0.0	0.0	0.0	0.0							
6	0.0	0.0	0.0	0.0	0.0							
7	0.0	0.0	0.0	0.0	0.0							
8	0.0	0.0	0.0	0.0	0.0							
9	0.0	0.0	0.0	0.0	0.0							
10												
11												
12												
13												
14												
15												
16												
17												
18												
19												

Comments:

Field Tests	Lab Testing							
						Extraction for Organics		
Head Space	Chemical - Soil	VOCs	SVOCs	PCBs	Pesticides	Sonication	Soxhlet	Metals (PP13)
Soil Classification	Chemical - GW	VOCs	SVOCs	PCBs	Pesticides	Gamma Spec	Other:	
Total Gamma (NaI)	Geotechnical	Grain Size	Atterberg Limit		Moisture Content		Hydrometer Test	
Unified Soil Classification	Radiological	Gamma Spec	Density					

Pg ___ of ___

Utilize 1 copy of this sheet for samples for Chemical Analysis, 1 for Radiological, and 1 for Geotechnical

FUSRAP Maywood Superfund Site

Sample Matrix Log

MISS

Stone & Webster Environmental Technology & Services

SAMPLE Headspace
BACKGROUND: 0.0 ppm

SAMPLE MATRIX	CHEMICAL	X	Prepared By:	Checked By:	Date:
Test Pit ID: Test Pit 2	GEOTECHNICAL		BRIAN Miller	Karl GOFF	8/24/99
	RADIOLOGICAL				

Range / Depth	A	B	C	D	E	F						
1	0.0	0.0	0.0	0.0	0.0	0.0						
2	0.0	0.0	0.0	0.0	0.0	0.0						
3	0.0	0.0	0.0	0.0	0.0	0.0						
4	0.0	0.0	0.0	0.0	0.0	0.0						
5	0.0	0.0	0.0	0.0	0.0	0.0						
6	0.0	0.0	0.0	0.0	0.0	0.0						
7	0.0	0.0	0.0	0.0	0.0	0.0						
8	0.0	0.0	0.0	0.0	0.0	0.0						
9	0.0	0.0	0.0	0.0	0.0	0.0						
10	0.0	0.0	0.0	0.0	0.0	0.0						
11												
12												
13												
14												
15												
16												
17												
18												
19												

Comments:

Field Tests	Lab Testing								
						Extraction for Organics			
Head Space	**Chemical - Soil**	VOCs	SVOCs	PCBs	Pesticides	Sonication	Soxhlet	Metals (PP13)	
Soil Classification	**Chemical - GW**	VOCs	SVOCs	PCBs	Pesticides	Gamma Spec	Other:		
Total Gamma (NaI)	**Geotechnical**	Grain Size	Atterberg Limit		Moisture Content		Hydrometer Test		
Unified Soil Classification	**Radiological**	Gamma Spec	Density						Pg __ of __

Utilize 1 copy of this sheet for samples for Chemical Analysis, 1 for Radiological, and 1 for Geotechnical

FORM-4

FUSRAP Maywood Superfund Site
Sample Matrix Log
MISS
Stone & Webster Environmental Technology & Services

Headspace
8/30/99

SAMPLE MATRIX	CHEMICAL	X	Prepared By:	Checked By:	Date:
Test Pit ID: Test Pit 3	GEOTECHNICAL		BRIAN MILLER	BEM	8/30/99
	RADIOLOGICAL				

Range / Depth	A	B	C	D	E							
1	0.0	0.5	0.3	0.0	0.0							
2	0.0	0.0	0.0	0.3	0.0							
3	0.0	0.0	0.0	0.0	0.0							
4	0.0	0.0	0.0	0.0	0.0							
5	0.0	0.0	0.0	0.0	0.0							
6	0.0	0.0	0.0	0.0	0.0							
7	0.0	0.0	0.0	0.0	0.0							
8	0.0	0.0	0.0	0.0	0.0							
9	0.0	0.0	0.0	0.0	0.0							
10	0.0	0.0	0.0	0.0	0.0							
11												
12												
13												
14												
15												
16												
17												
18												
19												

Comments:

Field Tests	Lab Testing								
						Extraction for Organics			
Head Space	Chemical - Soil	VOCs	SVOCs	PCBs	Pesticides	Sonication	Soxhlet	Metals (PP13)	
Soil Classification	Chemical - GW	VOCs	SVOCs	PCBs	Pesticides	Gamma Spec	Other:		
Total Gamma (NaI)	Geotechnical	Grain Size	Atterberg Limit		Moisture Content		Hydrometer Test		
Unified Soil Classification	Radiological	Gamma Spec	Density						Pg ___ of ___

Utilize 1 copy of this sheet for samples for Chemical Analysis, 1 for Radiological, and 1 for Geotechnical

TPFORM-4

FUSRAP Maywood Superfund Site
Sample Matrix Log
MISS
Stone & Webster Environmental Technology & Services

~~Excavator~~
Headspace
BKG. 0.0 ppm

SAMPLE MATRIX	CHEMICAL	X	Prepared By: Brian Miller	Checked By: BM	Date: 8/31/99
Test Pit ID: Test Pit 4	GEOTECHNICAL				
	RADIOLOGICAL				

Range													
Depth	A	B	C	D	E								
1	0.0	0.0	0.0	0.0	0.0								
2	0.0	0.0	0.0	0.3	2.9								
3	0.0	0.3	0.0	0.0	0.5								
4	0.0	0.0	0.0	0.0	0.5								
5				0.0	0.0								
6				0.3	0.0								
7				0.0	0.0								
8				0.0	0.0								
9													
10													
11													
12													
13													
14													
15													
16													
17													
18													
19													

Comments:

Field Tests	Lab Testing								
						Extraction for Organics			
Head Space	**Chemical - Soil**	VOCs	SVOCs	PCBs	Pesticides	Sonication	Soxhlet	Metals (PP13)	
Soil Classification	**Chemical - GW**	VOCs	SVOCs	PCBs	Pesticides	Gamma Spec	Other:		
Total Gamma (NaI)	**Geotechnical**	Grain Size	Atterberg Limit		Moisture Content		Hydrometer Test		
Unified Soil Classification	**Radiological**	Gamma Spec	Density						Pg ___ of ___

Utilize 1 copy of this sheet for samples for Chemical Analysis, 1 for Radiological, and 1 for Geotechnical

tpforms.xl

FUSRAP Maywood Superfund Site
Sample Matrix Log
MISS
Stone & Webster Environmental Technology & Services

Headspace

SAMPLE MATRIX	CHEMICAL	X	Prepared By:	Checked By:	Date:
Test Pit ID: TEST PIT 5	GEOTECHNICAL		B. Miller	BM	8/17/99
	RADIOLOGICAL				

Range	A	B	C									
Depth												
1	0.2	0.1	0.0									
2	0.0	0.0	0.0									
3	125.0	0.1	0.0									
4	2.2	0.5	0.1									
5	0.2	0.0	0.0									
6	0.0	0.0	0.0									
7	0.0	0.0	0.0									
8												
9												
10												
11												
12												
13												
14												
15												
16												
17												
18												
19												

Comments:

Field Tests	Lab Testing								
						Extraction for Organics			
Head Space	Chemical - Soil	VOCs	SVOCs	PCBs	Pesticides	Sonication	Soxhlet	Metals (PP13)	
Soil Classification	Chemical - GW	VOCs	SVOCs	PCBs	Pesticides	Gamma Spec	Other:		
Total Gamma (NaI)	Geotechnical	Grain Size	Atterberg Limit		Moisture Content		Hydrometer Test		
Unified Soil Classification	Radiological	Gamma Spec	Density						Pg ___ of ___

Utilize 1 copy of this sheet for samples for Chemical Analysis, 1 for Radiological, and 1 for Geotechnical

PRE & POST EXCAVATION SURFACE RADIOLOGICAL SURVEYS

ENGINEERING TEST PITS AT MISS FIELD DATA

FUSRAP MAYWOOD SUPERFUND SITE MAYWOOD, NEW JERSEY

FMSS Survey Data Sheet

Reviewed By: [signature] 9/20/99

Survey No.:	FMSS99RS.0067
Date:	8/10/1999
Survey Tech.:	G. Moyer/B. Miller
Count Rm. Tech.:	N/A
Survey Type:	Gamma Walkover
Level of Posting:	Restricted Area

Item Surveyed:	Pre-Excavation Gamma Walkover of Test Pit #1
Contaminant/Limits:	Th232: Limit = 180dpm (removable), 900 dpm (total); U238: Limit = 900dpm (removable), 4500 dpm (total)
Comments:	

Notes:

ACF = Area Correction Factor

T_b = Background Count Time

T_s = Sample Count Time

R_b = Bkgd count rate

**Bcpm = Background cpm = R_b

Survey Type

Routine, Release, Informational

corr urem (urem) = (cpm)(x) + Yint

Direct

(dpm) = (cpm - Bcpm)/(eff * ACF)

Removable

(dpm) = (cpm - Bcpm)/ eff

* dpm readings are per 100cm²

Parameters	Dose Rate	Gamma	Corr uR	Total Alpha	Total Beta-Gamma	Removable Alpha	Removable Beta-Gamma
Instrument Model:		L2221/SPA-3					
Instrument SN:		33375/33386					
Cal. Due Date:		3/18/00-1/23/00					
x, y int.: / Efficiency:	N/A						
BKG: / Bcpm**:		12 Kcpm	N/A				
ACF:							
tB:							
tS:							
Lc:							
MDC:							

No.	Descriptions	x	y	z	uR/hr	cpm	uR/hr	cpm	*dpm	cpm	*dpm	cpm	*dpm	cpm	*dpm
	See Attached Sheets														
	Shades areas = N/A														

FMSS Survey Information Sheet

Survey Drawing/Description/Comments

	N										
	30-35	30-35	30-35	25-30	25-30	30-34	30-34	25-30	25-30	25-30	50-65
	25-35	25-30	25-30	25-30	30-35	25-28	20-25	28-30	35-45	55-60	55-60
	30-40	35-40	30-35	25-30	25-30	25-30	25-30	15-18	15-20	25-35	38-48
	40-50	35-45	35-40	35-40	32-37	28-32	28-32				
	35-40	32-38	35-40	35-40	35-40	28-34	28-34				
	25-30	28-30	30-35	30-40	27-35	27-32	25-30				
	30-45	30-45	30-45	30-35	30-35	25-30	25-30				
	30-45	30-45	35-45	35-45	25-55	25-45	25-35				

General Information

NOTE: All SPA-3 readings are in Kcpm

Survey #: FMSS99RS.0067

Site: FMSS

Tech(s): Moyer/Miller

Comment Grid blocks 10' x 10' (100 ft^2) - Test Pit #1

FMSS Survey Data Sheet

Reviewed By: [signature] 9/26/99

Survey No.:	FMSS99RS.0071
Date:	9/8/1999
Survey Tech.:	Gendreau/Wade/Perry
Count Rm. Tech.:	N/A
Survey Type:	Gamma Walkover
Level of Posting:	Restricted Area

Item Surveyed:	Post-Excavation Gamma Walkover of Test Pit #1
Contaminant/Limits:	Th232: Limit = 180dpm (removable), 900 dpm (total); U238: Limit = 900dpm (removable), 4500 dpm (total)
Comments:	Swipe bkg. is the performance check bkg; direct probe bkg. taken in area of survey at time of survey

Notes:

ACF = Area Correction Factor

T_b = Background Count Time

T_s = Sample Count Time

R_b = Bkgd count rate

**Bcpm = Background cpm = R_b

Survey Type

Routine, Release, Informational

corr urem (urem) = (cptm)(x) + Yint.

Direct

(dpm) = (cpm - Bcpm)/(eff * ACF)

Removable

(dpm) = (cpm - Bcpm)/ eff

* dpm readings are per 100cm²

Parameters	Dose Rate	Gamma	Corr uR	Total Alpha	Total Beta-Gamma	Removable Alpha	Removable Beta-Gamma
Instrument Model:		L2221/SPA-3					
Instrument SN:		33390/33401					
Cal. Due Date:		6/30/00-3/1/00					
x, y int.: Efficiency:	N/A						
BKG: Bcpm**:		12 Kcpm	N/A				
ACF:							
tB:							
tS:							
Lc:							
MDC:							

No.	Descriptions	x	y	z	uR/hr	cptm	uR/hr	cpm	*dpm	cpm	*dpm	cpm	*dpm	cpm	*dpm
	See Attached Sheets														
	Shaded Areas = N/A														

FMSS Survey Information Sheet

Survey Drawing/Description/Comments

	N										
	30-40	32-37	33-36	31-35	33-38	30-35	30-34	31-38	29-34	34-38	31-35
	30-36	32-36	36-65	36-85	26-33	26-33	28-32	25-31	23-29	26-29	27-34
	30-36	35-45	36-76	35-90	29-170	30-70	26-31	23-32	23-27	25-29	29-34
	33-37	35-48	35-42	35-42	40-66	45-75	30-38				
	34-41	35-39	35-39	36-42	38-77	32-50	31-37				
	34-38	33-37	35-38	35-38	35-40	33-39	28-35				
	33-38	34-36	35-38	33-40	33-40	32-38	26-33				
	33-38	34-36	35-38	33-37	31-38	30-38	26-33				

General Information

Survey #: FMSS99RS.0071

Site: FMSS

Tech(s): Gendreau/Wade/Perry

Comment Grid blocks 10' x 10' (100 ft^2) - Test Pit #1

*NOTE- Bold boundary indicates areal extent of pre-excavation survey grid

** SPA-3 readings are in Kcpm

FMSS Survey Data Sheet

Reviewed By: [signature] 9/20/99

Survey No.:	FMSS99RS.0066
Date:	8/9/1999
Survey Tech.:	R. Gendreau/B. Miller
Count Rm. Tech.:	N/A
Survey Type:	Gamma Walkover
Level of Posting:	Restricted Area

Item Surveyed:	Pre-Excavation Gamma Walkover of Test Pit #2
Contaminant/Limits:	Th232: Limit = 180dpm (removable), 900 dpm (total); U238: Limit = 900dpm (removable), 4500 dpm (total)
Comments:	

Notes:

ACF = Area Correction Factor

T_b = Background Count Time

T_s = Sample Count Time

R_b = Bkgd count rate

**Bcpm = Background cpm = R_b

Survey Type

Routine, Release, Informational

corr urem (urem) = (cptm)(x) + Yint

Direct

(dpm) = (cpm - Bcpm)/(eff * ACF)

Removable

(dpm) = (cpm - Bcpm)/ eff

* dpm readings are per 100cm²

Parameters	Dose Rate	Gamma	Corr uR	Total Alpha	Total Beta-Gamma	Removable Alpha	Removable Beta-Gamma
Instrument Model:		L2221/SPA-3					
Instrument SN:		33359/33368					
Cal. Due Date:		6/4/00-3/18/00					
x, y int.: / Efficiency:	N/A						
BKG: / Bcpm**:		12 Kcpm	N/A				
ACF:							
tB:							
tS:							
Lc:							
MDC:							

No.	Descriptions	x	y	z	uR/hr	cptm	uR/hr	cpm	*dpm	cpm	*dpm	cpm	*dpm	cpm	*dpm
	See Attached Sheets														

FMSS Survey Information Sheet

Survey Drawing/Description/Comments

				13-15	14-17	14-17	14-17	14-17	14-17	14-17	18-21
				14-16	14-17	14-17	14-17	14-17	14-17	14-17	17-20
				14-16	14-17	14-17	14-17	14-17	14-17	14-17	17-20
				15-19	15-18	15-18	14-17	14-17	14-17	16-18	18-20
				15-19	16-18	16-18	16-18	16-18	20-23	20-23	22-25
				20-23	19-21	18-21	17-19	19-21	23-26	20-24	20-23
					18-20	18-20	18-20	19-22	19-22	20-22	20-23
						19-22	19-22	19-22	19-22	19-22	20-23
						20-22	21-23	20-22	22-25	20-31	22-31
						18-20	18-23	20-24	20-24	20-24	25-42
						16-20	18-28	22-28	22-28	25-35	30-45

General Information

NOTE: All SPA-3 readings are in Kcpm

Survey #: FMSS99RS.0066

Site: FMSS

Tech(s): Gendreau/Miller

Comment Grid blocks 10' x 10' (100 ft^2) - Test Pit #2

FM Survey Information Sheet

Survey Drawing/Description/Comments

				14-17	14-17	14-17	14-17	14-17	14-17	14-17	15-18
				14-17	14-17	14-17	14-17	15-18	15-18	15-18	17-22
				13-16	13-16	13-16	13-16	13-16	14-17	14-17	17-24

General Information

Survey #: FMSS99RS.0066

Site: FMSS

Tech(s): Gendreau/Miller

Comment Grid blocks 10' x 10' (100 ft^2) - Test Pit #2

NOTE: All SPA-3 readings are in Kcpm

FMSS Survey Data Sheet

Reviewed By [signature] 9/20/99

Survey No.:	FMSS99RS.0070
Date:	9/8/1999
Survey Tech.:	Gendreau/Wade/Perry
Count Rm. Tech.:	N/A
Survey Type:	Gamma Walkover
Level of Posting:	Restricted Area

Item Surveyed:	Post-Excavation Gamma Walkover of Test Pit #2
Contaminant/Limits:	Th232: Limit = 180dpm (removable), 900 dpm (total); U238: Limit = 900dpm (removable), 4500 dpm (total)
Comments:	

Notes:

ACF = Area Correction Factor
T_b = Background Count Time
T_s = Sample Count Time
R_b = Bkgd count rate
**Bcpm = Background cpm = R_b

Survey Type

Routine, Release, Informational

corr urem (urem) = (cptm)(x) + Yint

Direct

(dpm) = (cpm - Bcpm)/(eff * ACF)

Removable

(dpm) = (cpm - Bcpm)/ eff

* dpm readings are per 100cm²

Parameters	Dose Rate	Gamma	Corr uR	Total Alpha	Total Beta-Gamma	Removable Alpha	Removable Beta-Gamma
Instrument Model:		L2221/SPA-3					
Instrument SN:		33390/33401					
Cal. Due Date:		6/30/00-3/1/00					
x, y int.: Efficiency:	N/A						
BKG: Bcpm**:		12 Kcpm	N/A				
ACF:							
tB:							
tS:							
Lc:							
MDC:							

No.	Descriptions	x	y	z	uR/hr	cptm	uR/hr	cpm	*dpm	cpm	*dpm	cpm	*dpm	cpm	*dpm
	See Attached Sheets														
	Shaded areas = N/A														

FMSS Survey Information Sheet

Survey Drawing/Description/Comments

										17-35	35-38
	N				13-15	13-15	14-49	14-19	17-20	19-27	30-36
					14-16	15-17	17-21	18-25	20-23	19-24	22-30
					17-19	17-19	19-22	19-22	20-23	21-23	22-25
					18-20	17-19	17-19	19-22	20-23	20-25	22-25
						17-20	17-20	18-21	20-28	24-27	23-27
						17-20	17-20	18-21	21-25	23-25	23-27
						18-20	16-20	18-21	19-28	17-24	20-26
						20-23	20-25	19-26	23-33	20-23	19-22

General Information

Survey #: FMSS99RS.0070

Site: FMSS

Tech(s): Gendreau/Wade/Perry

Comment Grid blocks 10' x 10' (100 ft^2) - Test Pit #2

*NOTE- Bold boundary indicates areal extent of pre-excavation survey grid

** SPA-3 readings are in Kcpm

FMSS Survey Data Sheet

Reviewed By: [signature] 9/26/99

Survey No.:	FMSS99RS.0068
Date:	8/11/1999
Survey Tech.:	B. Miller/G. Perry
Count Rm. Tech.:	N/A
Survey Type:	Gamma Walkover
Level of Posting:	Restricted Area

Item Surveyed:	Pre-Excavation Gamma Walkover of Test Pit #3
Contaminant/Limits:	Th232: Limit = 180dpm (removable), 900 dpm (total); U238: Limit = 900dpm (removable), 4500 dpm (total)
Comments:	

Notes:

ACF = Area Correction Factor

T_b = Background Count Time

T_s = Sample Count Time

R_b = Bkgd count rate

**Bcpm = Background cpm = R_b

Survey Type

Routine, Release, Informational

corr urem (urem) = (cptm)(x) + Yint

Direct

(dpm) = (cpm - Bcpm)/(eff * ACF)

Removable

(dpm) = (cpm - Bcpm)/ eff

* dpm readings are per 100cm²

Parameters	*Dose Rate*	*Gamma*	*Corr uR*	*Total* Alpha	*Total* Beta-Gamma	*Removable* Alpha	*Removable* Beta-Gamma
Instrument Model:		L2221/SPA-3					
Instrument SN:		33375/33386					
Cal. Due Date:		11/23/99-3/18/00					
x, y int.: Efficiency:	N/A						
*BKG: Bcpm**:*		12 Kcpm	N/A				
ACF:							
tB:							
tS:							
Lc:							
MDC:							

No.	*Descriptions*	*x*	*y*	*z*	*uR/hr*	*cptm*	*uR/hr*	*cpm*	**dpm*	*cpm*	**dpm*	*cpm*	**dpm*	*cpm*	**dpm*
	See Attached Sheets														

Note: Shad[ed] [ar]eas = N/A

FM Survey Information Sheet

Survey Drawing/Description/Comments

				25-35	25-45	35-490	100-380	28-32	22-43	25-32	24-50
						40-200	60-140	30-40	22-43	25-42	22-50
						30-45	32-60	40-50	20-22	25-35	20-23
	N					30-40	26-32	30-50	20-22	25-30	18-21
						30-40	23-26	25-28	20-24	22-26	20-24
						35-45	23-26	24-30	20-28	19-22	22-32
						40-50	23-26	20-23	19-22	19-22	20-24
						30-45	23-26	20-23	19-22	19-22	18-20
						25-40	20-24	22-24	19-22	19-22	18-21
						24-60	20-24	22-25	19-23	19-22	18-22
						20-24	20-24	22-27	20-35	18-22	17-20

General Information

NOTE: All SPA-3 readings are in Kcpm

Survey #: FMSS99RS.0068

Site: FMSS

Tech(s): Miller/Perry

Comment Test Pit (TP3) Pre-excavation Gamma PID Walkover

FMSS Survey Information Sheet

Survey Drawing/Description/Comments

			18-25	25-40	25-35	20-30		80-225			
			20-25	25-35	20-30	20-35	20-45	80-225			
			20-25	25-35	20-30	20-35	20-120	80-155			
			20-25	25-45	25-35	25-75	100-200	55-65			
			20-25	20-230	30-150	30-160	80-150	45-55		30-40	25-40
				100-250	80-130	100-140	40-90	22-28	35-40	30-40	35-55
				40-60	40-80	60-110	35-100	22-28	35-55	35-45	40-55
				40-80	40-60	40-70	35-55	20-26	35-60	27-33	30-70
				30-120	40-70	30-80	30-40	24-28	25-60	25-32	25-35

General Information

NOTE: All SPA-3 readings are in Kcpm

Survey #: FMSS99RS.0068

Site: FMSS

Tech(s): Miller/Perry

Comment Test Pit (TP3) Pre-excavation Gamma PID Walkover

FMSS Survey Data Sheet

Reviewed By: [signature] 9/20/99

Survey No.:	FMSS99RS.0072
Date:	9/9/1999
Survey Tech.:	B. Miller/G. Perry
Count Rm. Tech.:	N/A
Survey Type:	Gamma Walkover
Level of Posting:	Restricted Area

Item Surveyed:	Post-Excavation Gamma Walkover of Test Pit #3
Contaminant/Limits:	Th232: Limit = 180dpm (removable), 900 dpm (total); U238: Limit = 900dpm (removable), 4500 dpm (total)
Comments:	

Notes:

ACF = Area Correction Factor

T_b = Background Count Time

T_s = Sample Count Time

R_b = Bkgd count rate

**Bcpm = Background cpm = R_b

Survey Type

Routine, Release, Informational

corr urem (urem) = (cptm)(x) + Yint.

Direct

(dpm) = (cpm - Bcpm)/(eff * ACF)

Removable

(dpm) = (cpm - Bcpm)/ eff

* dpm readings are per 100cm²

Parameters	Dose Rate	Gamma	Corr uR	Total Alpha	Total Beta-Gamma	Removable Alpha	Removable Beta-Gamma
Instrument Model:		L2221/SPA-3					
Instrument SN:		33357/33384					
Cal. Due Date:		6/10/00-3/1/00					
x, y int.: / Efficiency:	N/A						
BKG: / Bcpm**:		12 Kcpm	N/A				
ACF:							
tB:							
tS:							
Lc:							
MDC:							

No.	Descriptions	x	y	z	uR/hr	cptm	uR/hr	cpm	*dpm	cpm	*dpm	cpm	*dpm	cpm	*dpm
	See Attached Sheets														
	Shaded areas = N/A														

FMSS Survey Information Sheet

Survey Drawing/Description/Comments

				32-110	30-42	30-50	40-85	27-65	20-55	20-45	
				35-55	40-70	25-70	35-50	27-37	19-60	20-65	
				35-60	30-80	27-60	40-54	32-50	33-54	19-50	
				22-34	23-50	23-43	40-150	32-160	32-48	30-42	20-43
						28-70	40-180	40-240	28-45	27-200	22-54
						22-40	24-50	25-50	26-50	26-190	21-34
							23-30	20-30	22-45	22-27	19-24
							20-24	22-28	20-29	21-24	19-25
							19-23	19-34			
							21-30				
							24-33				

General Information

Survey #: FMSS99RS.0072

Site: FMSS

Tech(s): Miller/Perry

Comment Grid blocks 10' x 10' (100 ft^2) - Test Pit #3

*NOTE- Bold boundary indicates areal extent of pre-excavation survey grid

** All SPA-3 readings are in Kcpm

FMSS Survey Information Sheet

Survey Drawing/Description/Comments

N

				14-22	17-32	20-45					
			14-17	15-22	20-35	24-50	27-50	18-47			
			15-18	17-22	23-32	27-42	32-50	40-75	30-140		
				18-25	25-40	29-75	40-75	40-112	48-140		
				15-37	25-45	26-60	36-65	45-55	40-85	28-72	
				18-63	26-120	29-145	40-106	50-65	35-60	30-47	
				25-190	33-170	45-130	55-170	50-60	35-60	30-50	

General Information

Survey #: FMSS99RS.0072

Site: FMSS

Tech(s): Miller/Perry

Comment Grid blocks 10' x 10' (100 ft^2) - Test Pit #3

*NOTE- Bold boundary indicates areal extent of pre-excavation survey grid

** All SPA-3 readings are in Kcpm

FMSS Survey Data Sheet

Reviewed By: [signature] 9/26/99

Survey No.:	FMSS99RS.0069
Date:	8/12/1999
Survey Tech.:	G. Moyer/B. Miller
Count Rm. Tech.:	N/A
Survey Type:	Gamma Walkover
Level of Posting:	Restricted Area

Item Surveyed:	Pre-Excavation Gamma Walkover of Test Pit #4
Contaminant/Limits:	Th232: Limit = 180dpm (removable), 900 dpm (total); U238: Limit = 900dpm (removable), 4500 dpm (total)
Comments:	

Notes:

ACF = Area Correction Factor

T_b = Background Count Time

T_s = Sample Count Time

R_b = Bkgd count rate

**Bcpm = Background cpm = R_b

Survey Type

Routine, Release, Informational

corr urem (urem) = (cptm)(x) + Yint.

Direct

(dpm) = (cpm - Bcpm)/(eff * ACF)

Removable

(dpm) = (cpm - Bcpm)/ eff

* dpm readings are per $100cm^2$

Parameters	Dose Rate	Gamma	Corr uR	Total Alpha	Total Beta-Gamma	Removable Alpha	Removable Beta-Gamma
Instrument Model:		L2221/SPA-3					
Instrument SN:		33375/33386					
Cal. Due Date:		11/23/99-3/18/00					
x, y int.: Efficiency:	N/A						
BKG: Bcpm**:		12 Kcpm	N/A				
ACF:							
tB:							
tS:							
Lc:							
MDC:							

No.	Descriptions	x	y	z	uR/hr	cptm	uR/hr	cpm	*dpm	cpm	*dpm	cpm	*dpm	cpm	*dpm
	See Attached Sheets														

Shaded area = N/A

FM[illegible] Survey Information Sheet

Survey Drawing/Description/Comments

	N	30-35	50-110	160-330	300-350	500-630	500-650				
		35-45	40-100	80-300	300-400	400-450	400-450	400-450	450-550	100-250	
		40-50	40-60	40-80	80-350	300-350	350-400	400-450	450-550	90-150	
		40-50	35-45	40-45	45-75	100-250	200-350	200-300	200-250	150-200	
						125-200	200-300				

General Information

NOTE: All SPA-3 readings are in Kcpm

Survey #: FMSS99RS.0069

Site: FMSS

Tech(s): Moyer/Miller

Comment Grid blocks 10' x 10' (100 ft^2) - Test Pit #4

FMSS Survey Data Sheet

Reviewed By: [signature] 9/20/99

Survey No.:	FMSS99RS.0073
Date:	9/9/1999
Survey Tech.:	R. Gendreau/R. Wade
Count Rm. Tech.:	N/A
Survey Type:	Gamma Walkover
Level of Posting:	Restricted Area

Item Surveyed:	Post-Excavation Gamma Walkover of Test Pit #4
Contaminant/Limits:	Th232: Limit = 180dpm (removable), 900 dpm (total); U238: Limit = 900dpm (removable), 4500 dpm (total)
Comments:	

Notes:

ACF = Area Correction Factor

T_b = Background Count Time

T_s = Sample Count Time

R_b = Bkgd count rate

**Bcpm = Background cpm = R_b

Survey Type

Routine, Release, Informational

corr urem (urem) = (cptm)(x) + Yint.

Direct

(dpm) = (cpm - Bcpm)/(eff * ACF)

Removable

(dpm) = (cpm - Bcpm)/ eff

* dpm readings are per 100cm²

Parameters	Dose Rate	Gamma	Corr uR	Total Alpha	Total Beta-Gamma	Removable Alpha	Removable Beta-Gamma
Instrument Model:		L2221/SPA-3					
Instrument SN:		33390/33401					
Cal. Due Date:		6/30/1999-3/1/00					
x, y int.: / Efficiency:	N/A						
BKG: / Bcpm**:		12 Kcpm	N/A				
ACF:							
tB:							
tS:							
Lc:							
MDC:							

No.	Descriptions	x	y	z	uR/hr	cptm	uR/hr	cpm	*dpm	cpm	*dpm	cpm	*dpm	cpm	*dpm
	See Attached Sheets														

Shaded areas = N/A

F[illegible]S Survey Information Sheet

Survey Drawing/Description/Comments

N

			100-350	350-400	450-550							
			100-250	300-400	250-350	300-450						
			50-150	250-300	250-300	200-350	200-350					
				100-300	200-350	175-300	250-350	200-350				
					80-150	100-250	200-350	250-350	250-350			
						100-200	250-350	300-350	350-450	400-500		
							75-300	250-350	300-600	350-550	300-600	
								100-300	300-600	500-700	350-400	I
									200-500	400-600	400-800	II
										200-600	500-700	III

General Information

Survey #: FMSS99RS.0073

Site: FMSS

Tech(s): Gendreau/Wade

Comment Grid blocks 10' x 10' (100 ft^2) - Test Pit #4

*NOTE- Bold boundary indicates areal extent of pre-excavation survey grid

** All SPA-3 readings are in Kcpm

FMSS Survey Information Sheet

Survey Drawing/Description/Comments

I	350-500											
II	500-800	500-700										
III	700-900	400-700	400-600									
	700-900	600-800	300-600	300-600								
	500-900	500-800	500-800									

General Information

Survey #: FMSS99RS.0073

Site: FMSS

Tech(s): Gendreau/Wade

Comment Grid blocks 10' x 10' (100 ft^2) - Test Pit #4

*NOTE- Bold boundary indicates areal extent of pre-excavation survey grid

** All SPA-3 readings are in Kcpm

APPENDIX C

ENGINEERING TEST PITS AT MISS GEOTECHNICAL DATA RESULTS

FUSRAP MAYWOOD SUPERFUND SITE MAYWOOD, NEW JERSEY

Geotechnical Laboratory Analysis

Appendix C contains the geotechnical data results from the engineering test pit program. The following is a brief description of the results of mechanical grain size sieve analyses, hydrometer (sedimentation) analyses and specific gravity determinations performed on samples collected at the Maywood Interim Storage Site, in support of the Maywood Environmental Restoration Project. Forty-four (44) composite soil samples were prepared and delivered in a single batch to Advanced Terra Testing Laboratory (Lakewood, Colorado). Each sample container consisted of a 5 gallon pail containing soil material.

Each of the sample containers and contents were screened for radioactivity in accordance with Radioactive Materials License requirements. Testing commenced in general accordance with the Scope of Work provided by Stone & Webster. Any deviations from the Scope of Work were requested by Stone & Webster, and are discussed below.

General Approach

Following receipt radiological screening, the samples were prepared in general accordance with ASTMD 421 (Dry Preparation of Soil Samples for Particle-Size Analysis and Determination of Soil Constants). The air-dried samples were split over a #8 mesh sieve rather than a #10 mesh sieve. This requirement was stipulated in the Scope of Work (by virtue of the specific sieve sizes requested), and is coincident with the laboratory's standard practice for grain size analyses.

The coarse fraction of each sample (3-inch, 1.5-inch, ¾-inch, 3/8-inch, #4 mesh and #8 mesh) was washed, oven dried and sieved. Dry mass of the individual coarse fractions was recorded on the raw data sheets. A representative portion of the minus #8 mesh material (approximately 75 to 100 grams) was set aside for hydrometer and specific gravity testing. A 25 to 30 gram specimen of this material was oven dried to determine the hygroscopic moisture condition of the air dried soil (in support of the hydrometer testing) and was then placed in a pycnometer for specific gravity determination in accordance with ASTM D 854. Approximately 50 to 60 grams of the remaining minus #8 mesh material was mixed with deflocculant for a minimum period of 16 hours, and dispersed (using stirring apparatus A, Section 9.2 and 9.3 of ASTM D 422) for a period of one minute. This dispersed soil-water slurry was subjected to hydrometer testing, and was subsequently washed and sieved through the Number 16, 30, 40, 50, 60, 100, and 200 mesh sieves. Oven dry mass retained on each sieve was recorded on the raw data sheets.

Once the dry mass information has been collected for each sample, the data was entered into a LOTUS spreadsheet. The spreadsheet reports sample identification, tabular grain size information, and graphical representation of the grain size distribution. Grain size spreadsheet reports for each sample are included in the section entitled "Hydrometer Analysis with Mechanical Grain Size, ASTM D 422".

Post-test radiological screening was conducted on material retained on each individual sieve. These individual sieve splits were labeled for specific sieve size and original sample number identification. The individual sieve splits were then placed in a larger container (i.e. large Ziploc bags), identified by primary sample number, and returned to the site for further analytical testing.

Comments and Observations

The Geotechnical testing of 44 radiologically contaminated soil samples was conducted in accordance with the ASTM protocols referenced, and in general accordance with the Scope of Work, with the following exceptions:

Moisture content analyses (ASTM D 2216) were not conducted as requested in the original Scope of Work. Field personnel were required to spray the sample collection areas as a dust control measure. It was deemed that the moisture content would not therefore be indicative of natural conditions, and the laboratory was requested to delete this test.

During the collection campaign, it was determined by field personnel that the majority of the samples were non plastic in texture. Therefore, the laboratory was requested to delete the Atterberg Limits testing from the Scope of Work.

The following references were used in performing the requested analyses:

- ASTM D 421, "Dry Preparation of Soil Samples for Particle-Size Analysis and Determination of Soil Constants"
- ASTM D 422, "Particle-Size Analysis of Soils"
- ASTM D 854, "Specific Gravity of Soils"
- ASTM D 1140, "Amount of Material in Soils Finer than the No. 200 Sieve"
- Scope of Work, Geotechnical Engineering Laboratory Services, Excavation of Engineering Test Pits at MISS, FUSRAP Maywood Superfund Site, Maywood, New Jersey"

Geotechnical Data Results

Summaries of the geotechnical data results are shown in Tables C-1, C-2, and C-3. The complete data package from Advanced Terra Testing follows the summary tables. Table C-1 presents the percent passing of material by test pit for each zone. In Table C-2, a comparison was made between the amount of material passing for distinct zones (e.g., overburden, surrounding, lower, retention pond and transition) independently of test pit location in order to evaluate any trends or illustrate any variability. Table C-2 also presents percent passing averages per zone, and high and low values for each fraction in that particular zone.

Samples that were processed to determine the radiological levels of the soils fractions are listed in Table C-3. SORs for each of the fractions are developed in Appendix D of this report.

TABLE C-1
GEOTECHNICAL RESULTS SUMMARY

		Percent Passing				
	Sample	¾"	#4	#8	#40	#200
TP1	SUOV	80	71	67	53	25
	TROV	88	80	75	60	26
	REOV	96	89	84	67	34
	SUUP	84	77	73	64	32
	TRUP	96	89	86	76	56
	REUP	99	96	95	88	69
	SULO	69	66	65	61	25
	TRLO	81	74	72	67	31
	RELO	84	79	78	71	31
TP2	SUOV	68	61	56	37	19
	TROV	83	74	71	59	38
	REOV	68	60	57	45	33
	SUUP	81	74	71	60	46
	TRUP	80	70	66	53	35
	REUP	84	81	79	72	58
	SULO	100	100	99	88	45
	TRLO	100	100	100	90	40
	RELO	100	100	99	87	35
TP3	SUOV	96	86	79	59	32
	TROV	98	85	76	44	19
	REOV	100	100	100	93	82
	SUUP	98	92	87	73	39
	TRUP	91	80	75	63	47
	REUP	100	100	99	89	75
	SULO	100	100	99	93	25
	TRLO	100	98	96	81	26
	RELO	100	99	98	85	32
TP4	SUOV	97	92	90	87	74
	TROV	98	90	86	78	66
	REOV	100	91	87	74	55
	SUUP	87	78	75	64	32
	TRUP	85	83	82	72	38
	REUP	100	98	97	92	77
	SULO	100	100	100	84	37
	TRLO	100	99	98	84	39
	RELO	100	100	100	83	42
TP5	OVER	90	68	57	35	18
	UPER	96	95	88	70	39
	LWER	98	95	93	80	34

TABLE C-2

GEOTECHNICAL RESULTS BY ZONE

			Percent Passing				
Zone		Sample	¾"	#4	#8	#40	#200
Overburden	TP1	SUOV	80	71	67	53	25
	TP1	TROV	88	80	75	60	26
	TP1	REOV	98	89	84	67	34
	TP2	SUOV	68	61	56	37	19
	TP2	TROV	83	74	71	59	38
	TP2	REOV	68	60	57	45	33
	TP3	SUOV	96	86	79	59	32
	TP3	TROV	98	85	76	44	19
	TP3	REOV	100	100	100	93	82
	TP4	SUOV	97	92	90	87	74
	TP4	TROV	98	90	86	78	66
	TP4	REOV	100	91	87	74	55
	TP5	OVER	90	68	57	35	18
	Average		*90*	*81*	*76*	*61*	*40*
	High		*100*	*100*	*100*	*93*	*82*
	Low		*68*	*60*	*56*	*35*	*18*
Surrounding	TP1	SUUP	84	77	73	64	32
	TP2	SUUP	81	74	71	60	46
	TP3	SUUP	98	92	87	73	39
	TP4	SUUP	87	78	75	64	32
	TP5	UPER	96	95	88	70	39
	Average		*89*	*83*	*79*	*66*	*38*
	High		*98*	*95*	*88*	*73*	*46*
	Low		*81*	*74*	*71*	*60*	*32*
Lower	TP1	SULO	69	66	65	61	25
	TP1	TRLO	81	74	72	67	31
	TP1	RELO	84	79	78	71	31
	TP2	SULO	100	100	99	88	45
	TP2	TRLO	100	100	100	90	40
	TP2	RELO	100	100	99	87	35
	TP3	SULO	100	100	99	93	25
	TP3	TRLO	100	98	96	81	26
	TP3	RELO	100	99	98	85	32
	TP4	SULO	100	100	100	84	37
	TP4	TRLO	100	99	98	84	39
	TP4	RELO	100	100	100	83	42
	TP5	LWER	98	95	93	80	34
	Average		*95*	*93*	*92*	*81*	*34*
	High		*100*	*100*	*100*	*93*	*45*
	Low		*69*	*66*	*65*	*61*	*25*
Retention Pond	TP1	REUP	99	96	95	88	69
	TP2	REUP	84	81	79	72	58
	TP3	REUP	100	100	99	89	75
	TP4	REUP	100	98	97	92	77
	Average		*96*	*94*	*92*	*85*	*70*
	High		*100*	*100*	*99*	*92*	*77*
	Low		*84*	*81*	*79*	*72*	*58*
Transition	TP1	TRUP	96	89	86	76	56
	TP2	TRUP	80	70	66	53	35
	TP3	TRUP	91	80	75	63	47
	TP4	TRUP	85	83	82	72	38

TABLE C-3
Geotechnical Samples for
Radiological Analysis

Zone	SOR (Wet Count) Based on 15 pCi/g	SOR (Dry Count)	Sample #	Percent Passing (weight %) .75"	#4	#8	#40	#200
Test Pit 1								
SUOV	0.49	0.57	MISS-0014	80.1%	71.2%	67.1%	53.0%	25.1%
REOV	0.48	0.56	MISS-0020	98.1%	88.9%	84.1%	67.4%	34.4%
Test Pit 2								
SUOV	0.87	0.87	MISS-0033	67.6%	60.6%	55.7%	36.5%	18.5%
TROV	0.54	1.03	MISS-0036	82.8%	74.3%	70.9%	59.2%	38.1%
SUUP	0.71	1.06	MISS-0034	80.8%	73.6%	70.7%	60.4%	46.2%
TRUP	0.4	0.87	MISS-0037	79.5%	69.5%	66.0%	53.2%	35.3%
REUP	0.56	0.87	MISS-0040	84.2%	80.5%	78.6%	72.1%	57.6%
Test Pit 3								
SUOV	1.08	1.45	MISS-0052	95.8%	86.1%	79.4%	58.5%	31.6%
TROV	1.05	1.51	MISS-0055	97.5%	85.2%	75.9%	44.3%	19.1%
SUUP	0.82	0.90	MISS-0053	97.9%	91.5%	87.0%	72.7%	39.0%
TRUP	5.99	10.04	MISS-0056	90.5%	80.1%	74.6%	63.0%	46.9%
REUP	0.48	1.05	MISS-0059	100.0%	100.0%	99.2%	89.3%	74.9%
Test Pit 4								
SUOV	25.66	49.07	MISS-0071	97.1%	92.0%	90.3%	86.7%	74.3%
TROV	50.74	100.73	MISS-0074	98.4%	90.1%	86.1%	78.0%	66.1%
REOV	26.82	44.42	MISS-0077	100.0%	91.0%	87.2%	73.8%	54.5%
SUUP	4.15	5.43	MISS-0072	87.4%	77.7%	75.0%	63.6%	31.8%
REUP	8.78	17.72	MISS-0078	100.0%	98.1%	97.2%	92.1%	76.8%
TRLO	1.05	1.23	MISS-0076	100.0%	98.5%	97.8%	83.6%	39.3%
RELO	0.57	0.70	MISS-0079	100.0%	99.8%	99.5%	82.6%	42.4%
Test Pit 5								
OVER	1.25	1.61	MISS-0090	90.3%	67.6%	57.0%	35.4%	18.0%
UPER	0.62	0.96	MISS-0091	95.8%	94.9%	87.6%	70.4%	39.4%
UPER2	0.52	0.83	MISS-0093	89.5%	82.4%	79.3%	66.6%	34.5%

TEST PIT 1

ENGINEERING TEST PITS AT MISS
GEOTECHNICAL DATA RESULTS

FUSRAP MAYWOOD SUPERFUND SITE
MAYWOOD, NEW JERSEY

MECHANICAL ANALYSIS - SIEVE TEST DATA
ASTM D 422

CLIENT	Stone & Webster	JOB NO.	2162-07
BORING NO.	MISS-TP1SSSUOV0-00140	SAMPLED	8-23-99
DEPTH	1.0-2.0'	DATE TESTED	9-25-99 AH
SAMPLE NO. & TIME	MISS-00140, 1011	WASH SIEVE	Yes
		DRY SIEVE	No
SOIL DESCR.	FUSRAP Maywood Superfund Site; Proj# 085750303		

MOISTURE DATA

HYGROSCOPIC		Yes
NATURAL		No
Wt. Wet Soil & Pan	(g)	113.33
Wt. Dry Soil & Pan	(g)	110.53
Wt. Lost Moisture	(g)	2.80
Wt. of Pan Only	(g)	3.74
Wt. of Dry Soil	(g)	106.79
Moisture Content	%	2.6
Wt. Hydrom. Sample Wet	(g)	56.28
Wt. Hydrom. Sample Dry	(g)	54.85

WASH SIEVE ANALYSIS

Wt. Total Sample Wet (g)	19039.20
Weight of + #8 Before Washing (g)	6506.20
Weight of + #8 After Washing (g)	6152.10
Weight of - #8 Wet (g)	12533.00
Weight of - #8 Dry (g)	12557.84
Wt. Total Sample Dry (g)	18709.94
Calc. Wt. "W" (g)	81.72
Calc. Mass + #8	26.87

Sieve Number (Size)	Pan Weight (g)	Indiv. Wt. + Pan (g)	Indiv. Wt. Retain.	Cum. Wt. Retain.	Cum. % Retain.	% Finer By Wt.
3"	0.00	1714.40	1714.40	1714.40	9.2	90.8
1 1/2"	0.00	1231.88	1231.88	2946.28	15.7	84.3
3/4"	0.00	783.16	783.16	3729.44	19.9	80.1
3/8"	0.00	825.81	825.81	4555.25	24.3	75.7
#4	0.00	827.55	827.55	5382.80	28.8	71.2
#8	0.00	769.30	769.30	6152.10	32.9	67.1
#16	3.76	6.77	3.01	3.01	36.6	63.4
#30	3.72	8.52	4.80	7.81	42.4	57.6
#40	3.69	7.41	3.72	11.53	47.0	53.0
#50	3.70	8.00	4.30	15.83	52.3	47.7
#60	3.80	6.42	2.62	18.45	55.5	44.5
#100	3.69	11.78	8.09	26.54	65.4	34.6
#200	3.70	11.46	7.76	34.30	74.9	25.1

Data entered by: DLS Date: 10/06/99
Data checked by: SR Date: 10-6-99
FileName: SOH00140

ADVANCED TERRA TESTING, INC.

HYDROMETER ANALYSIS - SEDIMENTATION DATA

CLIENT	Stone & Webster	JOB NO.	2162-07
BORING NO.	MISS-TP1SSSUOVO-00140	SAMPLED	8-23-99
DEPTH	1.0-2.0'	DATE TESTED	9-25-99 AH
SAMPLE NO. & TIME	MISS-00140, 1011	WASH SIEVE	Yes
		DRY SIEVE	No
SOIL DESCR.	FUSRAP Maywood Superfund Site; Proj# 085750303		

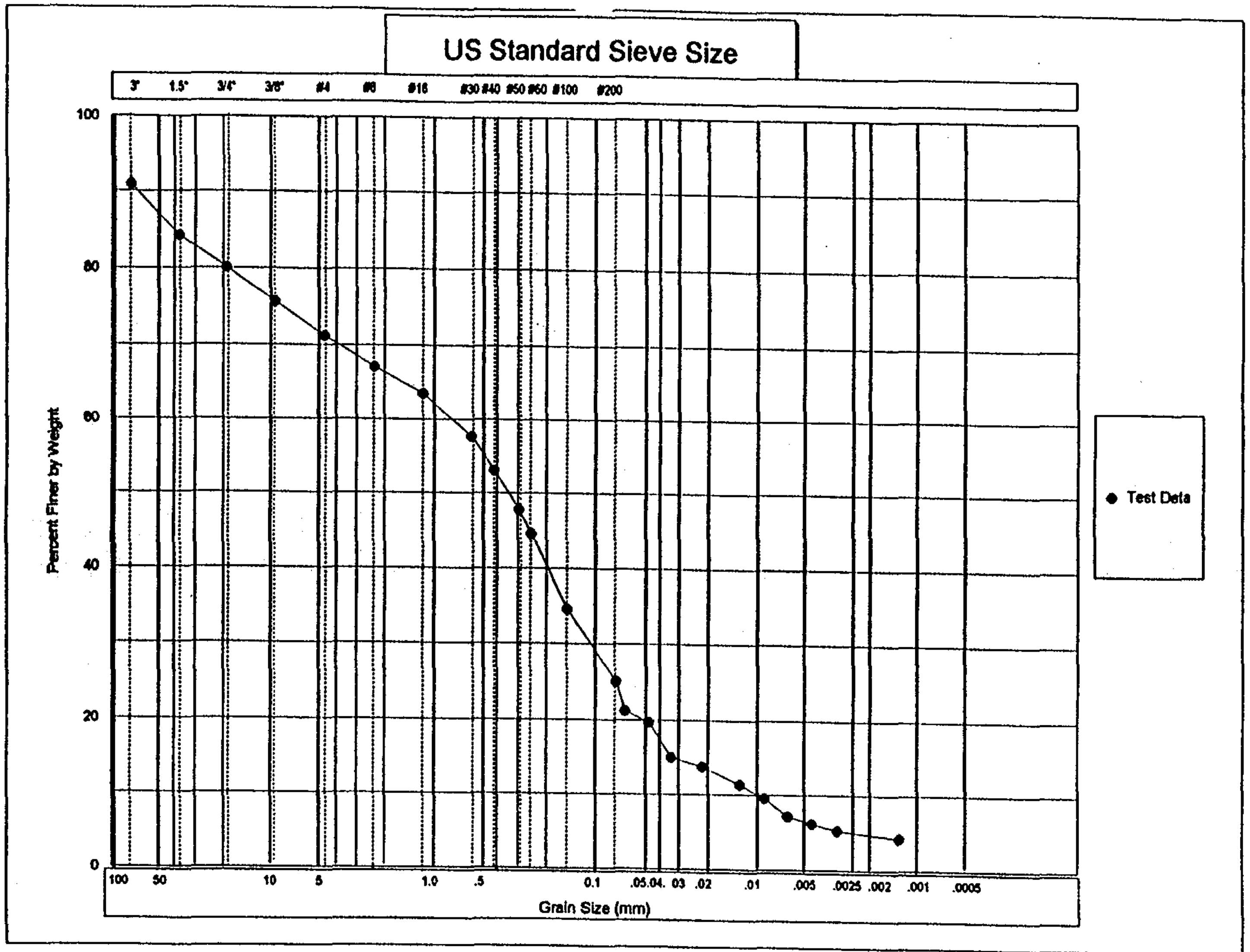
Hydrometer #	ASTM 152 H	Temp., Deg. C	24.0
Sp. Gr. of Soil	2.62	Temp. Coef. K	0.01313
Value of "alpha"	1.01	Wt. Dry Sample "W"	81.715
Deflocculant	Sodium Hexametaphosphate	% of Total Sample	100.0
Defloc. Corr'n	5.3		
Meniscus Corr'n	-1.0		

T Elapsed Time (min)	Hydrometer Reading Original	Corrected "R"	100Ra/W	% Total Sample	Effective Depth L	Grain Diameter (mm)
0.0	--	--	--	--	--	--
0.5	23.50	17.25	21.2	21.2	12.44	0.0655
1.0	22.25	16.00	19.7	19.7	12.64	0.0467
2.0	18.50	12.25	15.1	15.1	13.26	0.0338
5.0	17.50	11.25	13.8	13.8	13.42	0.0215
15.0	15.50	9.25	11.4	11.4	13.75	0.0126
30.0	14.00	7.75	9.5	9.5	13.99	0.0090
60.0	12.00	5.75	7.1	7.1	14.32	0.0064
120.0	11.25	5.00	6.2	6.2	14.45	0.0046
250.0	10.50	4.25	5.2	5.2	14.57	0.0032
1492.0	9.75	3.50	4.3	4.3	14.69	0.0013

Grain Diameter = K*(SQRT(L/T))

Data entered by: DLS   Date: 10/06/99
Data checked by: SR   Date: 10-6-99
FileName:SOH00140

ADVANCED TERRA TESTING, INC.



COBBLES	GRAVEL		SAND			SILT OR CLAY	USCS
	COARSE	FINE	CRS	MEDIUM	FINE		

COBBLES TO BOULDERS	PEBBLE GRAVEL				SAND			SILT	CLAY	WENTWORTH
	COARSE	MED	FINE	GRAN	COARSE	MED	FINE			

Client: Stone & Webster
Depth: 1.0-2.0'
Classification:____________________

Boring No.: MISS-TP1SSSUOV0-00140
Job Number: 2162-07

Sample No. & Time: MISS-00140, 1011

Advanced Terra Testing, Inc.

MECHANICAL ANALYSIS - SIEVE TEST DATA
ASTM D 422

CLIENT	Stone & Webster	JOB NO.	2162-07
BORING NO.	MISS-TP1SSTROV2-00170	SAMPLED	8-23-99 KG/BM
DEPTH	1.0-2.0'	DATE TESTED	10-25-99 RV
SAMPLE NO. & TIME	MISS-00170, 1120	WASH SIEVE	Yes
		DRY SIEVE	No
SOIL DESCR.	FUSRAP Maywood Superfund Site; Proj# 085750303		

MOISTURE DATA

HYGROSCOPIC	Yes	
NATURAL	No	
Wt. Wet Soil & Pan	(g)	72.44
Wt. Dry Soil & Pan	(g)	71.50
Wt. Lost Moisture	(g)	0.94
Wt. of Pan Only	(g)	4.24
Wt. of Dry Soil	(g)	67.26
Moisture Content	%	1.4
Wt. Hydrom. Sample Wet (g)		55.89
Wt. Hydrom. Sample Dry (g)		55.12

WASH SIEVE ANALYSIS

Wt. Total Sample Wet (g)	4439.48
Weight of + #8 Before Washing (g)	1148.28
Weight of + #8 After Washing (g)	1102.41
Weight of - #8 Wet (g)	3291.20
Weight of - #8 Dry (g)	3291.08
Wt. Total Sample Dry (g)	4393.49
Calc. Wt. "W" (g)	73.58
Calc. Mass + #8	18.46

Sieve Number (Size)	Pan Weight (g)	Indiv. Wt. + Pan (g)	Indiv. Wt. Retain.	Cum. Wt. Retain.	Cum. % Retain.	% Finer By Wt.
3"	0.00	0.00	0.00	0.00	0.0	100.0
1 1/2"	0.00	298.70	298.70	298.70	6.8	93.2
3/4"	0.00	224.92	224.92	523.62	11.9	88.1
3/8"	0.00	191.05	191.05	714.67	16.3	83.7
#4	0.00	180.81	180.81	895.48	20.4	79.6
#8	0.00	206.93	206.93	1102.41	25.1	74.9
#16	2.35	5.29	2.94	2.94	29.1	70.9
#30	2.31	6.84	4.53	7.47	35.2	64.8
#40	2.37	6.21	3.84	11.31	40.5	59.5
#50	2.35	6.91	4.56	15.87	46.7	53.3
#60	2.32	5.22	2.90	18.77	50.6	49.4
#100	2.38	12.22	9.84	28.61	64.0	36.0
#200	2.32	9.42	7.10	35.71	73.6	26.4

Data entered by: DLS Date: 10/28/99
Data checked by: KR Date: 11/1/99
FileName: SOH00170

ADVANCED TERRA TESTING, INC.

HYDROMETER ANALYSIS - SEDIMENTATION DATA

CLIENT Stone & Webster

JOB NO. 2162-07

BORING NO.	MISS-TP1SSTROV2-00170	SAMPLED	8-23-99 KG/BM
DEPTH	1.0-2.0'	DATE TESTED	10-25-99 RV
SAMPLE NO. & TIME	MISS-00170, 1120	WASH SIEVE	Yes
		DRY SIEVE	No

SOIL DESCR. FUSRAP Maywood Superfund Site; Proj# 085750303

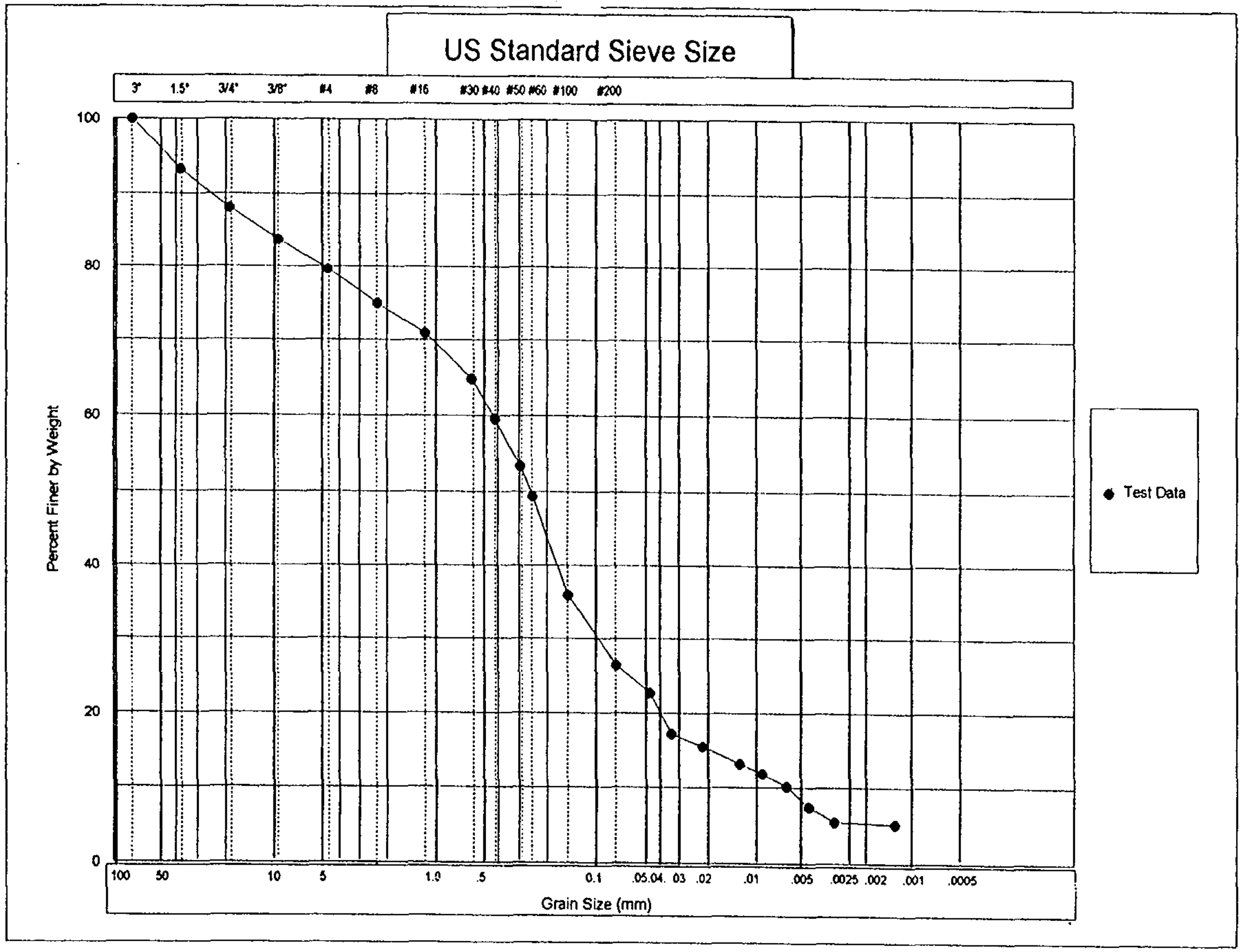
Hydrometer #	ASTM 152 H	Temp., Deg. C	23.1
Sp. Gr. of Soil	2.68	Temp. Coef. K	0.01303
Value of "alpha"	0.99	Wt. Dry Sample "W"	73.579
Deflocculant	Sodium Hexametaphosphate	% of Total Sample	100.0
Defloc. Corr'n	4.3		
Meniscus Corr'n	-1.0		

T Elapsed Time (min)	Hydrometer Reading Original	Corrected "R"	100Ra/W	% Total Sample	Effective Depth L	Grain Diameter (mm)
0.0	--	--	--	--	--	--
0.5	--	--	--	--	--	--
1.0	22.00	16.75	22.6	22.6	12.68	0.0464
2.0	18.00	12.75	17.2	17.2	13.34	0.0337
5.0	16.75	11.50	15.5	15.5	13.54	0.0214
15.0	15.00	9.75	13.2	13.2	13.83	0.0125
30.0	14.00	8.75	11.8	11.8	13.99	0.0089
60.0	12.75	7.50	10.1	10.1	14.20	0.0063
120.0	10.75	5.50	7.4	7.4	14.53	0.0045
250.0	9.25	4.00	5.4	5.4	14.77	0.0032
1500.0	9.00	3.75	5.1	5.1	14.81	0.0013

Grain Diameter = K*(SQRT(L/T))

Data entered by: DLS Date: 10/28/99
Data checked by: KR Date: 11/1/99
FileName:SOH00170

ADVANCED TERRA TESTING, INC.



COBBLES	GRAVEL		SAND			SILT OR CLAY	USCS
	COARSE	FINE	CRS	MEDIUM	FINE		

COBBLES TO BOULDERS	PEBBLE GRAVEL				SAND			SILT	CLAY	WENTWORTH
	COARSE	MED	FINE	GRAN	COARSE	MED	FINE			

Client: Stone & Webster
Boring No.: MISS-TP1SSTROV2-00170
Sample No. & Time: MISS-00170, 1120
Depth: 1.0-2.0'
Job Number: 2162-07
Classification:____________________

Advanced Terra Testing, Inc.

MECHANICAL ANALYSIS - SIEVE TEST DATA
ASTM D 422

CLIENT	Stone & Webster	JOB NO.	2162-07
BORING NO.	MISS-TP1SSREOV0-0020	SAMPLED	8-23-99 KG/BM
DEPTH	1.0-2.0'	DATE TESTED	10-7-99 DPM
SAMPLE NO. & TIME	MISS-00200, 1316	WASH SIEVE	Yes
		DRY SIEVE	No
SOIL DESCR.	FUSRAP Maywood Superfund Site; Proj# 085750303		

MOISTURE DATA

HYGROSCOPIC	Yes	
NATURAL	No	
Wt. Wet Soil & Pan	(g)	95.19
Wt. Dry Soil & Pan	(g)	94.11
Wt. Lost Moisture	(g)	1.08
Wt. of Pan Only	(g)	3.79
Wt. of Dry Soil	(g)	90.32
Moisture Content %		1.2
Wt. Hydrom. Sample Wet	(g)	85.82
Wt. Hydrom. Sample Dry	(g)	84.81

WASH SIEVE ANALYSIS

Wt. Total Sample Wet (g)	1771.37
Weight of + #8 Before Washing (g)	378.50
Weight of + #8 After Washing (g)	278.24
Weight of - #8 Wet (g)	1392.87
Weight of - #8 Dry (g)	1475.49
Wt. Total Sample Dry (g)	1753.73
Calc. Wt. "W" (g)	100.80
Calc. Mass + #8	15.99

Sieve Number (Size)	Pan Weight (g)	Indiv. Wt. + Pan (g)	Indiv. Wt. Retain.	Cum. Wt. Retain.	Cum. % Retain.	% Finer By Wt.
3"	0.00	0.00	0.00	0.00	0.0	100.0
1 1/2"	0.00	0.00	0.00	0.00	0.0	100.0
3/4"	0.00	34.13	34.13	34.13	1.9	98.1
3/8"	0.00	84.20	84.20	118.33	6.7	93.3
#4	0.00	76.61	76.61	194.94	11.1	88.9
#8	0.00	83.30	83.30	278.24	15.9	84.1
#16	2.36	6.25	3.89	3.89	19.7	80.3
#30	2.36	9.20	6.84	10.73	26.5	73.5
#40	2.31	8.44	6.13	16.86	32.6	67.4
#50	2.29	8.61	6.32	23.18	38.9	61.1
#60	2.40	6.72	4.32	27.50	43.1	56.9
#100	2.36	14.63	12.27	39.77	55.3	44.7
#200	2.35	12.73	10.38	50.15	65.6	34.4

Data entered by: DLS Date: 10/28/99
Data checked by: KL Date: 11/1/99
FileName: SOH00200

ADVANCED TERRA TESTING, INC.

HYDROMETER ANALYSIS - SEDIMENTATION DATA

CLIENT Stone & Webster JOB NO. 2162-07

BORING NO.	MISS-TP1SSREOV0-0020	SAMPLED	8-23-99 KG/BM
DEPTH	1.0-2.0'	DATE TESTED	10-7-99 DPM
SAMPLE NO. & TIME	MISS-00200, 1316	WASH SIEVE	Yes
		DRY SIEVE	No
SOIL DESCR.	FUSRAP Maywood Superfund Site; Proj# 085750303		

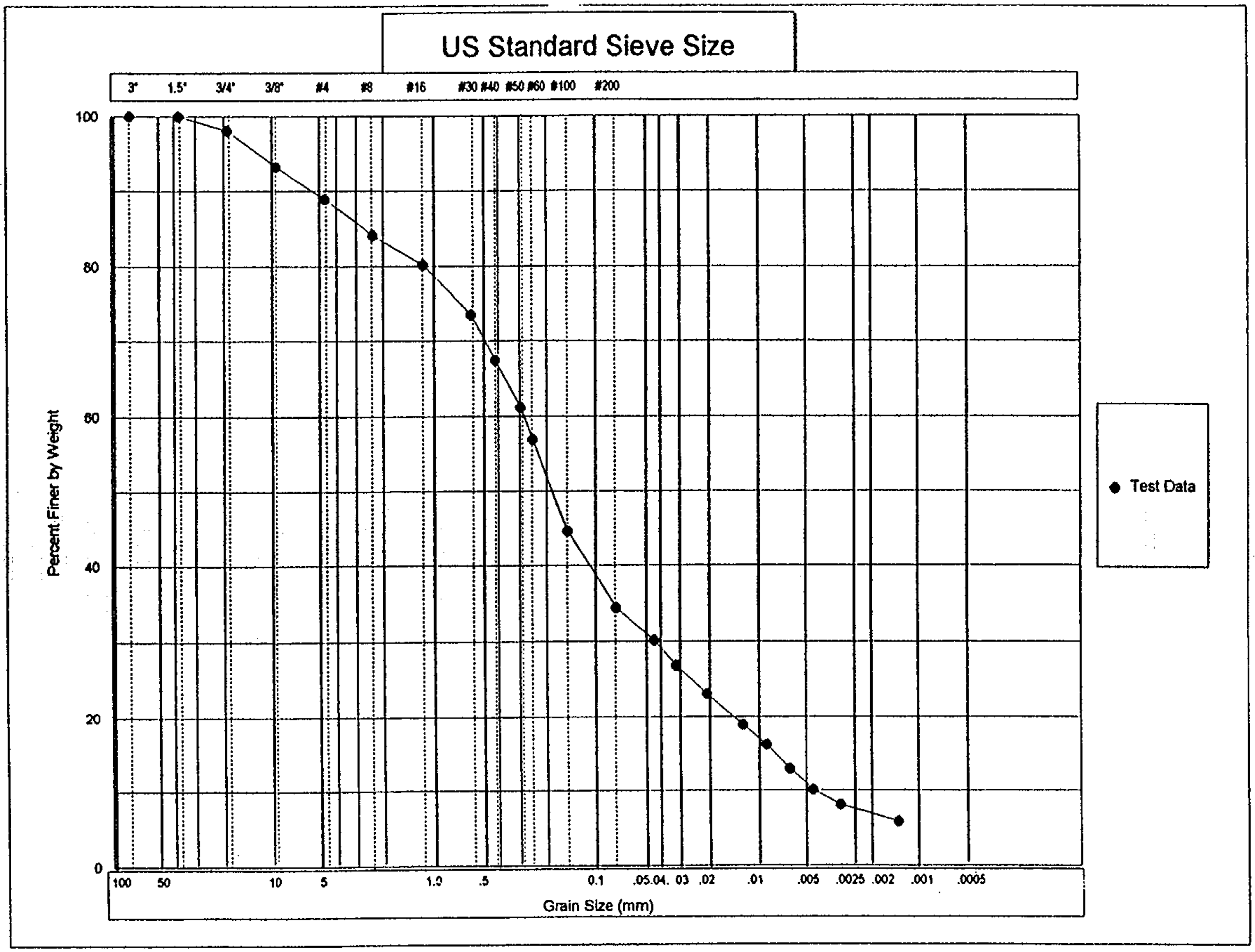
Hydrometer #	ASTM 152 H	Temp., Deg. C	22.5
Sp. Gr. of Soil	2.58	Temp. Coef. K	0.01353
Value of "alpha"	1.01	Wt. Dry Sample "W"	100.799
Deflocculant	Sodium Hexametaphosphate	% of Total Sample	100.0
Defloc. Corr'n	4.0		
Meniscus Corr'n	-1.0		

T Elapsed Time (min)	Hydrometer Reading Original	Corrected "R"	100Ra/W	% Total Sample	Effective Depth L	Grain Diameter (mm)
0.0	--	--	--	--	--	--
0.5	--	--	--	--	--	--
1.0	35.00	30.00	30.2	30.2	10.55	0.0440
2.0	31.75	26.75	26.9	26.9	11.08	0.0319
5.0	28.00	23.00	23.1	23.1	11.70	0.0207
15.0	23.75	18.75	18.9	18.9	12.40	0.0123
30.0	21.00	16.00	16.1	16.1	12.85	0.0089
60.0	17.75	12.75	12.8	12.8	13.38	0.0064
120.0	15.00	10.00	10.1	10.1	13.83	0.0046
271.0	13.00	8.00	8.0	8.0	14.16	0.0031
1440.0	10.75	5.75	5.8	5.8	14.53	0.0014

Grain Diameter = K*(SQRT(L/T))

Data entered by: DLS Date: 10/28/99
Data checked by: KP Date: 11/1/99
FileName:SOH00200

ADVANCED TERRA TESTING, INC.



COBBLES	GRAVEL		SAND			SILT OR CLAY	USCS
	COARSE	FINE	CRS	MEDIUM	FINE		

COBBLES TO BOULDERS	PEBBLE GRAVEL				SAND			SILT	CLAY	WENTWORTH
	COARSE	MED	FINE	GRAN	COARSE	MED	FINE			

Client: Stone & Webster Boring No.: MISS-TP1SSREOV0-0020 Sample No. & Time: MISS-00200, 1316

Depth: 1.0-2.0' Job Number: 2162-07

Classification:____________________

Advanced Terra Testing, Inc.

MECHANICAL ANALYSIS - SIEVE TEST DATA
ASTM D 422

CLIENT Stone & Webster JOB NO. 2162-07

BORING NO.	MISS-TP1SSSUUPO-0015X	SAMPLED	8-23-99
DEPTH	3.0-6.0'	DATE TESTED	9-24-99 AH
SAMPLE NO. & TIME	MISS-0015X, 1027	WASH SIEVE	Yes
		DRY SIEVE	No
SOIL DESCR.	FUSRAP Maywood Superfund Site; Proj# 085750303		

MOISTURE DATA

HYGROSCOPIC	Yes
NATURAL	No
Wt. Wet Soil & Pan (g)	119.56
Wt. Dry Soil & Pan (g)	115.24
Wt. Lost Moisture (g)	4.32
Wt. of Pan Only (g)	3.68
Wt. of Dry Soil (g)	111.56
Moisture Content %	3.9
Wt. Hydrom. Sample Wet (g)	59.24
Wt. Hydrom. Sample Dry (g)	57.03

WASH SIEVE ANALYSIS

Wt. Total Sample Wet (g)	4329.89
Weight of + #8 Before Washing (g)	1279.52
Weight of + #8 After Washing (g)	1152.25
Weight of - #8 Wet (g)	3050.37
Weight of - #8 Dry (g)	3059.18
Wt. Total Sample Dry (g)	4211.43
Calc. Wt. "W" (g)	78.51
Calc. Mass + #8	21.48

Sieve Number (Size)	Pan Weight (g)	Indiv. Wt. + Pan (g)	Indiv. Wt. Retain.	Cum. Wt. Retain.	Cum. % Retain.	% Finer By Wt.
3"	0.00	0.00	0.00	0.00	0.0	100.0
1 1/2"	0.00	444.89	444.89	444.89	10.6	89.4
3/4"	0.00	245.73	245.73	690.62	16.4	83.6
3/8"	0.00	104.63	104.63	795.25	18.9	81.1
#4	0.00	192.80	192.80	988.05	23.5	76.5
#8	0.00	164.20	164.20	1152.25	27.4	72.6
#16	2.35	3.95	1.60	1.60	29.4	70.6
#30	2.29	5.22	2.93	4.53	33.1	66.9
#40	2.36	5.01	2.65	7.18	36.5	63.5
#50	2.32	5.99	3.67	10.85	41.2	58.8
#60	2.35	5.51	3.16	14.01	45.2	54.8
#100	2.30	12.41	10.11	24.12	58.1	41.9
#200	2.32	9.88	7.56	31.68	67.7	32.3

Data entered by: DLS Date: 10/06/99
Data checked by: SR Date: 10-6-99
FileName: SOH0015X

ADVANCED TERRA TESTING, INC.

HYDROMETER ANALYSIS - SEDIMENTATION DATA

CLIENT Stone & Webster

JOB NO. 2162-07

BORING NO.	MISS-TP1SSSUUP0-0015X	SAMPLED	8-23-99
DEPTH	3.0-6.0'	DATE TESTED	9-24-99 AH
SAMPLE NO. & TIME	MISS-0015X, 1027	WASH SIEVE	Yes
		DRY SIEVE	No
SOIL DESCR.	FUSRAP Maywood Superfund Site; Proj# 085750303		

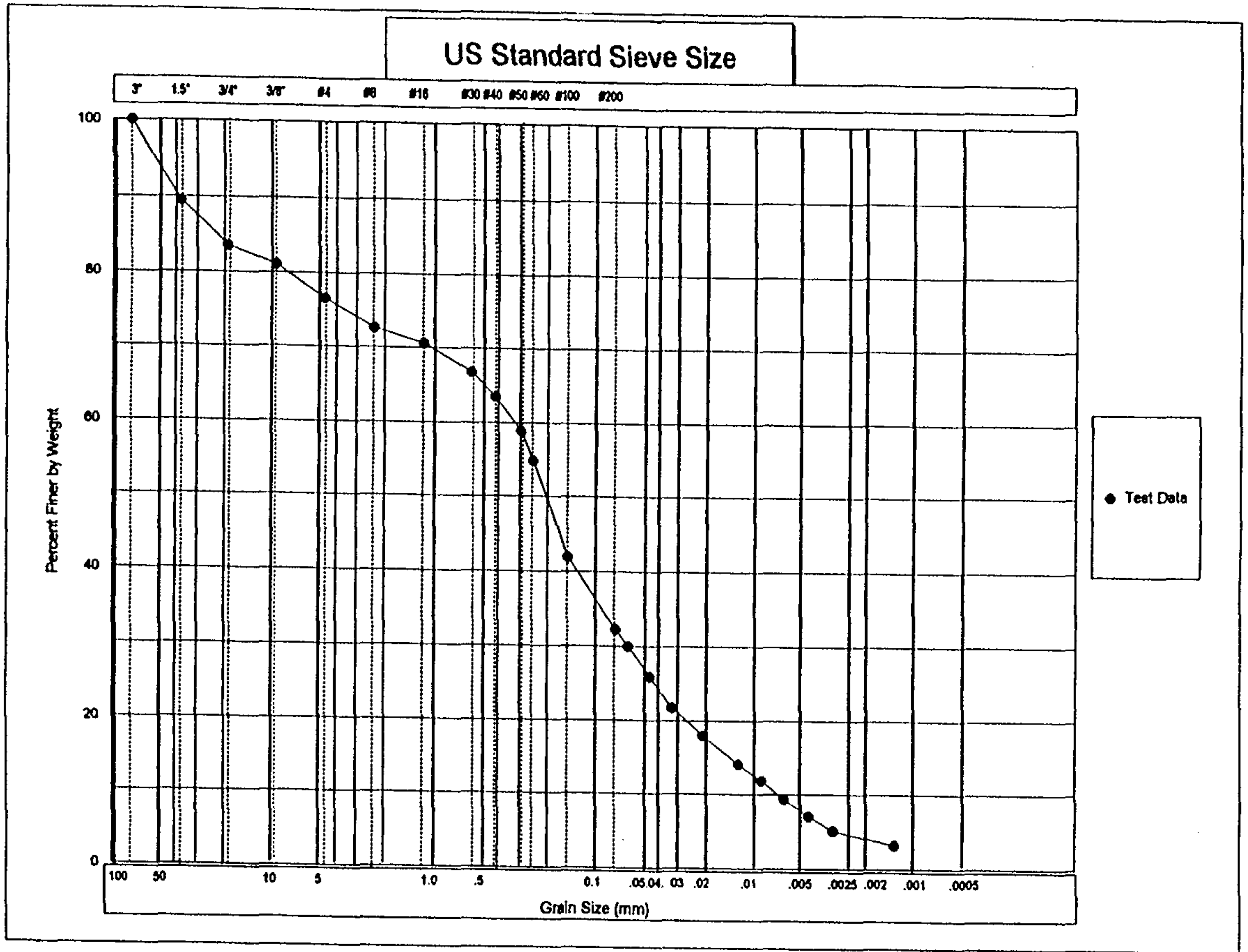
Hydrometer #	ASTM 152 H	Temp., Deg. C	24.4
Sp. Gr. of Soil	2.63	Temp. Coef. K	0.01303
Value of "alpha"	1.00	Wt. Dry Sample "W"	78.513
Deflocculant	Sodium Hexametaphosphate	% of Total Sample	100.0
Defloc. Corr'n	5.0		
Meniscus Corr'n	-1.0		

T Elapsed Time (min)	Hydrometer Reading Original	Hydrometer Reading Corrected "R"	100Ra/W	% Total Sample	Effective Depth L	Grain Diameter (mm)
0.0	--	--	--	--	--	--
0.5	29.50	23.50	30.1	30.1	11.45	0.0624
1.0	26.25	20.25	25.9	25.9	11.99	0.0451
2.0	23.00	17.00	21.7	21.7	12.52	0.0326
5.0	20.00	14.00	17.9	17.9	13.01	0.0210
15.0	17.00	11.00	14.1	14.1	13.50	0.0124
30.0	15.25	9.25	11.8	11.8	13.79	0.0088
60.0	13.25	7.25	9.3	9.3	14.12	0.0063
120.0	11.50	5.50	7.0	7.0	14.40	0.0045
250.0	10.00	4.00	5.1	5.1	14.65	0.0032
1454.0	8.50	2.50	3.2	3.2	14.90	0.0013

Grain Diameter = K*(SQRT(L/T))

Data entered by: DLS Date: 10/06/99
Data checked by: SR Date: 10-6-99
FileName:SOH0015X

ADVANCED TERRA TESTING, INC.



COBBLES	GRAVEL		SAND			SILT OR CLAY	USCS
	COARSE	FINE	CRS	MEDIUM	FINE		

COBBLES TO BOULDERS	PEBBLE GRAVEL				SAND			SILT	CLAY	WENTWORTH
	COARSE	MED	FINE	GRAN	COARSE	MED	FINE			

Client: Stone & Webster
Depth: 3.0-6.0'
Classification:____________________

Boring No.: MISS-TP1SSSUUP0-0015X
Job Number: 2162-07

Sample No. & Time: MISS-0015X, 1027

Advanced Terra Testing, Inc.

MECHANICAL ANALYSIS - SIEVE TEST DATA
ASTM D 422

CLIENT Stone & Webster

JOB NO. 2162-07

BORING NO.	MISS-TP1SSTRUP0-00180	SAMPLED	8-23-99
DEPTH	3.0-6.0'	DATE TESTED	9-23-99 CL
SAMPLE NO. & TIME	MISS-00180, 1130	WASH SIEVE	Yes
		DRY SIEVE	No

SOIL DESCR. FUSRAP Maywood Superfund Site; Proj# 085750303

MOISTURE DATA

HYGROSCOPIC	Yes
NATURAL	No
Wt. Wet Soil & Pan (g)	72.94
Wt. Dry Soil & Pan (g)	70.96
Wt. Lost Moisture (g)	1.98
Wt. of Pan Only (g)	3.81
Wt. of Dry Soil (g)	67.15
Moisture Content %	2.9
Wt. Hydrom. Sample Wet (g)	58.61
Wt. Hydrom. Sample Dry (g)	56.93

WASH SIEVE ANALYSIS

Wt. Total Sample Wet (g)	3432.88
Weight of + #8 Before Washing (g)	581.38
Weight of + #8 After Washing (g)	463.62
Weight of - #8 Wet (g)	2851.50
Weight of - #8 Dry (g)	2884.22
Wt. Total Sample Dry (g)	3347.84
Calc. Wt. "W" (g)	66.08
Calc. Mass + #8	9.15

Sieve Number (Size)	Pan Weight (g)	Indiv. Wt. + Pan (g)	Indiv. Wt. Retain.	Cum. Wt. Retain.	Cum. % Retain.	% Finer By Wt.
3"	0.00	0.00	0.00	0.00	0.0	100.0
1 1/2"	0.00	0.00	0.00	0.00	0.0	100.0
3/4"	0.00	151.75	151.75	151.75	4.5	95.5
3/8"	0.00	150.73	150.73	302.48	9.0	91.0
#4	0.00	83.39	83.39	385.87	11.5	88.5
#8	0.00	77.75	77.75	463.62	13.8	86.2
#16	2.30	3.53	1.23	1.23	15.7	84.3
#30	2.30	4.75	2.45	3.68	19.4	80.6
#40	2.29	5.12	2.83	6.51	23.7	76.3
#50	2.30	4.66	2.36	8.87	27.3	72.7
#60	2.28	3.68	1.40	10.27	29.4	70.6
#100	2.32	7.10	4.78	15.05	36.6	63.4
#200	2.36	7.11	4.75	19.80	43.8	56.2

Data entered by: DLS Date: 10/06/99
Data checked by: SR Date: 10-6-99
FileName: SOH00180

ADVANCED TERRA TESTING, INC.

HYDROMETER ANALYSIS - SEDIMENTATION DATA

CLIENT Stone & Webster JOB NO. 2162-07

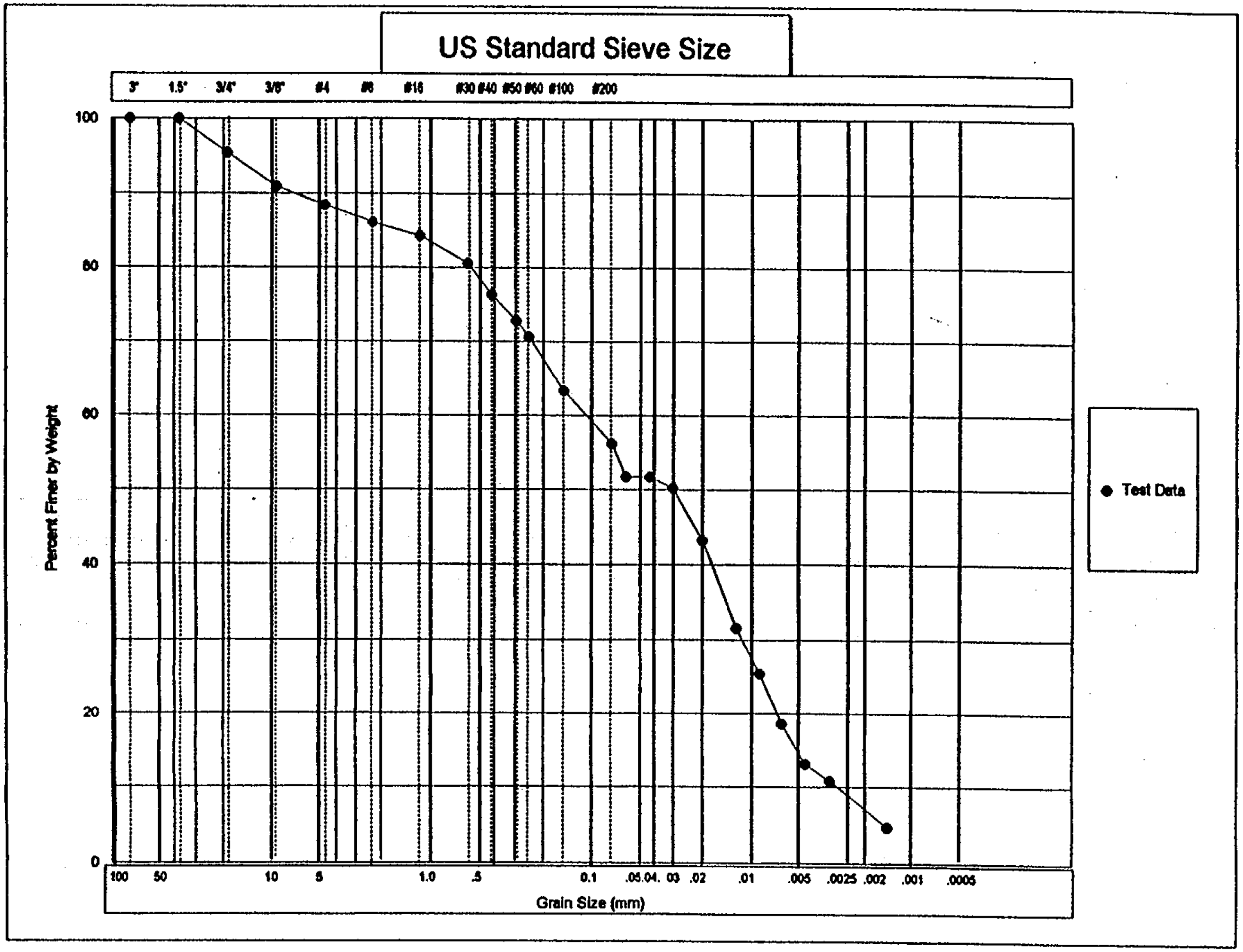
BORING NO.	MISS-TP1SSTRUP0-00180	SAMPLED	8-23-99
DEPTH	3.0-6.0'	DATE TESTED	9-23-99 CL
SAMPLE NO. & TIME	MISS-00180, 1130	WASH SIEVE	Yes
		DRY SIEVE	No
SOIL DESCR.	FUSRAP Maywood Superfund Site; Proj# 085750303		

Hydrometer #	ASTM 152 H	Temp., Deg. C	22.9
Sp. Gr. of Soil	2.55	Temp. Coef. K	0.01360
Value of "alpha"	1.02	Wt. Dry Sample "W"	66.079
Deflocculant	Sodium Hexametaphosphate	% of Total Sample	100.0
Defloc. Corr'n	4.5		
Meniscus Corr'n	-1.0		

T Elapsed Time (min)	Hydrometer Reading Original	Corrected "R"	100Ra/W	% Total Sample	Effective Depth L	Grain Diameter (mm)
0.0	--	--	--	--	--	--
0.5	39.00	33.50	51.7	51.7	9.89	0.0605
1.0	39.00	33.50	51.7	51.7	9.89	0.0428
2.0	38.00	32.50	50.2	50.2	10.06	0.0305
5.0	33.50	28.00	43.2	43.2	10.80	0.0200
15.0	26.00	20.50	31.6	31.6	12.03	0.0122
30.0	22.00	16.50	25.5	25.5	12.68	0.0088
60.0	17.50	12.00	18.5	18.5	13.42	0.0064
120.0	14.00	8.50	13.1	13.1	13.99	0.0046
250.0	12.50	7.00	10.8	10.8	14.24	0.0032
1322.0	8.50	3.00	4.6	4.6	14.90	0.0014

Grain Diameter = K*(SQRT(L/T))

Data entered by: DLS Date: 10/06/99
Data checked by:______ Date:________
FileName:SOH00180 ADVANCED TERRA TESTING, INC.



COBBLES	GRAVEL		SAND			SILT OR CLAY	
	COARSE	FINE	CRS	MEDIUM	FINE		USCS

COBBLES TO BOULDERS	PEBBLE GRAVEL				SAND			SILT	CLAY	
	COARSE	MED	FINE	GRAN	COARSE	MED	FINE			WENTWORTH

Client: Stone & Webster Boring No.: MISS-TP1SSTRUP0-00180 Sample No. & Time: MISS-00180, 1130
Depth: 3.0-6.0' Job Number: 2162-07
Classification:______________________

Advanced Terra Testing, Inc.

MECHANICAL ANALYSIS - SIEVE TEST DATA
ASTM D 422

CLIENT	Stone & Webster	JOB NO.	2162-07
BORING NO.	MISS-TP1SSREUP0-00210	SAMPLED	8-23-99 KG/BM
DEPTH	3.0-6.0'	DATE TESTED	10-13-99 DPM
SAMPLE NO. & TIME	MISS-00210, 1340	WASH SIEVE	Yes
		DRY SIEVE	No
SOIL DESCR.	FUSRAP Maywood Superfund Site; Proj# 085750303		

MOISTURE DATA

HYGROSCOPIC	Yes	
NATURAL	No	
Wt. Wet Soil & Pan	(g)	92.00
Wt. Dry Soil & Pan	(g)	86.26
Wt. Lost Moisture	(g)	5.74
Wt. of Pan Only	(g)	3.84
Wt. of Dry Soil	(g)	82.42
Moisture Content	%	7.0
Wt. Hydrom. Sample Wet	(g)	75.68
Wt. Hydrom. Sample Dry	(g)	70.75

WASH SIEVE ANALYSIS

Wt. Total Sample Wet (g)	1393.22
Weight of + #8 Before Washing (g)	94.25
Weight of + #8 After Washing (g)	67.73
Weight of - #8 Wet (g)	1298.97
Weight of - #8 Dry (g)	1239.19
Wt. Total Sample Dry (g)	1306.92
Calc. Wt. "W" (g)	74.62
Calc. Mass + #8	3.87

Sieve Number (Size)	Pan Weight (g)	Indiv. Wt. + Pan (g)	Indiv. Wt. Retain.	Cum. Wt. Retain.	Cum. % Retain.	% Finer By Wt.
3"	0.00	0.00	0.00	0.00	0.0	100.0
1 1/2"	0.00	0.00	0.00	0.00	0.0	100.0
3/4"	0.00	12.81	12.81	12.81	1.0	99.0
3/8"	0.00	11.24	11.24	24.05	1.8	98.2
#4	0.00	25.16	25.16	49.21	3.8	96.2
#8	0.00	18.52	18.52	67.73	5.2	94.8
#16	2.30	3.32	1.02	1.02	6.5	93.5
#30	2.34	4.44	2.10	3.12	9.4	90.6
#40	2.34	4.10	1.76	4.88	11.7	88.3
#50	2.34	4.37	2.03	6.91	14.4	85.6
#60	2.34	3.63	1.29	8.20	16.2	83.8
#100	2.31	6.98	4.67	12.87	22.4	77.6
#200	2.31	8.40	6.09	18.96	30.6	69.4

Data entered by: DLS   Date: 11/02/99
Data checked by: KR   Date: 11/2/99
FileName: SOH00210

ADVANCED TERRA TESTING, INC.

HYDROMETER ANALYSIS - SEDIMENTATION DATA

CLIENT	Stone & Webster	JOB NO.	2162-07
BORING NO.	MISS-TP1SSREUPO-00210	SAMPLED	8-23-99 KG/BM
DEPTH	3.0-6.0'	DATE TESTED	10-13-99 DPM
SAMPLE NO. & TIME	MISS-00210, 1340	WASH SIEVE	Yes
		DRY SIEVE	No
SOIL DESCR.	FUSRAP Maywood Superfund Site; Proj# 085750303		

Hydrometer #	ASTM 152 H	Temp., Deg. C	22.9
Sp. Gr. of Soil	2.57	Temp. Coef. K	0.01351
Value of "alpha"	1.02	Wt. Dry Sample "W"	74.621
Deflocculant	Sodium Hexametaphosphate	% of Total Sample	100.0
Defloc. Corr'n	4.8		
Meniscus Corr'n	-1.0		

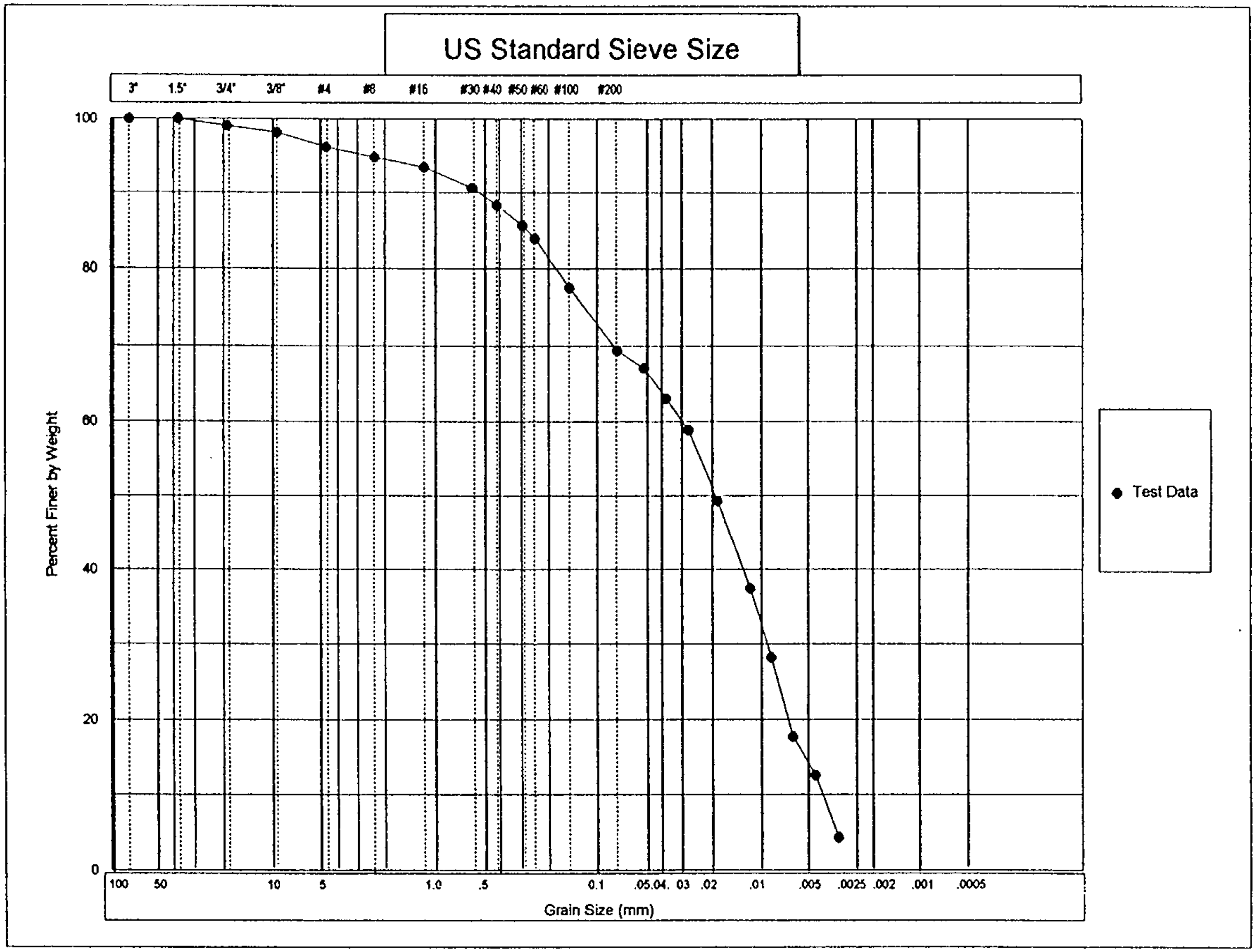
T Elapsed Time (min)	Hydrometer Reading Original	Corrected "R"	100Ra/W	% Total Sample	Effective Depth L	Grain Diameter (mm)
0.0	--	--	--	--	--	--
0.5	55.00	49.25	67.1	67.1	7.27	0.0515
1.0	52.00	46.25	63.0	63.0	7.76	0.0376
2.0	49.00	43.25	58.9	58.9	8.25	0.0275
5.0	42.00	36.25	49.4	49.4	9.40	0.0185
15.0	33.25	27.50	37.4	37.4	10.84	0.0115
30.0	26.50	20.75	28.3	28.3	11.94	0.0085
60.0	18.75	13.00	17.7	17.7	13.22	0.0063
120.0	15.00	9.25	12.6	12.6	13.83	0.0046
250.0	9.00	3.25	4.4	4.4	14.81	0.0033

Note: The 24 hr. reading was not reported because all the sample had settled out of suspension therefor the reading gave negative percentages.

Grain Diameter = K*(SQRT(L/T))

Data entered by: DLS Date: 11/02/99
Data checked by: KR Date: 11/2/99
FileName:SOH00210

ADVANCED TERRA TESTING, INC.



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	CRS	MEDIUM	FINE	

USCS

COBBLES TO BOULDERS	PEBBLE GRAVEL				SAND			SILT	CLAY
	COARSE	MED	FINE	GRAN	COARSE	MED	FINE		

WENTWORTH

Client: Stone & Webster Boring No.: MISS-TP1SSREUP0-00210 Sample No. & Time: MISS-00210, 1340

Depth: 3.0-6.0' Job Number: 2162-07

Classification:______________________

Advanced Terra Testing, Inc.

MECHANICAL ANALYSIS - SIEVE TEST DATA
ASTM D 422

CLIENT Stone & Webster — JOB NO. 2162-07

BORING NO.	MISS-TP1SSREUP2-00230	SAMPLED	8-23-99 KG/BM
DEPTH	3.0-6.0'	DATE TESTED	10-25-99 RV
SAMPLE NO. & TIME	MISS-00230, 1340	WASH SIEVE	Yes
		DRY SIEVE	No
SOIL DESCR.	FUSRAP Maywood Superfund Site; Proj# 085750303		

MOISTURE DATA

HYGROSCOPIC	Yes
NATURAL	No
Wt. Wet Soil & Pan (g)	57.95
Wt. Dry Soil & Pan (g)	53.71
Wt. Lost Moisture (g)	4.24
Wt. of Pan Only (g)	4.08
Wt. of Dry Soil (g)	49.63
Moisture Content %	8.5
Wt. Hydrom. Sample Wet (g)	55.52
Wt. Hydrom. Sample Dry (g)	51.15

WASH SIEVE ANALYSIS

Wt. Total Sample Wet (g)	2281.96
Weight of + #8 Before Washing (g)	93.02
Weight of + #8 After Washing (g)	78.13
Weight of - #8 Wet (g)	2188.94
Weight of - #8 Dry (g)	2030.37
Wt. Total Sample Dry (g)	2108.50
Calc. Wt. "W" (g)	53.11
Calc. Mass + #8	1.97

Sieve Number (Size)	Pan Weight (g)	Indiv. Wt. + Pan (g)	Indiv. Wt. Retain.	Cum. Wt. Retain.	Cum. % Retain.	% Finer By Wt.
3"	0.00	0.00	0.00	0.00	0.0	100.0
1 1/2"	0.00	0.00	0.00	0.00	0.0	100.0
3/4"	0.00	16.72	16.72	16.72	0.8	99.2
3/8"	0.00	20.42	20.42	37.14	1.8	98.2
#4	0.00	19.17	19.17	56.31	2.7	97.3
#8	0.00	21.82	21.82	78.13	3.7	96.3
#16	2.42	4.52	2.10	2.10	7.7	92.3
#30	2.37	4.84	2.47	4.57	12.3	87.7
#40	2.30	3.73	1.43	6.00	15.0	85.0
#50	2.36	3.89	1.53	7.53	17.9	82.1
#60	2.31	3.26	0.95	8.48	19.7	80.3
#100	2.35	5.35	3.00	11.48	25.3	74.7
#200	2.30	5.60	3.30	14.78	31.5	68.5

Data entered by: DLS Date: 10/28/99
Data checked by: KR Date: 11/1/99
FileName: SOH00230

ADVANCED TERRA TESTING, INC.

HYDROMETER ANALYSIS - SEDIMENTATION DATA

CLIENT	Stone & Webster	JOB NO.	2162-07
BORING NO.	MISS-TP1SSREUP2-00230	SAMPLED	8-23-99 KG/BM
DEPTH	3.0-6.0'	DATE TESTED	10-25-99 RV
SAMPLE NO. & TIME	MISS-00230, 1340	WASH SIEVE	Yes
		DRY SIEVE	No
SOIL DESCR.	FUSRAP Maywood Superfund Site; Proj# 085750303		

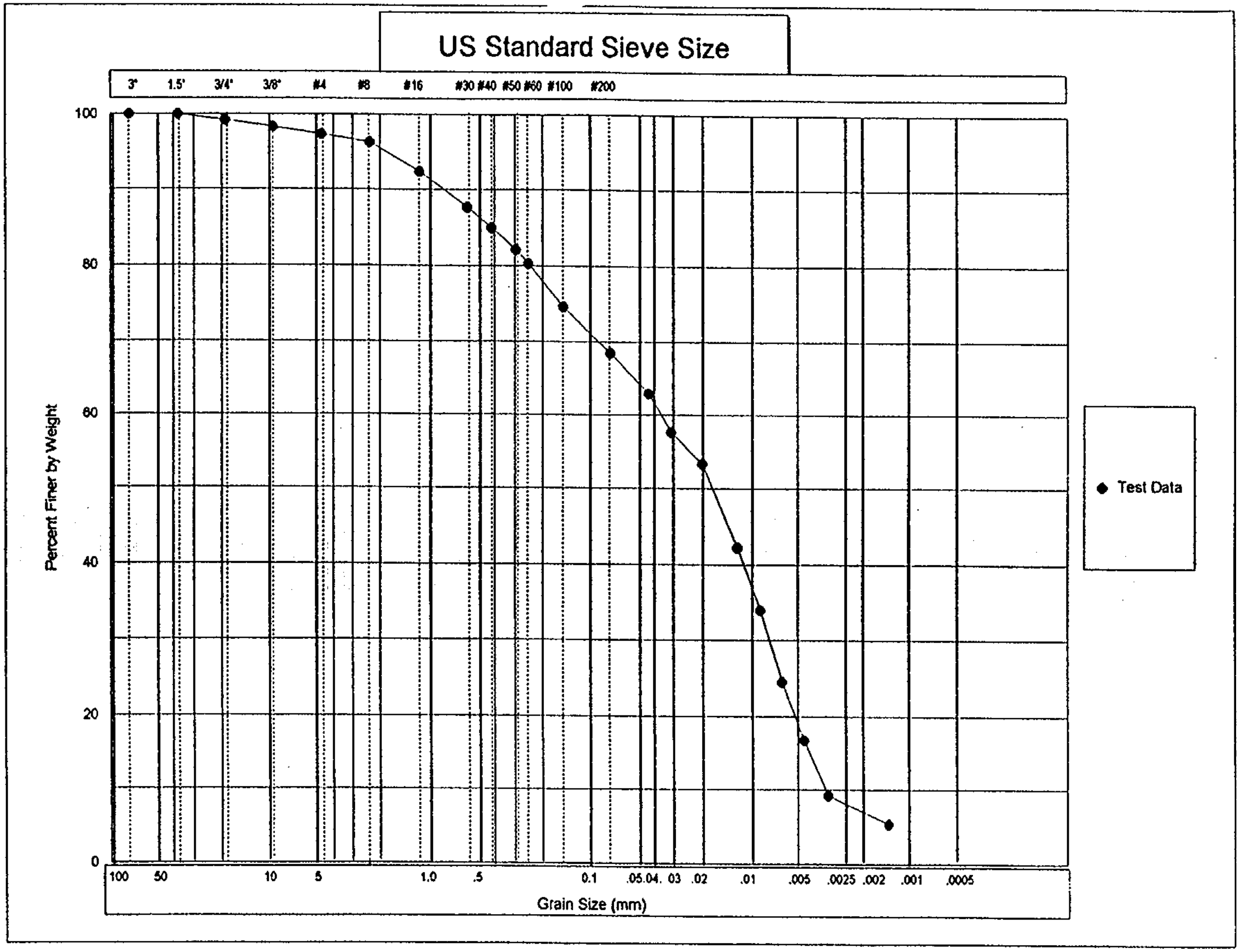
Hydrometer #	ASTM 152 H	Temp., Deg. C	23.0
Sp. Gr. of Soil	2.55	Temp. Coef. K	0.01358
Value of "alpha"	1.02	Wt. Dry Sample "W"	53.115
Deflocculant	Sodium Hexametaphosphate	% of Total Sample	100.0
Defloc. Corr'n	4.3		
Meniscus Corr'n	-1.0		

T Elapsed Time (min)	Hydrometer Reading Original	Corrected "R"	100Ra/W	% Total Sample	Effective Depth L	Grain Diameter (mm)
0.0	--	--	--	--	--	--
0.5	--	--	--	--	--	--
1.0	38.00	32.75	62.9	62.9	10.06	0.0431
2.0	35.25	30.00	57.6	57.6	10.51	0.0311
5.0	33.00	27.75	53.3	53.3	10.88	0.0200
15.0	27.25	22.00	42.2	42.2	11.82	0.0121
30.0	23.00	17.75	34.1	34.1	12.52	0.0088
60.0	18.00	12.75	24.5	24.5	13.34	0.0064
120.0	14.00	8.75	16.8	16.8	13.99	0.0046
250.0	10.00	4.75	9.1	9.1	14.65	0.0033
1482.0	8.00	2.75	5.3	5.3	14.98	0.0014

Grain Diameter = K*(SQRT(L/T))

Data entered by: DLS Date: 10/28/99
Data checked by: KR Date: 11/1/99
FileName:SOH00230

ADVANCED TERRA TESTING, INC.



COBBLES	GRAVEL		SAND			SILT OR CLAY	USCS
	COARSE	FINE	CRS	MEDIUM	FINE		

COBBLES TO BOULDERS	PEBBLE GRAVEL				SAND			SILT	CLAY	WENTWORTH
	COARSE	MED	FINE	GRAN	COARSE	MED	FINE			

Client: Stone & Webster Boring No.: MISS-TP1SSREUP2-00230 Sample No. & Time: MISS-00230, 1340

Depth: 3.0-6.0' Job Number: 2162-07

Classification:________________________

Advanced Terra Testing, Inc.

MECHANICAL ANALYSIS - SIEVE TEST DATA
ASTM D 422

CLIENT	Stone & Webster	JOB NO.	2162-07
BORING NO.	MISS-TP1SSSULOO-00160	SAMPLED	8-23-99
DEPTH	7.0-9.0'	DATE TESTED	9-25-99 AH
SAMPLE NO. & TIME	MISS-00160, 1106	WASH SIEVE	Yes
		DRY SIEVE	No
SOIL DESCR.	FUSRAP Maywood Superfund Site; Proj# 085750303		

MOISTURE DATA

HYGROSCOPIC	Yes	
NATURAL	No	
Wt. Wet Soil & Pan	(g)	47.12
Wt. Dry Soil & Pan	(g)	46.46
Wt. Lost Moisture	(g)	0.66
Wt. of Pan Only	(g)	3.72
Wt. of Dry Soil	(g)	42.74
Moisture Content	%	1.5
Wt. Hydrom. Sample Wet	(g)	57.57
Wt. Hydrom. Sample Dry	(g)	56.69

WASH SIEVE ANALYSIS

Wt. Total Sample Wet (g)	18621.00
Weight of + #8 Before Washing (g)	6673.20
Weight of + #8 After Washing (g)	6389.58
Weight of - #8 Wet (g)	11947.80
Weight of - #8 Dry (g)	12045.41
Wt. Total Sample Dry (g)	18434.99
Calc. Wt. "W" (g)	86.77
Calc. Mass + #8	30.07

Sieve Number (Size)	Pan Weight (g)	Indiv. Wt. + Pan (g)	Indiv. Wt. Retain.	Cum. Wt. Retain.	Cum. % Retain.	% Finer By Wt.
3"	0.00	2269.16	2269.16	2269.16	12.3	87.7
1 1/2"	0.00	1945.95	1945.95	4215.11	22.9	77.1
3/4"	0.00	1453.61	1453.61	5668.72	30.7	69.3
3/8"	0.00	365.65	365.65	6034.37	32.7	67.3
#4	0.00	231.89	231.89	6266.26	34.0	66.0
#8	0.00	123.32	123.32	6389.58	34.7	65.3
#16	2.35	3.39	1.04	1.04	35.9	64.1
#30	2.35	3.76	1.41	2.45	37.5	62.5
#40	2.36	4.15	1.79	4.24	39.5	60.5
#50	2.30	5.81	3.51	7.75	43.6	56.4
#60	2.28	6.20	3.92	11.67	48.1	51.9
#100	2.36	17.06	14.70	26.37	65.1	34.9
#200	2.36	11.20	8.84	35.21	75.2	24.8

Data entered by: DLS Date: 10/06/99
Data checked by: SR Date: 10-6-99
FileName: SOH00160

ADVANCED TERRA TESTING, INC.

HYDROMETER ANALYSIS - SEDIMENTATION DATA

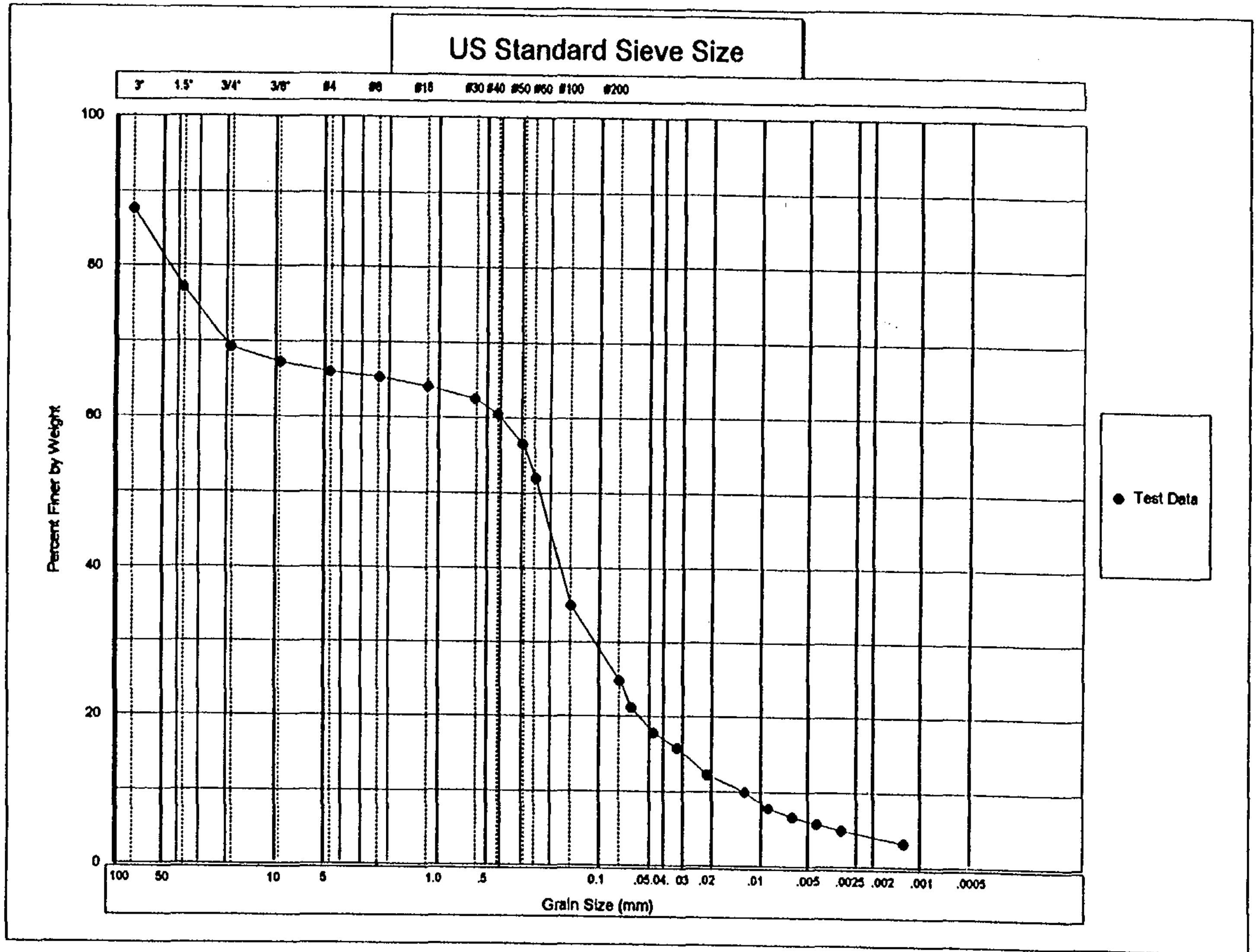
CLIENT	Stone & Webster	JOB NO.	2162-07
BORING NO.	MISS-TP1SSSUL00-00160	SAMPLED	8-23-99
DEPTH	7.0-9.0'	DATE TESTED	9-25-99 AH
SAMPLE NO. & TIME	MISS-00160, 1106	WASH SIEVE	Yes
		DRY SIEVE	No
SOIL DESCR.	FUSRAP Maywood Superfund Site; Proj# 085750303		

Hydrometer #	ASTM 152 H	Temp., Deg. C	23.8
Sp. Gr. of Soil	2.69	Temp. Coef. K	0.01289
Value of "alpha"	0.99	Wt. Dry Sample "W"	86.769
Deflocculant	Sodium Hexametaphosphate	% of Total Sample	100.0
Defloc. Corr'n	5.3		
Meniscus Corr'n	-1.0		

T Elapsed Time (min)	Hydrometer Reading Original	Hydrometer Reading Corrected "R"	100Ra/W	% Total Sample	Effective Depth L	Grain Diameter (mm)
0.0	--	--	--	--	--	--
0.5	24.75	18.50	21.2	21.2	12.23	0.0637
1.0	21.75	15.50	17.7	17.7	12.72	0.0460
2.0	20.00	13.75	15.7	15.7	13.01	0.0329
5.0	17.00	10.75	12.3	12.3	13.50	0.0212
15.0	15.00	8.75	10.0	10.0	13.83	0.0124
30.0	13.00	6.75	7.7	7.7	14.16	0.0089
60.0	12.00	5.75	6.6	6.6	14.32	0.0063
120.0	11.25	5.00	5.7	5.7	14.45	0.0045
250.0	10.50	4.25	4.9	4.9	14.57	0.0031
1487.0	9.00	2.75	3.1	3.1	14.81	0.0013

Grain Diameter = K*(SQRT(L/T))

Data entered by: DLS Date: 10/06/99
Data checked by:______ Date:_________
FileName:SOH00160 ADVANCED TERRA TESTING, INC.



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	CRS	MEDIUM	FINE	

USCS

COBBLES TO BOULDERS	PEBBLE GRAVEL				SAND			SILT	CLAY
	COARSE	MED	FINE	GRAN	COARSE	MED	FINE		

WENTWORTH

Client: Stone & Webster
Boring No.: MISS-TP1SSSULO0-00160
Sample No. & Time: MISS-00160, 1106
Depth: 7.0-9.0'
Job Number: 2162-07
Classification:________________________

Advanced Terra Testing, Inc.

MECHANICAL ANALYSIS - SIEVE TEST DATA
ASTM D 422

CLIENT	Stone & Webster	JOB NO.	2162-07
BORING NO.	MISS-TP1SSTRL00-00190	SAMPLED	8-23-99
DEPTH	7.0-9.0'	DATE TESTED	9-23-99 CL
SAMPLE NO. & TIME	MISS-00190, 1253	WASH SIEVE	Yes
		DRY SIEVE	No
SOIL DESCR.	FUSRAP Maywood Superfund Site; Proj# 085750303		

MOISTURE DATA

HYGROSCOPIC	Yes
NATURAL	No
Wt. Wet Soil & Pan (g)	67.04
Wt. Dry Soil & Pan (g)	65.89
Wt. Lost Moisture (g)	1.15
Wt. of Pan Only (g)	3.82
Wt. of Dry Soil (g)	62.07
Moisture Content %	1.9
Wt. Hydrom. Sample Wet (g)	55.70
Wt. Hydrom. Sample Dry (g)	54.69

WASH SIEVE ANALYSIS

Wt. Total Sample Wet (g)	7870.37
Weight of + #8 Before Washing (g)	2621.12
Weight of + #8 After Washing (g)	2162.55
Weight of - #8 Wet (g)	5249.25
Weight of - #8 Dry (g)	5603.99
Wt. Total Sample Dry (g)	7766.54
Calc. Wt. "W" (g)	75.79
Calc. Mass + #8	21.10

Sieve Number (Size)	Pan Weight (g)	Indiv. Wt. + Pan (g)	Indiv. Wt. Retain.	Cum. Wt. Retain.	Cum. % Retain.	% Finer By Wt.
3"	0.00	0.00	0.00	0.00	0.0	100.0
1 1/2"	0.00	822.08	822.08	822.08	10.6	89.4
3/4"	0.00	644.52	644.52	1466.60	18.9	81.1
3/8"	0.00	383.89	383.89	1850.49	23.8	76.2
#4	0.00	202.50	202.50	2052.99	26.4	73.6
#8	0.00	109.56	109.56	2162.55	27.8	72.2
#16	2.34	3.20	0.86	0.86	29.0	71.0
#30	2.30	3.76	1.46	2.32	30.9	69.1
#40	2.29	3.93	1.64	3.96	33.1	66.9
#50	2.33	5.51	3.18	7.14	37.3	62.7
#60	2.33	5.40	3.07	10.21	41.3	58.7
#100	2.36	13.95	11.59	21.80	56.6	43.4
#200	2.35	11.53	9.18	30.98	68.7	31.3

Data entered by: DLS Date: 10/06/99
Data checked by: SR Date: 10-6-99
FileName: SOH00190

ADVANCED TERRA TESTING, INC.

HYDROMETER ANALYSIS - SEDIMENTATION DATA

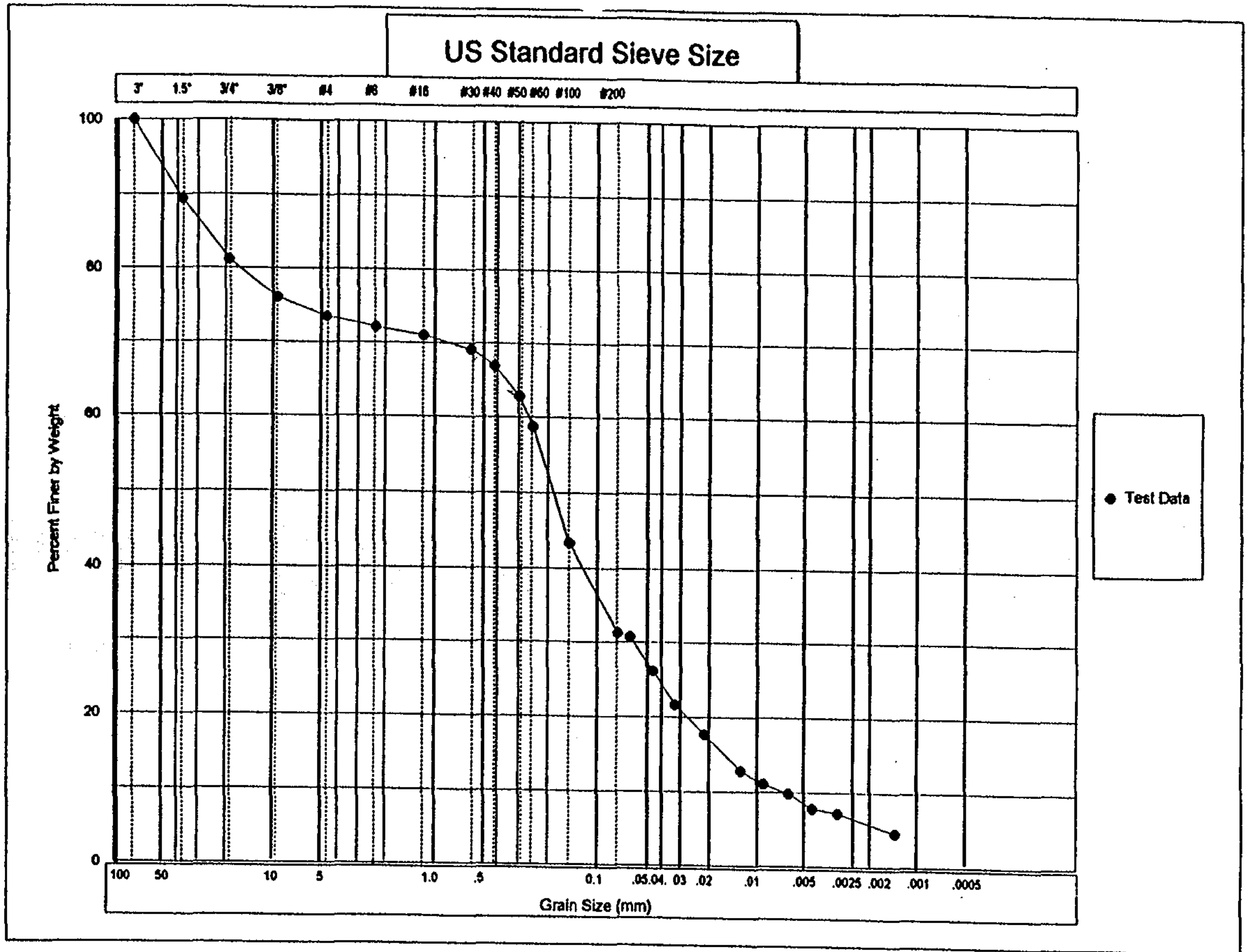
CLIENT	Stone & Webster	JOB NO.	2162-07
BORING NO.	MISS-TP1SSTRL00-00190	SAMPLED	8-23-99
DEPTH	7.0-9.0'	DATE TESTED	9-23-99 CL
SAMPLE NO. & TIME	MISS-00190, 1253	WASH SIEVE	Yes
		DRY SIEVE	No
SOIL DESCR.	FUSRAP Maywood Superfund Site; Proj# 085750303		

Hydrometer #	ASTM 152 H	Temp., Deg. C	22.9
Sp. Gr. of Soil	2.69	Temp. Coef. K	0.01303
Value of "alpha"	0.99	Wt. Dry Sample "W"	75.790
Deflocculant	Sodium Hexametaphosphate	% of Total Sample	100.0
Defloc. Corr'n	4.5		
Meniscus Corr'n	-1.0		

T Elapsed Time (min)	Hydrometer Reading Original	Corrected "R"	100Ra/W	% Total Sample	Effective Depth L	Grain Diameter (mm)
0.0	--	--	--	--	--	--
0.5	29.00	23.50	30.8	30.8	11.53	0.0626
1.0	25.50	20.00	26.2	26.2	12.11	0.0453
2.0	22.00	16.50	21.6	21.6	12.68	0.0328
5.0	19.00	13.50	17.7	17.7	13.17	0.0211
15.0	15.25	9.75	12.8	12.8	13.79	0.0125
30.0	14.00	8.50	11.1	11.1	13.99	0.0089
60.0	13.00	7.50	9.8	9.8	14.16	0.0063
120.0	11.50	6.00	7.9	7.9	14.40	0.0045
250.0	11.00	5.50	7.2	7.2	14.49	0.0031
1318.0	9.00	3.50	4.6	4.6	14.81	0.0014

Grain Diameter = K*(SQRT(L/T))

Data entered by: DLS Date: 10/06/99
Data checked by: SR Date: 10-6-99
FileName:SOH00190 ADVANCED TERRA TESTING, INC.



COBBLES	GRAVEL		SAND			SILT OR CLAY	USCS
	COARSE	FINE	CRS	MEDIUM	FINE		

COBBLES TO BOULDERS	PEBBLE GRAVEL				SAND			SILT	CLAY	WENTWORTH
	COARSE	MED	FINE	GRAN	COARSE	MED	FINE			

Client: Stone & Webster
Depth: 7.0-9.0'
Classification:______________

Boring No.: MISS-TP1SSTRLO0-00190
Job Number: 2162-07

Sample No. & Time: MISS-00190, 1253

Advanced Terra Testing, Inc.

MECHANICAL ANALYSIS - SIEVE TEST DATA
ASTM D 422

CLIENT	Stone & Webster	JOB NO.	2162-07
BORING NO.	MISS-TP1SSREL00-00220	SAMPLED	8-23-99
DEPTH	7.0-9.0'	DATE TESTED	9-23-99 AH
SAMPLE NO. & TIME	MISS-00220, 1426	WASH SIEVE	Yes
		DRY SIEVE	No
SOIL DESCR.	FUSRAP Maywood Superfund Site; Proj# 085750303		

MOISTURE DATA

HYGROSCOPIC	Yes
NATURAL	No
Wt. Wet Soil & Pan (g)	111.68
Wt. Dry Soil & Pan (g)	109.65
Wt. Lost Moisture (g)	2.03
Wt. of Pan Only (g)	3.75
Wt. of Dry Soil (g)	105.90
Moisture Content %	1.9
Wt. Hydrom. Sample Wet (g)	57.92
Wt. Hydrom. Sample Dry (g)	56.83

WASH SIEVE ANALYSIS

Wt. Total Sample Wet (g)	4626.50
Weight of + #8 Before Washing (g)	1205.50
Weight of + #8 After Washing (g)	1025.54
Weight of - #8 Wet (g)	3421.00
Weight of - #8 Dry (g)	3533.23
Wt. Total Sample Dry (g)	4558.77
Calc. Wt. "W" (g)	73.32
Calc. Mass + #8	16.49

Sieve Number (Size)	Pan Weight (g)	Indiv. Wt. + Pan (g)	Indiv. Wt. Retain.	Cum. Wt. Retain.	Cum. % Retain.	% Finer By Wt.
3"	0.00	0.00	0.00	0.00	0.0	100.0
1 1/2"	0.00	680.75	680.75	680.75	14.9	85.1
3/4"	0.00	54.03	54.03	734.78	16.1	83.9
3/8"	0.00	106.29	106.29	841.07	18.4	81.6
#4	0.00	100.11	100.11	941.18	20.6	79.4
#8	0.00	84.36	84.36	1025.54	22.5	77.5
#16	2.35	3.14	0.79	0.79	23.6	76.4
#30	2.34	3.95	1.61	2.40	25.8	74.2
#40	2.28	4.40	2.12	4.52	28.7	71.3
#50	2.37	6.85	4.48	9.00	34.8	65.2
#60	2.36	6.30	3.94	12.94	40.1	59.9
#100	2.30	15.23	12.93	25.87	57.8	42.2
#200	2.31	10.59	8.28	34.15	69.1	30.9

Data entered by: DLS   Date: 10/06/99
Data checked by: SR   Date: 10-6-99
FileName: SOH00220   ADVANCED TERRA TESTING, INC.

HYDROMETER ANALYSIS - SEDIMENTATION DATA

CLIENT Stone & Webster JOB NO. 2162-07

BORING NO. MISS-TP1SSREL00-00220
DEPTH 7.0-9.0'
SAMPLE NO. & TIME MISS-00220, 1426

SAMPLED 8-23-99
DATE TESTED 9-23-99 AH
WASH SIEVE Yes
DRY SIEVE No

SOIL DESCR. FUSRAP Maywood Superfund Site; Proj# 085750303

Hydrometer # ASTM 152 H
Sp. Gr. of Soil 2.70
Value of "alpha" 0.99
Deflocculant Sodium Hexametaphosphate
Defloc. Corr'n 5.0
Meniscus Corr'n -1.0

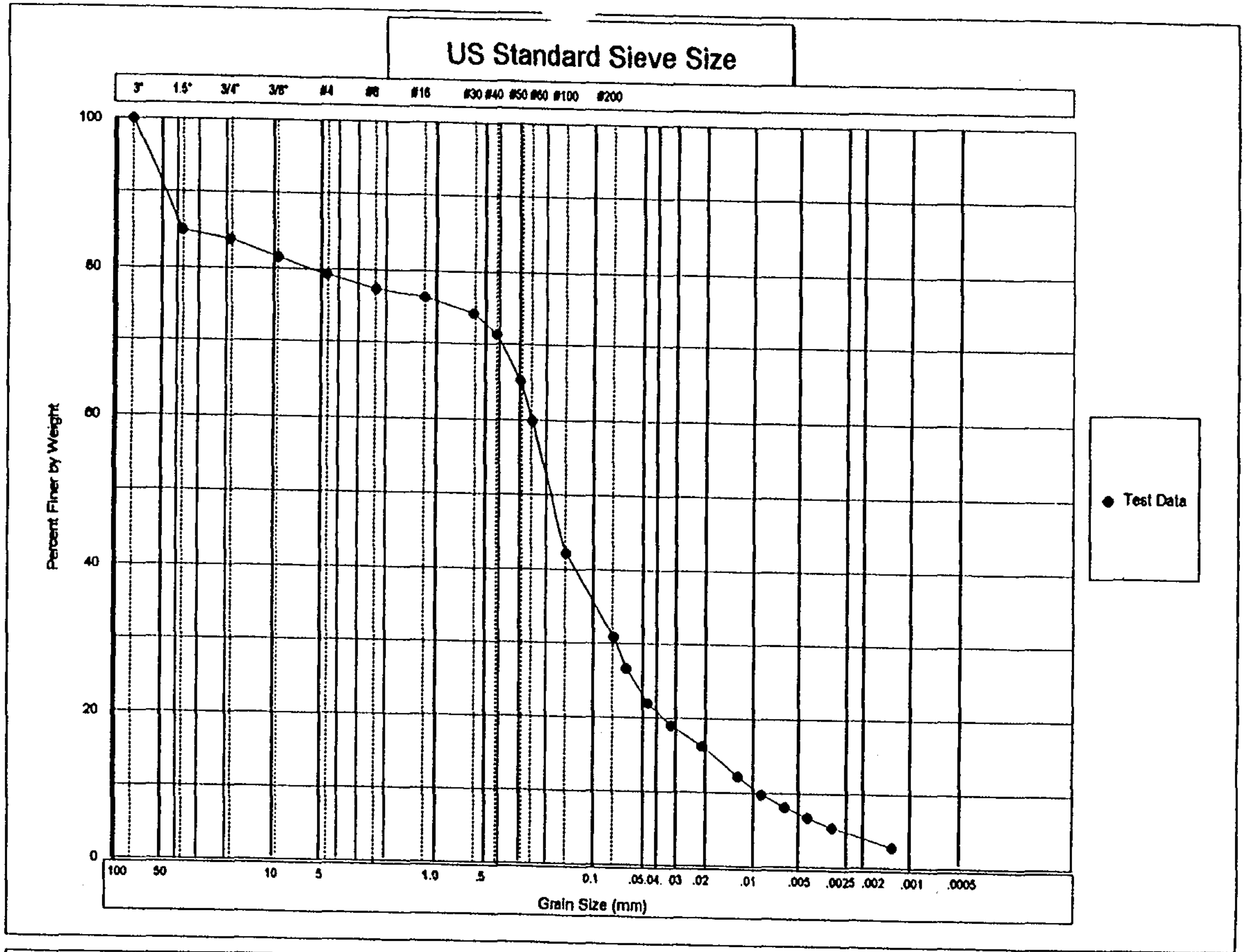
Temp., Deg. C 24.4
Temp. Coef. K 0.01276
Wt. Dry Sample "W" 73.321
% of Total Sample 100.0

T Elapsed Time (min)	Hydrometer Reading Original	Corrected "R"	100Ra/W	% Total Sample	Effective Depth L	Grain Diameter (mm)
0.0	--	--	--	--	--	--
0.5	25.75	19.75	26.7	26.7	12.07	0.0627
1.0	22.25	16.25	21.9	21.9	12.64	0.0454
2.0	20.00	14.00	18.9	18.9	13.01	0.0325
5.0	18.00	12.00	16.2	16.2	13.34	0.0208
15.0	15.00	9.00	12.2	12.2	13.83	0.0123
30.0	13.25	7.25	9.8	9.8	14.12	0.0088
60.0	12.00	6.00	8.1	8.1	14.32	0.0062
120.0	11.00	5.00	6.8	6.8	14.49	0.0044
250.0	10.00	4.00	5.4	5.4	14.65	0.0031
1439.0	8.00	2.00	2.7	2.7	14.98	0.0013

Grain Diameter = K*(SQRT(L/T))

Data entered by: DLS Date: 10/06/99
Data checked by: SR Date: 10-6-99
FileName:SOH00220

ADVANCED TERRA TESTING, INC.



COBBLES	GRAVEL		SAND			SILT OR CLAY	USCS
	COARSE	FINE	CRS	MEDIUM	FINE		

COBBLES TO BOULDERS	PEBBLE GRAVEL				SAND			SILT	CLAY	WENTWORTH
	COARSE	MED	FINE	GRAN	COARSE	MED	FINE			

Client: Stone & Webster
Depth: 7.0-9.0'
Classification: ____________________

Boring No.: MISS-TP1SSRELO0-00220
Job Number: 2162-07

Sample No. & Time: MISS-00220, 1426

Advanced Terra Testing, Inc.

TEST PIT 2

ENGINEERING TEST PITS AT MISS
GEOTECHNICAL DATA RESULTS

FUSRAP MAYWOOD SUPERFUND SITE
MAYWOOD, NEW JERSEY

MECHANICAL ANALYSIS - SIEVE TEST DATA
ASTM D 422

CLIENT Stone & Webster — JOB NO. 2162-07

BORING NO.	MISS-TP2SSSUOVO-00330	SAMPLED	8-26-99 KG/BM
DEPTH	1.0'	DATE TESTED	10-25-99 RV
SAMPLE NO. & TIME	MISS-00330, 1010	WASH SIEVE	Yes
		DRY SIEVE	No
SOIL DESCR.	FUSRAP Maywood Superfund Site; Proj# 085750303		

MOISTURE DATA

HYGROSCOPIC	Yes	
NATURAL	No	
Wt. Wet Soil & Pan	(g)	53.09
Wt. Dry Soil & Pan	(g)	52.48
Wt. Lost Moisture	(g)	0.61
Wt. of Pan Only	(g)	4.31
Wt. of Dry Soil	(g)	48.17
Moisture Content	%	1.3
Wt. Hydrom. Sample Wet	(g)	55.25
Wt. Hydrom. Sample Dry	(g)	54.55

WASH SIEVE ANALYSIS

Wt. Total Sample Wet (g)	13850.00
Weight of + #8 Before Washing (g)	6596.00
Weight of + #8 After Washing (g)	6091.18
Weight of - #8 Wet (g)	7254.00
Weight of - #8 Dry (g)	7661.79
Wt. Total Sample Dry (g)	13752.97
Calc. Wt. "W" (g)	97.93
Calc. Mass + #8	43.37

Sieve Number (Size)	Pan Weight (g)	Indiv. Wt. + Pan (g)	Indiv. Wt. Retain.	Cum. Wt. Retain.	Cum. % Retain.	% Finer By Wt.
3"	0.00	2585.60	2585.60	2585.60	18.8	81.2
1 1/2"	0.00	1226.90	1226.90	3812.50	27.7	72.3
3/4"	0.00	639.93	639.93	4452.43	32.4	67.6
3/8"	0.00	370.24	370.24	4822.67	35.1	64.9
#4	0.00	590.16	590.16	5412.83	39.4	60.6
#8	0.00	678.35	678.35	6091.18	44.3	55.7
#16	3.68	10.86	7.18	7.18	51.6	48.4
#30	3.64	10.90	7.26	14.44	59.0	41.0
#40	3.70	8.05	4.35	18.79	63.5	36.5
#50	3.79	7.98	4.19	22.98	67.8	32.2
#60	3.68	6.11	2.43	25.41	70.2	29.8
#100	3.91	9.87	5.96	31.37	76.3	23.7
#200	3.75	8.77	5.02	36.39	81.5	18.5

Data entered by: DLS Date: 11/02/99
Data checked by: KR Date: 11/2/99
FileName: SOH00330

ADVANCED TERRA TESTING, INC.

HYDROMETER ANALYSIS - SEDIMENTATION DATA

CLIENT Stone & Webster JOB NO. 2162-07

BORING NO.	MISS-TP2SSSUOV0-00330	SAMPLED	8-26-99 KG/BM
DEPTH	1.0'	DATE TESTED	10-25-99 RV
SAMPLE NO. & TIME	MISS-00330, 1010	WASH SIEVE	Yes
		DRY SIEVE	No
SOIL DESCR.	FUSRAP Maywood Superfund Site; Proj# 085750303		

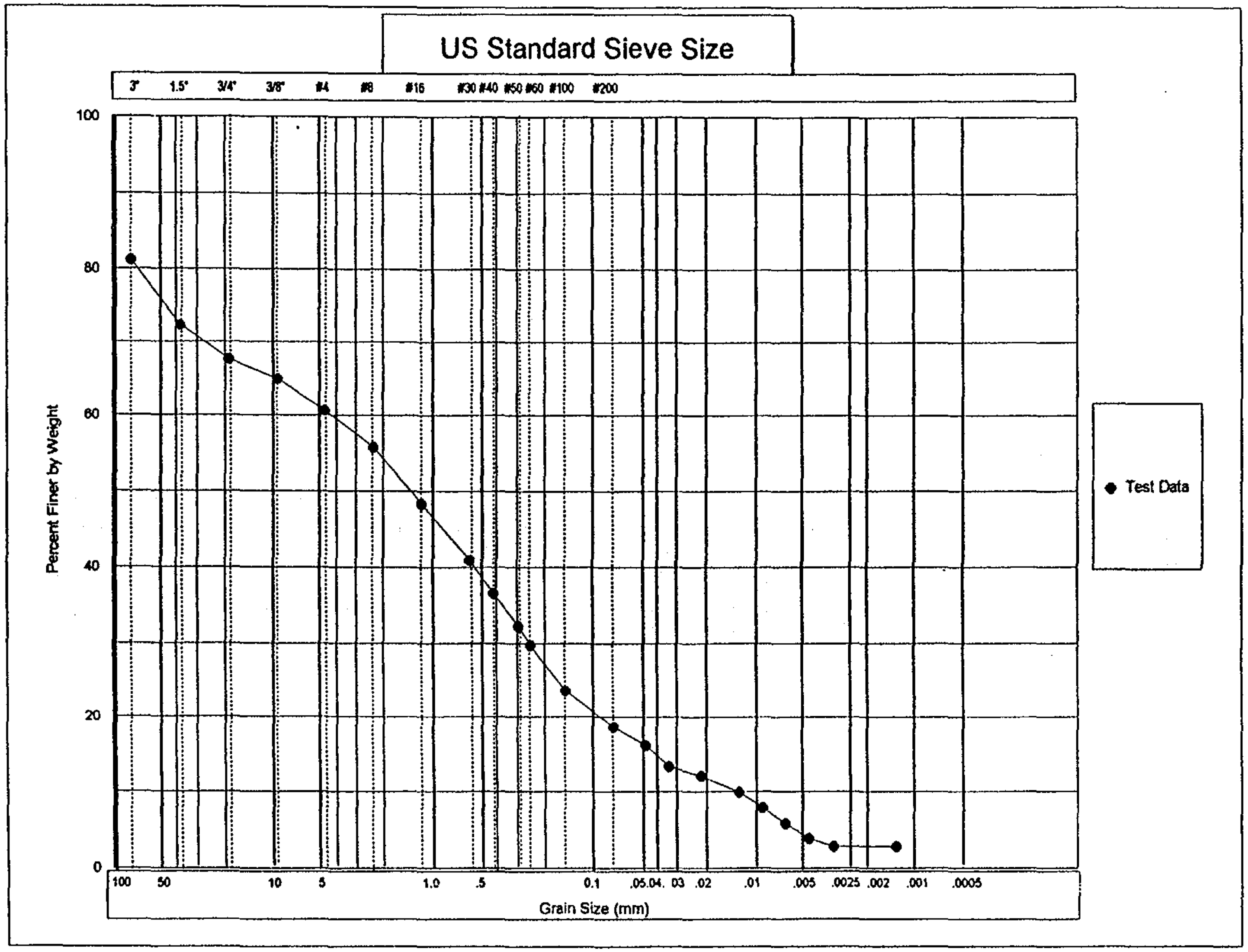
Hydrometer #	ASTM 152 H	Temp., Deg. C	23.0
Sp. Gr. of Soil	2.66	Temp. Coef. K	0.01313
Value of "alpha"	1.00	Wt. Dry Sample "W"	97.925
Deflocculant	Sodium Hexametaphosphate	% of Total Sample	100.0
Defloc. Corr'n	4.3		
Meniscus Corr'n	-1.0		

T Elapsed Time (min)	Hydrometer Reading Original	Corrected "R"	100Ra/W	% Total Sample	Effective Depth L	Grain Diameter (mm)
0.0	--	--	--	--	--	--
0.5	--	--	--	--	--	--
1.0	21.00	15.75	16.1	16.1	12.85	0.0471
2.0	18.25	13.00	13.2	13.2	13.30	0.0339
5.0	17.00	11.75	12.0	12.0	13.50	0.0216
15.0	15.00	9.75	9.9	9.9	13.83	0.0126
30.0	13.00	7.75	7.9	7.9	14.16	0.0090
60.0	11.00	5.75	5.9	5.9	14.49	0.0065
120.0	9.00	3.75	3.8	3.8	14.81	0.0046
250.0	8.00	2.75	2.8	2.8	14.98	0.0032
1493.0	8.00	2.75	2.8	2.8	14.98	0.0013

Grain Diameter = K*(SQRT(L/T))

Data entered by: DLS Date: 11/02/99
Data checked by: KR Date: 11/2/99
FileName: SOH00330

ADVANCED TERRA TESTING, INC.



COBBLES	GRAVEL		SAND			SILT OR CLAY	USCS
	COARSE	FINE	CRS	MEDIUM	FINE		

COBBLES TO BOULDERS	PEBBLE GRAVEL				SAND			SILT	CLAY	WENTWORTH
	COARSE	MED	FINE	GRAN	COARSE	MED	FINE			

Client: Stone & Webster Boring No.: MISS-TP2SSSUOV0-00330 Sample No. & Time: MISS-00330, 1010

Depth: 1.0' Job Number: 2162-07

Classification:________________

Advanced Terra Testing, Inc.

MECHANICAL ANALYSIS - SIEVE TEST DATA
ASTM D 422

CLIENT	Stone & Webster	JOB NO.	2162-07
BORING NO.	MISS-TP2SSTROV0-00360	SAMPLED	8-26-99 KG/BM
DEPTH	1.0'	DATE TESTED	10-5-99 DPM
SAMPLE NO. & TIME	MISS-00360, 1055	WASH SIEVE	Yes
		DRY SIEVE	No
SOIL DESCR.	FUSRAP Maywood Superfund Site; Proj# 085750303		

MOISTURE DATA

HYGROSCOPIC	Yes	
NATURAL	No	
Wt. Wet Soil & Pan	(g)	52.11
Wt. Dry Soil & Pan	(g)	50.69
Wt. Lost Moisture	(g)	1.42
Wt. of Pan Only	(g)	3.71
Wt. of Dry Soil	(g)	46.98
Moisture Content %		3.0
Wt. Hydrom. Sample Wet	(g)	55.85
Wt. Hydrom. Sample Dry	(g)	54.21

WASH SIEVE ANALYSIS

Wt. Total Sample Wet (g)	2116.49
Weight of + #8 Before Washing (g)	638.11
Weight of + #8 After Washing (g)	603.73
Weight of - #8 Wet (g)	1478.38
Weight of - #8 Dry (g)	1468.38
Wt. Total Sample Dry (g)	2072.11
Calc. Wt. "W" (g)	76.50
Calc. Mass + #8	22.29

Sieve Number (Size)	Pan Weight (g)	Indiv. Wt. + Pan (g)	Indiv. Wt. Retain.	Cum. Wt. Retain.	Cum. % Retain.	% Finer By Wt.
3"	0.00	0.00	0.00	0.00	0.0	100.0
1 1/2"	0.00	85.73	85.73	85.73	4.1	95.9
3/4"	0.00	271.24	271.24	356.97	17.2	82.8
3/8"	0.00	101.90	101.90	458.87	22.1	77.9
#4	0.00	73.37	73.37	532.24	25.7	74.3
#8	0.00	71.49	71.49	603.73	29.1	70.9
#16	1.00	3.83	2.83	2.83	32.8	67.2
#30	0.99	4.07	3.08	5.91	36.9	63.1
#40	1.02	4.05	3.03	8.94	40.8	59.2
#50	1.03	4.65	3.62	12.56	45.6	54.4
#60	1.02	2.68	1.66	14.22	47.7	52.3
#100	0.98	6.05	5.07	19.29	54.4	45.6
#200	2.31	8.08	5.77	25.06	61.9	38.1

Data entered by: DLS Date: 10/19/99
Data checked by: CAL Date: 10/20/99
FileName: SOH00360

ADVANCED TERRA TESTING, INC.

HYDROMETER ANALYSIS - SEDIMENTATION DATA

CLIENT	Stone & Webster	JOB NO.	2162-07
BORING NO.	MISS-TP2SSTROV0-00360	SAMPLED	8-26-99 KG/BM
DEPTH	1.0'	DATE TESTED	10-5-99 DPM
SAMPLE NO. & TIME	MISS-00360, 1055	WASH SIEVE	Yes
		DRY SIEVE	No
SOIL DESCR.	FUSRAP Maywood Superfund Site; Proj# 085750303		

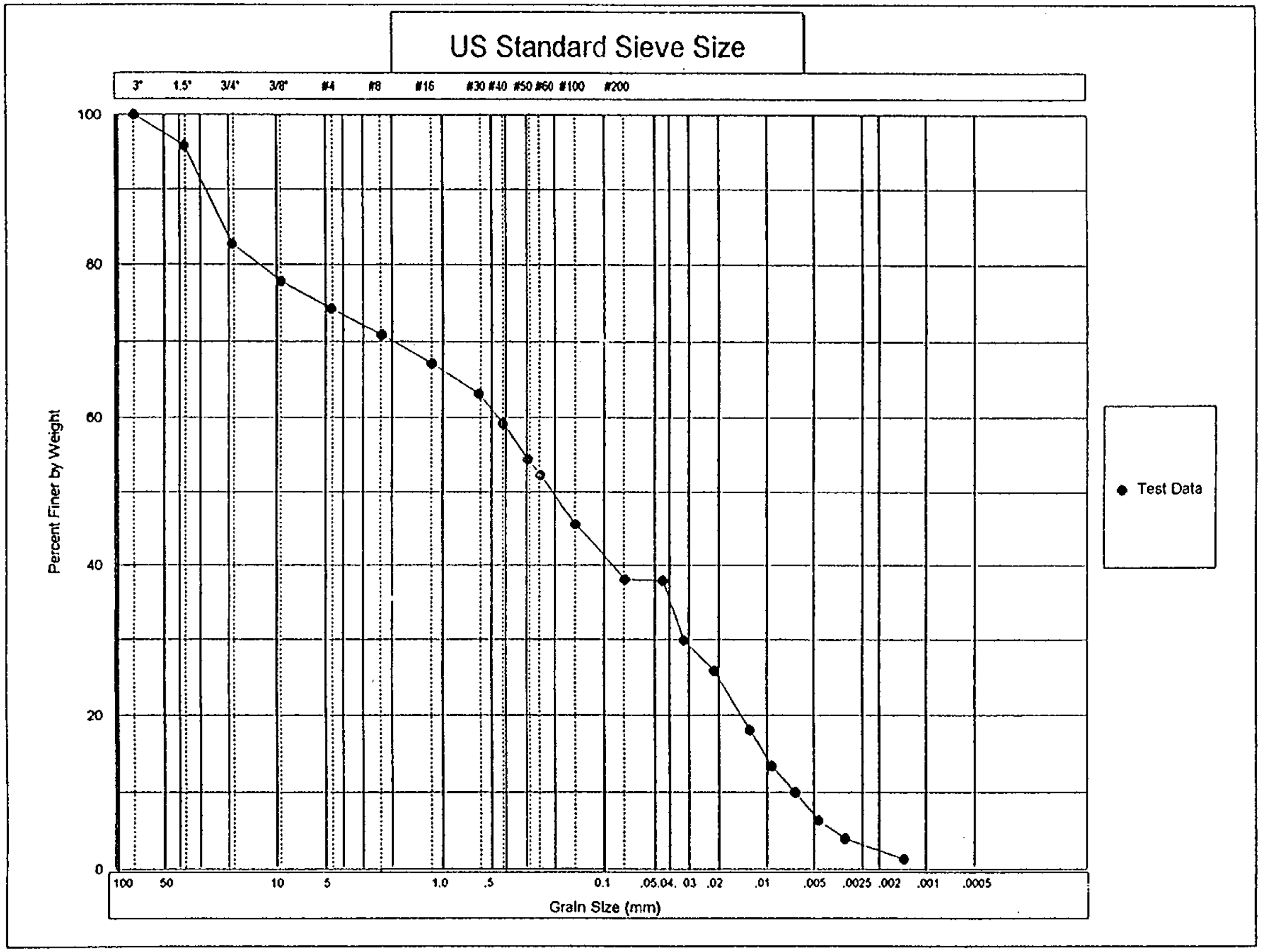
Hydrometer #	ASTM 152 H	Temp., Deg. C	22.8
Sp. Gr. of Soil	2.56	Temp. Coef. K	0.01357
Value of "alpha"	1.02	Wt. Dry Sample "W"	76.501
Deflocculant	Sodium Hexametaphosphate	% of Total Sample	100.0
Defloc. Corr'n	5.5		
Meniscus Corr'n	-1.0		

T Elapsed Time (min)	Hydrometer Reading Original	Corrected "R"	100Ra/W	% Total Sample	Effective Depth L	Grain Diameter (mm)
0.0	--	--	--	--	--	--
0.5	--	--	--	--	--	--
1.0	35.00	28.50	37.9	37.9	10.55	0.0441
2.0	29.00	22.50	29.9	29.9	11.53	0.0326
5.0	26.00	19.50	25.9	25.9	12.03	0.0210
15.0	20.00	13.50	18.0	18.0	13.01	0.0126
30.0	16.50	10.00	13.3	13.3	13.58	0.0091
60.0	14.00	7.50	10.0	10.0	13.99	0.0066
120.0	11.25	4.75	6.3	6.3	14.45	0.0047
260.0	9.50	3.00	4.0	4.0	14.73	0.0032
1443.0	7.50	1.00	1.3	1.3	15.06	0.0014

Grain Diameter = K*(SQRT(L/T))

Data entered by: DLS Date: 10/19/99
Data checked by: CAL Date: 10/20/99
FileName:SOH00360

ADVANCED TERRA TESTING, INC.



COBBLES	GRAVEL		SAND			SILT OR CLAY	
	COARSE	FINE	CRS	MEDIUM	FINE		USCS

COBBLES TO BOULDERS	PEBBLE GRAVEL				SAND			SILT	CLAY	
	COARSE	MED	FINE	GRAN	COARSE	MED	FINE			WENTWORTH

Client: Stone & Webster Boring No.: MISS-TP2SSTROV0-00360 Sample No. & Time: MISS-00360, 1055

Depth: 1.0' Job Number: 2162-07

Classification:____________________

Advanced Terra Testing, Inc.

MECHANICAL ANALYSIS - SIEVE TEST DATA
ASTM D 422

CLIENT	Stone & Webster	JOB NO.	2162-07
BORING NO.	MISS-TP2SSREOV0-00390	SAMPLED	8-26-99
DEPTH	1.0'	DATE TESTED	9-25-99 AH
SAMPLE NO. & TIME	MISS-00390, 1120	WASH SIEVE	Yes
		DRY SIEVE	No
SOIL DESCR.	FUSRAP Maywood Superfund Site; Proj# 085750303		

MOISTURE DATA

HYGROSCOPIC	Yes
NATURAL	No
Wt. Wet Soil & Pan (g)	87.93
Wt. Dry Soil & Pan (g)	82.44
Wt. Lost Moisture (g)	5.49
Wt. of Pan Only (g)	3.80
Wt. of Dry Soil (g)	78.64
Moisture Content %	7.0
Wt. Hydrom. Sample Wet (g)	57.37
Wt. Hydrom. Sample Dry (g)	53.63

WASH SIEVE ANALYSIS

Wt. Total Sample Wet (g)	3551.00
Weight of + #8 Before Washing (g)	1549.07
Weight of + #8 After Washing (g)	1465.73
Weight of - #8 Wet (g)	2001.93
Weight of - #8 Dry (g)	1949.19
Wt. Total Sample Dry (g)	3414.92
Calc. Wt. "W" (g)	93.96
Calc. Mass + #8	40.33

Sieve Number (Size)	Pan Weight (g)	Indiv. Wt. + Pan (g)	Indiv. Wt. Retain.	Cum. Wt. Retain.	Cum. % Retain.	% Finer By Wt.
3"	0.00	0.00	0.00	0.00	0.0	100.0
1 1/2"	0.00	265.41	265.41	265.41	7.8	92.2
3/4"	0.00	829.24	829.24	1094.65	32.1	67.9
3/8"	0.00	178.75	178.75	1273.40	37.3	62.7
#4	0.00	96.86	96.86	1370.26	40.1	59.9
#8	0.00	95.47	95.47	1465.73	42.9	57.1
#16	2.33	4.76	2.43	2.43	45.5	54.5
#30	2.32	7.59	5.27	7.70	51.1	48.9
#40	2.36	6.45	4.09	11.79	55.5	44.5
#50	2.35	5.43	3.08	14.87	58.7	41.3
#60	2.34	3.96	1.62	16.49	60.5	39.5
#100	2.39	5.92	3.53	20.02	64.2	35.8
#200	2.38	5.50	3.12	23.14	67.5	32.5

Data entered by: DLS Date: 10/06/99
Data checked by: SR Date: 10-6-99
FileName: SOH00390

ADVANCED TERRA TESTING, INC.

HYDROMETER ANALYSIS - SEDIMENTATION DATA

CLIENT	Stone & Webster	JOB NO.	2162-07
BORING NO.	MISS-TP2SSREOV0-00390	SAMPLED	8-26-99
DEPTH	1.0'	DATE TESTED	9-25-99 AH
SAMPLE NO. & TIME	MISS-00390, 1120	WASH SIEVE	Yes
		DRY SIEVE	No
SOIL DESCR.	FUSRAP Maywood Superfund Site; Proj# 085750303		

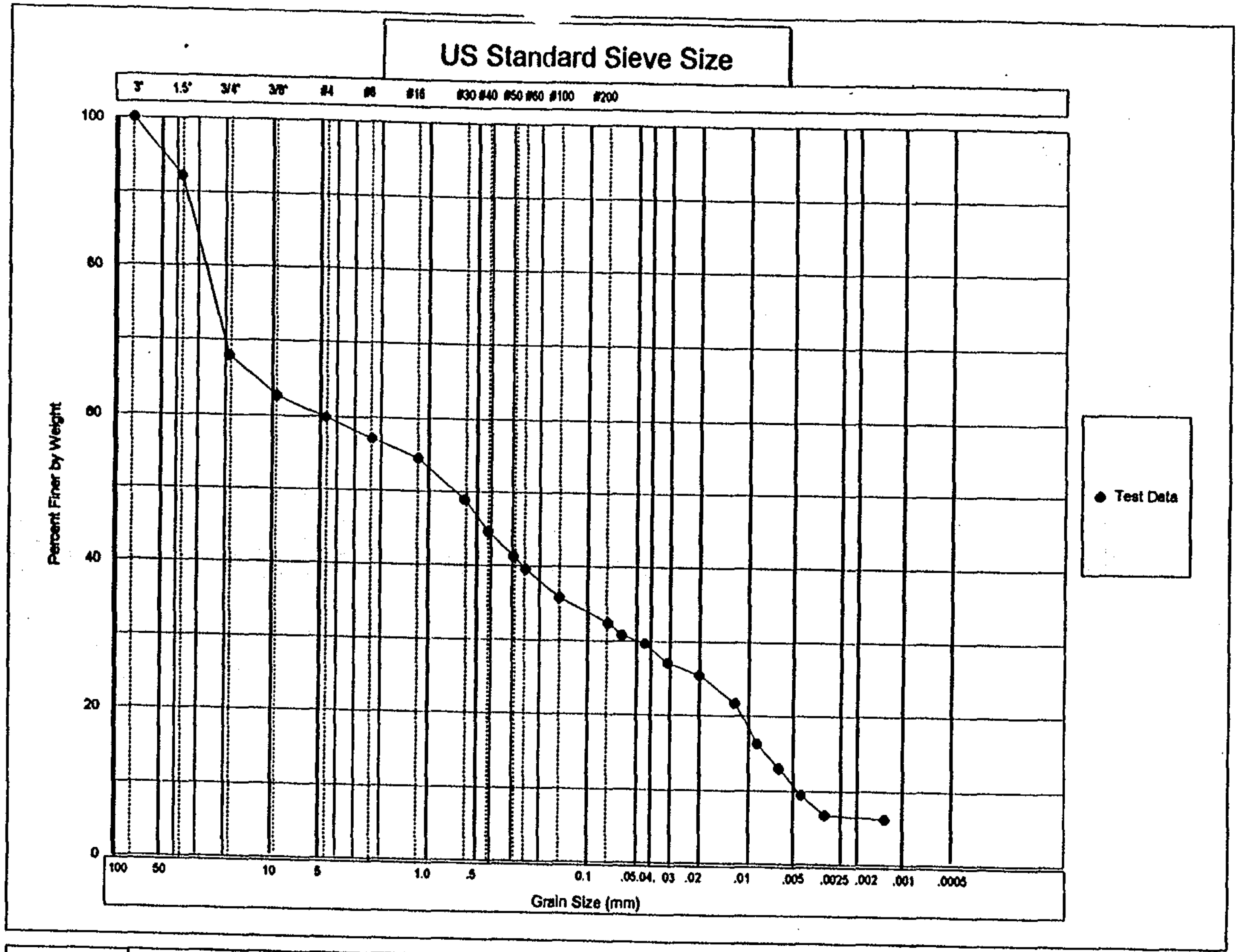
Hydrometer #	ASTM 152 H	Temp., Deg. C	24.3
Sp. Gr. of Soil	2.57	Temp. Coef. K	0.01329
Value of "alpha"	1.02	Wt. Dry Sample "W"	93.958
Deflocculant	Sodium Hexametaphosphate	% of Total Sample	100.0
Defloc. Corr'n	5.0		
Meniscus Corr'n	-1.0		

T Elapsed Time (min)	Hydrometer Reading Original	Corrected "R"	100Ra/W	% Total Sample	Effective Depth L	Grain Diameter (mm)
0.0	--	--	--	--	--	--
0.5	34.50	28.50	30.8	30.8	10.63	0.0613
1.0	33.50	27.50	29.7	29.7	10.80	0.0437
2.0	31.00	25.00	27.0	27.0	11.21	0.0315
5.0	29.50	23.50	25.4	25.4	11.45	0.0201
15.0	26.00	20.00	21.6	21.6	12.03	0.0119
30.0	21.00	15.00	16.2	16.2	12.85	0.0087
60.0	18.00	12.00	13.0	13.0	13.34	0.0063
120.0	14.75	8.75	9.5	9.5	13.87	0.0045
250.0	12.25	6.25	6.8	6.8	14.28	0.0032
1453.0	11.75	5.75	6.2	6.2	14.36	0.0013

Grain Diameter = K*(SQRT(L/T))

Data entered by: DLS Date: 10/06/99
Data checked by: SR Date: 10-6-99
FileName:SOH00390

ADVANCED TERRA TESTING, INC.



COBBLES	GRAVEL		SAND			SILT OR CLAY	USCS
	COARSE	FINE	CRS	MEDIUM	FINE		

COBBLES TO BOULDERS	PEBBLE GRAVEL				SAND			SILT	CLAY	WENTWORTH
	COARSE	MED	FINE	GRAN	COARSE	MED	FINE			

Client: Stone & Webster
Depth: 1.0'
Classification:__________________

Boring No.: MISS-TP2SSREOV0-00390
Job Number: 2162-07

Sample No. & Time: MISS-00390, 1120

Advanced Terra Testing, Inc.

MECHANICAL ANALYSIS - SIEVE TEST DATA
ASTM D 422

CLIENT Stone & Webster JOB NO. 2162-07

BORING NO.	MISS-TP2SSSUUPO-00340	SAMPLED	8-25-99 KG/BM
DEPTH	2.0'	DATE TESTED	10-25-99 RV
SAMPLE NO. & TIME	MISS-00340, 1010	WASH SIEVE	Yes
		DRY SIEVE	No
SOIL DESCR.	FUSRAP Maywood Superfund Site; Proj# 085750303		

MOISTURE DATA

HYGROSCOPIC Yes

NATURAL No

Wt. Wet Soil & Pan	(g)	43.62
Wt. Dry Soil & Pan	(g)	42.43
Wt. Lost Moisture	(g)	1.19
Wt. of Pan Only	(g)	4.50
Wt. of Dry Soil	(g)	37.93
Moisture Content	%	3.1
Wt. Hydrom. Sample Wet	(g)	55.83
Wt. Hydrom. Sample Dry	(g)	54.13

WASH SIEVE ANALYSIS

Wt. Total Sample Wet (g)	1876.36
Weight of + #8 Before Washing (g)	400.19
Weight of + #8 After Washing (g)	537.44
Weight of - #8 Wet (g)	1476.17
Weight of - #8 Dry (g)	1298.19
Wt. Total Sample Dry (g)	1835.63
Calc. Wt. "W" (g)	76.55
Calc. Mass + #8	22.41

Sieve Number (Size)	Pan Weight (g)	Indiv. Wt. + Pan (g)	Indiv. Wt. Retain.	Cum. Wt. Retain.	Cum. % Retain.	% Finer By Wt.
3"	0.00	0.00	0.00	0.00	0.0	100.0
1 1/2"	0.00	119.28	119.28	119.28	6.5	93.5
3/4"	0.00	232.81	232.81	352.09	19.2	80.8
3/8"	0.00	76.08	76.08	428.17	23.3	76.7
#4	0.00	56.75	56.75	484.92	26.4	73.6
#8	0.00	52.52	52.52	537.44	29.3	70.7
#16	2.35	4.82	2.47	2.47	32.5	67.5
#30	2.35	5.65	3.30	5.77	36.8	63.2
#40	2.35	4.47	2.12	7.89	39.6	60.4
#50	2.35	4.36	2.01	9.90	42.2	57.8
#60	2.34	3.51	1.17	11.07	43.7	56.3
#100	2.35	5.89	3.54	14.61	48.4	51.6
#200	2.35	6.54	4.19	18.80	53.8	46.2

Data entered by: DLS Date: 11/02/99
Data checked by: KR Date: 11/2/99
FileName: SOH00340

ADVANCED TERRA TESTING, INC.

HYDROMETER ANALYSIS - SEDIMENTATION DATA

CLIENT	Stone & Webster	JOB NO.	2162-07
BORING NO.	MISS-TP2SSSUUP0-00340	SAMPLED	8-25-99 KG/BM
DEPTH	2.0'	DATE TESTED	10-25-99 RV
SAMPLE NO. & TIME	MISS-00340, 1010	WASH SIEVE	Yes
		DRY SIEVE	No
SOIL DESCR.	FUSRAP Maywood Superfund Site; Proj# 085750303		

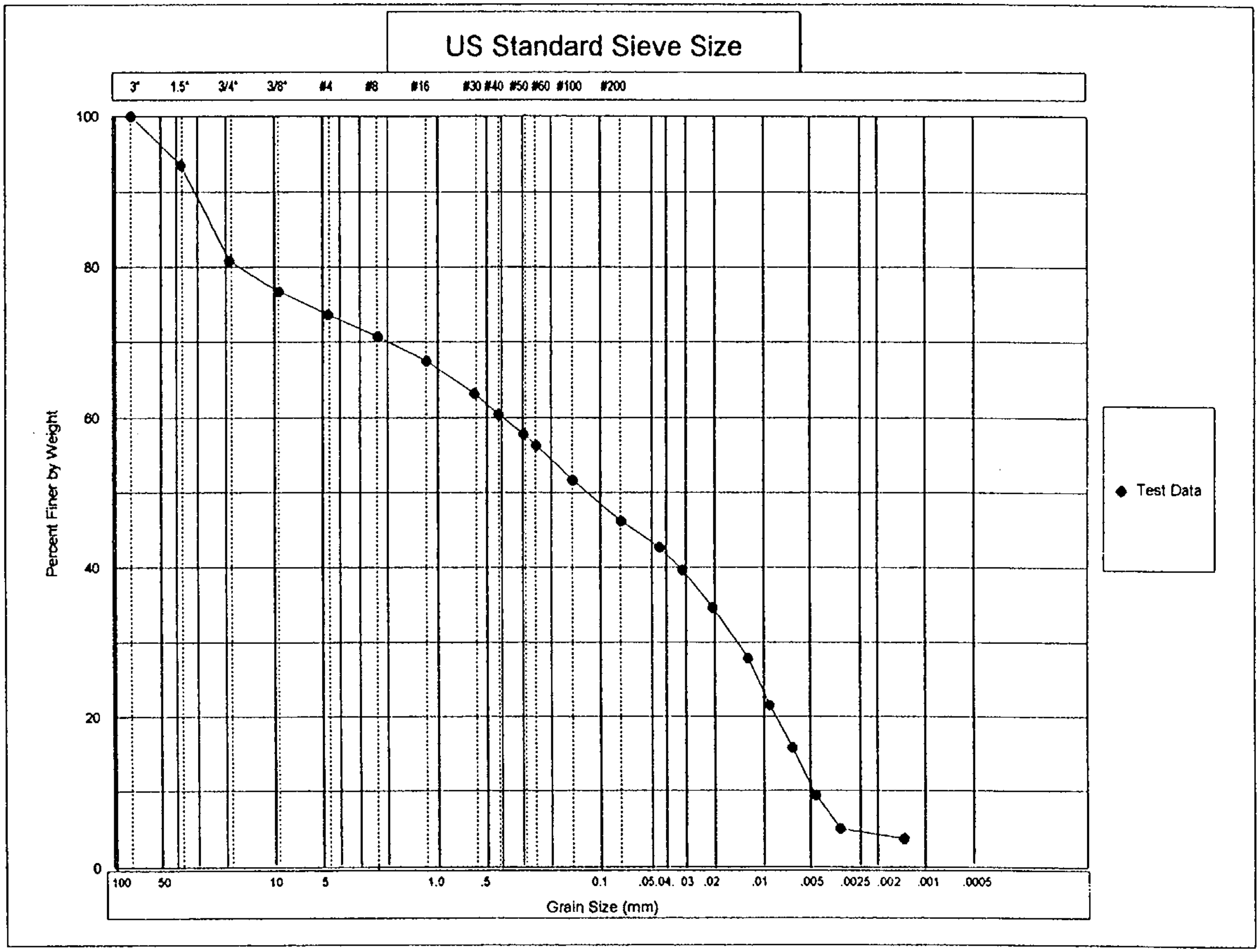
Hydrometer #	ASTM 152 H	Temp., Deg. C	23.1
Sp. Gr. of Soil	2.51	Temp. Coef. K	0.01375
Value of "alpha"	1.03	Wt. Dry Sample "W"	76.546
Deflocculant	Sodium Hexametaphosphate	% of Total Sample	100.0
Defloc. Corr'n	4.3		
Meniscus Corr'n	-1.0		

T Elapsed Time (min)	Hydrometer Reading Original	Corrected "R"	100Ra/W	% Total Sample	Effective Depth L	Grain Diameter (mm)
0.0	--	--	--	--	--	--
0.5	--	--	--	--	--	--
1.0	37.00	31.75	42.6	42.6	10.22	0.0440
2.0	34.75	29.50	39.6	39.6	10.59	0.0316
5.0	31.00	25.75	34.6	34.6	11.21	0.0206
15.0	26.00	20.75	27.9	27.9	12.03	0.0123
30.0	21.25	16.00	21.5	21.5	12.81	0.0090
60.0	17.00	11.75	15.8	15.8	13.50	0.0065
120.0	12.25	7.00	9.4	9.4	14.28	0.0047
250.0	9.00	3.75	5.0	5.0	14.81	0.0033
1489.0	8.00	2.75	3.7	3.7	14.98	0.0014

Grain Diameter = K*(SQRT(L/T))

Data entered by: DLS Date: 11/02/99
Data checked by: KR Date: 11/2/99
FileName:SOH00340

ADVANCED TERRA TESTING, INC.



COBBLES	GRAVEL		SAND			SILT OR CLAY	USCS
	COARSE	FINE	CRS	MEDIUM	FINE		

COBBLES TO BOULDERS	PEBBLE GRAVEL				SAND			SILT	CLAY	WENTWORTH
	COARSE	MED	FINE	GRAN	COARSE	MED	FINE			

Client: Stone & Webster
Boring No.: MISS-TP2SSSUUP0-00340
Sample No. & Time: MISS-00340, 1010
Depth: 2.0'
Job Number: 2162-07
Classification:____________________

Advanced Terra Testing, Inc.

MECHANICAL ANALYSIS - SIEVE TEST DATA
ASTM D 422

CLIENT Stone & Webster JOB NO. 2162-07

BORING NO.	MISS-TP2SSTRUP0-0037X	SAMPLED	8-26-99
DEPTH	2.0-8.0'	DATE TESTED	9-23-99 CL
SAMPLE NO. & TIME	MISS-0037X, 1145	WASH SIEVE	Yes
		DRY SIEVE	No

SOIL DESCR. FUSRAP Maywood Superfund Site; Proj# 085750303

MOISTURE DATA

HYGROSCOPIC	Yes
NATURAL	No
Wt. Wet Soil & Pan (g)	105.50
Wt. Dry Soil & Pan (g)	93.89
Wt. Lost Moisture (g)	11.61
Wt. of Pan Only (g)	3.66
Wt. of Dry Soil (g)	90.23
Moisture Content %	12.9
Wt. Hydrom. Sample Wet (g)	58.03
Wt. Hydrom. Sample Dry (g)	51.42

WASH SIEVE ANALYSIS

Wt. Total Sample Wet (g)	5005.42
Weight of + #8 Before Washing (g)	1883.73
Weight of + #8 After Washing (g)	1568.09
Weight of - #8 Wet (g)	3121.69
Weight of - #8 Dry (g)	3045.47
Wt. Total Sample Dry (g)	4613.56
Calc. Wt. "W" (g)	77.89
Calc. Mass + #8	26.47

Sieve Number (Size)	Pan Weight (g)	Indiv. Wt. + Pan (g)	Indiv. Wt. Retain.	Cum. Wt. Retain.	Cum. % Retain.	% Finer By Wt.
3"	0.00	617.98	617.98	617.98	13.4	86.6
1 1/2"	0.00	41.82	41.82	659.80	14.3	85.7
3/4"	0.00	287.72	287.72	947.52	20.5	79.5
3/8"	0.00	221.47	221.47	1168.99	25.3	74.7
#4	0.00	239.33	239.33	1408.32	30.5	69.5
#8	0.00	159.77	159.77	1568.09	34.0	66.0
#16	2.30	4.85	2.55	2.55	37.3	62.7
#30	2.29	6.57	4.28	6.83	42.8	57.2
#40	2.36	5.48	3.12	9.95	46.8	53.2
#50	2.34	5.62	3.28	13.23	51.0	49.0
#60	2.33	4.04	1.71	14.94	53.2	46.8
#100	2.32	7.19	4.87	19.81	59.4	40.6
#200	2.31	6.42	4.11	23.92	64.7	35.3

Data entered by: DLS Date: 10/06/99
Data checked by: SR Date: 10-6-99
FileName: SOH0037X

ADVANCED TERRA TESTING, INC.

HYDROMETER ANALYSIS - SEDIMENTATION DATA

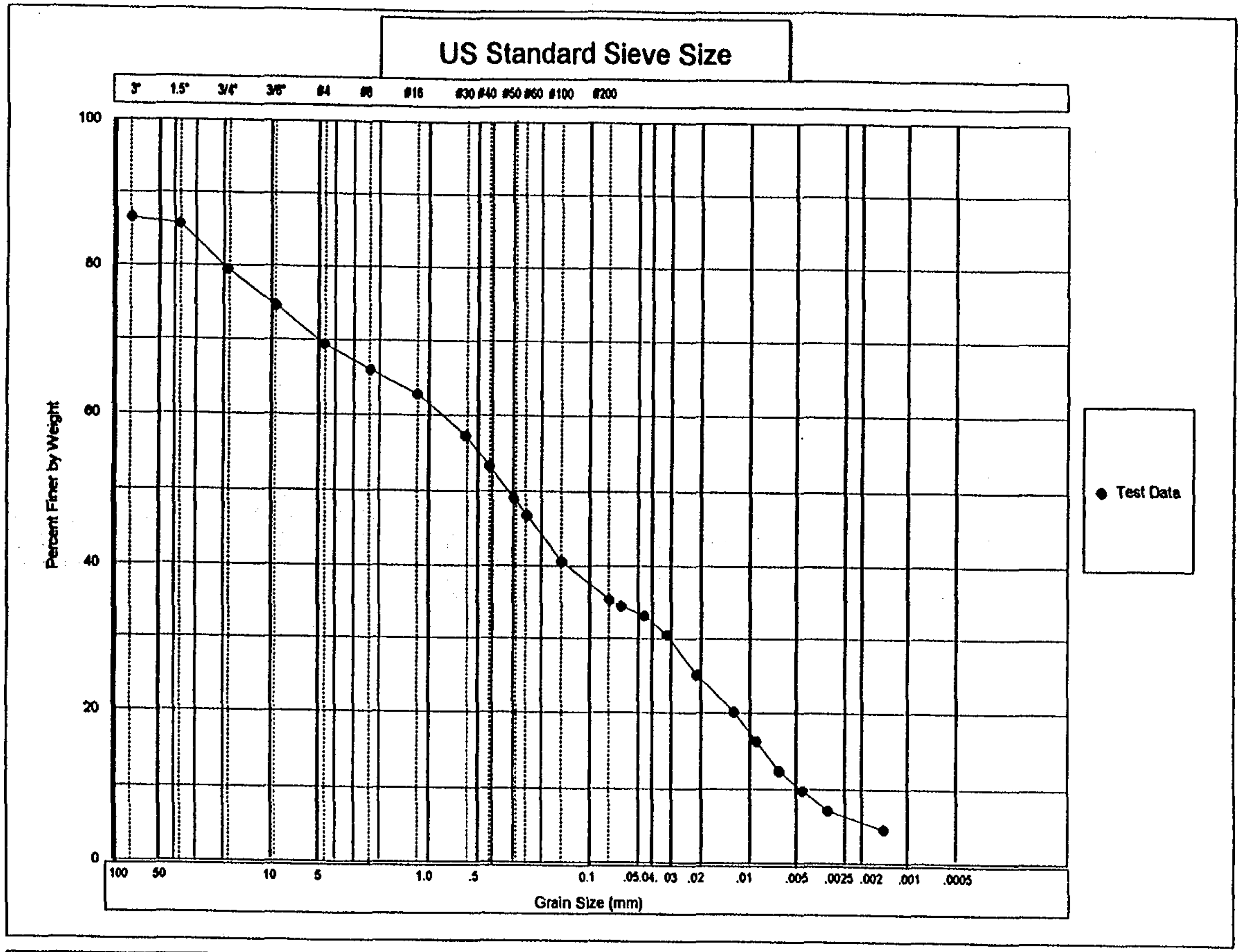
CLIENT	Stone & Webster	JOB NO.	2162-07
BORING NO.	MISS-TP2SSTRUPO-0037X	SAMPLED	8-26-99
DEPTH	2.0-8.0'	DATE TESTED	9-23-99 CL
SAMPLE NO. & TIME	MISS-0037X, 1145	WASH SIEVE	Yes
		DRY SIEVE	No
SOIL DESCR.	FUSRAP Maywood Superfund Site; Proj# 085750303		

Hydrometer #	ASTM 152 H	Temp., Deg. C	23.0
Sp. Gr. of Soil	2.59	Temp. Coef. K	0.01341
Value of "alpha"	1.01	Wt. Dry Sample "W"	77.889
Deflocculant	Sodium Hexametaphosphate	% of Total Sample	100.0
Defloc. Corr'n	4.5		
Meniscus Corr'n	-1.0		

T Elapsed Time (min)	Hydrometer Reading Original	Hydrometer Reading Corrected "R"	100Ra/W	% Total Sample	Effective Depth L	Grain Diameter (mm)
0.0	--	--	--	--	--	--
0.5	32.00	26.50	34.4	34.4	11.04	0.0630
1.0	31.00	25.50	33.1	33.1	11.21	0.0449
2.0	29.00	23.50	30.5	30.5	11.53	0.0322
5.0	24.75	19.25	25.0	25.0	12.23	0.0210
15.0	21.00	15.50	20.1	20.1	12.85	0.0124
30.0	18.00	12.50	16.2	16.2	13.34	0.0089
60.0	15.00	9.50	12.3	12.3	13.83	0.0064
120.0	13.00	7.50	9.7	9.7	14.16	0.0046
250.0	11.00	5.50	7.1	7.1	14.49	0.0032
1288.0	9.00	3.50	4.5	4.5	14.81	0.0014

Grain Diameter = K*(SQRT(L/T))

Data entered by: DLS   Date: 10/06/99
Data checked by: SR   Date: 10-6-99
FileName:SOH0037X   ADVANCED TERRA TESTING, INC.



COBBLES	GRAVEL		SAND			SILT OR CLAY	USCS
	COARSE	FINE	CRS	MEDIUM	FINE		

COBBLES TO BOULDERS	PEBBLE GRAVEL				SAND			SILT	CLAY	WENTWORTH
	COARSE	MED	FINE	GRAN	COARSE	MED	FINE			

Client: Stone & Webster
Depth: 2.0-8.0'
Classification:_______________

Boring No.: MISS-TP2SSTRUP0-0037X
Job Number: 2162-07

Sample No. & Time: MISS-0037X, 1145

Advanced Terra Testing, Inc.

MECHANICAL ANALYSIS - SIEVE TEST DATA
ASTM D 422

CLIENT	Stone & Webster	JOB NO.	2162-07
BORING NO.	MISS-TP2SSREUP2-00430	SAMPLED	8-26-99
DEPTH	2.0-8.0'	DATE TESTED	10-25-99 RV
SAMPLE NO. & TIME	MISS-00430, 1145	WASH SIEVE	Yes
		DRY SIEVE	No
SOIL DESCR.	FUSRAP Maywood Superfund Site; Proj# 085750303		

MOISTURE DATA

HYGROSCOPIC	Yes	
NATURAL	No	
Wt. Wet Soil & Pan	(g)	60.27
Wt. Dry Soil & Pan	(g)	57.74
Wt. Lost Moisture	(g)	2.53
Wt. of Pan Only	(g)	3.89
Wt. of Dry Soil	(g)	53.85
Moisture Content	%	4.7
Wt. Hydrom. Sample Wet	(g)	59.20
Wt. Hydrom. Sample Dry	(g)	56.54

WASH SIEVE ANALYSIS

Wt. Total Sample Wet (g)	392.41
Weight of + #8 Before Washing (g)	21.57
Weight of + #8 After Washing (g)	18.52
Weight of - #8 Wet (g)	370.84
Weight of - #8 Dry (g)	357.11
Wt. Total Sample Dry (g)	375.63
Calc. Wt. "W" (g)	59.48
Calc. Mass + #8	2.93

Sieve Number (Size)	Pan Weight (g)	Indiv. Wt. + Pan (g)	Indiv. Wt. Retain.	Cum. Wt. Retain.	Cum. % Retain.	% Finer By Wt.
3"	0.00	0.00	0.00	0.00	0.0	100.0
1 1/2"	0.00	0.00	0.00	0.00	0.0	100.0
3/4"	0.00	0.00	0.00	0.00	0.0	100.0
3/8"	0.00	1.09	1.09	1.09	0.3	99.7
#4	0.00	5.93	5.93	7.02	1.9	98.1
#8	0.00	11.50	11.50	18.52	4.9	95.1
#16	2.28	6.86	4.58	4.58	12.6	87.4
#30	2.35	6.48	4.13	8.71	19.6	80.4
#40	2.36	4.72	2.36	11.07	23.5	76.5
#50	2.33	4.79	2.46	13.53	27.7	72.3
#60	2.30	3.91	1.61	15.14	30.4	69.6
#100	2.28	6.99	4.71	19.85	38.3	61.7
#200	2.33	6.73	4.40	24.25	45.7	54.3

Data entered by: DLS Date: 10/28/99
Data checked by: KR Date: 11/1/99
FileName: SOH00430

ADVANCED TERRA TESTING, INC.

HYDROMETER ANALYSIS - SEDIMENTATION DATA

CLIENT	Stone & Webster	JOB NO.	2162-07
BORING NO.	MISS-TP2SSREUP2-00430	SAMPLED	8-26-99
DEPTH	2.0-8.0'	DATE TESTED	10-25-99 RV
SAMPLE NO. & TIME	MISS-00430, 1145	WASH SIEVE	Yes
		DRY SIEVE	No
SOIL DESCR.	FUSRAP Maywood Superfund Site; Proj# 085750303		

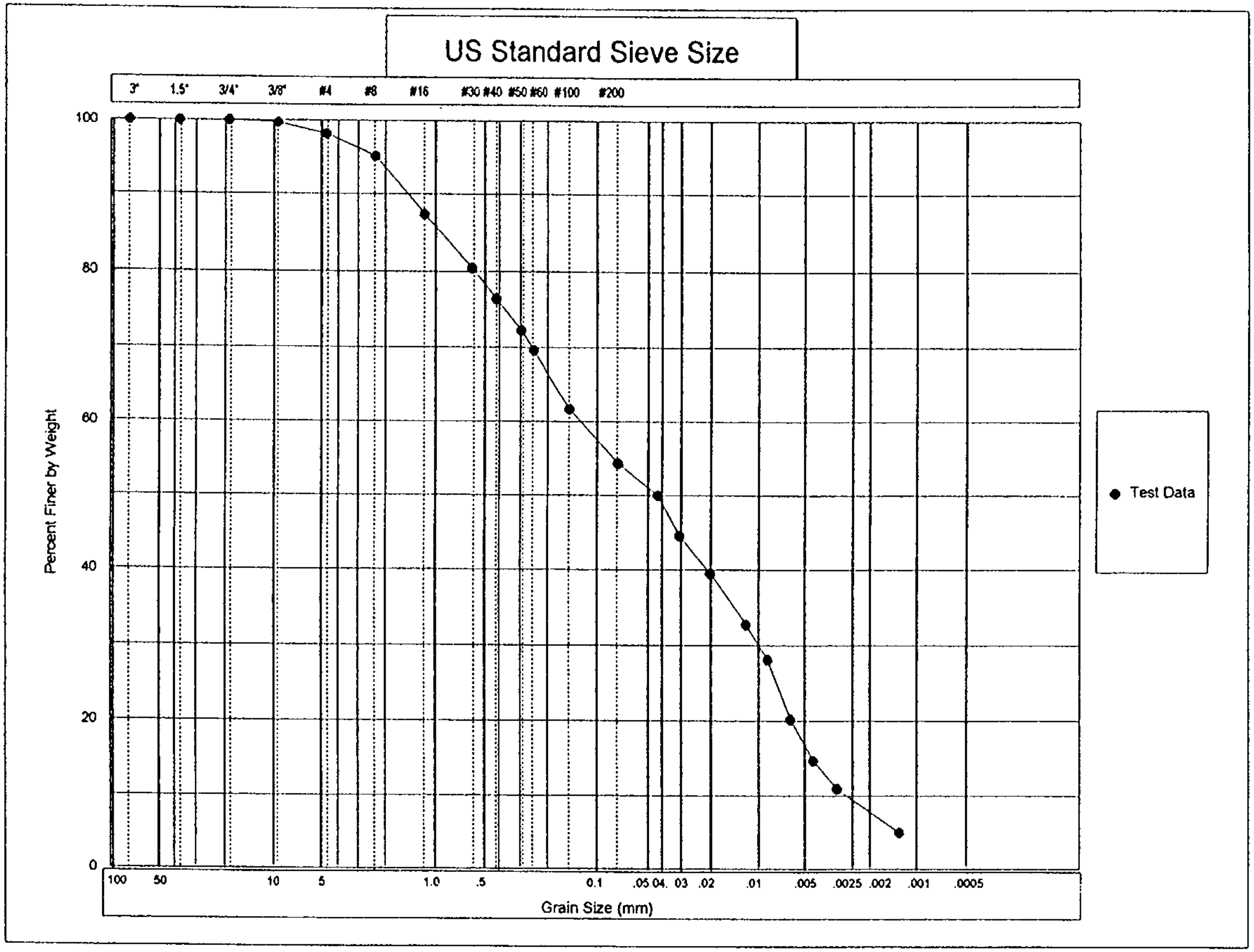
Hydrometer #	ASTM 152 H	Temp., Deg. C	23.1
Sp. Gr. of Soil	2.65	Temp. Coef. K	0.01315
Value of "alpha"	1.00	Wt. Dry Sample "W"	59.476
Deflocculant	Sodium Hexametaphosphate	% of Total Sample	100.0
Defloc. Corr'n	4.3		
Meniscus Corr'n	-1.0		

T Elapsed Time (min)	Hydrometer Reading Original	Corrected "R"	100Ra/W	% Total Sample	Effective Depth L	Grain Diameter (mm)
0.0	--	--	--	--	--	--
0.5	--	--	--	--	--	--
1.0	35.00	29.75	50.0	50.0	10.55	0.0427
2.0	31.75	26.50	44.6	44.6	11.08	0.0310
5.0	28.75	23.50	39.5	39.5	11.58	0.0200
15.0	24.75	19.50	32.8	32.8	12.23	0.0119
30.0	22.00	16.75	28.2	28.2	12.68	0.0086
60.0	17.25	12.00	20.2	20.2	13.46	0.0062
120.0	14.00	8.75	14.7	14.7	13.99	0.0045
250.0	11.75	6.50	10.9	10.9	14.36	0.0032
1503.0	8.25	3.00	5.0	5.0	14.94	0.0013

Grain Diameter = K*(SQRT(L/T))

Data entered by: DLS Date: 10/28/99
Data checked by: FR Date: 11/1/99
FileName:SOH00430

ADVANCED TERRA TESTING, INC.



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	CRS	MEDIUM	FINE	

USCS

COBBLES TO BOULDERS	PEBBLE GRAVEL				SAND			SILT	CLAY
	COARSE	MED	FINE	GRAN	COARSE	MED	FINE		

WENTWORTH

Client: Stone & Webster
Boring No.: MISS-TP2SSREUP2-00430
Sample No. & Time: MISS-00430, 1145
Depth: 2.0-8.0'
Job Number: 2162-07
Classification:____________________

Advanced Terra Testing, Inc.

MECHANICAL ANALYSIS - SIEVE TEST DATA
ASTM D 422

CLIENT	Stone & Webster	JOB NO.	2162-07
BORING NO.	MISS-TP2SSREUP0-00400	SAMPLED	8-26-99
DEPTH	2.0-8.0'	DATE TESTED	9-24-99 AH
SAMPLE NO. & TIME	MISS-00400, 1145	WASH SIEVE	Yes
		DRY SIEVE	No
SOIL DESCR.	FUSRAP Maywood Superfund Site; Proj# 085750303		

MOISTURE DATA

HYGROSCOPIC	Yes
NATURAL	No
Wt. Wet Soil & Pan (g)	83.91
Wt. Dry Soil & Pan (g)	82.21
Wt. Lost Moisture (g)	1.70
Wt. of Pan Only (g)	3.91
Wt. of Dry Soil (g)	78.30
Moisture Content %	2.2
Wt. Hydrom. Sample Wet (g)	56.73
Wt. Hydrom. Sample Dry (g)	55.53

WASH SIEVE ANALYSIS

Wt. Total Sample Wet (g)	3101.73
Weight of + #8 Before Washing (g)	771.76
Weight of + #8 After Washing (g)	651.52
Weight of - #8 Wet (g)	2329.97
Weight of - #8 Dry (g)	2398.14
Wt. Total Sample Dry (g)	3049.66
Calc. Wt. "W" (g)	70.61
Calc. Mass + #8	15.09

Sieve Number (Size)	Pan Weight (g)	Indiv. Wt. + Pan (g)	Indiv. Wt. Retain.	Cum. Wt. Retain.	Cum. % Retain.	% Finer By Wt.
3"	0.00	0.00	0.00	0.00	0.0	100.0
1 1/2"	0.00	287.76	287.76	287.76	9.4	90.6
3/4"	0.00	194.73	194.73	482.49	15.8	84.2
3/8"	0.00	64.67	64.67	547.16	17.9	82.1
#4	0.00	46.54	46.54	593.70	19.5	80.5
#8	0.00	57.82	57.82	651.52	21.4	78.6
#16	2.35	3.42	1.07	1.07	22.9	77.1
#30	2.36	4.22	1.86	2.93	25.5	74.5
#40	2.30	4.02	1.72	4.65	27.9	72.1
#50	2.30	4.40	2.10	6.75	30.9	69.1
#60	2.27	3.35	1.08	7.83	32.5	67.5
#100	2.30	5.84	3.54	11.37	37.5	62.5
#200	2.35	5.86	3.51	14.88	42.4	57.6

Data entered by: DLS Date: 10/06/99
Data checked by: SB Date: 10-6-99
FileName: SOH00400

ADVANCED TERRA TESTING, INC.

HYDROMETER ANALYSIS - SEDIMENTATION DATA

CLIENT	Stone & Webster	JOB NO.	2162-07
BORING NO.	MISS-TP2SSREUPO-00400	SAMPLED	8-26-99
DEPTH	2.0-8.0'	DATE TESTED	9-24-99 AH
SAMPLE NO. & TIME	MISS-00400, 1145	WASH SIEVE	Yes
		DRY SIEVE	No
SOIL DESCR.	FUSRAP Maywood Superfund Site; Proj# 085750303		

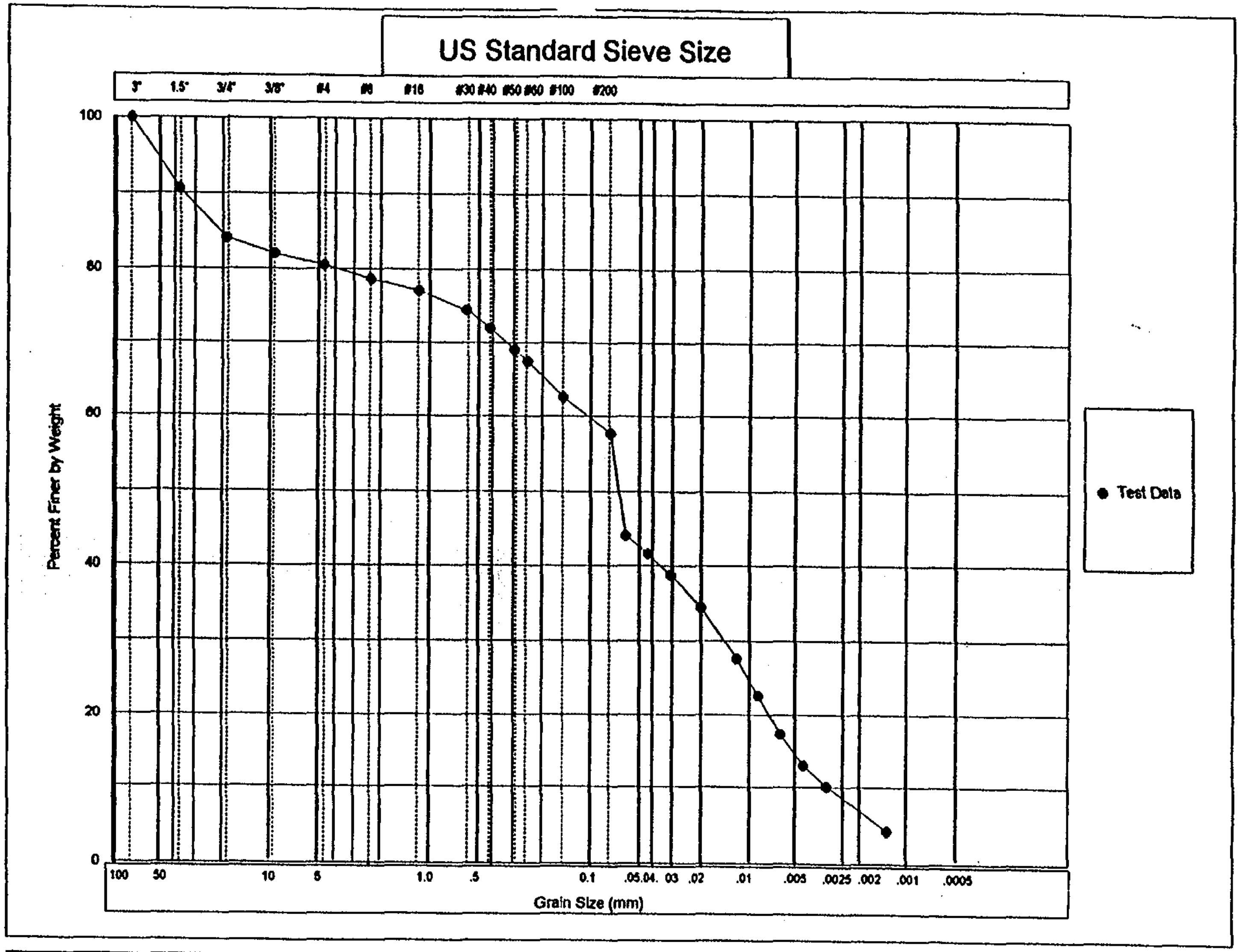
Hydrometer #	ASTM 152 H	Temp., Deg. C	24.4
Sp. Gr. of Soil	2.58	Temp. Coef. K	0.01323
Value of "alpha"	1.01	Wt. Dry Sample "W"	70.614
Deflocculant	Sodium Hexametaphosphate	% of Total Sample	100.0
Defloc. Corr'n	5.0		
Meniscus Corr'n	-1.0		

T Elapsed Time (min)	Hydrometer Reading Original	Corrected "R"	100Ra/W	% Total Sample	Effective Depth L	Grain Diameter (mm)
0.0	--	--	--	--	--	--
0.5	36.75	30.75	44.2	44.2	10.26	0.0600
1.0	35.00	29.00	41.6	41.6	10.55	0.0430
2.0	33.00	27.00	38.8	38.8	10.88	0.0309
5.0	30.00	24.00	34.5	34.5	11.37	0.0200
15.0	25.25	19.25	27.6	27.6	12.15	0.0119
30.0	21.75	15.75	22.6	22.6	12.72	0.0086
60.0	18.00	12.00	17.2	17.2	13.34	0.0062
120.0	15.00	9.00	12.9	12.9	13.83	0.0045
250.0	13.00	7.00	10.1	10.1	14.16	0.0031
1446.0	9.00	3.00	4.3	4.3	14.81	0.0013

Grain Diameter = K*(SQRT(L/T))

Data entered by: DLS Date: 10/06/99
Data checked by: SR Date: 10-6-99
FileName:SOH00400

ADVANCED TERRA TESTING, INC.



COBBLES	GRAVEL		SAND			SILT OR CLAY	USCS
	COARSE	FINE	CRS	MEDIUM	FINE		

COBBLES TO BOULDERS	PEBBLE GRAVEL				SAND			SILT	CLAY	WENTWORTH
	COARSE	MED	FINE	GRAN	COARSE	MED	FINE			

Client: Stone & Webster
Boring No.: MISS-TP2SSREUP0-00400
Sample No. & Time: MISS-00400, 1145
Depth: 2.0-8.0'
Job Number: 2162-07
Classification:____________________

Advanced Terra Testing, Inc.

MECHANICAL ANALYSIS - SIEVE TEST DATA
ASTM D 422

CLIENT Stone & Webster

JOB NO. 2162-07

BORING NO.	MISS-TP2SSSUL00-00350	SAMPLED	8-26-99 KG/BM
DEPTH	1.0'	DATE TESTED	9-28-99 RV
SAMPLE NO. & TIME	MISS-00350, 1051	WASH SIEVE	Yes
		DRY SIEVE	No
SOIL DESCR.	FUSRAP Maywood Superfund Site; Proj# 085750303		

MOISTURE DATA

HYGROSCOPIC	Yes
NATURAL	No
Wt. Wet Soil & Pan (g)	128.59
Wt. Dry Soil & Pan (g)	126.96
Wt. Lost Moisture (g)	1.63
Wt. of Pan Only (g)	3.72
Wt. of Dry Soil (g)	123.24
Moisture Content %	1.3
Wt. Hydrom. Sample Wet (g)	55.37
Wt. Hydrom. Sample Dry (g)	54.65

WASH SIEVE ANALYSIS

Wt. Total Sample Wet (g)	1074.32
Weight of + #8 Before Washing (g)	11.46
Weight of + #8 After Washing (g)	7.95
Weight of - #8 Wet (g)	1062.86
Weight of - #8 Dry (g)	1052.45
Wt. Total Sample Dry (g)	1060.40
Calc. Wt. "W" (g)	55.06
Calc. Mass + #8	0.41

Sieve Number (Size)	Pan Weight (g)	Indiv. Wt. + Pan (g)	Indiv. Wt. Retain.	Cum. Wt. Retain.	Cum. % Retain.	% Finer By Wt.
3"	0.00	0.00	0.00	0.00	0.0	100.0
1 1/2"	0.00	0.00	0.00	0.00	0.0	100.0
3/4"	0.00	0.00	0.00	0.00	0.0	100.0
3/8"	0.00	0.00	0.00	0.00	0.0	100.0
#4	0.00	1.42	1.42	1.42	0.1	99.9
#8	0.00	6.53	6.53	7.95	0.7	99.3
#16	2.35	3.29	0.94	0.94	2.5	97.5
#30	2.30	5.04	2.74	3.68	7.4	92.6
#40	2.31	5.11	2.80	6.48	12.5	87.5
#50	2.31	6.38	4.07	10.55	19.9	80.1
#60	2.34	5.40	3.06	13.61	25.5	74.5
#100	2.33	10.12	7.79	21.40	39.6	60.4
#200	2.37	10.76	8.39	29.79	54.9	45.1

Data entered by: DLS Date: 10/06/99
Data checked by: SR Date: 10-6-99
FileName: SOH00350

ADVANCED TERRA TESTING, INC.

HYDROMETER ANALYSIS - SEDIMENTATION DATA

CLIENT Stone & Webster

JOB NO. 2162-07

BORING NO.	MISS-TP2SSSUL00-00350	SAMPLED	8-26-99 KG/BM
DEPTH	1.0'	DATE TESTED	9-28-99 RV
SAMPLE NO. & TIME	MISS-00350, 1051	WASH SIEVE	Yes
		DRY SIEVE	No
SOIL DESCR.	FUSRAP Maywood Superfund Site; Proj# 085750303		

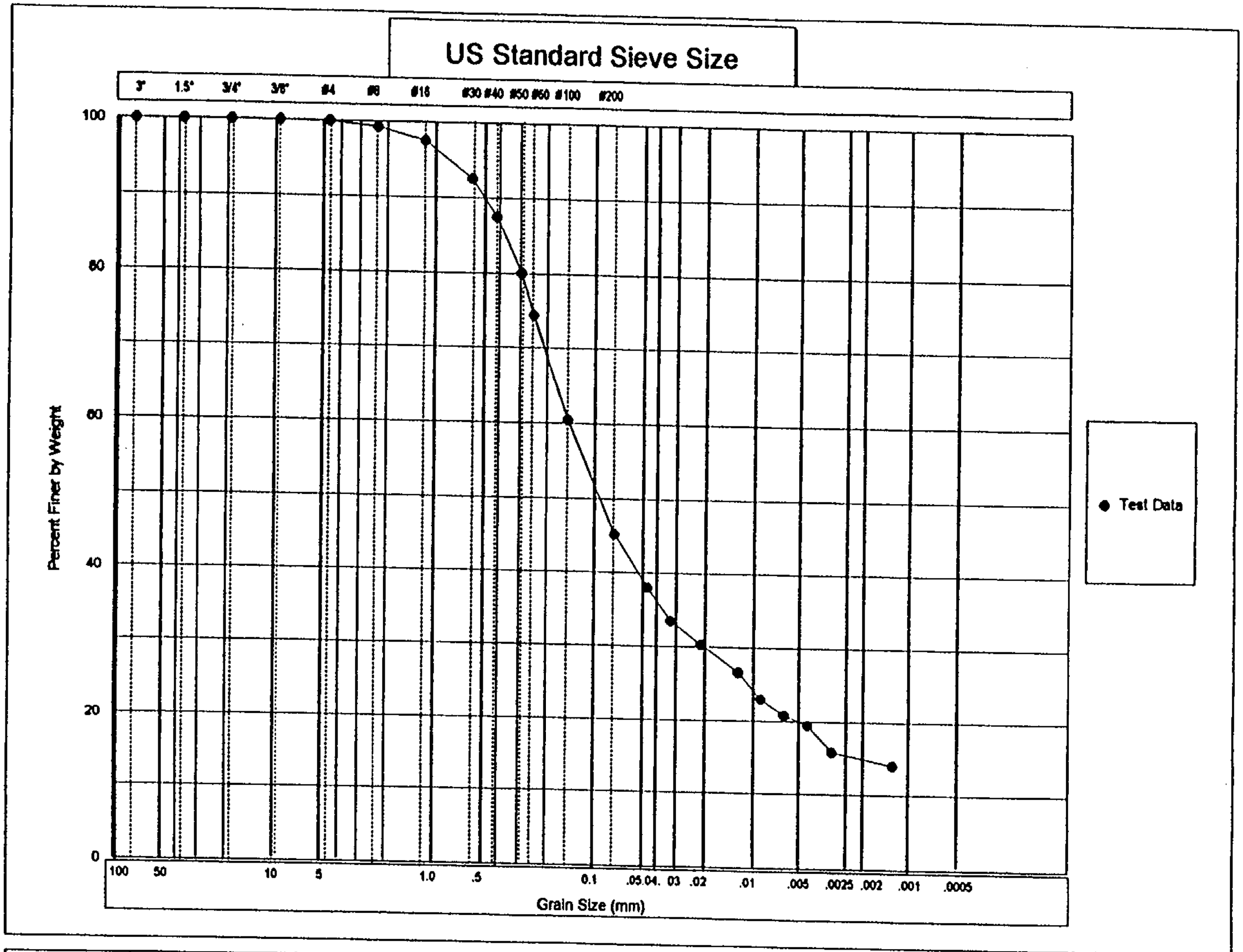
Hydrometer #	ASTM 152 H	Temp., Deg. C	23.0
Sp. Gr. of Soil	2.67	Temp. Coef. K	0.01309
Value of "alpha"	1.00	Wt. Dry Sample "W"	55.058
Deflocculant	Sodium Hexametaphosphate	% of Total Sample	100.0
Defloc. Corr'n	3.3		
Meniscus Corr'n	-1.0		

T Elapsed Time (min)	Hydrometer Reading Original	Corrected "R"	100Ra/W	% Total Sample	Effective Depth L	Grain Diameter (mm)
0.0	--	--	--	--	--	--
0.5	--	--	--	--	--	--
1.0	25.25	21.00	38.0	38.0	12.15	0.0456
2.0	22.75	18.50	33.5	33.5	12.56	0.0328
5.0	21.00	16.75	30.3	30.3	12.85	0.0210
15.0	19.00	14.75	26.7	26.7	13.17	0.0123
30.0	17.00	12.75	23.1	23.1	13.50	0.0088
60.0	15.75	11.50	20.8	20.8	13.71	0.0063
120.0	15.00	10.75	19.4	19.4	13.83	0.0044
250.0	13.00	8.75	15.8	15.8	14.16	0.0031
1505.0	12.00	7.75	14.0	14.0	14.32	0.0013

Grain Diameter = K*(SQRT(L/T))

Data entered by: DLS Date: 10/06/99
Data checked by: SA Date: 10-6-99
FileName:SOH00350

ADVANCED TERRA TESTING, INC.



COBBLES	GRAVEL		SAND			SILT OR CLAY	USCS
	COARSE	FINE	CRS	MEDIUM	FINE		

COBBLES TO BOULDERS	PEBBLE GRAVEL				SAND			SILT	CLAY	WENTWORTH
	COARSE	MED	FINE	GRAN	COARSE	MED	FINE			

Client: Stone & Webster
Depth: 1.0'
Classification:________________

Boring No.: MISS-TP2SSSULO0-00350
Job Number: 2162-07

Sample No. & Time: MISS-00350, 1051

Advanced Terra Testing, Inc.

MECHANICAL ANALYSIS - SIEVE TEST DATA
ASTM D 422

CLIENT	Stone & Webster	JOB NO.	2162-07
BORING NO.	MISS-TP2SSTRLOO-00380	SAMPLED	8-26-99
DEPTH	1.0'	DATE TESTED	9-28-99 RV
SAMPLE NO. & TIME	MISS-00380, 1115	WASH SIEVE	Yes
		DRY SIEVE	No
SOIL DESCR.	FUSRAP Maywood Superfund Site; Proj# 085750303		

MOISTURE DATA

HYGROSCOPIC	Yes	
NATURAL	No	
Wt. Wet Soil & Pan	(g)	116.09
Wt. Dry Soil & Pan	(g)	115.22
Wt. Lost Moisture	(g)	0.87
Wt. of Pan Only	(g)	3.82
Wt. of Dry Soil	(g)	111.40
Moisture Content %		0.8
Wt. Hydrom. Sample Wet (g)		55.87
Wt. Hydrom. Sample Dry (g)		55.44

WASH SIEVE ANALYSIS

Wt. Total Sample Wet (g)	1153.61
Weight of + #8 Before Washing (g)	2.43
Weight of + #8 After Washing (g)	5.73
Weight of - #8 Wet (g)	1151.18
Weight of - #8 Dry (g)	1138.98
Wt. Total Sample Dry (g)	1144.71
Calc. Wt. "W" (g)	55.72
Calc. Mass + #8	0.28

Sieve Number (Size)	Pan Weight (g)	Indiv. Wt. + Pan (g)	Indiv. Wt. Retain.	Cum. Wt. Retain.	Cum. % Retain.	% Finer By Wt.
3"	0.00	0.00	0.00	0.00	0.0	100.0
1 1/2"	0.00	0.00	0.00	0.00	0.0	100.0
3/4"	0.00	0.00	0.00	0.00	0.0	100.0
3/8"	0.00	0.00	0.00	0.00	0.0	100.0
#4	0.00	4.00	4.00	4.00	0.3	99.7
#8	0.00	1.73	1.73	5.73	0.5	99.5
#16	2.35	3.06	0.71	0.71	1.8	98.2
#30	2.36	4.50	2.14	2.85	5.6	94.4
#40	2.34	4.96	2.62	5.47	10.3	89.7
#50	2.33	6.39	4.06	9.53	17.6	82.4
#60	2.29	5.88	3.59	13.12	24.0	76.0
#100	2.29	13.99	11.70	24.82	45.0	55.0
#200	2.35	10.87	8.52	33.34	60.3	39.7

Data entered by: DLS Date: 10/06/99
Data checked by: SR Date: 10-6-99
FileName: SOH00380

ADVANCED TERRA TESTING, INC.

HYDROMETER ANALYSIS - SEDIMENTATION DATA

CLIENT	Stone & Webster	JOB NO.	2162-07
BORING NO.	MISS-TP2SSTRL00-00380	SAMPLED	8-26-99
DEPTH	1.0'	DATE TESTED	9-28-99 RV
SAMPLE NO. & TIME	MISS-00380, 1115	WASH SIEVE	Yes
		DRY SIEVE	No
SOIL DESCR.	FUSRAP Maywood Superfund Site; Proj# 085750303		

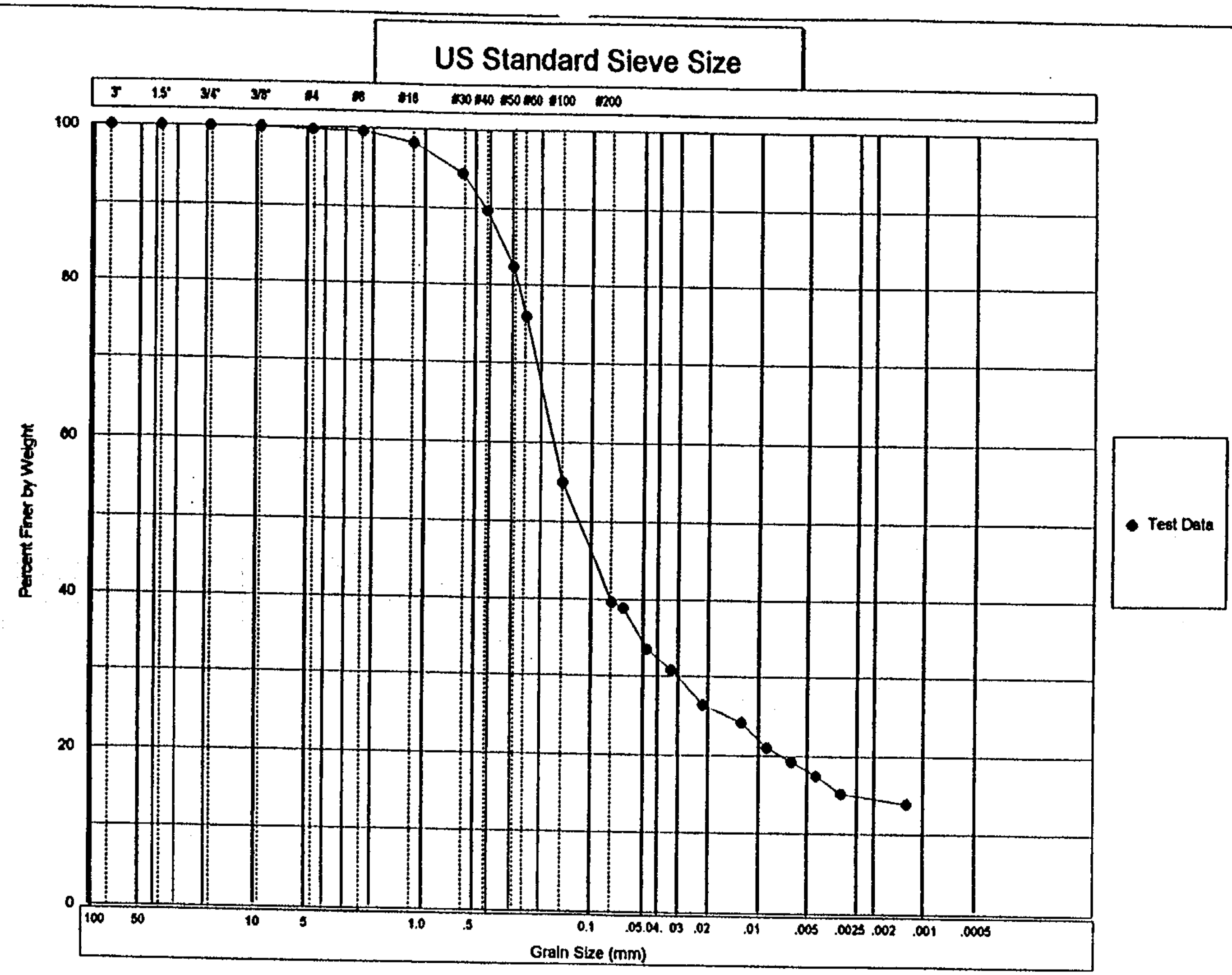
Hydrometer #	ASTM 152 H	Temp., Deg. C	23.0
Sp. Gr. of Soil	2.67	Temp. Coef. K	0.01309
Value of "alpha"	1.00	Wt. Dry Sample "W"	55.718
Deflocculant	Sodium Hexametaphosphate	% of Total Sample	100.0
Defloc. Corr'n	3.3		
Meniscus Corr'n	-1.0		

T Elapsed Time (min)	Hydrometer Reading Original	Corrected "R"	100Ra/W	% Total Sample	Effective Depth L	Grain Diameter (mm)
0.0	--	--	--	--	--	--
0.5	26.00	21.75	38.9	38.9	12.03	0.0642
1.0	23.00	18.75	33.5	33.5	12.52	0.0463
2.0	21.50	17.25	30.8	30.8	12.76	0.0331
5.0	19.00	14.75	26.4	26.4	13.17	0.0212
15.0	17.75	13.50	24.1	24.1	13.38	0.0124
30.0	16.00	11.75	21.0	21.0	13.67	0.0088
60.0	15.00	10.75	19.2	19.2	13.83	0.0063
120.0	14.00	9.75	17.4	17.4	13.99	0.0045
250.0	12.75	8.50	15.2	15.2	14.20	0.0031
1512.0	12.00	7.75	13.9	13.9	14.32	0.0013

Grain Diameter = K*(SQRT(L/T))

Data entered by: DLS Date: 10/06/99
Data checked by: SA Date: 10-6-99
FileName:SOH00380

ADVANCED TERRA TESTING, INC.



COBBLES	GRAVEL		SAND			SILT OR CLAY	USCS
	COARSE	FINE	CRS	MEDIUM	FINE		

COBBLES TO BOULDERS	PEBBLE GRAVEL				SAND			SILT	CLAY	WENTWORTH
	COARSE	MED	FINE	GRAN	COARSE	MED	FINE			

Client: Stone & Webster
Depth: 1.0'
Classification:______________

Boring No.: MISS-TP2SSTRLO0-00380
Job Number: 2162-07

Sample No. & Time: MISS-00380, 1115

Advanced Terra Testing, Inc.

MECHANICAL ANALYSIS - SIEVE TEST DATA
ASTM D 422

CLIENT	Stone & Webster	JOB NO.	2162-07
BORING NO.	MISS-TP2SSREL00-00410	SAMPLED	8-26-99
DEPTH	9.0-10.0'	DATE TESTED	9-23-99 CL
SAMPLE NO. & TIME	MISS-00410, 1140	WASH SIEVE	Yes
		DRY SIEVE	No
SOIL DESCR.	FUSRAP Maywood Superfund Site; Proj# 085750303		

MOISTURE DATA

HYGROSCOPIC	Yes
NATURAL	No
Wt. Wet Soil & Pan (g)	110.33
Wt. Dry Soil & Pan (g)	106.52
Wt. Lost Moisture (g)	3.81
Wt. of Pan Only (g)	3.67
Wt. of Dry Soil (g)	102.85
Moisture Content %	3.7
Wt. Hydrom. Sample Wet (g)	58.25
Wt. Hydrom. Sample Dry (g)	56.17

WASH SIEVE ANALYSIS

Wt. Total Sample Wet (g)	2213.99
Weight of + #8 Before Washing (g)	15.41
Weight of + #8 After Washing (g)	12.01
Weight of - #8 Wet (g)	2198.58
Weight of - #8 Dry (g)	2123.32
Wt. Total Sample Dry (g)	2135.33
Calc. Wt. "W" (g)	56.49
Calc. Mass + #8	0.32

Sieve Number (Size)	Pan Weight (g)	Indiv. Wt. + Pan (g)	Indiv. Wt. Retain.	Cum. Wt. Retain.	Cum. % Retain.	% Finer By Wt.
3"	0.00	0.00	0.00	0.00	0.0	100.0
1 1/2"	0.00	0.00	0.00	0.00	0.0	100.0
3/4"	0.00	0.00	0.00	0.00	0.0	100.0
3/8"	0.00	0.00	0.00	0.00	0.0	100.0
#4	0.00	1.61	1.61	1.61	0.1	99.9
#8	0.00	10.40	10.40	12.01	0.6	99.4
#16	2.34	3.28	0.94	0.94	2.2	97.8
#30	2.31	4.92	2.61	3.55	6.8	93.2
#40	2.40	5.74	3.34	6.89	12.8	87.2
#50	2.34	7.44	5.10	11.99	21.8	78.2
#60	2.30	6.29	3.99	15.98	28.9	71.1
#100	2.29	14.11	11.82	27.80	49.8	50.2
#200	2.30	11.19	8.89	36.69	65.5	34.5

Data entered by: DLS Date: 10/06/99
Data checked by: SR Date: 10-6-99
FileName: SOH00410 ADVANCED TERRA TESTING, INC.

HYDROMETER ANALYSIS - SEDIMENTATION DATA

CLIENT Stone & Webster JOB NO. 2162-07

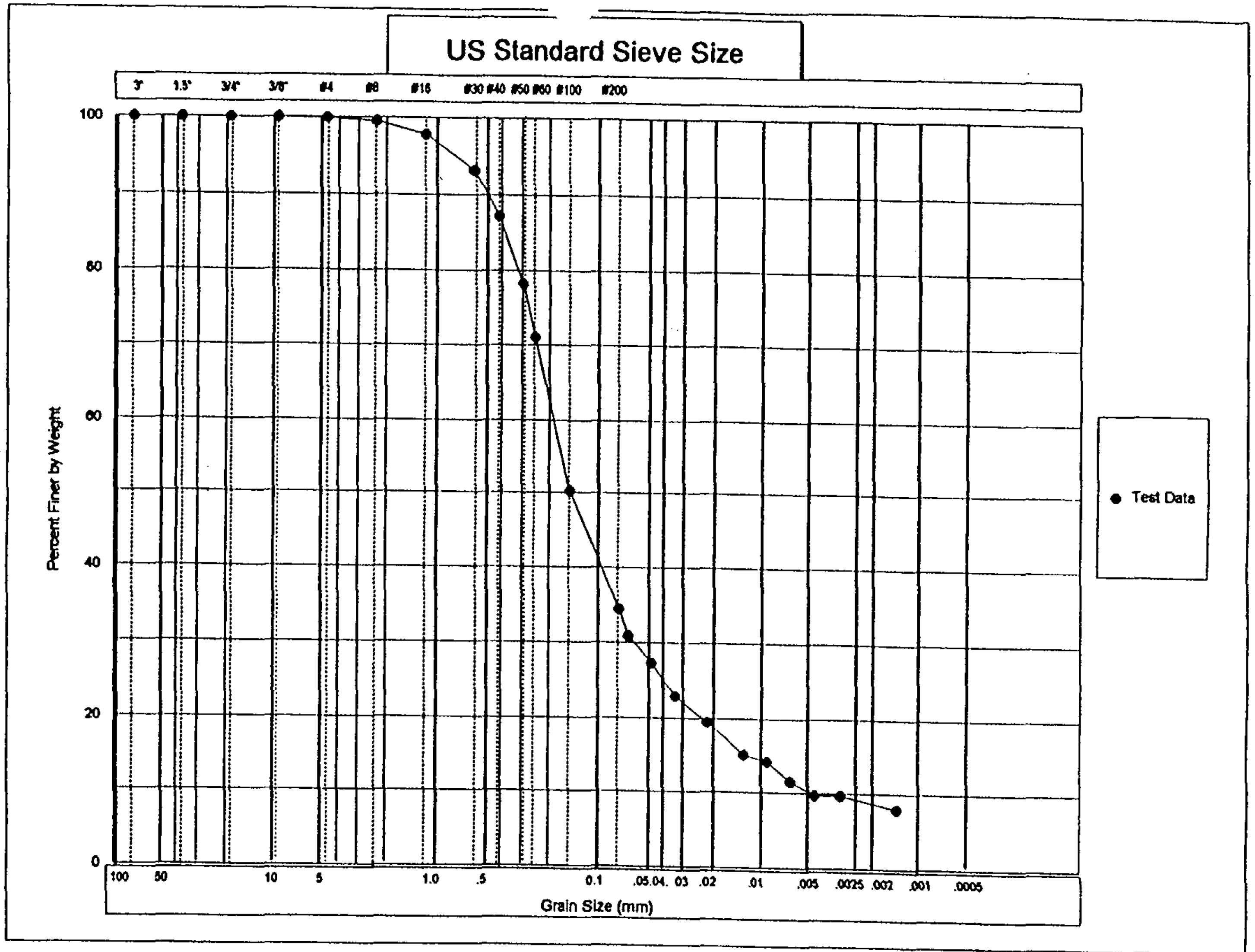
BORING NO.	MISS-TP2SSREL00-00410	SAMPLED	8-26-99
DEPTH	9.0-10.0'	DATE TESTED	9-23-99 CL
SAMPLE NO. & TIME	MISS-00410, 1140	WASH SIEVE	Yes
		DRY SIEVE	No
SOIL DESCR.	FUSRAP Maywood Superfund Site; Proj# 085750303		

Hydrometer #	ASTM 152 H	Temp., Deg. C	22.8
Sp. Gr. of Soil	2.66	Temp. Coef. K	0.01316
Value of "alpha"	1.00	Wt. Dry Sample "W"	56.486
Deflocculant	Sodium Hexametaphosphate	% of Total Sample	100.0
Defloc. Corr'n	4.5		
Meniscus Corr'n	-1.0		

T Elapsed Time (min)	Hydrometer Reading Original	Corrected "R"	100Ra/W	% Total Sample	Effective Depth L	Grain Diameter (mm)
0.0	--	--	--	--	--	--
0.5	23.00	17.50	30.9	30.9	12.52	0.0658
1.0	21.00	15.50	27.4	27.4	12.85	0.0472
2.0	18.50	13.00	23.0	23.0	13.26	0.0339
5.0	16.50	11.00	19.4	19.4	13.58	0.0217
15.0	14.00	8.50	15.0	15.0	13.99	0.0127
30.0	13.50	8.00	14.1	14.1	14.08	0.0090
60.0	12.00	6.50	11.5	11.5	14.32	0.0064
120.0	11.00	5.50	9.7	9.7	14.49	0.0046
250.0	11.00	5.50	9.7	9.7	14.49	0.0032
1302.0	10.00	4.50	8.0	8.0	14.65	0.0014

Grain Diameter = K*(SQRT(L/T))

Data entered by: DLS Date: 10/06/99
Data checked by: SR Date: 10-6-99
FileName:SOH00410 ADVANCED TERRA TESTING, INC.



COBBLES	GRAVEL		SAND			SILT OR CLAY	
	COARSE	FINE	CRS	MEDIUM	FINE		USCS

COBBLES TO BOULDERS	PEBBLE GRAVEL				SAND			SILT	CLAY	
	COARSE	MED	FINE	GRAN	COARSE	MED	FINE			WENTWORTH

Client: Stone & Webster
Depth: 9.0-10.0'
Boring No.: MISS-TP2SSRELO0-00410
Job Number: 2162-07
Sample No. & Time: MISS-00410, 1140
Classification:________________

Advanced Terra Testing, Inc.

TEST PIT 3

ENGINEERING TEST PITS AT MISS
GEOTECHNICAL DATA RESULTS

FUSRAP MAYWOOD SUPERFUND SITE
MAYWOOD, NEW JERSEY

MECHANICAL ANALYSIS - SIEVE TEST DATA
ASTM D 422

CLIENT Stone & Webster JOB NO. 2162-07

BORING NO. MISS-TP3SSSUOV0-00520
DEPTH 1.0'
SAMPLE NO. & TIME MISS-00520, 1110
SAMPLED 8-31-99 KG/BM
DATE TESTED 9-24-99 DPM
WASH SIEVE Yes
DRY SIEVE No
SOIL DESCR. FUSRAP Maywood Superfund Site; Proj# 085750303

MOISTURE DATA

HYGROSCOPIC Yes

NATURAL No

Wt. Wet Soil & Pan	(g)	58.62
Wt. Dry Soil & Pan	(g)	52.92
Wt. Lost Moisture	(g)	5.70
Wt. of Pan Only	(g)	3.74
Wt. of Dry Soil	(g)	49.18
Moisture Content %		11.6
Wt. Hydrom. Sample Wet	(g)	56.24
Wt. Hydrom. Sample Dry	(g)	50.40

WASH SIEVE ANALYSIS

Wt. Total Sample Wet (g)	1776.91
Weight of + #8 Before Washing (g)	386.33
Weight of + #8 After Washing (g)	335.12
Weight of - #8 Wet (g)	1390.58
Weight of - #8 Dry (g)	1292.04
Wt. Total Sample Dry (g)	1627.16
Calc. Wt. "W" (g)	63.47
Calc. Mass + #8	13.07

Sieve Number (Size)	Pan Weight (g)	Indiv. Wt. + Pan (g)	Indiv. Wt. Retain.	Cum. Wt. Retain.	Cum. % Retain.	% Finer By Wt.
3"	0.00	0.00	0.00	0.00	0.0	100.0
1 1/2"	0.00	0.00	0.00	0.00	0.0	100.0
3/4"	0.00	67.59	67.59	67.59	4.2	95.8
3/8"	0.00	68.05	68.05	135.64	8.3	91.7
#4	0.00	90.58	90.58	226.22	13.9	86.1
#8	0.00	108.90	108.90	335.12	20.6	79.4
#16	1.00	5.06	4.06	4.06	27.0	73.0
#30	1.01	6.38	5.37	9.43	35.5	64.5
#40	1.02	4.85	3.83	13.26	41.5	58.5
#50	1.02	4.84	3.82	17.08	47.5	52.5
#60	1.03	2.83	1.80	18.88	50.3	49.7
#100	1.00	6.17	5.17	24.05	58.5	41.5
#200	1.03	7.32	6.29	30.34	68.4	31.6

Data entered by: DLS Date: 10/13/99
Data checked by: CM Date: 10/16/99
FileName: SOH00520

ADVANCED TERRA TESTING, INC.

HYDROMETER ANALYSIS - SEDIMENTATION DATA

CLIENT	Stone & Webster	JOB NO.	2162-07
BORING NO.	MISS-TP3SSSUOV0-00520	SAMPLED	8-31-99 KG/BM
DEPTH	1.0'	DATE TESTED	9-24-99 DPM
SAMPLE NO. & TIME	MISS-00520, 1110	WASH SIEVE	Yes
		DRY SIEVE	No
SOIL DESCR.	FUSRAP Maywood Superfund Site; Proj# 085750303		

Hydrometer #	ASTM 152 H	Temp., Deg. C	19.6
Sp. Gr. of Soil	2.47	Temp. Coef. K	0.01454
Value of "alpha"	1.04	Wt. Dry Sample "W"	63.470
Deflocculant	Sodium Hexametaphosphate	% of Total Sample	100.0
Defloc. Corr'n	5.8		
Meniscus Corr'n	-1.0		

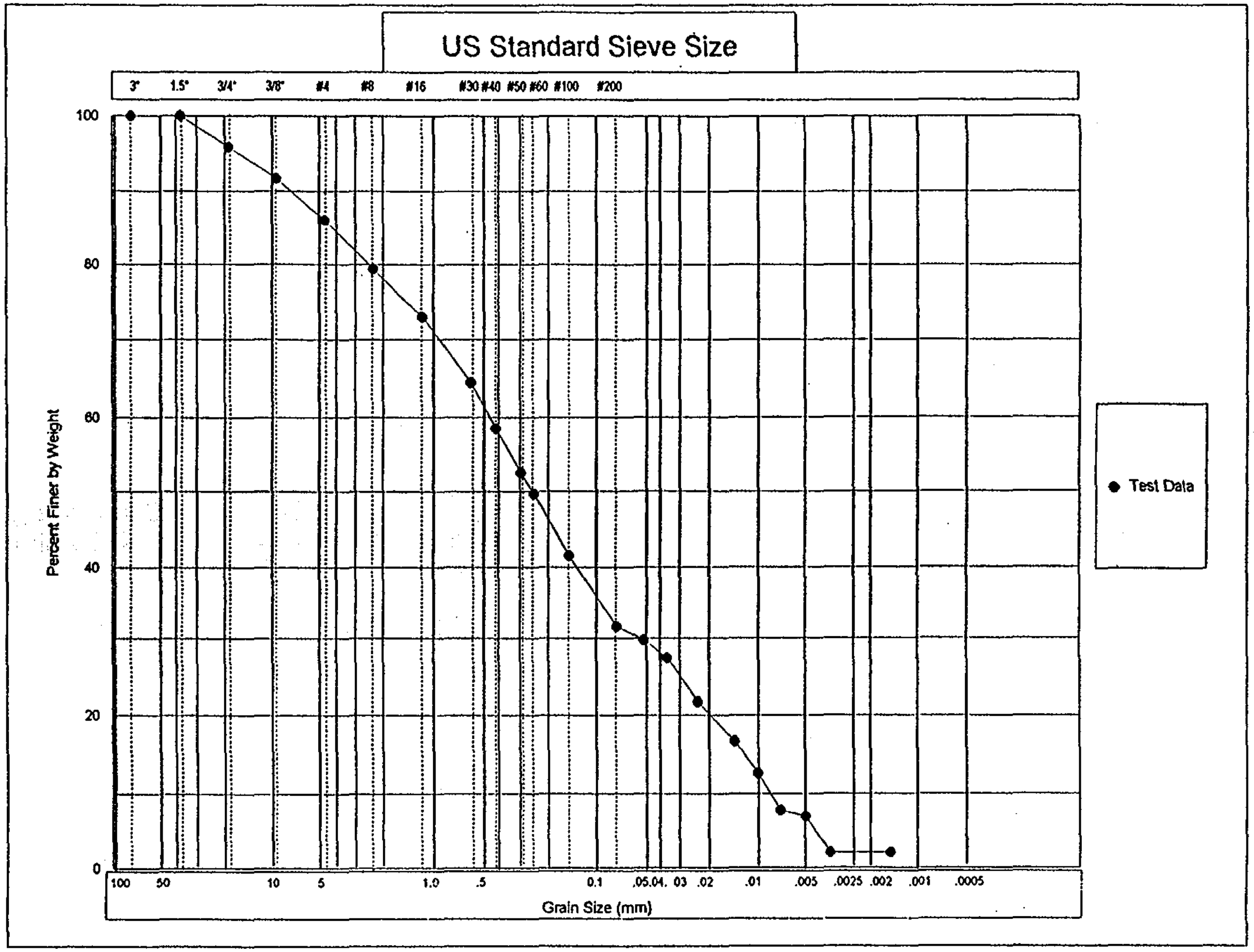
T Elapsed Time (min)	Hydrometer Reading Original	Corrected "R"	100Ra/W	% Total Sample	Effective Depth L	Grain Diameter (mm)
0.0	--	--	--	--	--	--
0.5	--	--	--	--	--	--
1.0	25.00	18.25	29.8	29.8	12.19	0.0507
2.0	23.50	16.75	27.3	27.3	12.44	0.0362
5.0	20.00	13.25	21.6	21.6	13.01	0.0234
15.0	17.00	10.25	16.7	16.7	13.50	0.0138
30.0	14.50	7.75	12.7	12.7	13.91	0.0099
60.0	11.50	4.75	7.8	7.8	14.40	0.0071
120.0	11.00	4.25	6.9	6.9	14.49	0.0051
250.0	8.00	1.25	2.0	2.0	14.98	0.0036
1439.0	8.00	1.25	2.0	2.0	14.98	0.0015

Note: The 30 second reading was not reported, because it was not accurate because the sample had too much foam.

Grain Diameter = K*(SQRT(L/T))

Data entered by: DLS Date: 10/13/99
Data checked by: CAL Date: 10/16/99
FileName:SOH00520

ADVANCED TERRA TESTING, INC.



COBBLES	GRAVEL		SAND			SILT OR CLAY	USCS
	COARSE	FINE	CRS	MEDIUM	FINE		

COBBLES TO BOULDERS	PEBBLE GRAVEL			GRAN	SAND			SILT	CLAY	WENTWORTH
	COARSE	MED	FINE	GRAN	COARSE	MED	FINE			

Client: Stone & Webster Boring No.: MISS-TP3SSSUOV0-00520 Sample No. & Time: MISS-00520, 1110

Depth: 1.0' Job Number: 2162-07

Classification:________________

Advanced Terra Testing, Inc.

MECHANICAL ANALYSIS - SIEVE TEST DATA
ASTM D 422

CLIENT Stone & Webster JOB NO. 2162-07

BORING NO.	MISS-TP3SSREOV0-00580	SAMPLED	8-31-99
DEPTH	1.0'	DATE TESTED	9-24-99 AH
SAMPLE NO. & TIME	MISS-00580, 1113	WASH SIEVE	Yes
		DRY SIEVE	No
SOIL DESCR.	FUSRAP Maywood Superfund Site; Proj# 085750303		

MOISTURE DATA

HYGROSCOPIC	Yes
NATURAL	No
Wt. Wet Soil & Pan (g)	50.99
Wt. Dry Soil & Pan (g)	49.26
Wt. Lost Moisture (g)	1.73
Wt. of Pan Only (g)	3.83
Wt. of Dry Soil (g)	45.43
Moisture Content %	3.8
Wt. Hydrom. Sample Wet (g)	57.11
Wt. Hydrom. Sample Dry (g)	55.01

WASH SIEVE ANALYSIS

Wt. Total Sample Wet (g)	308.62
Weight of + #8 Before Washing (g)	0.00
Weight of + #8 After Washing (g)	0.00
Weight of - #8 Wet (g)	308.62
Weight of - #8 Dry (g)	297.30
Wt. Total Sample Dry (g)	297.30
Calc. Wt. "W" (g)	55.01
Calc. Mass + #8	0.00

Sieve Number (Size)	Pan Weight (g)	Indiv. Wt. + Pan (g)	Indiv. Wt. Retain.	Cum. Wt. Retain.	Cum. % Retain.	% Finer By Wt.
3"	0.00	0.00	0.00	0.00	0.0	100.0
1 1/2"	0.00	0.00	0.00	0.00	0.0	100.0
3/4"	0.00	0.00	0.00	0.00	0.0	100.0
3/8"	0.00	0.00	0.00	0.00	0.0	100.0
#4	0.00	0.00	0.00	0.00	0.0	100.0
#8	0.00	0.00	0.00	0.00	0.0	100.0
#16	2.37	2.83	0.46	0.46	0.8	99.2
#30	2.33	4.11	1.78	2.24	4.1	95.9
#40	2.34	3.84	1.50	3.74	6.8	93.2
#50	2.31	3.58	1.27	5.01	9.1	90.9
#60	2.32	3.03	0.71	5.72	10.4	89.6
#100	2.30	4.31	2.01	7.73	14.1	85.9
#200	2.35	4.66	2.31	10.04	18.3	81.7

Data entered by: DLS Date: 10/06/99
Data checked by: SR Date: 10-6-99
FileName: SOH00580 ADVANCED TERRA TESTING, INC.

MECHANICAL ANALYSIS - SIEVE TEST DATA
ASTM D 422

CLIENT Stone & Webster JOB NO. 2162-07

BORING NO.	MISS-TP3SSTROV0-00550	SAMPLED	8-31-99 KG/BM
DEPTH	1.0′	DATE TESTED	10-25-99 RV
SAMPLE NO. & TIME	MISS-00550, 1142	WASH SIEVE	Yes
		DRY SIEVE	No
SOIL DESCR.	FUSRAP Maywood Superfund Site; Proj# 085750303		

MOISTURE DATA

HYGROSCOPIC	Yes
NATURAL	No
Wt. Wet Soil & Pan (g)	63.93
Wt. Dry Soil & Pan (g)	59.95
Wt. Lost Moisture (g)	3.98
Wt. of Pan Only (g)	4.05
Wt. of Dry Soil (g)	55.90
Moisture Content %	7.1
Wt. Hydrom. Sample Wet (g)	55.01
Wt. Hydrom. Sample Dry (g)	51.36

WASH SIEVE ANALYSIS

Wt. Total Sample Wet (g)	2066.48
Weight of + #8 Before Washing (g)	379.48
Weight of + #8 After Washing (g)	472.13
Weight of - #8 Wet (g)	1687.00
Weight of - #8 Dry (g)	1488.38
Wt. Total Sample Dry (g)	1960.51
Calc. Wt. "W" (g)	67.65
Calc. Mass + #8	16.29

Sieve Number (Size)	Pan Weight (g)	Indiv. Wt. + Pan (g)	Indiv. Wt. Retain.	Cum. Wt. Retain.	Cum. % Retain.	% Finer By Wt.
3"	0.00	0.00	0.00	0.00	0.0	100.0
1 1/2"	0.00	0.00	0.00	0.00	0.0	100.0
3/4"	0.00	48.22	48.22	48.22	2.5	97.5
3/8"	0.00	91.30	91.30	139.52	7.1	92.9
#4	0.00	150.83	150.83	290.35	14.8	85.2
#8	0.00	181.78	181.78	472.13	24.1	75.9
#16	3.80	12.80	9.00	9.00	37.4	62.6
#30	3.82	11.93	8.11	17.11	49.4	50.6
#40	3.77	8.04	4.27	21.38	55.7	44.3
#50	3.69	7.38	3.69	25.07	61.1	38.9
#60	3.81	5.81	2.00	27.07	64.1	35.9
#100	3.81	9.39	5.58	32.65	72.3	27.7
#200	3.82	9.58	5.76	38.41	80.9	19.1

Data entered by: DLS Date: 11/01/99
Data checked by: KR Date: 11/1/99
FileName: SOH00550 ADVANCED TERRA TESTING, INC.

HYDROMETER ANALYSIS - SEDIMENTATION DATA

CLIENT Stone & Webster JOB NO. 2162-07

BORING NO.	MISS-TP3SSTROV0-00550	SAMPLED	8-31-99 KG/BM
DEPTH	1.0'	DATE TESTED	10-25-99 RV
SAMPLE NO. & TIME	MISS-00550, 1142	WASH SIEVE	Yes
		DRY SIEVE	No

SOIL DESCR. FUSRAP Maywood Superfund Site; Proj# 085750303

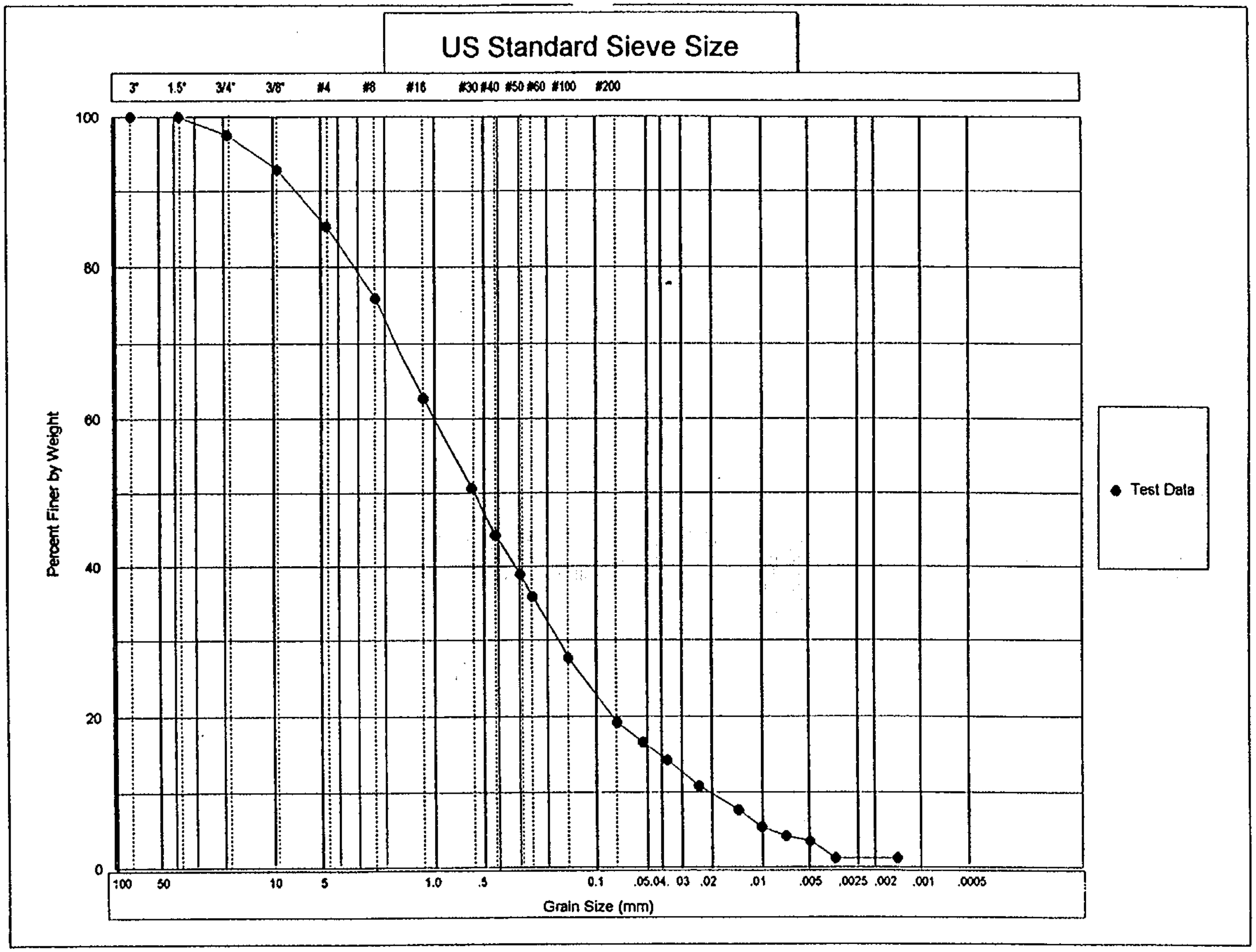
Hydrometer #	ASTM 152 H	Temp., Deg. C	22.9
Sp. Gr. of Soil	2.45	Temp. Coef. K	0.01406
Value of "alpha"	1.04	Wt. Dry Sample "W"	67.647
Deflocculant	Sodium Hexametaphosphate	% of Total Sample	100.0
Defloc. Corr'n	4.3		
Meniscus Corr'n	-1.0		

T Elapsed Time (min)	Hydrometer Reading Original	Corrected "R"	100Ra/W	% Total Sample	Effective Depth L	Grain Diameter (mm)
0.0	--	--	--	--	--	--
0.5	--	--	--	--	--	--
1.0	16.00	10.75	16.5	16.5	13.67	0.0520
2.0	14.50	9.25	14.2	14.2	13.91	0.0371
5.0	12.25	7.00	10.8	10.8	14.28	0.0238
15.0	10.25	5.00	7.7	7.7	14.61	0.0139
30.0	8.75	3.50	5.4	5.4	14.86	0.0099
60.0	8.00	2.75	4.2	4.2	14.98	0.0070
120.0	7.50	2.25	3.5	3.5	15.06	0.0050
250.0	6.00	0.75	1.2	1.2	15.31	0.0035
1479.0	6.00	0.75	1.2	1.2	15.31	0.0014

Grain Diameter = K*(SQRT(L/T))

Data entered by: DLS Date: 11/01/99
Data checked by: KP Date: 11/1/99
FileName:SOH00550

ADVANCED TERRA TESTING, INC.



COBBLES	GRAVEL		SAND			SILT OR CLAY	USCS
	COARSE	FINE	CRS	MEDIUM	FINE		

COBBLES TO BOULDERS	PEBBLE GRAVEL				SAND			SILT	CLAY	WENTWORTH
	COARSE	MED	FINE	GRAN	COARSE	MED	FINE			

Client: Stone & Webster Boring No.: MISS-TP3SSTROV0-00550 Sample No. & Time: MISS-00550, 1142

Depth: 1.0' Job Number: 2162-07

Classification:____________________

Advanced Terra Testing, Inc.

HYDROMETER ANALYSIS - SEDIMENTATION DATA

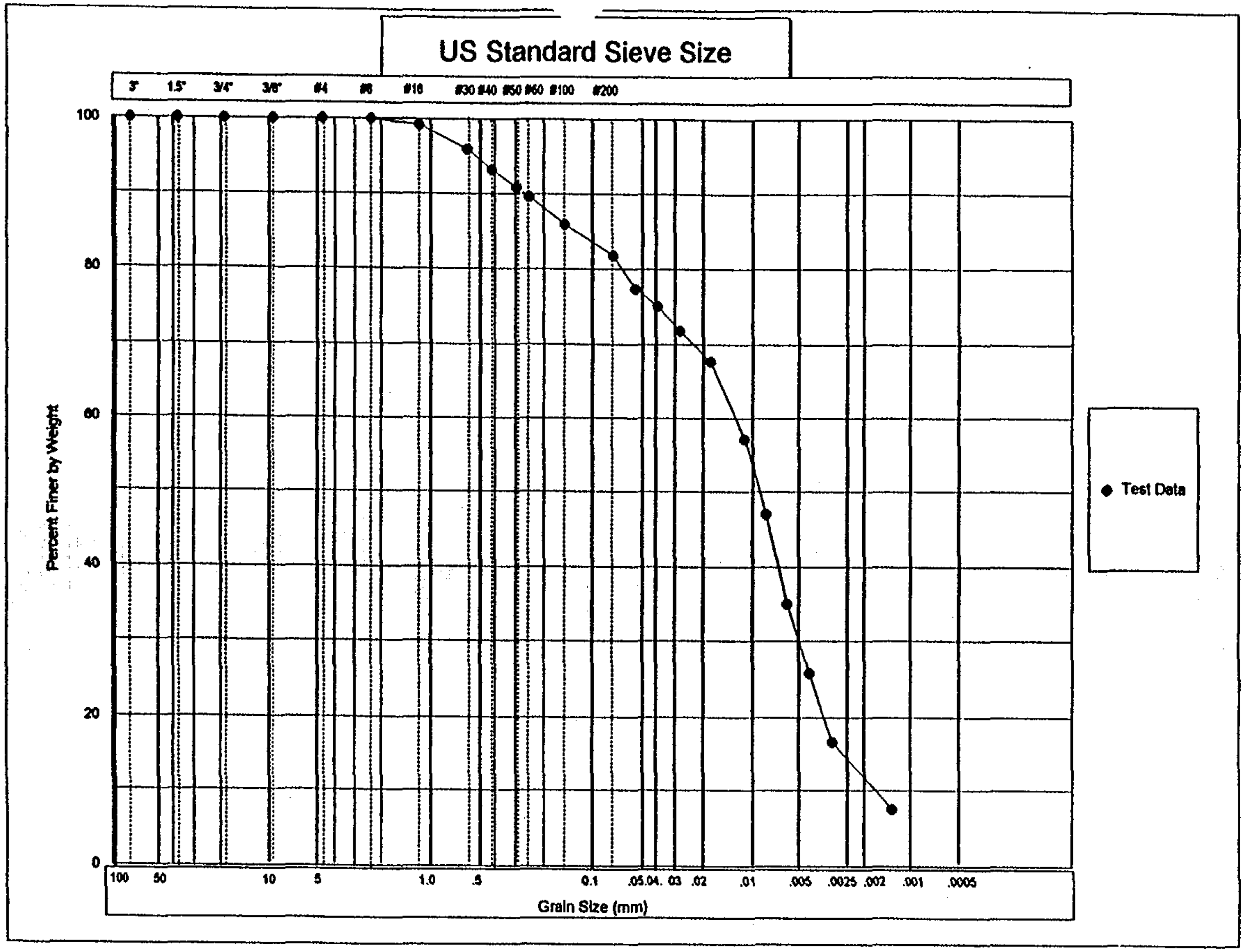
CLIENT	Stone & Webster	JOB NO.	2162-07
BORING NO.	MISS-TP3SSREOV0-00580	SAMPLED	8-31-99
DEPTH	1.0'	DATE TESTED	9-24-99 AH
SAMPLE NO. & TIME	MISS-00580, 1113	WASH SIEVE	Yes
		DRY SIEVE	No
SOIL DESCR.	FUSRAP Maywood Superfund Site; Proj# 085750303		

Hydrometer #	ASTM 152 H	Temp., Deg. C	24.5
Sp. Gr. of Soil	2.58	Temp. Coef. K	0.01322
Value of "alpha"	1.01	Wt. Dry Sample "W"	55.012
Deflocculant	Sodium Hexametaphosphate	% of Total Sample	100.0
Defloc. Corr'n	5.0		
Meniscus Corr'n	-1.0		

T Elapsed Time (min)	Hydrometer Reading Original	Corrected "R"	100Ra/W	% Total Sample	Effective Depth L	Grain Diameter (mm)
0.0	--	--	--	--	--	--
0.5	48.00	42.00	77.4	77.4	8.42	0.0542
1.0	46.75	40.75	75.1	75.1	8.62	0.0388
2.0	45.00	39.00	71.9	71.9	8.91	0.0279
5.0	42.75	36.75	67.7	67.7	9.28	0.0180
15.0	37.00	31.00	57.1	57.1	10.22	0.0109
30.0	31.50	25.50	47.0	47.0	11.12	0.0080
60.0	25.00	19.00	35.0	35.0	12.19	0.0060
120.0	20.00	14.00	25.8	25.8	13.01	0.0044
250.0	15.00	9.00	16.6	16.6	13.83	0.0031
1451.0	10.00	4.00	7.4	7.4	14.65	0.0013

Grain Diameter = K*(SQRT(L/T))

Data entered by: DLS Date: 10/06/99
Data checked by: SR Date: 10-6-99
FileName:SOH00580 ADVANCED TERRA TESTING, INC.



COBBLES	GRAVEL		SAND			SILT OR CLAY	USCS
	COARSE	FINE	CRS	MEDIUM	FINE		

COBBLES TO BOULDERS	PEBBLE GRAVEL				SAND			SILT	CLAY	WENTWORTH
	COARSE	MED	FINE	GRAN	COARSE	MED	FINE			

Client: Stone & Webster
Boring No.: MISS-TP3SSREOV0-00580
Sample No. & Time: MISS-00580, 1113
Depth: 1.0'
Job Number: 2162-07
Classification:_______________

Advanced Terra Testing, Inc.

MECHANICAL ANALYSIS - SIEVE TEST DATA
ASTM D 422

CLIENT Stone & Webster JOB NO. 2162-07

BORING NO.	MISS-TP3SSSUUPO-0053X	SAMPLED	8-31-99 KG/BM
DEPTH	2.0-8.0'	DATE TESTED	10-13-99 DPM
SAMPLE NO. & TIME	MISS-0053X, 1500	WASH SIEVE	Yes
		DRY SIEVE	No

SOIL DESCR. FUSRAP Maywood Superfund Site; Proj# 085750303

MOISTURE DATA

HYGROSCOPIC	Yes	
NATURAL	No	
Wt. Wet Soil & Pan	(g)	89.75
Wt. Dry Soil & Pan	(g)	87.05
Wt. Lost Moisture	(g)	2.70
Wt. of Pan Only	(g)	3.76
Wt. of Dry Soil	(g)	83.29
Moisture Content	%	3.2
Wt. Hydrom. Sample Wet (g)		88.01
Wt. Hydrom. Sample Dry (g)		85.25

WASH SIEVE ANALYSIS

Wt. Total Sample Wet (g)	1646.04
Weight of + #8 Before Washing (g)	251.38
Weight of + #8 After Washing (g)	208.34
Weight of - #8 Wet (g)	1394.66
Weight of - #8 Dry (g)	1392.56
Wt. Total Sample Dry (g)	1600.90
Calc. Wt. "W" (g)	98.00
Calc. Mass + #8	12.75

Sieve Number (Size)	Pan Weight (g)	Indiv. Wt. + Pan (g)	Indiv. Wt. Retain.	Cum. Wt. Retain.	Cum. % Retain.	% Finer By Wt.
3"	0.00	0.00	0.00	0.00	0.0	100.0
1 1/2"	0.00	0.00	0.00	0.00	0.0	100.0
3/4"	0.00	32.98	32.98	32.98	2.1	97.9
3/8"	0.00	42.26	42.26	75.24	4.7	95.3
#4	0.00	61.03	61.03	136.27	8.5	91.5
#8	0.00	72.07	72.07	208.34	13.0	87.0
#16	3.81	7.68	3.87	3.87	17.0	83.0
#30	3.71	9.42	5.71	9.58	22.8	77.2
#40	3.64	8.07	4.43	14.01	27.3	72.7
#50	3.80	9.29	5.49	19.50	32.9	67.1
#60	3.67	7.22	3.55	23.05	36.5	63.5
#100	3.71	16.79	13.08	36.13	49.9	50.1
#200	3.95	14.84	10.89	47.02	61.0	39.0

Data entered by: DLS Date: 10/27/99
Data checked by: CM Date: 10/30/99
FileName: SOH0053X ADVANCED TERRA TESTING, INC.

HYDROMETER ANALYSIS - SEDIMENTATION DATA

CLIENT	Stone & Webster	JOB NO.	2162-07
BORING NO.	MISS-TP3SSSUUPO-0053X	SAMPLED	8-31-99 KG/BM
DEPTH	2.0-8.0'	DATE TESTED	10-13-99 DPM
SAMPLE NO. & TIME	MISS-0053X, 1500	WASH SIEVE	Yes
		DRY SIEVE	No
SOIL DESCR.	FUSRAP Maywood Superfund Site; Proj# 085750303		

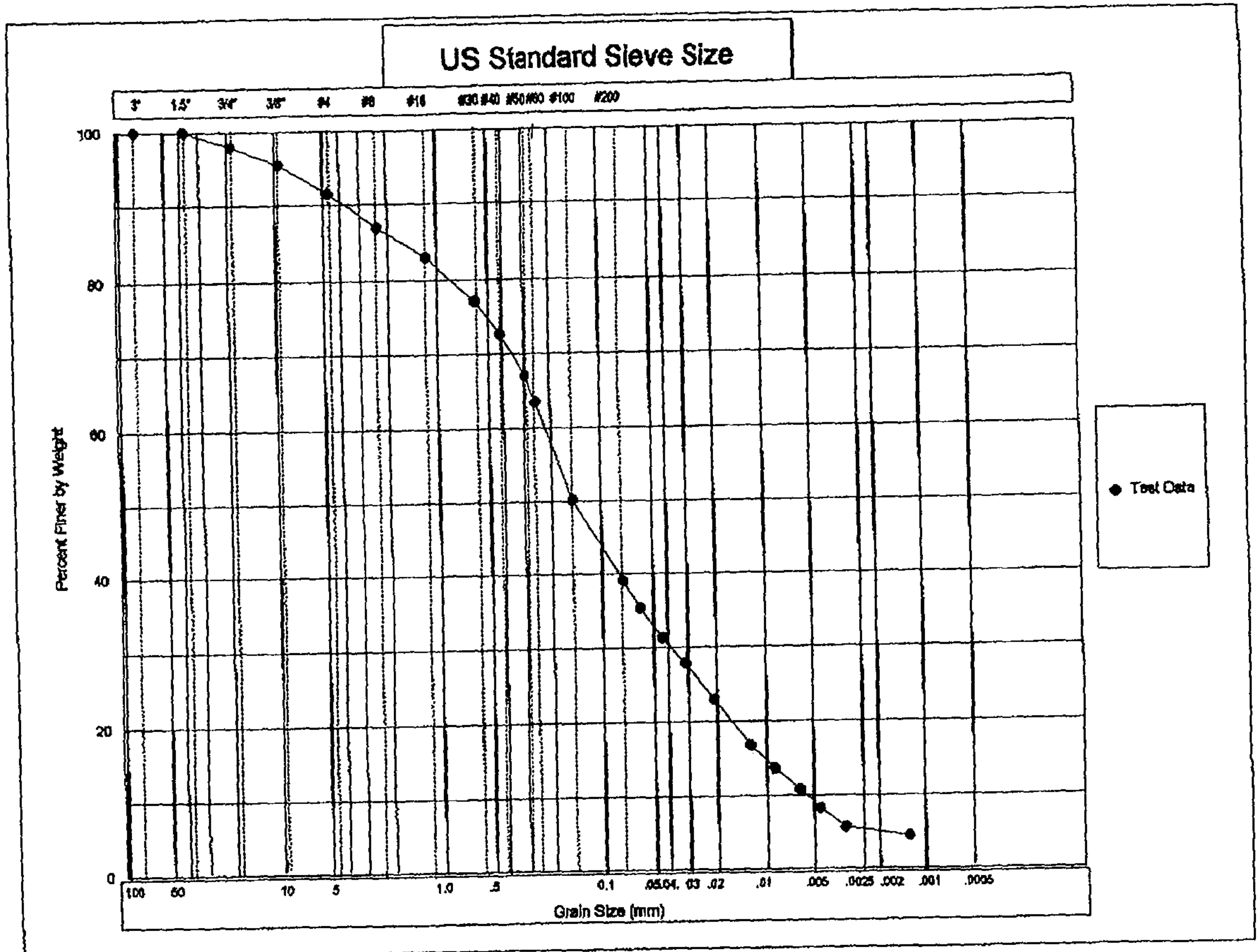
Hydrometer #	ASTM 152 H	Temp., Deg. C	22.5
Sp. Gr. of Soil	2.59	Temp. Coef. K	0.01349
Value of "alpha"	1.01	Wt. Dry Sample "W"	98.001
Deflocculant	Sodium Hexametaphosphate	% of Total Sample	100.0
Defloc. Corr'n	4.8		
Meniscus Corr'n	-1.0		

T Elapsed Time (min)	Hydrometer Reading Original	Corrected "R"	100Ra/W	% Total Sample	Effective Depth L	Grain Diameter (mm)
0.0	--	--	--	--	--	--
0.5	40.00	34.25	35.4	35.4	9.73	0.0595
1.0	36.00	30.25	31.2	31.2	10.39	0.0435
2.0	32.75	27.00	27.9	27.9	10.92	0.0315
5.0	28.00	22.25	23.0	23.0	11.70	0.0206
15.0	22.00	16.25	16.8	16.8	12.68	0.0124
31.0	19.00	13.25	13.7	13.7	13.17	0.0088
64.0	16.25	10.50	10.8	10.8	13.63	0.0062
120.0	13.75	8.00	8.3	8.3	14.04	0.0046
250.0	11.25	5.50	5.7	5.7	14.45	0.0032
1589.0	10.00	4.25	4.4	4.4	14.65	0.0013

Grain Diameter = K*(SQRT(L/T))

Data entered by: DLS Date: 10/27/99
Data checked by: CAL Date: 10/30/99
FileName:SOH0053X

ADVANCED TERRA TESTING, INC.



COBBLES	GRAVEL		SAND			SILT OR CLAY	USCS
	COARSE	FINE	CRS	MEDIUM	FINE		

COBBLES TO BOULDERS	PEBBLE GRAVEL				SAND			SILT	CLAY	WENTWORTH
	COARSE	MED	FINE	GRAN	COARSE	MED	FINE			

Client: Stone & Webster
Depth: 2.0-6.0'
Classification:________________

Boring No.: MISS-TP3SSSUUP0-0053X
Job Number: 2162-07

Sample No. & Time: MISS-0053X, 1500

Advanced Terra Testing, Inc.

MECHANICAL ANALYSIS - SIEVE TEST DATA
ASTM D 422

CLIENT	Stone & Webster	JOB NO.	2162-07
BORING NO.	MISS-TP3SSTRUP0-00560	SAMPLED	8-31-99 KG/BM
DEPTH	2.0-8.0'	DATE TESTED	10-5-99 DPM
SAMPLE NO. & TIME	MISS-00560, 1340	WASH SIEVE	Yes
		DRY SIEVE	No
SOIL DESCR.	FUSRAP Maywood Superfund Site; Proj# 085750303		

MOISTURE DATA

HYGROSCOPIC	Yes
NATURAL	No
Wt. Wet Soil & Pan (g)	53.38
Wt. Dry Soil & Pan (g)	47.88
Wt. Lost Moisture (g)	5.50
Wt. of Pan Only (g)	3.83
Wt. of Dry Soil (g)	44.05
Moisture Content %	12.5
Wt. Hydrom. Sample Wet (g)	55.93
Wt. Hydrom. Sample Dry (g)	49.72

WASH SIEVE ANALYSIS

Wt. Total Sample Wet (g)	4241.83
Weight of + #8 Before Washing (g)	1051.54
Weight of + #8 After Washing (g)	986.06
Weight of - #8 Wet (g)	3190.29
Weight of - #8 Dry (g)	2894.50
Wt. Total Sample Dry (g)	3880.56
Calc. Wt. "W" (g)	66.66
Calc. Mass + #8	16.94

Sieve Number (Size)	Pan Weight (g)	Indiv. Wt. + Pan (g)	Indiv. Wt. Retain.	Cum. Wt. Retain.	Cum. % Retain.	% Finer By Wt.
3"	0.00	0.00	0.00	0.00	0.0	100.0
1 1/2"	0.00	266.34	266.34	266.34	6.9	93.1
3/4"	0.00	101.67	101.67	368.01	9.5	90.5
3/8"	0.00	210.41	210.41	578.42	14.9	85.1
#4	0.00	192.40	192.40	770.82	19.9	80.1
#8	0.00	215.24	215.24	986.06	25.4	74.6
#16	1.02	3.70	2.68	2.68	29.4	70.6
#30	1.01	3.99	2.98	5.66	33.9	66.1
#40	0.99	3.08	2.09	7.75	37.0	63.0
#50	1.02	3.04	2.02	9.77	40.1	59.9
#60	1.03	2.20	1.17	10.94	41.8	58.2
#100	0.99	4.30	3.31	14.25	46.8	53.2
#200	1.03	5.22	4.19	18.44	53.1	46.9

Data entered by: DLS Date: 10/13/99
Data checked by: cm Date: 10/14/99
FileName: SOH00560

ADVANCED TERRA TESTING, INC.

HYDROMETER ANALYSIS - SEDIMENTATION DATA

CLIENT	Stone & Webster	JOB NO.	2162-07
BORING NO.	MISS-TP3SSTRUP0-00560	SAMPLED	8-31-99 KG/BM
DEPTH	2.0-8.0'	DATE TESTED	10-5-99 DPM
SAMPLE NO. & TIME	MISS-00560, 1340	WASH SIEVE	Yes
		DRY SIEVE	No
SOIL DESCR.	FUSRAP Maywood Superfund Site; Proj# 085750303		

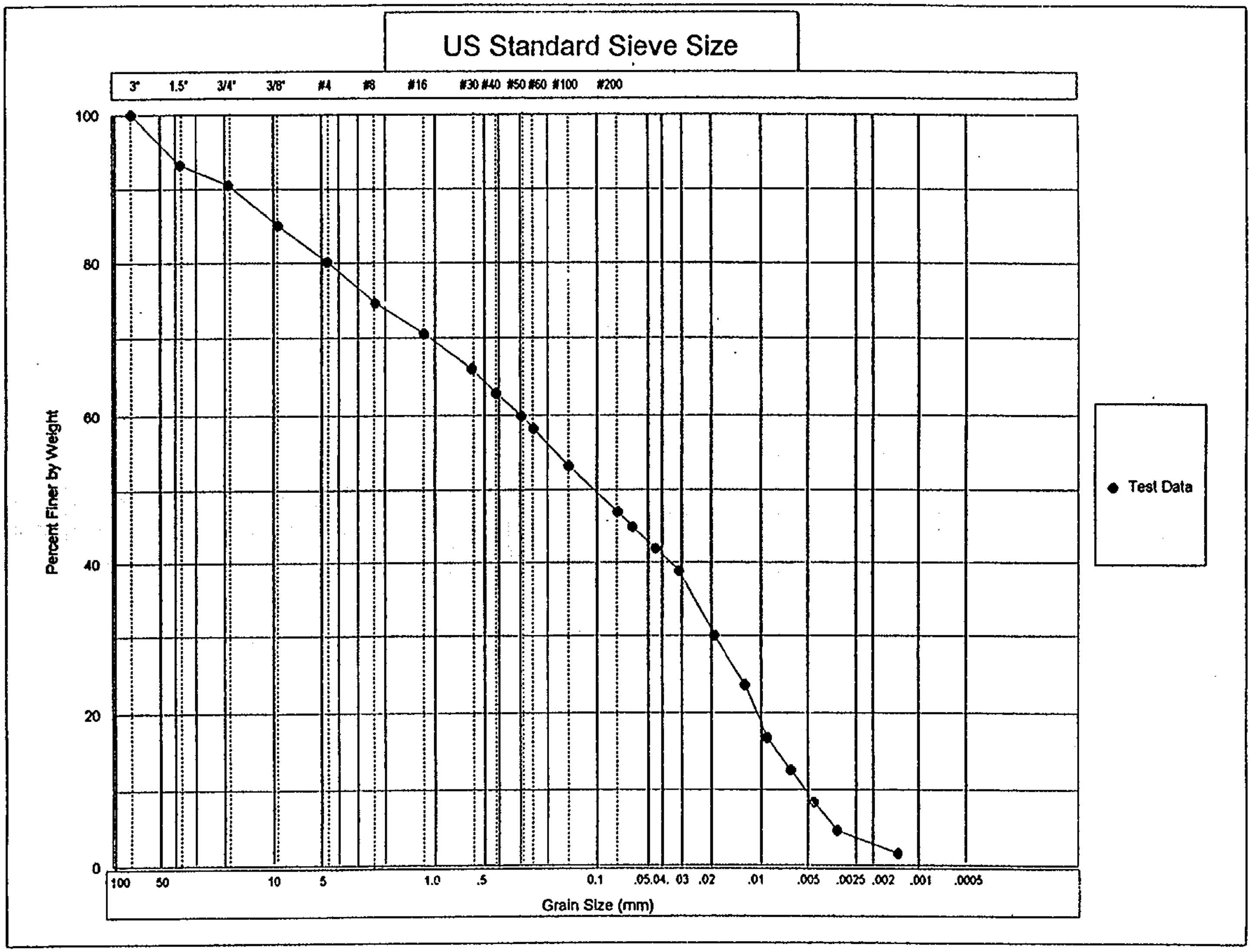
Hydrometer #	ASTM 152 H	Temp., Deg. C	23.2
Sp. Gr. of Soil	2.58	Temp. Coef. K	0.01342
Value of "alpha"	1.01	Wt. Dry Sample "W"	66.657
Deflocculant	Sodium Hexametaphosphate	% of Total Sample	100.0
Defloc. Corr'n	5.5		
Meniscus Corr'n	-1.0		

T Elapsed Time (min)	Hydrometer Reading Original	Corrected "R"	100Ra/W	% Total Sample	Effective Depth L	Grain Diameter (mm)
0.0	--	--	--	--	--	--
0.5	36.00	29.50	44.9	44.9	10.39	0.0612
1.0	34.00	27.50	41.8	41.8	10.71	0.0439
2.0	32.00	25.50	38.8	38.8	11.04	0.0315
6.0	26.25	19.75	30.0	30.0	11.99	0.0190
15.0	22.00	15.50	23.6	23.6	12.68	0.0123
30.0	17.50	11.00	16.7	16.7	13.42	0.0090
60.0	14.75	8.25	12.6	12.6	13.87	0.0065
120.0	12.00	5.50	8.4	8.4	14.32	0.0046
241.0	9.50	3.00	4.6	4.6	14.73	0.0033
1440.0	7.50	1.00	1.5	1.5	15.06	0.0014

Grain Diameter = K*(SQRT(L/T))

Data entered by: DLS Date: 10/13/99
Data checked by: cm Date: 10/16/99
FileName:SOH00560

ADVANCED TERRA TESTING, INC.



COBBLES	GRAVEL		SAND			SILT OR CLAY	USCS
	COARSE	FINE	CRS	MEDIUM	FINE		

COBBLES TO BOULDERS	PEBBLE GRAVEL				SAND			SILT	CLAY	WENTWORTH
	COARSE	MED	FINE	GRAN	COARSE	MED	FINE			

Client: Stone & Webster
Depth: 2.0-8.0'
Classification:________________

Boring No.: MISS-TP3SSTRUP0-00560
Job Number: 2162-07

Sample No. & Time: MISS-00560, 1340

Advanced Terra Testing, Inc.

MECHANICAL ANALYSIS - SIEVE TEST DATA
ASTM D 422

CLIENT	Stone & Webster	JOB NO.	2162-07
BORING NO.	MISS-TP3SSREUP0-00590	SAMPLED	8-31-99
DEPTH	2.0-8.0'	DATE TESTED	9-24-99 AH
SAMPLE NO. & TIME	MISS-00590, 1430	WASH SIEVE	Yes
		DRY SIEVE	No
SOIL DESCR.	FUSRAP Maywood Superfund Site; Proj# 085750303		

MOISTURE DATA

HYGROSCOPIC	Yes
NATURAL	No
Wt. Wet Soil & Pan (g)	68.92
Wt. Dry Soil & Pan (g)	58.76
Wt. Lost Moisture (g)	10.16
Wt. of Pan Only (g)	3.77
Wt. of Dry Soil (g)	54.99
Moisture Content %	18.5
Wt. Hydrom. Sample Wet (g)	58.65
Wt. Hydrom. Sample Dry (g)	49.50

WASH SIEVE ANALYSIS

Wt. Total Sample Wet (g)	459.14
Weight of + #8 Before Washing (g)	4.21
Weight of + #8 After Washing (g)	3.23
Weight of - #8 Wet (g)	454.93
Weight of - #8 Dry (g)	384.81
Wt. Total Sample Dry (g)	388.04
Calc. Wt. "W" (g)	49.92
Calc. Mass + #8	0.42

Sieve Number (Size)	Pan Weight (g)	Indiv. Wt. + Pan (g)	Indiv. Wt. Retain.	Cum. Wt. Retain.	Cum. % Retain.	% Finer By Wt.
3"	0.00	0.00	0.00	0.00	0.0	100.0
1 1/2"	0.00	0.00	0.00	0.00	0.0	100.0
3/4"	0.00	0.00	0.00	0.00	0.0	100.0
3/8"	0.00	0.00	0.00	0.00	0.0	100.0
#4	0.00	0.00	0.00	0.00	0.0	100.0
#8	0.00	3.23	3.23	3.23	0.8	99.2
#16	2.35	3.76	1.41	1.41	3.7	96.3
#30	2.30	4.42	2.12	3.53	7.9	92.1
#40	2.34	3.75	1.41	4.94	10.7	89.3
#50	2.30	3.58	1.28	6.22	13.3	86.7
#60	2.36	3.08	0.72	6.94	14.7	85.3
#100	2.31	4.52	2.21	9.15	19.2	80.8
#200	2.31	5.27	2.96	12.11	25.1	74.9

Data entered by: DLS   Date: 10/06/99
Data checked by: SM   Date: 10-6-99
FileName: SOH00590

ADVANCED TERRA TESTING, INC.

HYDROMETER ANALYSIS - SEDIMENTATION DATA

CLIENT	Stone & Webster	JOB NO.	2162-07
BORING NO.	MISS-TP3SSREUPO-00590	SAMPLED	8-31-99
DEPTH	2.0-8.0'	DATE TESTED	9-24-99 AH
SAMPLE NO. & TIME	MISS-00590, 1430	WASH SIEVE	Yes
		DRY SIEVE	No
SOIL DESCR.	FUSRAP Maywood Superfund Site; Proj# 085750303		

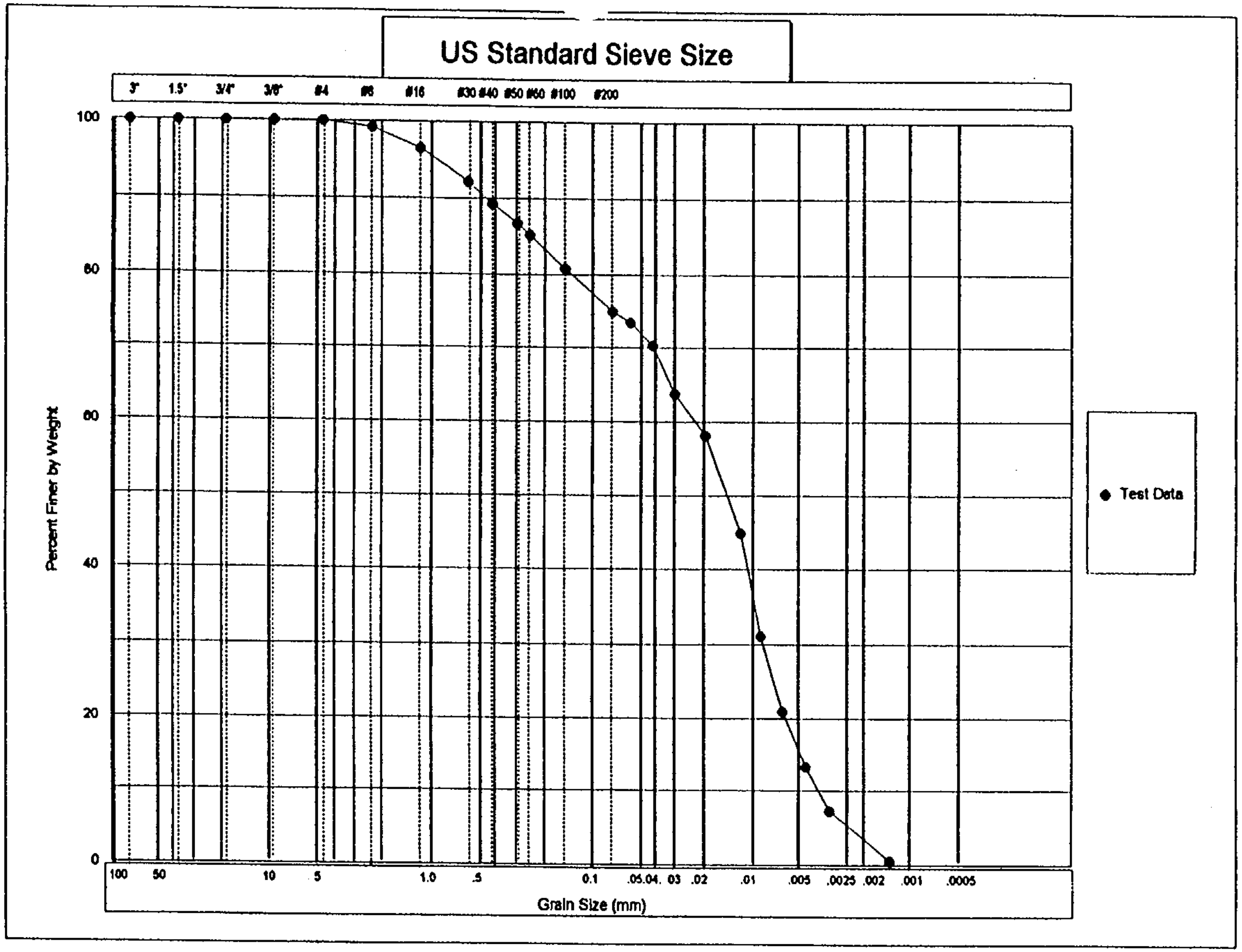
Hydrometer #	ASTM 152 H	Temp., Deg. C	24.4
Sp. Gr. of Soil	2.56	Temp. Coef. K	0.01332
Value of "alpha"	1.02	Wt. Dry Sample "W"	49.919
Deflocculant	Sodium Hexametaphosphate	% of Total Sample	100.0
Defloc. Corr'n	5.0		
Meniscus Corr'n	-1.0		

T Elapsed Time (min)	Hydrometer Reading Original	Corrected "R"	100Ra/W	% Total Sample	Effective Depth L	Grain Diameter (mm)
0.0	--	--	--	--	--	--
0.5	42.00	36.00	73.4	73.4	9.40	0.0578
1.0	40.50	34.50	70.4	70.4	9.65	0.0414
2.0	37.25	31.25	63.7	63.7	10.18	0.0300
5.0	34.50	28.50	58.1	58.1	10.63	0.0194
15.0	28.00	22.00	44.9	44.9	11.70	0.0118
30.0	21.25	15.25	31.1	31.1	12.81	0.0087
60.0	16.25	10.25	20.9	20.9	13.63	0.0063
120.0	12.50	6.50	13.3	13.3	14.24	0.0046
250.0	9.50	3.50	7.1	7.1	14.73	0.0032
1458.0	6.25	0.25	0.5	0.5	15.27	0.0014

Grain Diameter = K*(SQRT(L/T))

Data entered by: DLS Date: 10/06/99
Data checked by: SR Date: 10-6-99
FileName:SOH00590

ADVANCED TERRA TESTING, INC.



COBBLES	GRAVEL		SAND			SILT OR CLAY	USCS
	COARSE	FINE	CRS	MEDIUM	FINE		

COBBLES TO BOULDERS	PEBBLE GRAVEL				SAND			SILT	CLAY	WENTWORTH
	COARSE	MED	FINE	GRAN	COARSE	MED	FINE			

Client: Stone & Webster Boring No.: MISS-TP3SSREUP0-00590 Sample No. & Time: MISS-00590, 1430
Depth: 2.0-8.0' Job Number: 2162-07
Classification:________________________

Advanced Terra Testing, Inc.

MECHANICAL ANALYSIS - SIEVE TEST DATA
ASTM D 422

CLIENT	Stone & Webster	JOB NO.	2162-07
BORING NO.	MISS-TP3SSREUP2-00610	SAMPLED	8-31-99 KG/BM
DEPTH	2.0-8.0'	DATE TESTED	10-13-99 DPM
SAMPLE NO. & TIME	MISS-00610, 1430	WASH SIEVE	Yes
		DRY SIEVE	No
SOIL DESCR.	FUSRAP Maywood Superfund Site; Proj# 085750303		

MOISTURE DATA

HYGROSCOPIC	Yes
NATURAL	No
Wt. Wet Soil & Pan (g)	78.08
Wt. Dry Soil & Pan (g)	67.86
Wt. Lost Moisture (g)	10.22
Wt. of Pan Only (g)	3.67
Wt. of Dry Soil (g)	64.19
Moisture Content %	15.9
Wt. Hydrom. Sample Wet (g)	66.87
Wt. Hydrom. Sample Dry (g)	57.68

WASH SIEVE ANALYSIS

Wt. Total Sample Wet (g)	790.21
Weight of + #8 Before Washing (g)	29.82
Weight of + #8 After Washing (g)	25.47
Weight of - #8 Wet (g)	760.39
Weight of - #8 Dry (g)	659.71
Wt. Total Sample Dry (g)	685.18
Calc. Wt. "W" (g)	59.91
Calc. Mass + #8	2.23

Sieve Number (Size)	Pan Weight (g)	Indiv. Wt. + Pan (g)	Indiv. Wt. Retain.	Cum. Wt. Retain.	Cum. % Retain.	% Finer By Wt.
3"	0.00	0.00	0.00	0.00	0.0	100.0
1 1/2"	0.00	0.00	0.00	0.00	0.0	100.0
3/4"	0.00	0.00	0.00	0.00	0.0	100.0
3/8"	0.00	4.33	4.33	4.33	0.6	99.4
#4	0.00	9.54	9.54	13.87	2.0	98.0
#8	0.00	11.60	11.60	25.47	3.7	96.3
#16	3.64	4.68	1.04	1.04	5.5	94.5
#30	3.91	6.22	2.31	3.35	9.3	90.7
#40	3.67	5.32	1.65	5.00	12.1	87.9
#50	3.78	5.36	1.58	6.58	14.7	85.3
#60	3.71	4.60	0.89	7.47	16.2	83.8
#100	3.68	6.38	2.70	10.17	20.7	79.3
#200	3.69	7.11	3.42	13.59	26.4	73.6

Data entered by: DLS Date: 11/01/99
Data checked by: KR Date: 11/1/99
FileName: SOH00610

ADVANCED TERRA TESTING, INC.

HYDROMETER ANALYSIS - SEDIMENTATION DATA

CLIENT	Stone & Webster	JOB NO.	2162-07
BORING NO.	MISS-TP3SSREUP2-00610	SAMPLED	8-31-99 KG/BM
DEPTH	2.0-8.0'	DATE TESTED	10-13-99 DPM
SAMPLE NO. & TIME	MISS-00610, 1430	WASH SIEVE	Yes
		DRY SIEVE	No
SOIL DESCR.	FUSRAP Maywood Superfund Site; Proj# 085750303		

Hydrometer #	ASTM 152 H	Temp., Deg. C	22.7
Sp. Gr. of Soil	2.58	Temp. Coef. K	0.01350
Value of "alpha"	1.01	Wt. Dry Sample "W"	59.909
Deflocculant	Sodium Hexametaphosphate	% of Total Sample	100.0
Defloc. Corr'n	4.8		
Meniscus Corr'n	-1.0		

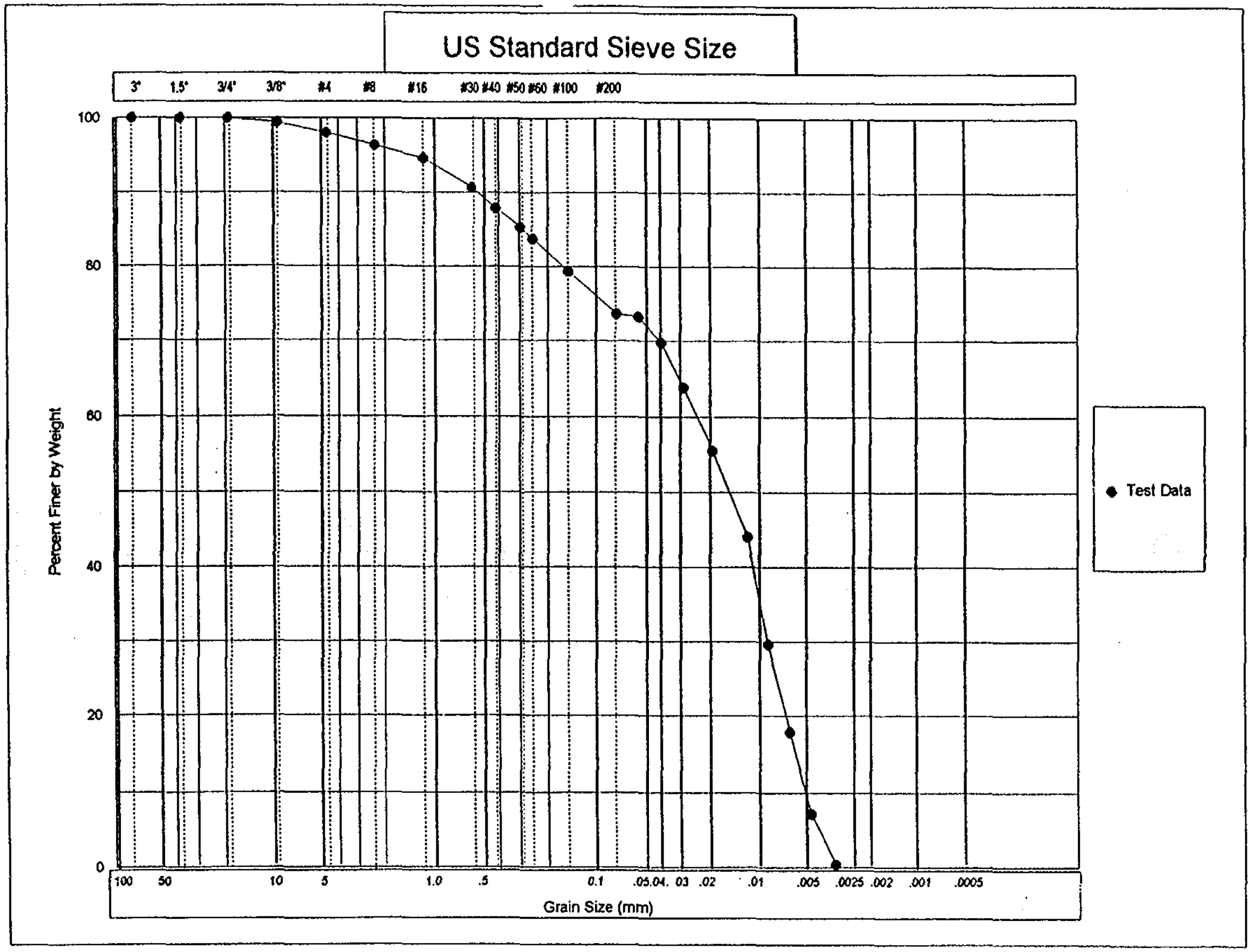
T Elapsed Time (min)	Hydrometer Reading Original	Hydrometer Reading Corrected "R"	100Ra/W	% Total Sample	Effective Depth L	Grain Diameter (mm)
0.0	--	--	--	--	--	--
0.5	49.00	43.25	73.2	73.2	8.25	0.0549
1.0	47.00	41.25	69.8	69.8	8.58	0.0396
2.0	43.50	37.75	63.9	63.9	9.16	0.0289
5.0	38.50	32.75	55.4	55.4	9.98	0.0191
15.0	31.75	26.00	44.0	44.0	11.08	0.0116
30.0	23.25	17.50	29.6	29.6	12.48	0.0087
60.0	16.25	10.50	17.8	17.8	13.63	0.0064
120.0	10.00	4.25	7.2	7.2	14.65	0.0047
250.0	6.00	0.25	0.4	0.4	15.31	0.0033

Note: 24 hr. reading not reported because all the material already settled out of suspension.

Grain Diameter = K*(SQRT(L/T))

Data entered by: DLS Date: 11/01/99
Data checked by: KP Date: 11/1/99
FileName:SOH00610

ADVANCED TERRA TESTING, INC.



COBBLES	GRAVEL		SAND			SILT OR CLAY	USCS
	COARSE	FINE	CRS	MEDIUM	FINE		

COBBLES TO BOULDERS	PEBBLE GRAVEL				SAND			SILT	CLAY	WENTWORTH
	COARSE	MED	FINE	GRAN	COARSE	MED	FINE			

Client: Stone & Webster Boring No.: MISS-TP3SSREUP2-00610 Sample No. & Time: MISS-00610, 1430
Depth: 2.0-8.0' Job Number: 2162-07
Classification:____________________ Advanced Terra Testing, Inc.

MECHANICAL ANALYSIS - SIEVE TEST DATA
ASTM D 422

CLIENT Stone & Webster JOB NO. 2162-07

BORING NO.	MISS-TP3SSSULO0-00540	SAMPLED	8-31-99
DEPTH	9.0-10.0'	DATE TESTED	9-25-99 AH
SAMPLE NO. & TIME	MISS-00540, 1345	WASH SIEVE	Yes
		DRY SIEVE	No
SOIL DESCR.	FUSRAP Maywood Superfund Site; Proj# 085750303		

MOISTURE DATA

HYGROSCOPIC	Yes	
NATURAL	No	
Wt. Wet Soil & Pan	(g)	106.50
Wt. Dry Soil & Pan	(g)	106.06
Wt. Lost Moisture	(g)	0.44
Wt. of Pan Only	(g)	3.78
Wt. of Dry Soil	(g)	102.28
Moisture Content	%	0.4
Wt. Hydrom. Sample Wet	(g)	57.30
Wt. Hydrom. Sample Dry	(g)	57.05

WASH SIEVE ANALYSIS

Wt. Total Sample Wet (g)	632.06
Weight of + #8 Before Washing (g)	10.48
Weight of + #8 After Washing (g)	7.03
Weight of - #8 Wet (g)	621.58
Weight of - #8 Dry (g)	622.35
Wt. Total Sample Dry (g)	629.38
Calc. Wt. "W" (g)	57.70
Calc. Mass + #8	0.64

Sieve Number (Size)	Pan Weight (g)	Indiv. Wt. + Pan (g)	Indiv. Wt. Retain.	Cum. Wt. Retain.	Cum. % Retain.	% Finer By Wt.
3"	0.00	0.00	0.00	0.00	0.0	100.0
1 1/2"	0.00	0.00	0.00	0.00	0.0	100.0
3/4"	0.00	0.00	0.00	0.00	0.0	100.0
3/8"	0.00	0.00	0.00	0.00	0.0	100.0
#4	0.00	0.97	0.97	0.97	0.2	99.8
#8	0.00	6.06	6.06	7.03	1.1	98.9
#16	3.91	5.01	1.10	1.10	3.0	97.0
#30	3.78	5.15	1.37	2.47	5.4	94.6
#40	3.70	4.92	1.22	3.69	7.5	92.5
#50	3.91	5.76	1.85	5.54	10.7	89.3
#60	3.80	5.45	1.65	7.19	13.6	86.4
#100	3.74	17.39	13.65	20.84	37.2	62.8
#200	3.64	25.46	21.82	42.66	75.1	24.9

Data entered by: DLS Date: 10/06/99
Data checked by: SR Date: 10-6-99
FileName: SOH00540

ADVANCED TERRA TESTING, INC.

HYDROMETER ANALYSIS - SEDIMENTATION DATA

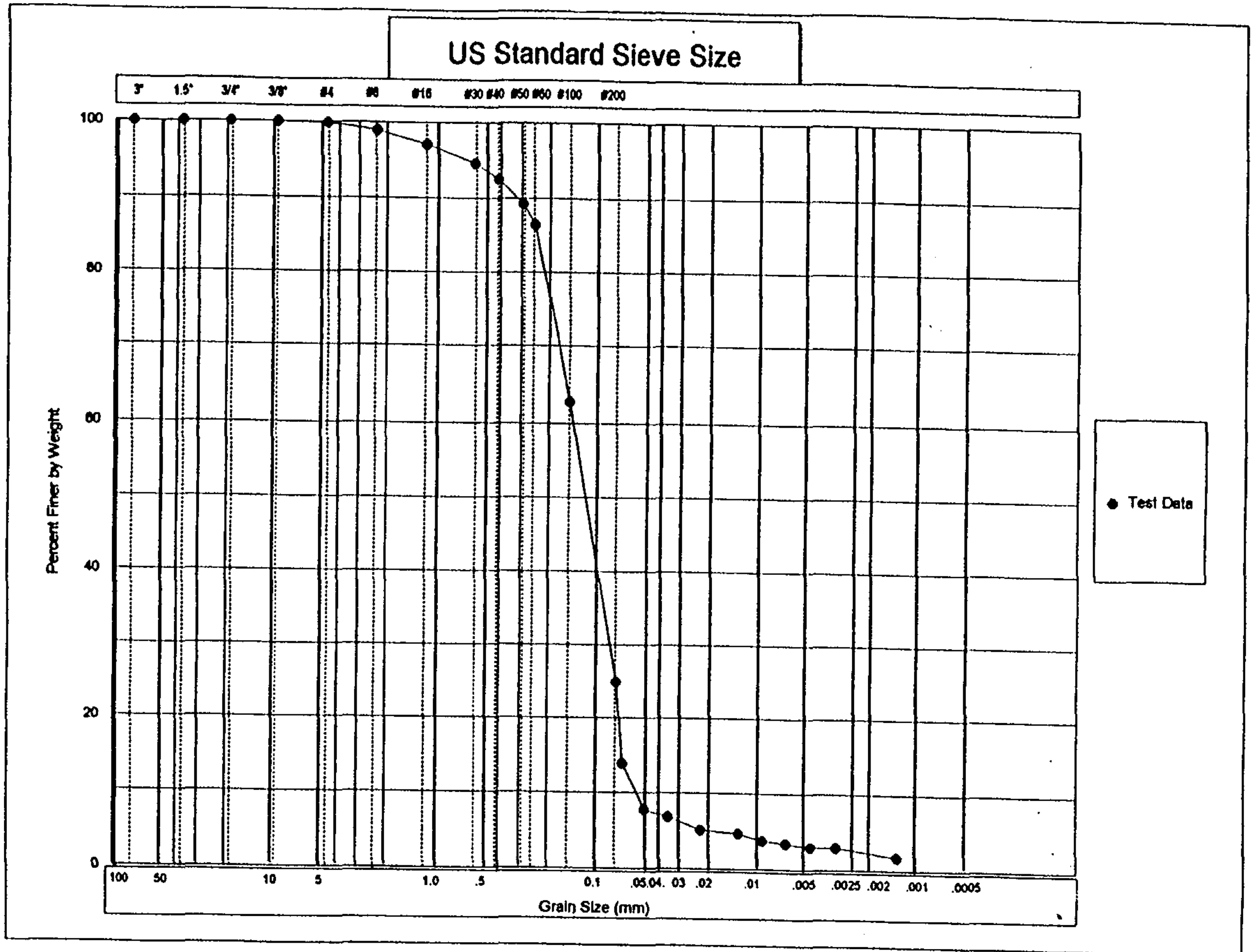
CLIENT	Stone & Webster	JOB NO.	2162-07
BORING NO.	MISS-TP3SSSUL00-00540	SAMPLED	8-31-99
DEPTH	9.0-10.0'	DATE TESTED	9-25-99 AH
SAMPLE NO. & TIME	MISS-00540, 1345	WASH SIEVE	Yes
		DRY SIEVE	No
SOIL DESCR.	FUSRAP Maywood Superfund Site; Proj# 085750303		

Hydrometer #	ASTM 152 H	Temp., Deg. C	24.1
Sp. Gr. of Soil	2.67	Temp. Coef. K	0.01292
Value of "alpha"	1.00	Wt. Dry Sample "W"	57.698
Deflocculant	Sodium Hexametaphosphate	% of Total Sample	100.0
Defloc. Corr'n	5.0		
Meniscus Corr'n	-1.0		

T Elapsed Time (min)	Hydrometer Reading Original	Corrected "R"	100Ra/W	% Total Sample	Effective Depth L	Grain Diameter (mm)
0.0	--	--	--	--	--	--
0.5	14.00	8.00	13.8	13.8	13.99	0.0683
1.0	10.50	4.50	7.8	7.8	14.57	0.0493
2.0	10.00	4.00	6.9	6.9	14.65	0.0350
5.0	9.00	3.00	5.2	5.2	14.81	0.0222
15.0	8.75	2.75	4.7	4.7	14.86	0.0129
30.0	8.25	2.25	3.9	3.9	14.94	0.0091
60.0	8.00	2.00	3.5	3.5	14.98	0.0065
120.0	7.75	1.75	3.0	3.0	15.02	0.0046
250.0	7.75	1.75	3.0	3.0	15.02	0.0032
1447.0	7.00	1.00	1.7	1.7	15.14	0.0013

Grain Diameter = K*(SQRT(L/T))

Data entered by: DLS Date: 10/06/99
Data checked by: SR Date: 10-6-99
FileName:SOH00540 ADVANCED TERRA TESTING, INC.



COBBLES	GRAVEL		SAND			SILT OR CLAY	USCS
	COARSE	FINE	CRS	MEDIUM	FINE		

COBBLES TO BOULDERS	PEBBLE GRAVEL				SAND			SILT	CLAY	WENTWORTH
	COARSE	MED	FINE	GRAN	COARSE	MED	FINE			

Client: Stone & Webster
Depth: 9.0-10.0'
Classification:______________________

Boring No.: MISS-TP3SSSULO0-00540
Job Number: 2162-07

Sample No. & Time: MISS-00540, 1345

Advanced Terra Testing, Inc.

MECHANICAL ANALYSIS - SIEVE TEST DATA
ASTM D 422

CLIENT	Stone & Webster	JOB NO.	2162-07
BORING NO.	MISS-TP3SSTRL00-00570	SAMPLED	8-31-99 KG/BM
DEPTH	9.0-10.0'	DATE TESTED	10-5-99 DPM
SAMPLE NO. & TIME	MISS-00570, 1335	WASH SIEVE	Yes
		DRY SIEVE	No
SOIL DESCR.	FUSRAP Maywood Superfund Site; Proj# 085750303		

MOISTURE DATA		WASH SIEVE ANALYSIS	
HYGROSCOPIC	Yes	Wt. Total Sample Wet (g)	987.33
NATURAL	No	Weight of + #8 Before Washing (g)	67.86
Wt. Wet Soil & Pan (g)	45.12	Weight of + #8 After Washing (g)	42.82
Wt. Dry Soil & Pan (g)	44.78	Weight of - #8 Wet (g)	919.47
Wt. Lost Moisture (g)	0.34		
Wt. of Pan Only (g)	3.83	Weight of - #8 Dry (g)	936.73 --
Wt. of Dry Soil (g)	40.95		
Moisture Content %	0.8	Wt. Total Sample Dry (g)	979.55
Wt. Hydrom. Sample Wet (g)	55.19	Calc. Wt. "W" (g)	57.23
Wt. Hydrom. Sample Dry (g)	54.73	Calc. Mass + #8	2.50

Sieve Number (Size)	Pan Weight (g)	Indiv. Wt. + Pan (g)	Indiv. Wt. Retain.	Cum. Wt. Retain.	Cum. % Retain.	% Finer By Wt.
3"	0.00	0.00	0.00	0.00	0.0	100.0
1 1/2"	0.00	0.00	0.00	0.00	0.0	100.0
3/4"	0.00	0.00	0.00	0.00	0.0	100.0
3/8"	0.00	2.17	2.17	2.17	0.2	99.8
#4	0.00	17.03	17.03	19.20	2.0	98.0
#8	0.00	23.62	23.62	42.82	4.4	95.6
#16	2.31	3.93	1.62	1.62	7.2	92.8
#30	2.34	5.77	3.43	5.05	13.2	86.8
#40	2.34	5.76	3.42	8.47	19.2	80.8
#50	2.35	7.03	4.68	13.15	27.3	72.7
#60	2.30	5.78	3.48	16.63	33.4	66.6
#100	2.36	14.96	12.60	29.23	55.4	44.6
#200	2.35	12.78	10.43	39.66	73.7	26.3

Data entered by: DLS Date: 10/28/99
Data checked by: KR Date: 11/1/99
FileName: SOH00570

ADVANCED TERRA TESTING, INC.

HYDROMETER ANALYSIS - SEDIMENTATION DATA

CLIENT Stone & Webster JOB NO. 2162-07

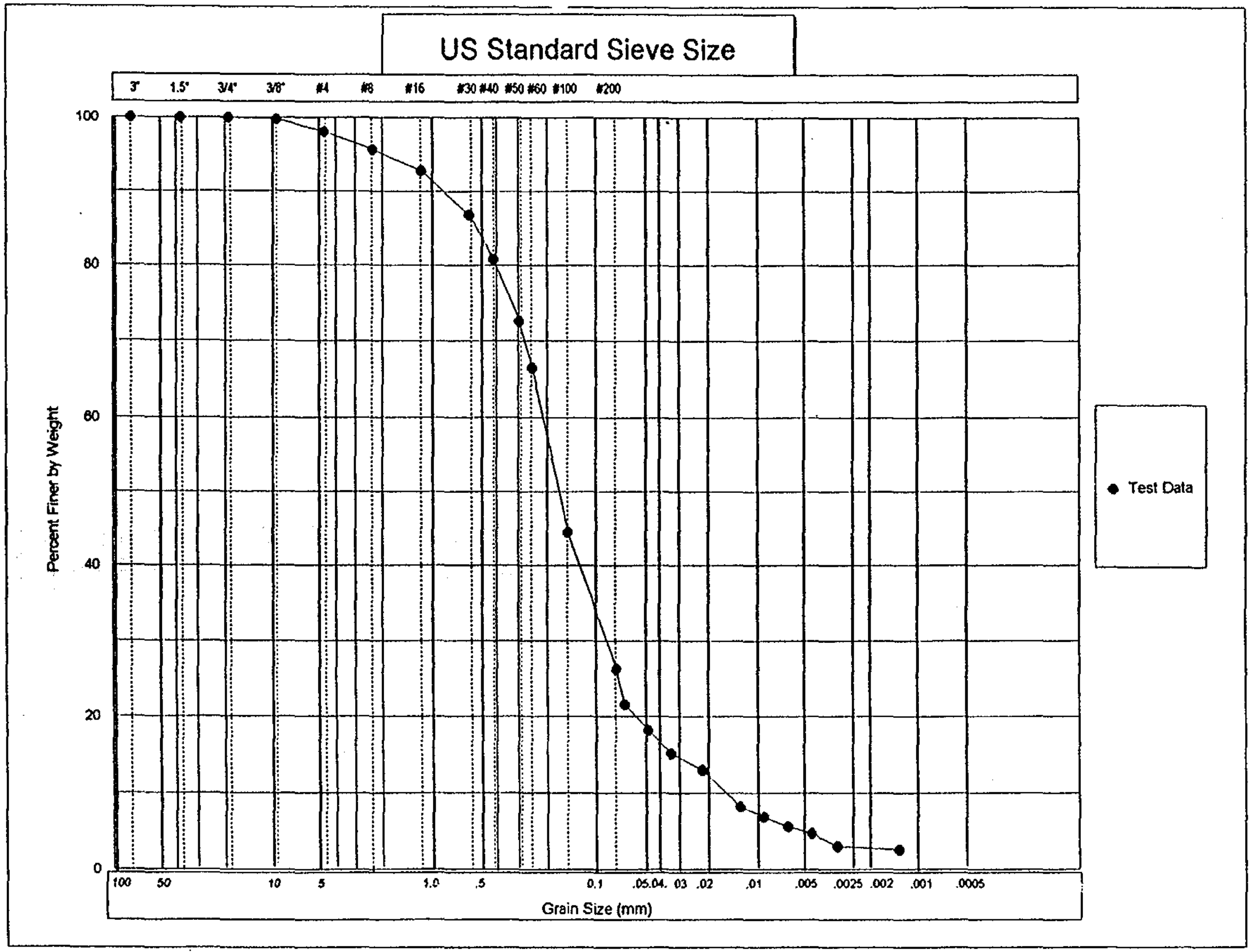
BORING NO.	MISS-TP3SSTRLOO-00570	SAMPLED	8-31-99 KG/BM
DEPTH	9.0-10.0'	DATE TESTED	10-5-99 DPM
SAMPLE NO. & TIME	MISS-00570, 1335	WASH SIEVE	Yes
		DRY SIEVE	No
SOIL DESCR.	FUSRAP Maywood Superfund Site; Proj# 085750303		

Hydrometer #	ASTM 152 H	Temp., Deg. C	22.9
Sp. Gr. of Soil	2.71	Temp. Coef. K	0.01295
Value of "alpha"	0.99	Wt. Dry Sample "W"	57.233
Deflocculant	Sodium Hexametaphosphate	% of Total Sample	100.0
Defloc. Corr'n	5.5		
Meniscus Corr'n	-1.0		

T Elapsed Time (min)	Hydrometer Reading Original	Corrected "R"	100Ra/W	% Total Sample	Effective Depth L	Grain Diameter (mm)
0.0	--	--	--	--	--	--
0.5	19.00	12.50	21.6	21.6	13.17	0.0665
1.0	17.00	10.50	18.1	18.1	13.50	0.0476
2.0	15.25	8.75	15.1	15.1	13.79	0.0340
5.0	14.00	7.50	12.9	12.9	13.99	0.0217
15.0	11.25	4.75	8.2	8.2	14.45	0.0127
30.0	10.50	4.00	6.9	6.9	14.57	0.0090
60.0	9.75	3.25	5.6	5.6	14.69	0.0064
120.0	9.25	2.75	4.7	4.7	14.77	0.0045
255.0	8.25	1.75	3.0	3.0	14.94	0.0031
1440.0	8.00	1.50	2.6	2.6	14.98	0.0013

Grain Diameter = K*(SQRT(L/T))

Data entered by: DLS Date: 10/28/99
Data checked by:______ Date:________
FileName:SOH00570 ADVANCED TERRA TESTING, INC.



COBBLES	GRAVEL		SAND			SILT OR CLAY	USCS
	COARSE	FINE	CRS	MEDIUM	FINE		

COBBLES TO BOULDERS	PEBBLE GRAVEL				SAND			SILT	CLAY	WENTWORTH
	COARSE	MED	FINE	GRAN	COARSE	MED	FINE			

Client: Stone & Webster Boring No.: MISS-TP3SSTRLO0-00570 Sample No. & Time: MISS-00570, 1335
Depth: 9.0-10.0' Job Number: 2162-07
Classification:_______________

Advanced Terra Testing, Inc.

MECHANICAL ANALYSIS - SIEVE TEST DATA
ASTM D 422

CLIENT Stone & Webster JOB NO. 2162-07

BORING NO.	MISS-TP3SSREL00-00600	SAMPLED	8-31-99 KG/BM
DEPTH	9.0-10.0'	DATE TESTED	9-28-99 RV
SAMPLE NO. & TIME	MISS-00600, 1355	WASH SIEVE	Yes
		DRY SIEVE	No
SOIL DESCR.	FUSRAP Maywood Superfund Site; Proj# 085750303		

MOISTURE DATA

HYGROSCOPIC	Yes
NATURAL	No
Wt. Wet Soil & Pan (g)	110.93
Wt. Dry Soil & Pan (g)	110.21
Wt. Lost Moisture (g)	0.72
Wt. of Pan Only (g)	3.75
Wt. of Dry Soil (g)	106.46
Moisture Content %	0.7
Wt. Hydrom. Sample Wet (g)	55.71
Wt. Hydrom. Sample Dry (g)	55.33

WASH SIEVE ANALYSIS

Wt. Total Sample Wet (g)	1204.29
Weight of + #8 Before Washing (g)	27.33
Weight of + #8 After Washing (g)	20.54
Weight of - #8 Wet (g)	1176.96
Weight of - #8 Dry (g)	1175.80
Wt. Total Sample Dry (g)	1196.34
Calc. Wt. "W" (g)	56.30
Calc. Mass + #8	0.97

Sieve Number (Size)	Pan Weight (g)	Indiv. Wt. + Pan (g)	Indiv. Wt. Retain.	Cum. Wt. Retain.	Cum. % Retain.	% Finer By Wt.
3"	0.00	0.00	0.00	0.00	0.0	100.0
1 1/2"	0.00	0.00	0.00	0.00	0.0	100.0
3/4"	0.00	0.00	0.00	0.00	0.0	100.0
3/8"	0.00	3.80	3.80	3.80	0.3	99.7
#4	0.00	5.18	5.18	8.98	0.8	99.2
#8	0.00	11.56	11.56	20.54	1.7	98.3
#16	2.37	3.52	1.15	1.15	3.8	96.2
#30	2.29	5.17	2.88	4.03	8.9	91.1
#40	2.34	5.74	3.40	7.43	14.9	85.1
#50	2.31	7.14	4.83	12.26	23.5	76.5
#60	2.36	5.72	3.36	15.62	29.5	70.5
#100	2.30	13.31	11.01	26.63	49.0	51.0
#200	2.39	13.32	10.93	37.56	68.4	31.6

Data entered by: DLS Date: 10/06/99
Data checked by: SR Date: 10-6-99
FileName: SOH00600 ADVANCED TERRA TESTING, INC.

HYDROMETER ANALYSIS - SEDIMENTATION DATA

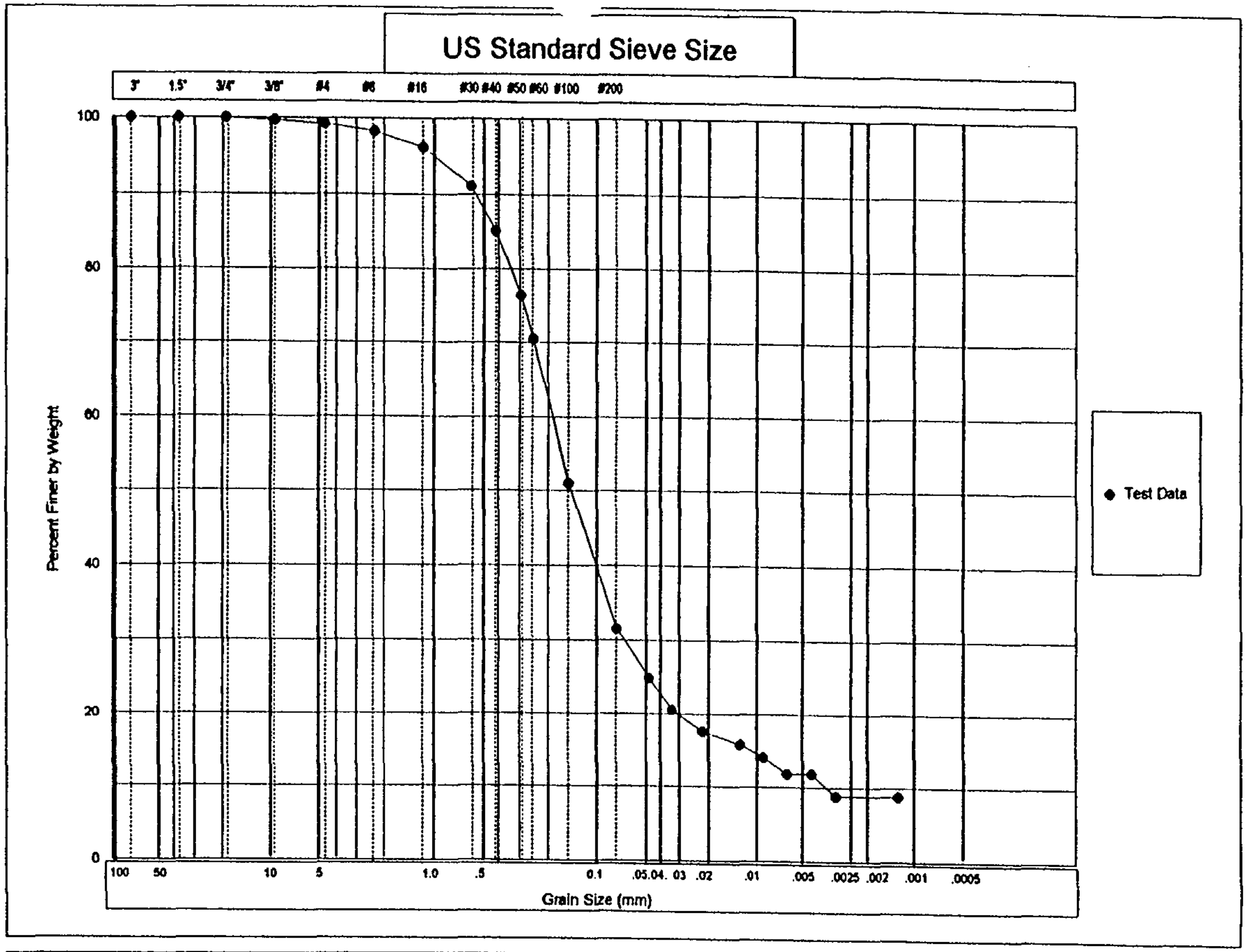
CLIENT	Stone & Webster	JOB NO.	2162-07
BORING NO.	MISS-TP3SSREL00-00600	SAMPLED	8-31-99 KG/BM
DEPTH	9.0-10.0'	DATE TESTED	9-28-99 RV
SAMPLE NO. & TIME	MISS-00600, 1355	WASH SIEVE	Yes
		DRY SIEVE	No
SOIL DESCR.	FUSRAP Maywood Superfund Site; Proj# 085750303		

Hydrometer #	ASTM 152 H	Temp., Deg. C	22.9
Sp. Gr. of Soil	2.72	Temp. Coef. K	0.01291
Value of "alpha"	0.99	Wt. Dry Sample "W"	56.298
Deflocculant	Sodium Hexametaphosphate	% of Total Sample	100.0
Defloc. Corr'n	3.3		
Meniscus Corr'n	-1.0		

T Elapsed Time (min)	Hydrometer Reading Original	Corrected "R"	100Ra/W	% Total Sample	Effective Depth L	Grain Diameter (mm)
0.0	--	--	--	--	--	--
0.5	--	--	--	--	--	--
1.0	18.50	14.25	25.0	25.0	13.26	0.0470
2.0	16.00	11.75	20.6	20.6	13.67	0.0338
5.0	14.25	10.00	17.5	17.5	13.95	0.0216
15.0	13.25	9.00	15.8	15.8	14.12	0.0125
30.0	12.25	8.00	14.0	14.0	14.28	0.0089
60.0	11.00	6.75	11.8	11.8	14.49	0.0063
120.0	11.00	6.75	11.8	11.8	14.49	0.0045
250.0	9.25	5.00	8.8	8.8	14.77	0.0031
1509.0	9.25	5.00	8.8	8.8	14.77	0.0013

Grain Diameter = K*(SQRT(L/T))

Data entered by: DLS Date: 10/06/99
Data checked by: SR Date: 10-6-99
FileName:SOH00600 ADVANCED TERRA TESTING, INC.



COBBLES	GRAVEL		SAND			SILT OR CLAY	USCS
	COARSE	FINE	CRS	MEDIUM	FINE		

COBBLES TO BOULDERS	PEBBLE GRAVEL				SAND			SILT	CLAY	WENTWORTH
	COARSE	MED	FINE	GRAN	COARSE	MED	FINE			

Client: Stone & Webster
Boring No.: MISS-TP3SSRELO0-00600
Sample No. & Time: MISS-00600, 1355
Depth: 9.0-10.0'
Job Number: 2162-07
Classification:____________________

Advanced Terra Testing, Inc.

TEST PIT 4

ENGINEERING TEST PITS AT MISS
GEOTECHNICAL DATA RESULTS

FUSRAP MAYWOOD SUPERFUND SITE
MAYWOOD, NEW JERSEY

MECHANICAL ANALYSIS - SIEVE TEST DATA
ASTM D 422

CLIENT	Stone & Webster	JOB NO.	2162-07
BORING NO.	MISS-TP4SSSUOVO-00710	SAMPLED	9-1-99 KG/BM
DEPTH	1.0'	DATE TESTED	9-24-99 DPM
SAMPLE NO. & TIME	MISS-00710, 1330	WASH SIEVE	Yes
		DRY SIEVE	No
SOIL DESCR.	FUSRAP Maywood Superfund Site; Proj# 085750303		

MOISTURE DATA

HYGROSCOPIC	Yes	
NATURAL	No	
Wt. Wet Soil & Pan	(g)	45.56
Wt. Dry Soil & Pan	(g)	42.97
Wt. Lost Moisture	(g)	2.59
Wt. of Pan Only	(g)	3.80
Wt. of Dry Soil	(g)	39.17
Moisture Content %		6.6
Wt. Hydrom. Sample Wet (g)		56.66
Wt. Hydrom. Sample Dry (g)		53.14

WASH SIEVE ANALYSIS

Wt. Total Sample Wet (g)	1646.79
Weight of + #8 Before Washing (g)	158.67
Weight of + #8 After Washing (g)	151.09
Weight of - #8 Wet (g)	1488.12
Weight of - #8 Dry (g)	1402.94
Wt. Total Sample Dry (g)	1554.03
Calc. Wt. "W" (g)	58.87
Calc. Mass + #8	5.72

Sieve Number (Size)	Pan Weight (g)	Indiv. Wt. + Pan (g)	Indiv. Wt. Retain.	Cum. Wt. Retain.	Cum. % Retain.	% Finer By Wt.
3"	0.00	0.00	0.00	0.00	0.0	100.0
1 1/2"	0.00	0.00	0.00	0.00	0.0	100.0
3/4"	0.00	45.10	45.10	45.10	2.9	97.1
3/8"	0.00	59.67	59.67	104.77	6.7	93.3
#4	0.00	18.83	18.83	123.60	8.0	92.0
#8	0.00	27.49	27.49	151.09	9.7	90.3
#16	0.99	1.53	0.54	0.54	10.6	89.4
#30	1.02	1.79	0.77	1.31	11.9	88.1
#40	0.99	1.79	0.80	2.11	13.3	86.7
#50	1.02	2.03	1.01	3.12	15.0	85.0
#60	1.00	1.56	0.56	3.68	16.0	84.0
#100	1.01	3.34	2.33	6.01	19.9	80.1
#200	1.02	4.42	3.40	9.41	25.7	74.3

Data entered by: DLS Date: 10/13/99
Data checked by: CAL Date: 10/16/99
FileName: SOH00710

ADVANCED TERRA TESTING, INC.

HYDROMETER ANALYSIS - SEDIMENTATION DATA

CLIENT	Stone & Webster	JOB NO.	2162-07
BORING NO.	MISS-TP4SSSUOVO-00710	SAMPLED	9-1-99 KG/BM
DEPTH	1.0'	DATE TESTED	9-24-99 DPM
SAMPLE NO. & TIME	MISS-00710, 1330	WASH SIEVE	Yes
		DRY SIEVE	No
SOIL DESCR.	FUSRAP Maywood Superfund Site; Proj# 085750303		

Hydrometer #	ASTM 152 H	Temp., Deg. C	19.8
Sp. Gr. of Soil	2.72	Temp. Coef. K	0.01340
Value of "alpha"	0.99	Wt. Dry Sample "W"	58.868
Deflocculant	Sodium Hexametaphosphate	% of Total Sample	100.0
Defloc. Corr'n	5.8		
Meniscus Corr'n	-1.0		

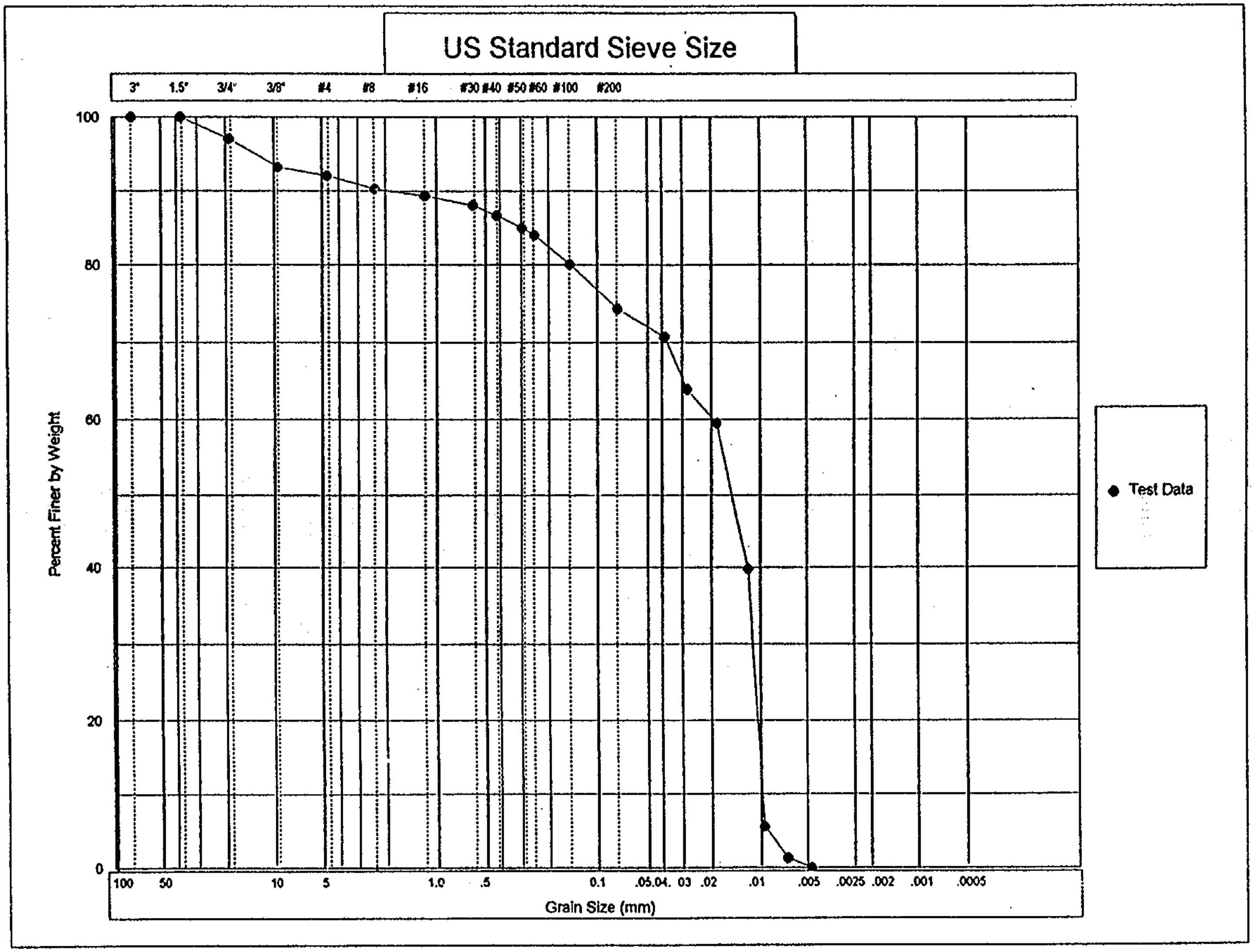
T Elapsed Time (min)	Hydrometer Reading Original	Hydrometer Reading Corrected "R"	100Ra/W	% Total Sample	Effective Depth L	Grain Diameter (mm)
0.0	--	--	--	--	--	--
0.5	--	--	--	--	--	--
1.0	49.00	42.25	70.8	70.8	8.25	0.0385
2.0	45.00	38.25	64.1	64.1	8.91	0.0283
5.0	42.25	35.50	59.5	59.5	9.36	0.0183
15.0	30.50	23.75	39.8	39.8	11.29	0.0116
30.0	10.00	3.25	5.4	5.4	14.65	0.0094
60.0	7.50	0.75	1.3	1.3	15.06	0.0067
120.0	6.75	0.00	0.0	0.0	15.18	0.0048

Notes: The 30 second reading was not reported, because it was not accurate because the sample had too much foam.
Test was terminated at the 120 minute reading.

Grain Diameter = K*(SQRT(L/T))

Data entered by: DLS Date: 10/13/99
Data checked by: CAC Date: 10/14/99
FileName:SOH00710

ADVANCED TERRA TESTING, INC.



COBBLES	GRAVEL		SAND			SILT OR CLAY	USCS
	COARSE	FINE	CRS	MEDIUM	FINE		

COBBLES TO BOULDERS	PEBBLE GRAVEL				SAND			SILT	CLAY	WENTWORTH
	COARSE	MED	FINE	GRAN	COARSE	MED	FINE			

Client: Stone & Webster　Boring No.: MISS-TP4SSSUOV0-00710　Sample No. & Time: MISS-00710, 1330

Depth: 1.0'　Job Number: 2162-07

Classification:____________________

Advanced Terra Testing, Inc.

MECHANICAL ANALYSIS - SIEVE TEST DATA
ASTM D 422

CLIENT	Stone & Webster	JOB NO.	2162-07
BORING NO.	MISS-TP4SSTROV0-00740	SAMPLED	9-1-99 KG/BM
DEPTH	1.0'	DATE TESTED	9-24-99 DPM
SAMPLE NO. & TIME	MISS-00740, 1355	WASH SIEVE	Yes
		DRY SIEVE	No
SOIL DESCR.	FUSRAP Maywood Superfund Site; Proj# 085750303		

MOISTURE DATA

HYGROSCOPIC	Yes
NATURAL	No
Wt. Wet Soil & Pan (g)	48.62
Wt. Dry Soil & Pan (g)	46.25
Wt. Lost Moisture (g)	2.37
Wt. of Pan Only (g)	3.68
Wt. of Dry Soil (g)	42.57
Moisture Content %	5.6
Wt. Hydrom. Sample Wet (g)	55.55
Wt. Hydrom. Sample Dry (g)	52.62

WASH SIEVE ANALYSIS

Wt. Total Sample Wet (g)	1285.96
Weight of + #8 Before Washing (g)	175.01
Weight of + #8 After Washing (g)	170.90
Weight of - #8 Wet (g)	1110.95
Weight of - #8 Dry (g)	1056.26
Wt. Total Sample Dry (g)	1227.16
Calc. Wt. "W" (g)	61.14
Calc. Mass + #8	8.51

Sieve Number (Size)	Pan Weight (g)	Indiv. Wt. + Pan (g)	Indiv. Wt. Retain.	Cum. Wt. Retain.	Cum. % Retain.	% Finer By Wt.
3"	0.00	0.00	0.00	0.00	0.0	100.0
1 1/2"	0.00	0.00	0.00	0.00	0.0	100.0
3/4"	0.00	19.25	19.25	19.25	1.6	98.4
3/8"	0.00	58.92	58.92	78.17	6.4	93.6
#4	0.00	43.53	43.53	121.70	9.9	90.1
#8	0.00	49.20	49.20	170.90	13.9	86.1
#16	3.84	5.68	1.84	1.84	16.9	83.1
#30	3.75	5.47	1.72	3.56	19.7	80.3
#40	3.84	5.20	1.36	4.92	22.0	78.0
#50	3.79	5.29	1.50	6.42	24.4	75.6
#60	3.85	4.55	0.70	7.12	25.6	74.4
#100	3.67	5.94	2.27	9.39	29.3	70.7
#200	3.81	6.63	2.82	12.21	33.9	66.1

Data entered by: DLS Date: 11/01/99
Data checked by: KR Date: 11/1/99
FileName: SOH00740

ADVANCED TERRA TESTING, INC.

HYDROMETER ANALYSIS - SEDIMENTATION DATA

CLIENT Stone & Webster JOB NO. 2162-07

BORING NO.	MISS-TP4SSTROV0-00740	SAMPLED	9-1-99 KG/BM
DEPTH	1.0'	DATE TESTED	9-24-99 DPM
SAMPLE NO. & TIME	MISS-00740, 1355	WASH SIEVE	Yes
		DRY SIEVE	No
SOIL DESCR.	FUSRAP Maywood Superfund Site; Proj# 085750303		

Hydrometer #	ASTM 152 H	Temp., Deg. C	19.7
Sp. Gr. of Soil	2.80	Temp. Coef. K	0.01311
Value of "alpha"	0.97	Wt. Dry Sample "W"	61.139
Deflocculant	Sodium Hexametaphosphate	% of Total Sample	100.0
Defloc. Corr'n	5.8		
Meniscus Corr'n	-1.0		

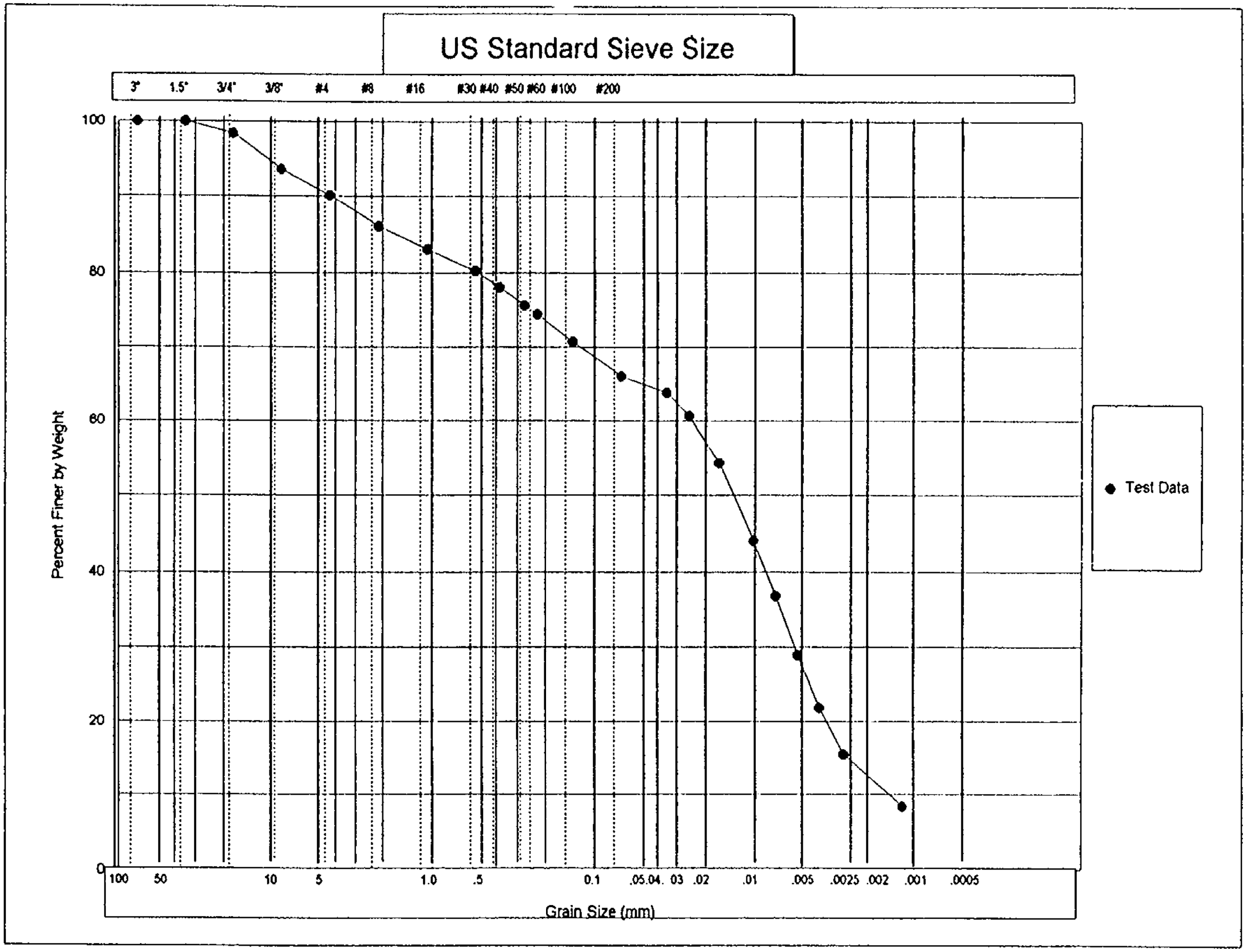
T Elapsed Time (min)	Hydrometer Reading Original	Hydrometer Reading Corrected "R"	100Ra/W	% Total Sample	Effective Depth L	Grain Diameter (mm)
0.0	--	--	--	--	--	--
0.5	--	--	--	--	--	--
1.0	47.00	40.25	63.9	63.9	8.58	0.0384
2.0	45.00	38.25	60.7	60.7	8.91	0.0277
5.0	41.00	34.25	54.3	54.3	9.57	0.0181
15.0	34.50	27.75	44.0	44.0	10.63	0.0110
30.0	30.00	23.25	36.9	36.9	11.37	0.0081
60.0	25.00	18.25	29.0	29.0	12.19	0.0059
120.0	20.50	13.75	21.8	21.8	12.93	0.0043
250.0	16.50	9.75	15.5	15.5	13.58	0.0031
1433.0	12.00	5.25	8.3	8.3	14.32	0.0013

Note: The 30 second reading was omitted because there was to much foam to get an valid reading.

Grain Diameter = K*(SQRT(L/T))

Data entered by: DLS Date: 11/01/99
Data checked by: KP Date: 11/1/99
FileName:SOH00740

ADVANCED TERRA TESTING, INC.



COBBLES	GRAVEL		SAND			SILT OR CLAY	USCS
	COARSE	FINE	CRS	MEDIUM	FINE		

COBBLES TO BOULDERS	PEBBLE GRAVEL				SAND			SILT	CLAY	WENTWORTH
	COARSE	MED	FINE	GRAN	COARSE	MED	FINE			

Client: Stone & Webster
Boring No.: MISS-TP4SSTROV0-00740
Sample No. & Time: MISS-00740, 1355
Depth: 1.0'
Job Number: 2162-07
Classification:____________________

Advanced Terra Testing, Inc.

MECHANICAL ANALYSIS - SIEVE TEST DATA
ASTM D 422

CLIENT	Stone & Webster	JOB NO.	2162-07
BORING NO.	MISS-TP4SSREVOV0-00770	SAMPLED	9-1-99 KG/BM
DEPTH	1.0'	DATE TESTED	9-24-99 DPM
SAMPLE NO. & TIME	MISS-00770, 1435	WASH SIEVE	Yes
		DRY SIEVE	No
SOIL DESCR.	FUSRAP Maywood Superfund Site; Proj# 085750303		

MOISTURE DATA

HYGROSCOPIC	Yes
NATURAL	No
Wt. Wet Soil & Pan (g)	50.50
Wt. Dry Soil & Pan (g)	48.07
Wt. Lost Moisture (g)	2.43
Wt. of Pan Only (g)	3.83
Wt. of Dry Soil (g)	44.24
Moisture Content %	5.5
Wt. Hydrom. Sample Wet (g)	55.73
Wt. Hydrom. Sample Dry (g)	52.83

WASH SIEVE ANALYSIS

Wt. Total Sample Wet (g)	789.47
Weight of + #8 Before Washing (g)	99.42
Weight of + #8 After Washing (g)	96.50
Weight of - #8 Wet (g)	690.05
Weight of - #8 Dry (g)	656.89
Wt. Total Sample Dry (g)	753.39
Calc. Wt. "W" (g)	60.59
Calc. Mass + #8	7.76

Sieve Number (Size)	Pan Weight (g)	Indiv. Wt. + Pan (g)	Indiv. Wt. Retain.	Cum. Wt. Retain.	Cum. % Retain.	% Finer By Wt.
3"	0.00	0.00	0.00	0.00	0.0	100.0
1 1/2"	0.00	0.00	0.00	0.00	0.0	100.0
3/4"	0.00	0.00	0.00	0.00	0.0	100.0
3/8"	0.00	46.91	46.91	46.91	6.2	93.8
#4	0.00	21.08	21.08	67.99	9.0	91.0
#8	0.00	28.51	28.51	96.50	12.8	87.2
#16	1.01	3.65	2.64	2.64	17.2	82.8
#30	1.01	3.95	2.94	5.58	22.0	78.0
#40	1.01	3.54	2.53	8.11	26.2	73.8
#50	1.02	3.88	2.86	10.97	30.9	69.1
#60	1.01	2.41	1.40	12.37	33.2	66.8
#100	0.98	4.85	3.87	16.24	39.6	60.4
#200	1.03	4.58	3.55	19.79	45.5	54.5

Data entered by: DLS Date: 10/13/99
Data checked by: CK Date: 10/16/99
FileName: SOH00770

ADVANCED TERRA TESTING, INC.

HYDROMETER ANALYSIS - SEDIMENTATION DATA

CLIENT Stone & Webster

JOB NO. 2162-07

BORING NO.	MISS-TP4SSREVOV0-00770	SAMPLED	9-1-99 KG/BM
DEPTH	1.0'	DATE TESTED	9-24-99 DPM
SAMPLE NO. & TIME	MISS-00770, 1435	WASH SIEVE	Yes
		DRY SIEVE	No
SOIL DESCR.	FUSRAP Maywood Superfund Site; Proj# 085750303		

Hydrometer #	ASTM 152 H	Temp., Deg. C	19.9
Sp. Gr. of Soil	2.59	Temp. Coef. K	0.01393
Value of "alpha"	1.01	Wt. Dry Sample "W"	60.591
Deflocculant	Sodium Hexametaphosphate	% of Total Sample	100.0
Defloc. Corr'n	5.8		
Meniscus Corr'n	-1.0		

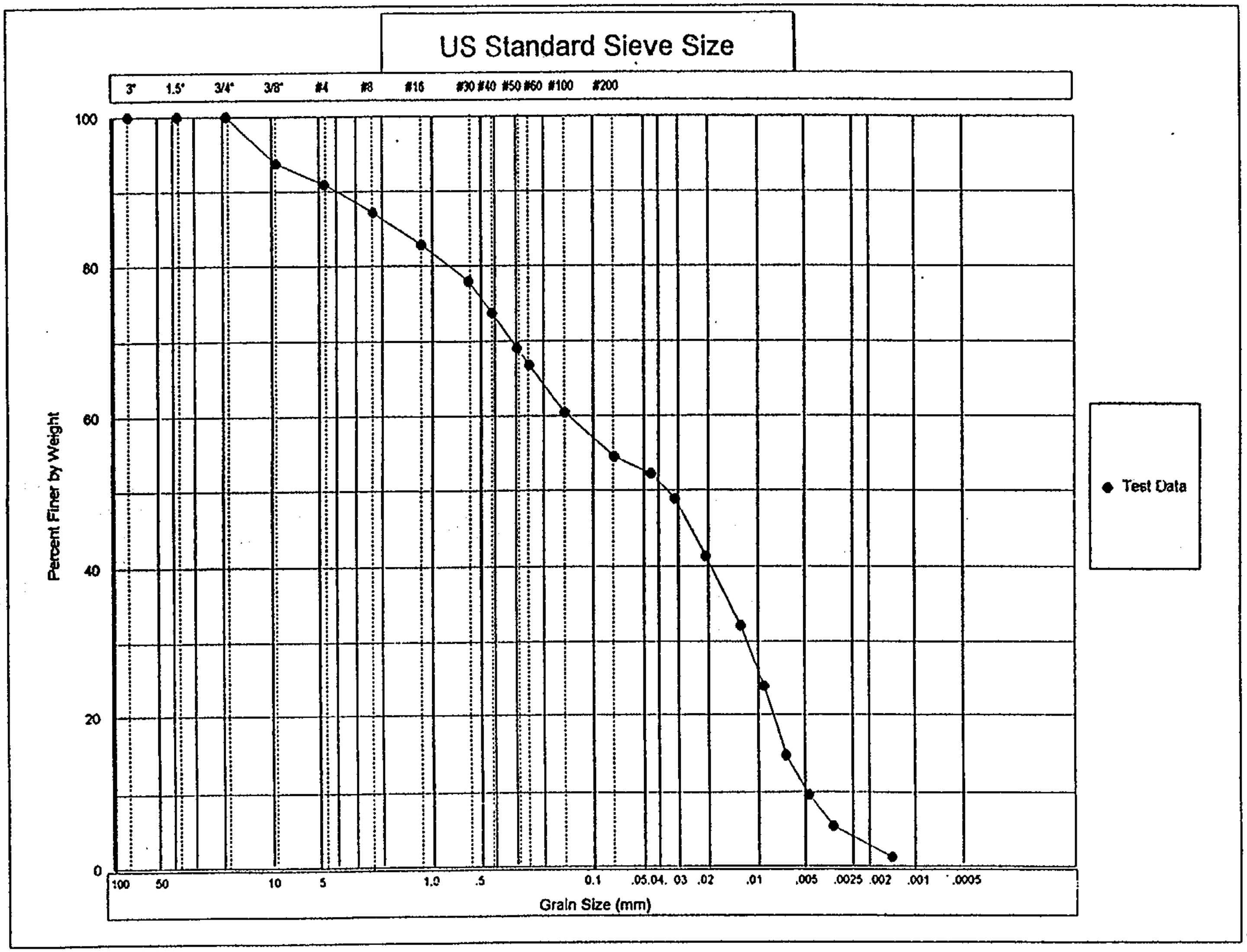
T Elapsed Time (min)	Hydrometer Reading Original	Corrected "R"	100Ra/W	% Total Sample	Effective Depth L	Grain Diameter (mm)
0.0	--	--	--	--	--	--
0.5	--	--	--	--	--	--
1.0	38.00	31.25	52.2	52.2	10.06	0.0442
2.0	36.00	29.25	48.9	48.9	10.39	0.0317
5.0	31.50	24.75	41.3	41.3	11.12	0.0208
15.0	26.00	19.25	32.2	32.2	12.03	0.0125
30.0	21.00	14.25	23.8	23.8	12.85	0.0091
60.0	15.50	8.75	14.6	14.6	13.75	0.0067
120.0	12.50	5.75	9.6	9.6	14.24	0.0048
250.0	10.00	3.25	5.4	5.4	14.65	0.0034
1423.0	7.50	0.75	1.3	1.3	15.06	0.0014

Note: The 30 second reading was not reported, because it was not accurate because the sample had too much foam.

Grain Diameter = K*(SQRT(L/T))

Data entered by: DLS Date: 10/13/99
Data checked by: CAL Date: 10/16/99
FileName:SOH00770

ADVANCED TERRA TESTING, INC.



COBBLES	GRAVEL		SAND			SILT OR CLAY	USCS
	COARSE	FINE	CRS	MEDIUM	FINE		

COBBLES TO BOULDERS	PEBBLE GRAVEL				SAND			SILT	CLAY	WENTWORTH
	COARSE	MED	FINE	GRAN	COARSE	MED	FINE			

Client: Stone & Webster
Depth: 1.0'
Classification:____________________

Boring No.: MISS-TP4SSREVOV0-00770
Job Number: 2162-07

Sample No. & Time: MISS-00770, 1435

Advanced Terra Testing, Inc.

MECHANICAL ANALYSIS - SIEVE TEST DATA
ASTM D 422

CLIENT	Stone & Webster	JOB NO.	2162-07
BORING NO.	MISS-TP4SSSUUP0-00720	SAMPLED	9-1-99 KG/BM
DEPTH	2.0-3.0'	DATE TESTED	10-13-99 DPM
SAMPLE NO. & TIME	MISS-00720, 1345	WASH SIEVE	Yes
		DRY SIEVE	No
SOIL DESCR.	FUSRAP Maywood Superfund Site; Proj# 085750303		

MOISTURE DATA

HYGROSCOPIC	Yes	
NATURAL	No	
Wt. Wet Soil & Pan	(g)	66.12
Wt. Dry Soil & Pan	(g)	64.84
Wt. Lost Moisture	(g)	1.28
Wt. of Pan Only	(g)	3.68
Wt. of Dry Soil	(g)	61.16
Moisture Content %		2.1
Wt. Hydrom. Sample Wet	(g)	78.08
Wt. Hydrom. Sample Dry	(g)	76.48

WASH SIEVE ANALYSIS

Wt. Total Sample Wet (g)	2626.94
Weight of + #8 Before Washing (g)	655.36
Weight of + #8 After Washing (g)	647.60
Weight of - #8 Wet (g)	1971.58
Weight of - #8 Dry (g)	1938.76
Wt. Total Sample Dry (g)	2586.36
Calc. Wt. "W" (g)	102.03
Calc. Mass + #8	25.55

Sieve Number (Size)	Pan Weight (g)	Indiv. Wt. + Pan (g)	Indiv. Wt. Retain.	Cum. Wt. Retain.	Cum. % Retain.	% Finer By Wt.
3"	0.00	0.00	0.00	0.00	0.0	100.0
1 1/2"	0.00	118.54	118.54	118.54	4.6	95.4
3/4"	0.00	208.56	208.56	327.10	12.6	87.4
3/8"	0.00	158.86	158.86	485.96	18.8	81.2
#4	0.00	91.10	91.10	577.06	22.3	77.7
#8	0.00	70.54	70.54	647.60	25.0	75.0
#16	3.68	6.89	3.21	3.21	28.2	71.8
#30	3.68	7.61	3.93	7.14	32.0	68.0
#40	3.71	8.21	4.50	11.64	36.4	63.6
#50	3.93	10.06	6.13	17.77	42.5	57.5
#60	3.72	7.19	3.47	21.24	45.9	54.1
#100	3.77	15.70	11.93	33.17	57.5	42.5
#200	3.79	14.66	10.87	44.04	68.2	31.8

Data entered by: DLS Date: 10/25/99
Data checked by: CAL Date: 10/26/99
FileName: SOH00720

ADVANCED TERRA TESTING, INC.

HYDROMETER ANALYSIS - SEDIMENTATION DATA

CLIENT Stone & Webster JOB NO. 2162-07

BORING NO.	MISS-TP4SSSUUPO-00720	SAMPLED	9-1-99 KG/BM
DEPTH	2.0-3.0'	DATE TESTED	10-13-99 DPM
SAMPLE NO. & TIME	MISS-00720, 1345	WASH SIEVE	Yes
		DRY SIEVE	No

SOIL DESCR. FUSRAP Maywood Superfund Site; Proj# 085750303

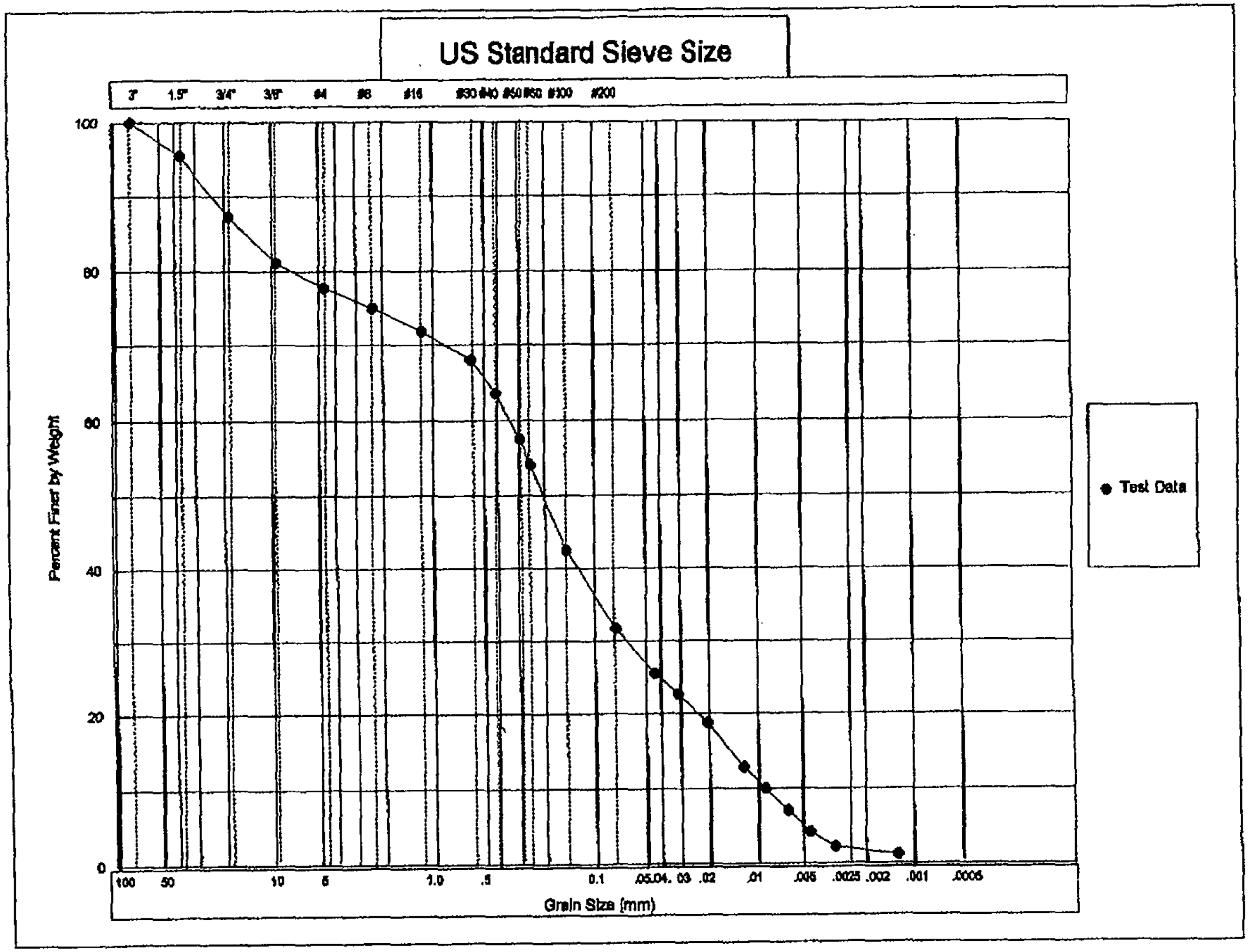
Hydrometer #	ASTM 152 H	Temp., Deg. C	22.5
Sp. Gr. of Soil	2.69	Temp. Coef. K	0.01309
Value of "alpha"	0.99	Wt. Dry Sample "W"	102.028
Deflocculant	Sodium Hexametaphosphate	% of Total Sample	100.0
Defloc. Corr'n	4.8		
Meniscus Corr'n	-1.0		

T Elapsed Time (min)	Hydrometer Reading Original	Hydrometer Reading Corrected "R"	100Ra/W	% Total Sample	Effective Depth L	Grain Diameter (mm)
0.0	--	--	--	--	--	--
0.5	--	--	--	--	--	--
1.0	32.00	26.25	25.5	25.5	11.04	0.0435
2.0	29.00	23.25	22.6	22.6	11.53	0.0314
5.0	25.00	19.25	18.7	18.7	12.19	0.0204
15.0	19.00	13.25	12.9	12.9	13.17	0.0123
30.0	16.00	10.25	10.0	10.0	13.67	0.0088
60.0	13.00	7.25	7.0	7.0	14.16	0.0064
120.0	10.00	4.25	4.1	4.1	14.65	0.0046
250.0	8.00	2.25	2.2	2.2	14.98	0.0032
1579.0	7.00	1.25	1.2	1.2	15.14	0.0013

Grain Diameter = K*(SQRT(L/T))

Data entered by: DLS Date: 10/25/99
Data checked by:______ Date:________
FileName:SOH00720

ADVANCED TERRA TESTING, INC.



COBBLES	GRAVEL		SAND			SILT OR CLAY	USCS
	COARSE	FINE	CRS	MEDIUM	FINE		

COBBLES TO BOULDERS	PEBBLE GRAVEL				SAND			SILT	CLAY	WENTWORTH
	COARSE	MED	FINE	GRAN	COARSE	MED	FINE			

Client: Stone & Webster
Boring No.: MISS-TP4SSSUUP0-00720
Sample No. & Time: MISS-00720, 1345
Depth: 2.0-3.0'
Job Number: 2162-07
Classification:________________

Advanced Terra Testing, Inc.

MECHANICAL ANALYSIS - SIEVE TEST DATA
ASTM D 422

CLIENT Stone & Webster JOB NO. 2162-07

BORING NO.	MISS-TP4SSTRUPO-0750	SAMPLED	9-1-99 KG/BM
DEPTH	3.0-6.0'	DATE TESTED	10-13-99 DPM
SAMPLE NO. & TIME	MISS-00750, 1400	WASH SIEVE	Yes
		DRY SIEVE	No

SOIL DESCR. FUSRAP Maywood Superfund Site; Proj# 085750303

MOISTURE DATA

HYGROSCOPIC	Yes	
NATURAL	No	
Wt. Wet Soil & Pan	(g)	105.41
Wt. Dry Soil & Pan	(g)	104.12
Wt. Lost Moisture	(g)	1.29
Wt. of Pan Only	(g)	3.85
Wt. of Dry Soil	(g)	100.27
Moisture Content	%	1.3
Wt. Hydrom. Sample Wet	(g)	85.66
Wt. Hydrom. Sample Dry	(g)	84.57

WASH SIEVE ANALYSIS

Wt. Total Sample Wet (g)	8792.67
Weight of + #8 Before Washing (g)	1688.03
Weight of + #8 After Washing (g)	1561.28
Weight of - #8 Wet (g)	7104.64
Weight of - #8 Dry (g)	7139.54
Wt. Total Sample Dry (g)	8700.82
Calc. Wt. "W" (g)	103.06
Calc. Mass + #8	18.49

Sieve Number (Size)	Pan Weight (g)	Indiv. Wt. + Pan (g)	Indiv. Wt. Retain.	Cum. Wt. Retain.	Cum. % Retain.	% Finer By Wt.
3"	0.00	1118.25	1118.25	1118.25	12.9	87.1
1 1/2"	0.00	0.00	0.00	1118.25	12.9	87.1
3/4"	0.00	213.98	213.98	1332.23	15.3	84.7
3/8"	0.00	118.00	118.00	1450.23	16.7	83.3
#4	0.00	56.20	56.20	1506.43	17.3	82.7
#8	0.00	54.85	54.85	1561.28	17.9	82.1
#16	3.82	5.22	1.40	1.40	19.3	80.7
#30	3.80	8.45	4.65	6.05	23.8	76.2
#40	3.80	8.48	4.68	10.73	28.4	71.6
#50	3.77	10.67	6.90	17.63	35.1	64.9
#60	3.69	8.26	4.57	22.20	39.5	60.5
#100	3.81	17.03	13.22	35.42	52.3	47.7
#200	3.81	14.13	10.32	45.74	62.3	37.7

Data entered by: DLS Date: 10/27/99
Data checked by: CM Date: 10/30/99
FileName: SOH00750

ADVANCED TERRA TESTING, INC.

HYDROMETER ANALYSIS - SEDIMENTATION DATA

CLIENT Stone & Webster JOB NO. 2162-07

BORING NO.	MISS-TP4SSTRUP0-0750	SAMPLED	9-1-99 KG/BM
DEPTH	3.0-6.0'	DATE TESTED	10-13-99 DPM
SAMPLE NO. & TIME	MISS-00750, 1400	WASH SIEVE	Yes
		DRY SIEVE	No

SOIL DESCR. FUSRAP Maywood Superfund Site; Proj# 085750303

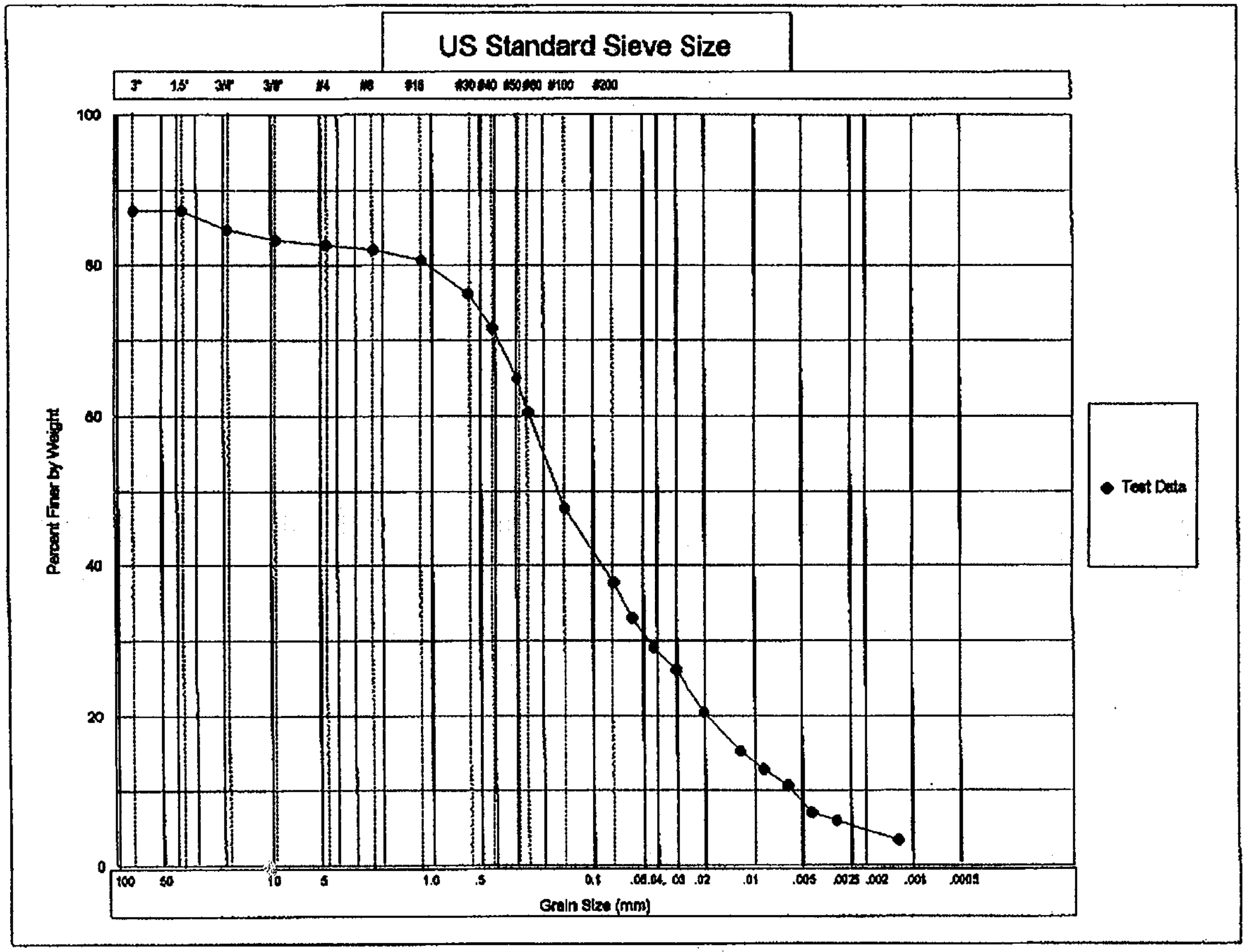
Hydrometer #	ASTM 152 H	Temp., Deg. C	22.4
Sp. Gr. of Soil	2.69	Temp. Coef. K	0.01310
Value of "alpha"	0.99	Wt. Dry Sample "W"	103.061
Deflocculant	Sodium Hexametaphosphate	% of Total Sample	100.0
Defloc. Corr'n	4.8		
Meniscus Corr'n	-1.0		

T Elapsed Time (min)	Hydrometer Reading Original	Corrected "R"	100Ra/W	% Total Sample	Effective Depth L	Grain Diameter (mm)
0.0	--	--	--	--	--	--
0.5	40.00	34.25	33.0	33.0	9.73	0.0578
1.0	36.00	30.25	29.1	29.1	10.39	0.0422
2.0	33.00	27.25	26.2	26.2	10.88	0.0306
5.0	27.00	21.25	20.5	20.5	11.86	0.0202
15.0	21.50	15.75	15.2	15.2	12.76	0.0121
30.0	19.00	13.25	12.8	12.8	13.17	0.0087
60.0	16.75	11.00	10.6	10.6	13.54	0.0062
120.0	13.00	7.25	7.0	7.0	14.16	0.0045
250.0	12.00	6.25	6.0	6.0	14.32	0.0031
1594.0	9.25	3.50	3.4	3.4	14.77	0.0013

Grain Diameter = K*(SQRT(L/T))

Data entered by: DLS Date: 10/27/99
Data checked by: CM Date: 10/30/99
FileName:SOH00750

ADVANCED TERRA TESTING, INC.



COBBLES	GRAVEL		SAND			SILT OR CLAY	USCS
	COARSE	FINE	CRS	MEDIUM	FINE		

COBBLES TO BOULDERS	PEBBLE GRAVEL				SAND			SILT	CLAY	WENTWORTH
	COARSE	MED	FINE	GRAN	COARSE	MED	FINE			

Client: Stone & Webster Boring No.: MISS-TP4SSTRUP0-0750 Sample No. & Time: MISS-00750, 1400
Depth: 3.0-6.0' Job Number: 2162-07
Classification:____________________

Advanced Terra Testing, Inc.

MECHANICAL ANALYSIS - SIEVE TEST DATA
ASTM D 422

CLIENT	Stone & Webster	JOB NO.	2162-07
BORING NO.	MISS-TP4SSREUP0-0078X	SAMPLED	9-21-99 KG/BM
DEPTH	2.0-7.0'	DATE TESTED	9-24-99 DPM
SAMPLE NO. & TIME	MISS-0078X, 1500	WASH SIEVE	Yes
		DRY SIEVE	No
SOIL DESCR.	FUSRAP Maywood Superfund Site; Proj# 085750303		

MOISTURE DATA

HYGROSCOPIC	Yes
NATURAL	No
Wt. Wet Soil & Pan (g)	49.86
Wt. Dry Soil & Pan (g)	46.29
Wt. Lost Moisture (g)	3.57
Wt. of Pan Only (g)	3.77
Wt. of Dry Soil (g)	42.52
Moisture Content %	8.4
Wt. Hydrom. Sample Wet (g)	55.38
Wt. Hydrom. Sample Dry (g)	51.09

WASH SIEVE ANALYSIS

Wt. Total Sample Wet (g)	1461.64
Weight of + #8 Before Washing (g)	39.75
Weight of + #8 After Washing (g)	38.44
Weight of - #8 Wet (g)	1421.89
Weight of - #8 Dry (g)	1312.96
Wt. Total Sample Dry (g)	1351.40
Calc. Wt. "W" (g)	52.59
Calc. Mass + #8	1.50

Sieve Number (Size)	Pan Weight (g)	Indiv. Wt. + Pan (g)	Indiv. Wt. Retain.	Cum. Wt. Retain.	Cum. % Retain.	% Finer By Wt.
3"	0.00	0.00	0.00	0.00	0.0	100.0
1 1/2"	0.00	0.00	0.00	0.00	0.0	100.0
3/4"	0.00	0.00	0.00	0.00	0.0	100.0
3/8"	0.00	15.20	15.20	15.20	1.1	98.9
#4	0.00	9.82	9.82	25.02	1.9	98.1
#8	0.00	13.42	13.42	38.44	2.8	97.2
#16	2.30	3.14	0.84	0.84	4.4	95.6
#30	2.28	3.24	0.96	1.80	6.3	93.7
#40	2.29	3.17	0.88	2.68	7.9	92.1
#50	2.31	3.33	1.02	3.70	9.9	90.1
#60	2.30	2.86	0.56	4.26	10.9	89.1
#100	2.29	3.90	1.61	5.87	14.0	86.0
#200	2.31	7.17	4.86	10.73	23.2	76.8

Data entered by: DLS Date: 10/17/99
Data checked by:______ Date:_________
FileName: SOH0078X

ADVANCED TERRA TESTING, INC.

HYDROMETER ANALYSIS - SEDIMENTATION DATA

CLIENT	Stone & Webster	JOB NO.	2162-07
BORING NO.	MISS-TP4SSREUP0-0078X	SAMPLED	9-1-99 KG/BM
DEPTH	2.0-7.0'	DATE TESTED	9-24-99 DPM
SAMPLE NO. & TIME	MISS-0078X, 1500	WASH SIEVE	Yes
		DRY SIEVE	No
SOIL DESCR.	FUSRAP Maywood Superfund Site; Proj# 085750303		

Hydrometer #	ASTM 152 H	Temp., Deg. C	20.0
Sp. Gr. of Soil	2.67	Temp. Coef. K	0.01357
Value of "alpha"	1.00	Wt. Dry Sample "W"	52.588
Deflocculant	Sodium Hexametaphosphate	% of Total Sample	100.0
Defloc. Corr'n	5.8		
Meniscus Corr'n	-1.0		

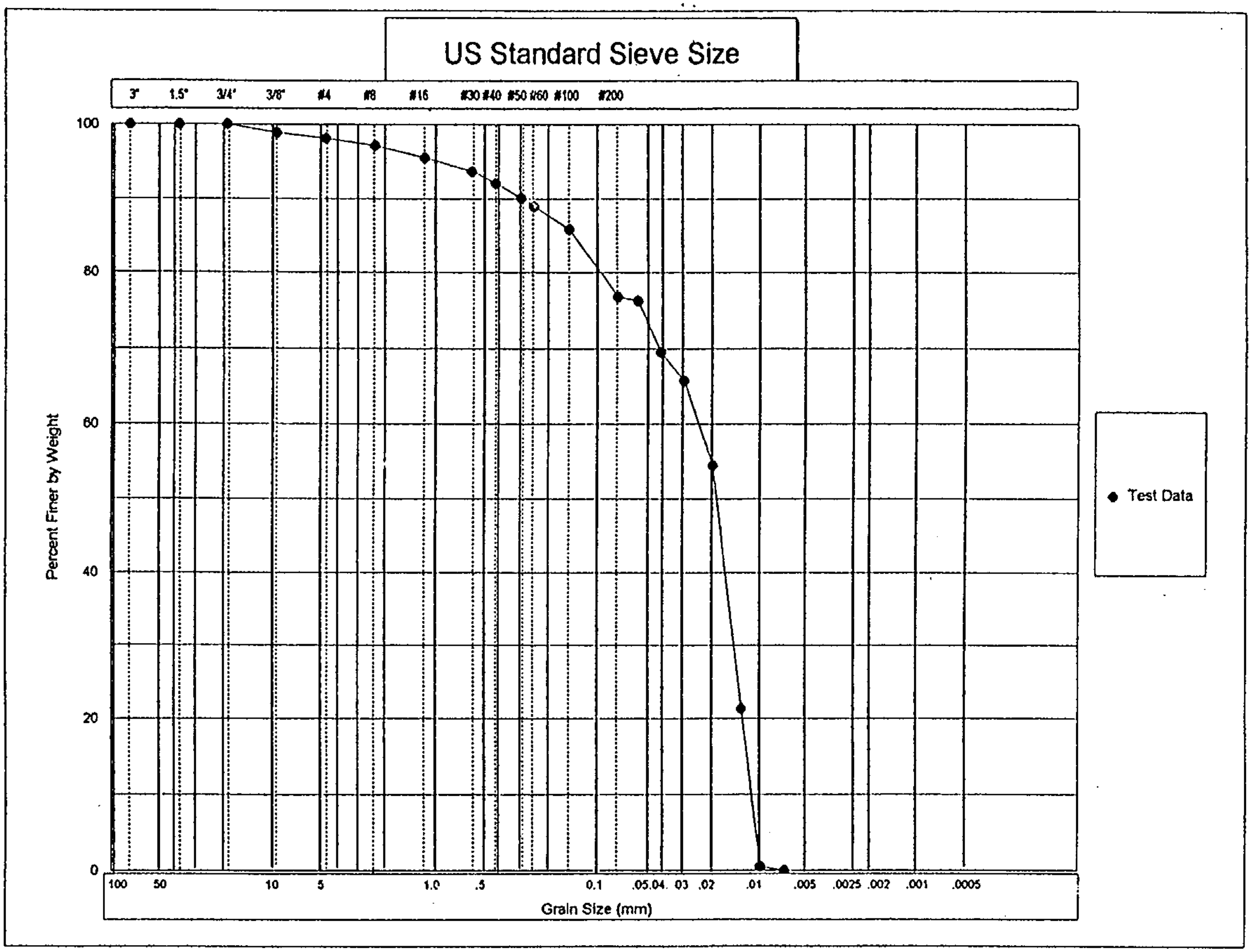
T Elapsed Time (min)	Hydrometer Reading Original	Corrected "R"	100Ra/W	% Total Sample	Effective Depth L	Grain Diameter (mm)
0.0	--	--	--	--	--	--
0.5	47.00	40.25	76.2	76.2	8.58	0.0562
1.0	43.50	36.75	69.6	69.6	9.16	0.0411
2.0	41.50	34.75	65.8	65.8	9.48	0.0295
5.0	35.50	28.75	54.5	54.5	10.47	0.0196
15.0	18.00	11.25	21.3	21.3	13.34	0.0128
30.0	7.00	0.25	0.5	0.5	15.14	0.0096
60.0	6.75	0.00	0.0	0.0	15.18	0.0068

Note: Test terminated at 60 second reading because values had reached zero.

Grain Diameter = K*(SQRT(L/T))

Data entered by: DLS Date: 10/17/99
Data checked by:______ Date:________
FileName:SOH0078X

ADVANCED TERRA TESTING, INC.



COBBLES	GRAVEL		SAND			SILT OR CLAY	USCS
	COARSE	FINE	CRS	MEDIUM	FINE		

COBBLES TO BOULDERS	PEBBLE GRAVEL				SAND			SILT	CLAY	WENTWORTH
	COARSE	MED	FINE	GRAN	COARSE	MED	FINE			

Client: Stone & Webster Boring No.: MISS-TP4SSREUP0-0078X Sample No. & Time: MISS-0078X, 1500

Depth: 2.0-7.0' Job Number: 2162-07

Classification:____________________

Advanced Terra Testing, Inc.

MECHANICAL ANALYSIS - SIEVE TEST DATA
ASTM D 422

CLIENT Stone & Webster JOB NO. 2162-07

BORING NO.	MISS-TP4SSSUL00-00730	SAMPLED	9-1-99
DEPTH	4.0'	DATE TESTED	9-25-99 AH
SAMPLE NO. & TIME	MISS-00730, 1330	WASH SIEVE	Yes
		DRY SIEVE	No

SOIL DESCR. FUSRAP Maywood Superfund Site; Proj# 085750303

MOISTURE DATA

HYGROSCOPIC	Yes
NATURAL	No
Wt. Wet Soil & Pan (g)	106.29
Wt. Dry Soil & Pan (g)	105.46
Wt. Lost Moisture (g)	0.83
Wt. of Pan Only (g)	3.79
Wt. of Dry Soil (g)	101.67
Moisture Content %	0.8
Wt. Hydrom. Sample Wet (g)	56.96
Wt. Hydrom. Sample Dry (g)	56.50

WASH SIEVE ANALYSIS

Wt. Total Sample Wet (g)	2335.33
Weight of + #8 Before Washing (g)	13.63
Weight of + #8 After Washing (g)	11.96
Weight of - #8 Wet (g)	2321.70
Weight of - #8 Dry (g)	2304.56
Wt. Total Sample Dry (g)	2316.52
Calc. Wt. "W" (g)	56.79
Calc. Mass + #8	0.29

Sieve Number (Size)	Pan Weight (g)	Indiv. Wt. + Pan (g)	Indiv. Wt. Retain.	Cum. Wt. Retain.	Cum. % Retain.	% Finer By Wt.
3"	0.00	0.00	0.00	0.00	0.0	100.0
1 1/2"	0.00	0.00	0.00	0.00	0.0	100.0
3/4"	0.00	0.00	0.00	0.00	0.0	100.0
3/8"	0.00	0.00	0.00	0.00	0.0	100.0
#4	0.00	0.00	0.00	0.00	0.0	100.0
#8	0.00	11.96	11.96	11.96	0.5	99.5
#16	2.36	3.74	1.38	1.38	2.9	97.1
#30	2.29	5.85	3.56	4.94	9.2	90.8
#40	2.30	5.98	3.68	8.62	15.7	84.3
#50	2.30	7.20	4.90	13.52	24.3	75.7
#60	2.28	6.20	3.92	17.44	31.2	68.8
#100	2.30	12.64	10.34	27.78	49.4	50.6
#200	2.31	9.99	7.68	35.46	63.0	37.0

Data entered by: DLS Date: 10/06/99
Data checked by: SR Date: 10-6-99
FileName: SOH00730 ADVANCED TERRA TESTING, INC.

HYDROMETER ANALYSIS - SEDIMENTATION DATA

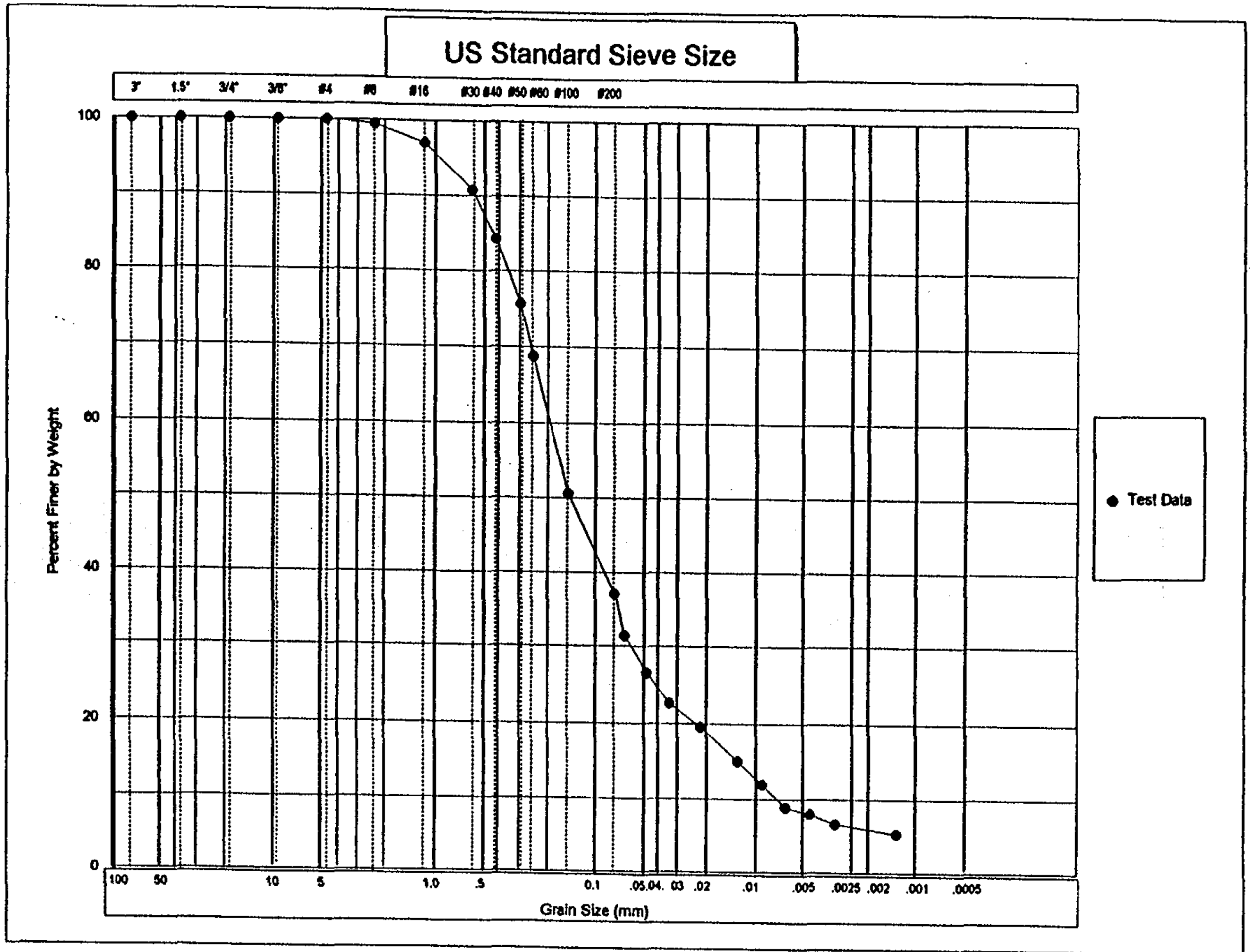
CLIENT	Stone & Webster	JOB NO.	2162-07
BORING NO.	MISS-TP4SSSUL00-00730	SAMPLED	9-1-99
DEPTH	4.0'	DATE TESTED	9-25-99 AH
SAMPLE NO. & TIME	MISS-00730, 1330	WASH SIEVE	Yes
		DRY SIEVE	No
SOIL DESCR.	FUSRAP Maywood Superfund Site; Proj# 085750303		

Hydrometer #	ASTM 152 H	Temp., Deg. C	24.1
Sp. Gr. of Soil	2.62	Temp. Coef. K	0.01312
Value of "alpha"	1.01	Wt. Dry Sample "W"	56.793
Deflocculant	Sodium Hexametaphosphate	% of Total Sample	100.0
Defloc. Corr'n	5.0		
Meniscus Corr'n	-1.0		

T Elapsed Time (min)	Hydrometer Reading Original	Corrected "R"	100Ra/W	% Total Sample	Effective Depth L	Grain Diameter (mm)
0.0	--	--	--	--	--	--
0.5	23.75	17.75	31.4	31.4	12.40	0.0653
1.0	21.00	15.00	26.6	26.6	12.85	0.0470
2.0	18.75	12.75	22.6	22.6	13.22	0.0337
5.0	17.00	11.00	19.5	19.5	13.50	0.0216
15.0	14.50	8.50	15.1	15.1	13.91	0.0126
30.0	12.75	6.75	12.0	12.0	14.20	0.0090
60.0	11.00	5.00	8.9	8.9	14.49	0.0064
120.0	10.50	4.50	8.0	8.0	14.57	0.0046
250.0	9.75	3.75	6.6	6.6	14.69	0.0032
1455.0	9.00	3.00	5.3	5.3	14.81	0.0013

Grain Diameter = K*(SQRT(L/T))

Data entered by: DLS Date: 10/06/99
Data checked by: SR Date: 10-6-99
FileName:SOH00730 ADVANCED TERRA TESTING, INC.



COBBLES	GRAVEL		SAND			SILT OR CLAY	USCS
	COARSE	FINE	CRS	MEDIUM	FINE		

COBBLES TO BOULDERS	PEBBLE GRAVEL				SAND			SILT	CLAY	WENTWORTH
	COARSE	MED	FINE	GRAN	COARSE	MED	FINE			

Client: Stone & Webster
Depth: 4.0'
Classification:______________________

Boring No.: MISS-TP4SSSULO0-00730
Job Number: 2162-07

Sample No. & Time: MISS-00730, 1330

Advanced Terra Testing, Inc.

MECHANICAL ANALYSIS - SIEVE TEST DATA
ASTM D 422

CLIENT	Stone & Webster	JOB NO.	2162-07
BORING NO.	MISS-TP4SSTRLOO-00760	SAMPLED	9-1-99 KG/BM
DEPTH	4.0′	DATE TESTED	10-25-99 RV
SAMPLE NO. & TIME	MISS-00760, 1410	WASH SIEVE	Yes
		DRY SIEVE	No
SOIL DESCR.	FUSRAP Maywood Superfund Site; Proj# 085750303		

MOISTURE DATA

HYGROSCOPIC	Yes
NATURAL	No
Wt. Wet Soil & Pan (g)	70.90
Wt. Dry Soil & Pan (g)	70.29
Wt. Lost Moisture (g)	0.61
Wt. of Pan Only (g)	4.29
Wt. of Dry Soil (g)	66.00
Moisture Content %	0.9
Wt. Hydrom. Sample Wet (g)	55.83
Wt. Hydrom. Sample Dry (g)	55.31

WASH SIEVE ANALYSIS

Wt. Total Sample Wet (g)	1993.11
Weight of + #8 Before Washing (g)	101.43
Weight of + #8 After Washing (g)	42.53
Weight of - #8 Wet (g)	1891.68
Weight of - #8 Dry (g)	1932.72
Wt. Total Sample Dry (g)	1975.25
Calc. Wt. "W" (g)	56.53
Calc. Mass + #8	1.22

Sieve Number (Size)	Pan Weight (g)	Indiv. Wt. + Pan (g)	Indiv. Wt. Retain.	Cum. Wt. Retain.	Cum. % Retain.	% Finer By Wt.
3"	0.00	0.00	0.00	0.00	0.0	100.0
1 1/2"	0.00	0.00	0.00	0.00	0.0	100.0
3/4"	0.00	0.00	0.00	0.00	0.0	100.0
3/8"	0.00	20.08	20.08	20.08	1.0	99.0
#4	0.00	9.87	9.87	29.95	1.5	98.5
#8	0.00	12.58	12.58	42.53	2.2	97.8
#16	2.34	3.64	1.30	1.30	4.5	95.5
#30	2.28	5.69	3.41	4.71	10.5	89.5
#40	2.36	5.73	3.37	8.08	16.4	83.6
#50	2.30	6.77	4.47	12.55	24.4	75.6
#60	2.29	5.43	3.14	15.69	29.9	70.1
#100	2.35	12.08	9.73	25.42	47.1	52.9
#200	2.40	10.09	7.69	33.11	60.7	39.3

Data entered by: DLS Date: 10/28/99
Data checked by: KR Date: 11/1/99
FileName: SOH00760

ADVANCED TERRA TESTING, INC.

HYDROMETER ANALYSIS - SEDIMENTATION DATA

CLIENT	Stone & Webster	JOB NO.	2162-07
BORING NO.	MISS-TP4SSTRLOO-00760	SAMPLED	9-1-99 KG/BM
DEPTH	4.0'	DATE TESTED	10-25-99 RV
SAMPLE NO. & TIME	MISS-00760, 1410	WASH SIEVE	Yes
		DRY SIEVE	No
SOIL DESCR.	FUSRAP Maywood Superfund Site; Proj# 085750303		

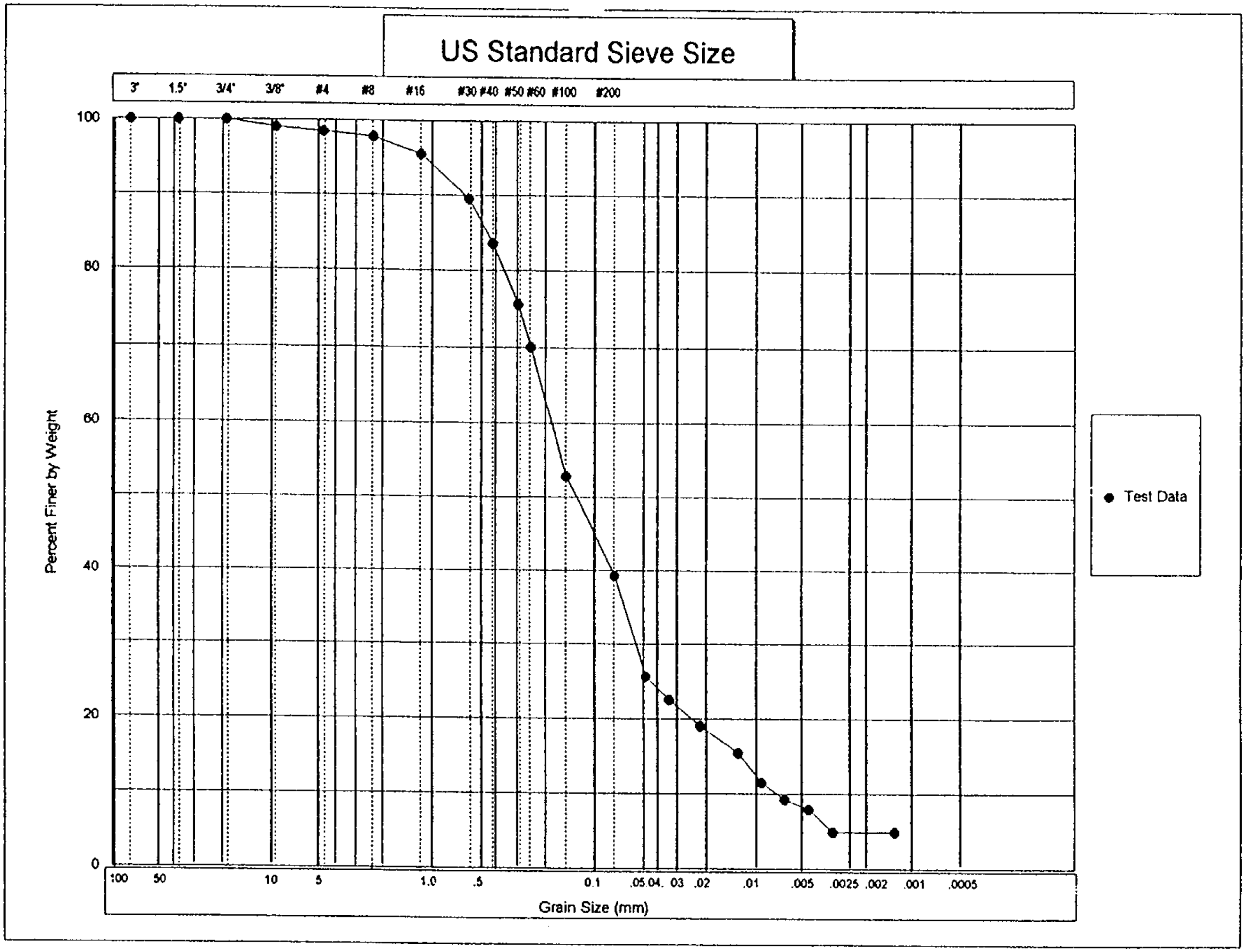
Hydrometer #	ASTM 152 H	Temp., Deg. C	23.1
Sp. Gr. of Soil	2.66	Temp. Coef. K	0.01311
Value of "alpha"	1.00	Wt. Dry Sample "W"	56.531
Deflocculant	Sodium Hexametaphosphate	% of Total Sample	100.0
Defloc. Corr'n	4.3		
Meniscus Corr'n	-1.0		

T Elapsed Time (min)	Hydrometer Reading Original	Hydrometer Reading Corrected "R"	100Ra/W	% Total Sample	Effective Depth L	Grain Diameter (mm)
0.0	--	--	--	--	--	--
0.5	--	--	--	--	--	--
1.0	19.75	14.50	25.6	25.6	13.05	0.0474
2.0	18.00	12.75	22.5	22.5	13.34	0.0338
5.0	16.00	10.75	19.0	19.0	13.67	0.0217
15.0	14.00	8.75	15.4	15.4	13.99	0.0127
30.0	11.75	6.50	11.5	11.5	14.36	0.0091
60.0	10.50	5.25	9.3	9.3	14.57	0.0065
120.0	9.75	4.50	7.9	7.9	14.69	0.0046
250.0	8.00	2.75	4.9	4.9	14.98	0.0032
1486.0	8.00	2.75	4.9	4.9	14.98	0.0013

Grain Diameter = K*(SQRT(L/T))

Data entered by: DLS Date: 10/28/99
Data checked by: KR Date: 11/1/99
FileName:SOH00760

ADVANCED TERRA TESTING, INC.



COBBLES	GRAVEL		SAND			SILT OR CLAY	USCS
	COARSE	FINE	CRS	MEDIUM	FINE		

COBBLES TO BOULDERS	PEBBLE GRAVEL				SAND			SILT	CLAY	WENTWORTH
	COARSE	MED	FINE	GRAN	COARSE	MED	FINE			

Client: Stone & Webster
Depth: 4.0'
Classification:____________________

Boring No.: MISS-TP4SSTRLO0-00760
Job Number: 2162-07

Sample No. & Time: MISS-00760, 1410

Advanced Terra Testing, Inc.

MECHANICAL ANALYSIS - SIEVE TEST DATA
ASTM D 422

CLIENT	Stone & Webster	JOB NO.	2162-07
BORING NO.	MISS-TP4SSREL00-00790	SAMPLED	9-1-99 KG/BM
DEPTH	7.0-9.0'	DATE TESTED	9-23-99 CL
SAMPLE NO. & TIME	MISS-00790, 1445	WASH SIEVE	Yes
		DRY SIEVE	No
SOIL DESCR.	FUSRAP Maywood Superfund Site; Proj# 085750303		

MOISTURE DATA

HYGROSCOPIC	Yes	
NATURAL	No	
Wt. Wet Soil & Pan	(g)	100.66
Wt. Dry Soil & Pan	(g)	93.03
Wt. Lost Moisture	(g)	7.63
Wt. of Pan Only	(g)	3.67
Wt. of Dry Soil	(g)	89.36
Moisture Content	%	8.5
Wt. Hydrom. Sample Wet	(g)	58.62
Wt. Hydrom. Sample Dry	(g)	54.01

WASH SIEVE ANALYSIS

Wt. Total Sample Wet (g)	2272.93
Weight of + #8 Before Washing (g)	14.41
Weight of + #8 After Washing (g)	10.75
Weight of - #8 Wet (g)	2258.52
Weight of - #8 Dry (g)	2084.22
Wt. Total Sample Dry (g)	2094.97
Calc. Wt. "W" (g)	54.29
Calc. Mass + #8	0.28

Sieve Number (Size)	Pan Weight (g)	Indiv. Wt. + Pan (g)	Indiv. Wt. Retain.	Cum. Wt. Retain.	Cum. % Retain.	% Finer By Wt.
3"	0.00	0.00	0.00	0.00	0.0	100.0
1 1/2"	0.00	0.00	0.00	0.00	0.0	100.0
3/4"	0.00	0.00	0.00	0.00	0.0	100.0
3/8"	0.00	2.40	2.40	2.40	0.1	99.9
#4	0.00	1.12	1.12	3.52	0.2	99.8
#8	0.00	7.23	7.23	10.75	0.5	99.5
#16	2.28	3.58	1.30	1.30	2.9	97.1
#30	2.35	5.81	3.46	4.76	9.3	90.7
#40	2.32	6.72	4.40	9.16	17.4	82.6
#50	2.37	8.02	5.65	14.81	27.8	72.2
#60	2.29	5.42	3.13	17.94	33.6	66.4
#100	2.30	9.74	7.44	25.38	47.3	52.7
#200	2.36	7.96	5.60	30.98	57.6	42.4

Data entered by: DLS Date: 10/06/99
Data checked by: SK Date: 10-6-99
FileName: SOH00790

ADVANCED TERRA TESTING, INC.

HYDROMETER ANALYSIS - SEDIMENTATION DATA

CLIENT Stone & Webster JOB NO. 2162-07

BORING NO.	MISS-TP4SSRELOO-00790	SAMPLED	9-1-99 KG/BM
DEPTH	7.0-9.0'	DATE TESTED	9-23-99 CL
SAMPLE NO. & TIME	MISS-00790, 1445	WASH SIEVE	Yes
		DRY SIEVE	No
SOIL DESCR.	FUSRAP Maywood Superfund Site; Proj# 085750303		

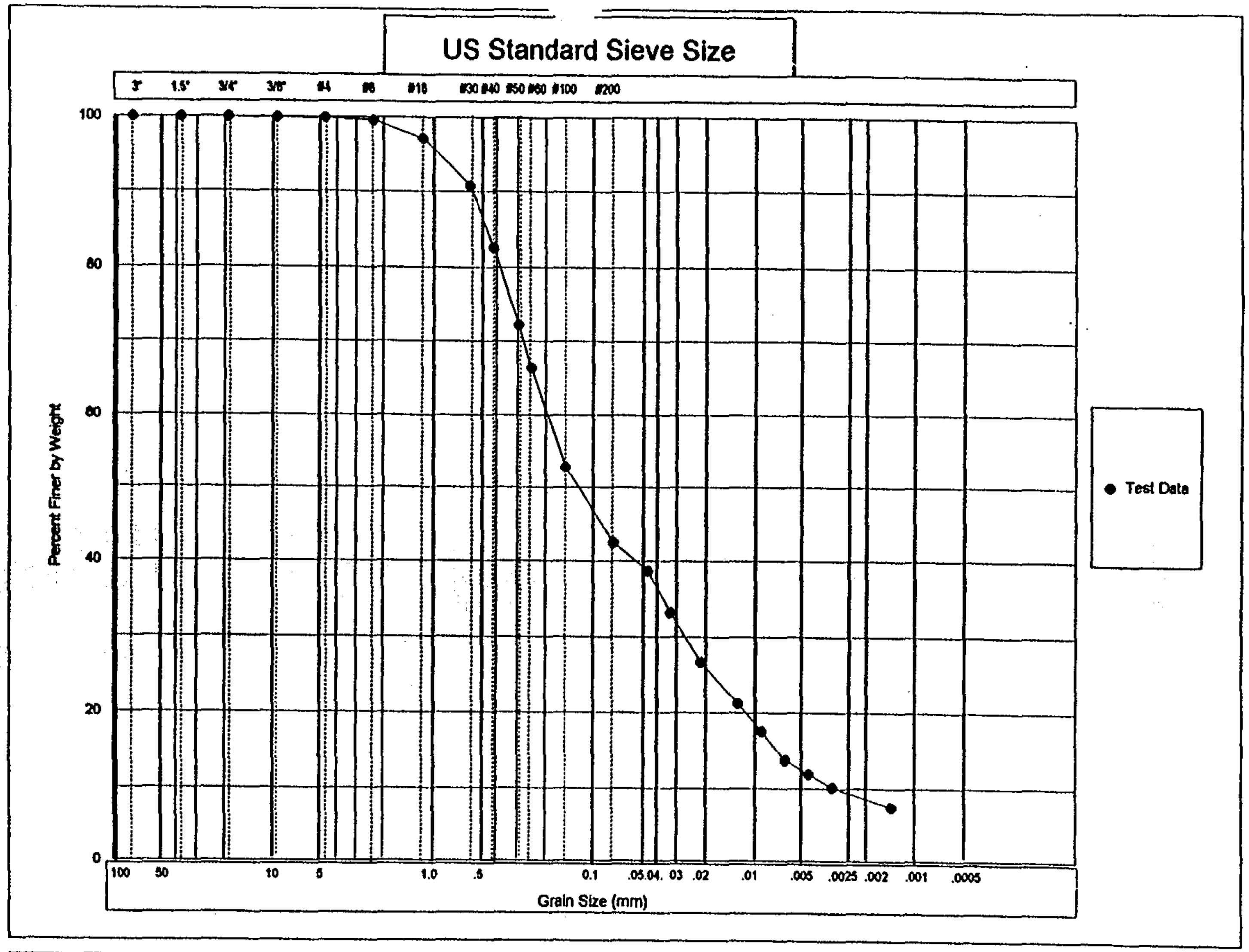
Hydrometer #	ASTM 152 H	Temp., Deg. C	22.8
Sp. Gr. of Soil	2.65	Temp. Coef. K	0.01320
Value of "alpha"	1.00	Wt. Dry Sample "W"	54.288
Deflocculant	Sodium Hexametaphosphate	% of Total Sample	100.0
Defloc. Corr'n	4.5		
Meniscus Corr'n	-1.0		

T Elapsed Time (min)	Hydrometer Reading Original	Corrected "R"	100Ra/W	% Total Sample	Effective Depth L	Grain Diameter (mm)
0.0	--	--	--	--	--	--
0.5	--	--	--	--	--	--
1.0	26.50	21.00	38.7	38.7	11.94	0.0456
2.0	23.50	18.00	33.2	33.2	12.44	0.0329
5.0	20.00	14.50	26.7	26.7	13.01	0.0213
15.0	17.00	11.50	21.2	21.2	13.50	0.0125
30.0	15.00	9.50	17.5	17.5	13.83	0.0090
60.0	13.00	7.50	13.8	13.8	14.16	0.0064
120.0	12.00	6.50	12.0	12.0	14.32	0.0046
250.0	11.00	5.50	10.1	10.1	14.49	0.0032
1308.0	9.50	4.00	7.4	7.4	14.73	0.0014

Grain Diameter = K*(SQRT(L/T))

Data entered by: DLS Date: 10/06/99
Data checked by: SR Date: 10-6-99
FileName:SOH00790

ADVANCED TERRA TESTING, INC.



COBBLES	GRAVEL		SAND			SILT OR CLAY	
	COARSE	FINE	CRS	MEDIUM	FINE		USCS

COBBLES TO BOULDERS	PEBBLE GRAVEL				SAND			SILT	CLAY	
	COARSE	MED	FINE	GRAN	COARSE	MED	FINE			WENTWORTH

Client: Stone & Webster
Depth: 7.0-9.0'
Classification:________________________

Boring No.: MISS-TP4SSRELO0-00790
Job Number: 2162-07

Sample No. & Time: MISS-00790, 1445

Advanced Terra Testing, Inc.

MECHANICAL ANALYSIS - SIEVE TEST DATA
ASTM D 422

CLIENT	Stone & Webster	JOB NO.	2162-07
BORING NO.	MISS-TP4SSREL02-00800	SAMPLED	9-1-99 KG
DEPTH	7.0-9.0'	DATE TESTED	10-25-99 RV
SAMPLE NO. & TIME	MISS-00800, 1445	WASH SIEVE	Yes
		DRY SIEVE	No
SOIL DESCR.	FUSRAP Maywood Superfund Site; Proj# 085750303		

MOISTURE DATA			WASH SIEVE ANALYSIS	
HYGROSCOPIC	Yes		Wt. Total Sample Wet (g)	1824.60
NATURAL	No		Weight of + #8 Before Washing (g)	6.36
			Weight of + #8 After Washing (g)	5.26
Wt. Wet Soil & Pan (g)		93.26		
Wt. Dry Soil & Pan (g)		92.04	Weight of - #8 Wet (g)	1818.24
Wt. Lost Moisture (g)		1.22		
Wt. of Pan Only (g)		4.30	Weight of - #8 Dry (g)	1794.39
Wt. of Dry Soil (g)		87.74		
Moisture Content %		1.4	Wt. Total Sample Dry (g)	1799.65
Wt. Hydrom. Sample Wet (g)		55.87	Calc. Wt. "W" (g)	55.26
Wt. Hydrom. Sample Dry (g)		55.10	Calc. Mass + #8	0.16

Sieve Number (Size)	Pan Weight (g)	Indiv. Wt. + Pan (g)	Indiv. Wt. Retain.	Cum. Wt. Retain.	Cum. % Retain.	% Finer By Wt.
3"	0.00	0.00	0.00	0.00	0.0	100.0
1 1/2"	0.00	0.00	0.00	0.00	0.0	100.0
3/4"	0.00	0.00	0.00	0.00	0.0	100.0
3/8"	0.00	0.00	0.00	0.00	0.0	100.0
#4	0.00	2.19	2.19	2.19	0.1	99.9
#8	0.00	3.07	3.07	5.26	0.3	99.7
#16	2.30	3.70	1.40	1.40	2.8	97.2
#30	2.34	6.52	4.18	5.58	10.4	89.6
#40	2.33	6.86	4.53	10.11	18.6	81.4
#50	2.28	8.13	5.85	15.96	29.2	70.8
#60	2.37	5.72	3.35	19.31	35.2	64.8
#100	2.30	10.13	7.83	27.14	49.4	50.6
#200	2.34	8.82	6.48	33.62	61.1	38.9

Data entered by: DLS Date: 11/02/99
Data checked by: KR Date: 11/2/99
FileName: SOH00800

ADVANCED TERRA TESTING, INC.

HYDROMETER ANALYSIS - SEDIMENTATION DATA

CLIENT Stone & Webster JOB NO. 2162-07

BORING NO.	MISS-TP4SSREL02-00800	SAMPLED	9-1-99 KG
DEPTH	7.0-9.0'	DATE TESTED	10-25-99 RV
SAMPLE NO. & TIME	MISS-00800, 1445	WASH SIEVE	Yes
		DRY SIEVE	No
SOIL DESCR.	FUSRAP Maywood Superfund Site; Proj# 085750303		

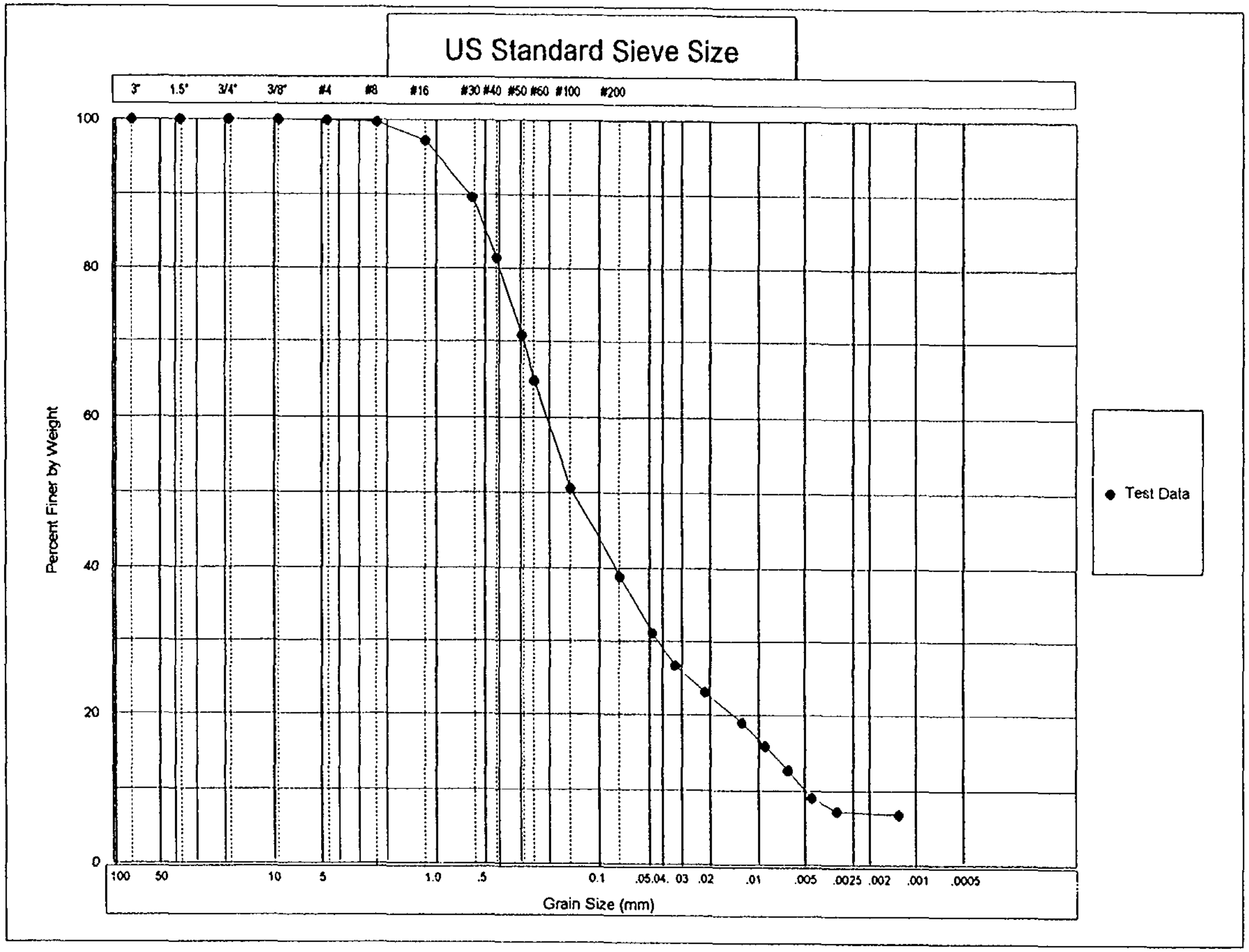
Hydrometer #	ASTM 152 H	Temp., Deg. C	23.1
Sp. Gr. of Soil	2.66	Temp. Coef. K	0.01311
Value of "alpha"	1.00	Wt. Dry Sample "W"	55.262
Deflocculant	Sodium Hexametaphosphate	% of Total Sample	100.0
Defloc. Corr'n	4.3		
Meniscus Corr'n	-1.0		

T Elapsed Time (min)	Hydrometer Reading Original	Corrected "R"	100Ra/W	% Total Sample	Effective Depth L	Grain Diameter (mm)
0.0	--	--	--	--	--	--
0.5	--	--	--	--	--	--
1.0	22.50	17.25	31.2	31.2	12.60	0.0465
2.0	20.00	14.75	26.6	26.6	13.01	0.0334
5.0	18.00	12.75	23.0	23.0	13.34	0.0214
15.0	15.75	10.50	19.0	19.0	13.71	0.0125
30.0	14.00	8.75	15.8	15.8	13.99	0.0090
60.0	12.25	7.00	12.6	12.6	14.28	0.0064
120.0	10.25	5.00	9.0	9.0	14.61	0.0046
250.0	9.25	4.00	7.2	7.2	14.77	0.0032
1496.0	9.00	3.75	6.8	6.8	14.81	0.0013

Grain Diameter = K*(SQRT(L/T))

Data entered by: DLS Date: 11/02/99
Data checked by: KR Date: 11/2/99
FileName:SOH00800

ADVANCED TERRA TESTING, INC.



COBBLES	GRAVEL		SAND			SILT OR CLAY	USCS
	COARSE	FINE	CRS	MEDIUM	FINE		

COBBLES TO BOULDERS	PEBBLE GRAVEL				SAND			SILT	CLAY	WENTWORTH
	COARSE	MED	FINE	GRAN	COARSE	MED	FINE			

Client: Stone & Webster　Boring No.: MISS-TP4SSRELO2-00800　Sample No. & Time: MISS-00800, 1445

Depth: 7.0-9.0'　Job Number: 2162-07

Classification:____________________

Advanced Terra Testing, Inc.

TEST PIT 5

ENGINEERING TEST PITS AT MISS
GEOTECHNICAL DATA RESULTS

FUSRAP MAYWOOD SUPERFUND SITE
MAYWOOD, NEW JERSEY

MECHANICAL ANALYSIS - SIEVE TEST DATA
ASTM D 422

CLIENT	Stone & Webster	JOB NO.	2162-07
BORING NO.	MISS-TP5SSOVER0-00900	SAMPLED	8-18-99 KG/BM
DEPTH	1.0-2.0'	DATE TESTED	10-7-99 DPM
SAMPLE NO. & TIME	MISS-00900, 1515	WASH SIEVE	Yes
		DRY SIEVE	No
SOIL DESCR.	FUSRAP Maywood Superfund Site; Proj# 085750303		

MOISTURE DATA

HYGROSCOPIC	Yes	
NATURAL	No	
Wt. Wet Soil & Pan	(g)	79.08
Wt. Dry Soil & Pan	(g)	77.89
Wt. Lost Moisture	(g)	1.19
Wt. of Pan Only	(g)	3.82
Wt. of Dry Soil	(g)	74.07
Moisture Content	%	1.6
Wt. Hydrom. Sample Wet (g)		83.79
Wt. Hydrom. Sample Dry (g)		82.47

WASH SIEVE ANALYSIS

Wt. Total Sample Wet (g)	2124.62
Weight of + #8 Before Washing (g)	965.53
Weight of + #8 After Washing (g)	904.87
Weight of - #8 Wet (g)	1159.09
Weight of - #8 Dry (g)	1200.46
Wt. Total Sample Dry (g)	2105.33
Calc. Wt. "W" (g)	144.62
Calc. Mass + #8	62.16

Sieve Number (Size)	Pan Weight (g)	Indiv. Wt. + Pan (g)	Indiv. Wt. Retain.	Cum. Wt. Retain.	Cum. % Retain.	% Finer By Wt.
3"	0.00	0.00	0.00	0.00	0.0	100.0
1 1/2"	0.00	61.77	61.77	61.77	2.9	97.1
3/4"	0.00	142.72	142.72	204.49	9.7	90.3
3/8"	0.00	247.36	247.36	451.85	21.5	78.5
#4	0.00	231.04	231.04	682.89	32.4	67.6
#8	0.00	221.98	221.98	904.87	43.0	57.0
#16	2.34	14.25	11.91	11.91	51.2	48.8
#30	2.36	15.08	12.72	24.63	60.0	40.0
#40	2.35	9.03	6.68	31.31	64.6	35.4
#50	2.38	7.66	5.28	36.59	68.3	31.7
#60	2.36	5.27	2.91	39.50	70.3	29.7
#100	2.37	10.76	8.39	47.89	76.1	23.9
#200	2.35	10.88	8.53	56.42	82.0	18.0

Data entered by: DLS Date: 10/28/99
Data checked by: KR Date: 11/1/99
FileName: SOH00900

ADVANCED TERRA TESTING, INC.

HYDROMETER ANALYSIS - SEDIMENTATION DATA

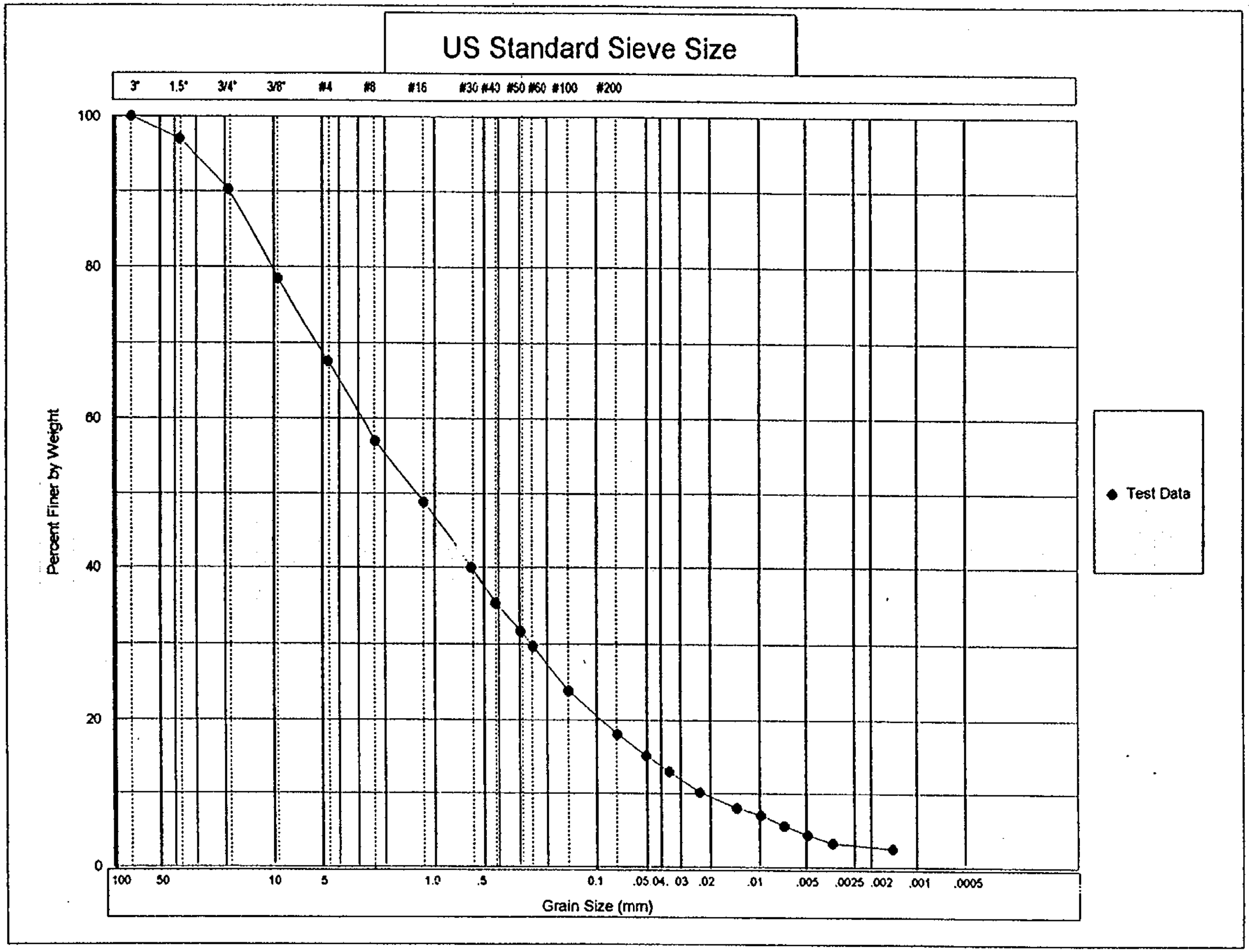
CLIENT	Stone & Webster	JOB NO.	2162-07
BORING NO.	MISS-TP5SSOVER0-00900	SAMPLED	8-18-99 KG/BM
DEPTH	1.0-2.0'	DATE TESTED	10-7-99 DPM
SAMPLE NO. & TIME	MISS-00900, 1515	WASH SIEVE	Yes
		DRY SIEVE	No
SOIL DESCR.	FUSRAP Maywood Superfund Site; Proj# 085750303		

Hydrometer #	ASTM 152 H	Temp., Deg. C	22.8
Sp. Gr. of Soil	2.42	Temp. Coef. K	0.01421
Value of "alpha"	1.05	Wt. Dry Sample "W"	144.625
Deflocculant	Sodium Hexametaphosphate	% of Total Sample	100.0
Defloc. Corr'n	4.0		
Meniscus Corr'n	-1.0		

T Elapsed Time (min)	Hydrometer Reading Original	Corrected "R"	100Ra/W	% Total Sample	Effective Depth L	Grain Diameter (mm)
0.0	--	--	--	--	--	--
0.5	--	--	--	--	--	--
1.0	26.00	21.00	15.2	15.2	12.03	0.0493
2.0	23.00	18.00	13.0	13.0	12.52	0.0356
5.0	19.00	14.00	10.1	10.1	13.17	0.0231
15.0	16.00	11.00	8.0	8.0	13.67	0.0136
30.0	14.75	9.75	7.1	7.1	13.87	0.0097
60.0	12.75	7.75	5.6	5.6	14.20	0.0069
120.0	11.00	6.00	4.3	4.3	14.49	0.0049
250.0	9.50	4.50	3.3	3.3	14.73	0.0034
1440.0	8.50	3.50	2.5	2.5	14.90	0.0014

Grain Diameter = K*(SQRT(L/T))

Data entered by: DLS Date: 10/28/99
Data checked by: KR Date: 11/1/99
FileName:SOH00900 ADVANCED TERRA TESTING, INC.



COBBLES	GRAVEL		SAND			SILT OR CLAY	
	COARSE	FINE	CRS	MEDIUM	FINE		USCS

COBBLES TO BOULDERS	PEBBLE GRAVEL				SAND			SILT	CLAY	
	COARSE	MED	FINE	GRAN	COARSE	MED	FINE			WENTWORTH

Client: Stone & Webster   Boring No.: MISS-TP5SSOVER0-00900   Sample No. & Time: MISS-00900, 1515

Depth: 1.0-2.0'   Job Number: 2162-07

Classification:__________

Advanced Terra Testing, Inc.

MECHANICAL ANALYSIS - SIEVE TEST DATA
ASTM D 422

CLIENT	Stone & Webster	JOB NO.	2162-07
BORING NO.	MISS-TP5SSUPERO-00910	SAMPLED	8-18-99
DEPTH	3.0-6.0'	DATE TESTED	9-25-99 AH
SAMPLE NO. & TIME	MISS-00910, 1550	WASH SIEVE	Yes
		DRY SIEVE	No
SOIL DESCR.	FUSRAP Maywood Superfund Site; Proj# 085750303		

MOISTURE DATA

HYGROSCOPIC	Yes	
NATURAL	No	
Wt. Wet Soil & Pan	(g)	52.89
Wt. Dry Soil & Pan	(g)	49.83
Wt. Lost Moisture	(g)	3.06
Wt. of Pan Only	(g)	3.69
Wt. of Dry Soil	(g)	46.14
Moisture Content %		6.6
Wt. Hydrom. Sample Wet	(g)	55.85
Wt. Hydrom. Sample Dry	(g)	52.37

WASH SIEVE ANALYSIS

Wt. Total Sample Wet (g)	3099.17
Weight of + #8 Before Washing (g)	385.26
Weight of + #8 After Washing (g)	362.54
Weight of - #8 Wet (g)	2713.91
Weight of - #8 Dry (g)	2566.42
Wt. Total Sample Dry (g)	2928.96
Calc. Wt. "W" (g)	59.77
Calc. Mass + #8	7.40

Sieve Number (Size)	Pan Weight (g)	Indiv. Wt. + Pan (g)	Indiv. Wt. Retain.	Cum. Wt. Retain.	Cum. % Retain.	% Finer By Wt.
3"	0.00	0.00	0.00	0.00	0.0	100.0
1 1/2"	0.00	52.38	52.38	52.38	1.8	98.2
3/4"	0.00	71.97	71.97	124.35	4.2	95.8
3/8"	0.00	5.63	5.63	129.98	4.4	95.6
#4	0.00	19.61	19.61	149.59	5.1	94.9
#8	0.00	212.95	212.95	362.54	12.4	87.6
* See Note on Page 2.						
#16	3.92	7.26	3.34	3.34	18.0	82.0
#30	3.64	7.75	4.11	7.45	24.8	75.2
#40	3.67	6.49	2.82	10.27	29.6	70.4
#50	3.86	7.28	3.42	13.69	35.3	64.7
#60	3.20	5.90	2.70	16.39	39.8	60.2
#100	3.76	10.45	6.69	23.08	51.0	49.0
#200	3.80	9.53	5.73	28.81	60.6	39.4

Data entered by: DLS Date: 10/06/99
Data checked by: SR Date: 10-6-99
FileName: SOH00910

ADVANCED TERRA TESTING, INC.

HYDROMETER ANALYSIS - SEDIMENTATION DATA

CLIENT Stone & Webster JOB NO. 2162-07

BORING NO.	MISS-TP5SSUPERO-00910	SAMPLED	8-18-99
DEPTH	3.0-6.0'	DATE TESTED	9-25-99 AH
SAMPLE NO. & TIME	MISS-00910, 1550	WASH SIEVE	Yes
		DRY SIEVE	No

SOIL DESCR. FUSRAP Maywood Superfund Site; Proj# 085750303

Hydrometer #	ASTM 152 H	Temp., Deg. C	24.0
Sp. Gr. of Soil	2.28	Temp. Coef. K	0.01466
Value of "alpha"	1.07	Wt. Dry Sample "W"	59.772
Deflocculant	Sodium Hexametaphosphate	% of Total Sample	100.0
Defloc. Corr'n	5.3		
Meniscus Corr'n	-1.0		

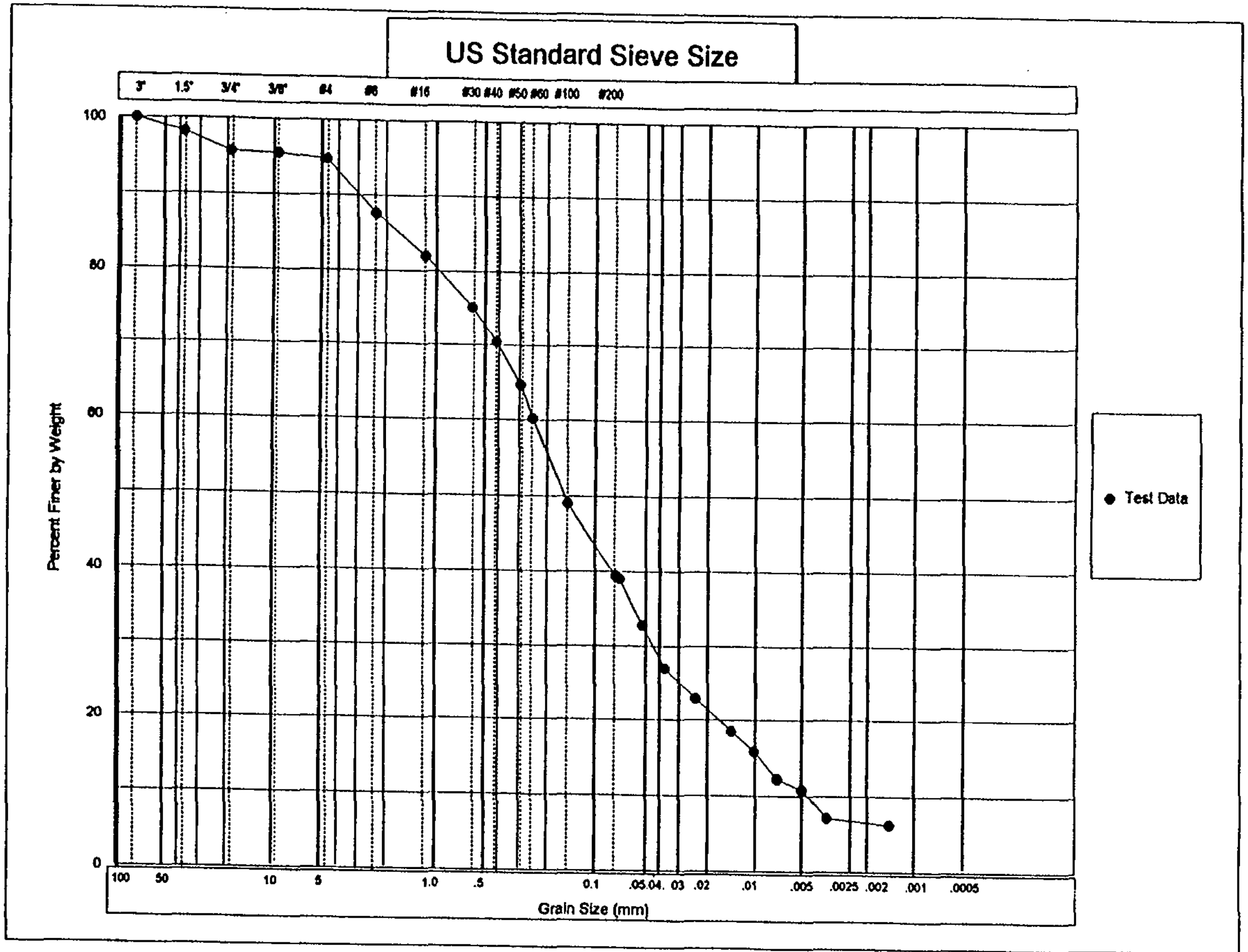
T Elapsed Time (min)	Hydrometer Reading Original	Corrected "R"	100Ra/W	% Total Sample	Effective Depth L	Grain Diameter (mm)
0.0	--	--	--	--	--	--
0.5	28.00	21.75	39.1	39.1	11.70	0.0709
1.0	24.50	18.25	32.8	32.8	12.27	0.0514
2.0	21.25	15.00	27.0	27.0	12.81	0.0371
5.0	19.00	12.75	22.9	22.9	13.17	0.0238
15.0	16.50	10.25	18.4	18.4	13.58	0.0140
30.0	15.00	8.75	15.7	15.7	13.83	0.0100
60.0	13.00	6.75	12.1	12.1	14.16	0.0071
120.0	12.25	6.00	10.8	10.8	14.28	0.0051
250.0	10.25	4.00	7.2	7.2	14.61	0.0035
1490.0	9.75	3.50	6.3	6.3	14.69	0.0015

Grain Diameter = K*(SQRT(L/T))

*Notes: Some of the + #8 material was partially melted. Possibly some sort of asphalt chips.
The material retained on the 1.5" sieve was a piece of tile.
34.57g of the material retained on the 3/4" sieve was tile pieces.

Data entered by: DLS Date: 10/06/99
Data checked by: SR Date: 10-6-99
FileName: SOH00910

ADVANCED TERRA TESTING, INC.



COBBLES	GRAVEL		SAND			SILT OR CLAY	
	COARSE	FINE	CRS	MEDIUM	FINE		USCS

COBBLES TO BOULDERS	PEBBLE GRAVEL				SAND			SILT	CLAY	
	COARSE	MED	FINE	GRAN	COARSE	MED	FINE			WENTWORTH

Client: Stone & Webster
Depth: 3.0-6.0'
Classification:________________

Boring No.: MISS-TP5SSUPER0-00910
Job Number: 2162-07

Sample No. & Time: MISS-00910, 1550

Advanced Terra Testing, Inc.

MECHANICAL ANALYSIS - SIEVE TEST DATA
ASTM D 422

CLIENT	Stone & Webster	JOB NO.	2162-07
BORING NO.	MISS-TP5SSUPER20-00930	SAMPLED	8-18-99 KG/BM
DEPTH	3.0-6.0'	DATE TESTED	9-28-99 RV
SAMPLE NO. & TIME	MISS-00930, 1550	WASH SIEVE	Yes
		DRY SIEVE	No
SOIL DESCR.	FUSRAP Maywood Superfund Site; Proj# 085750303		

MOISTURE DATA

HYGROSCOPIC	Yes
NATURAL	No
Wt. Wet Soil & Pan (g)	83.64
Wt. Dry Soil & Pan (g)	81.28
Wt. Lost Moisture (g)	2.36
Wt. of Pan Only (g)	3.84
Wt. of Dry Soil (g)	77.44
Moisture Content %	3.0
Wt. Hydrom. Sample Wet (g)	55.18
Wt. Hydrom. Sample Dry (g)	53.55

WASH SIEVE ANALYSIS

Wt. Total Sample Wet (g)	5452.77
Weight of + #8 Before Washing (g)	1335.77
Weight of + #8 After Washing (g)	1104.56
Weight of - #8 Wet (g)	4117.00
Weight of - #8 Dry (g)	4219.62
Wt. Total Sample Dry (g)	5324.18
Calc. Wt. "W" (g)	67.57
Calc. Mass + #8	14.02

Sieve Number (Size)	Pan Weight (g)	Indiv. Wt. + Pan (g)	Indiv. Wt. Retain.	Cum. Wt. Retain.	Cum. % Retain.	% Finer By Wt.
3"	0.00	0.00	0.00	0.00	0.0	100.0
1 1/2"	0.00	456.92	456.92	456.92	8.6	91.4
3/4"	0.00	100.52	100.52	557.44	10.5	89.5
3/8"	0.00	183.15	183.15	740.59	13.9	86.1
#4	0.00	194.18	194.18	934.77	17.6	82.4
#8	0.00	169.79	169.79	1104.56	20.7	79.3
#16	2.34	4.46	2.12	2.12	23.9	76.1
#30	2.30	5.55	3.25	5.37	28.7	71.3
#40	2.30	5.49	3.19	8.56	33.4	66.6
#50	2.31	6.83	4.52	13.08	40.1	59.9
#60	2.28	4.94	2.66	15.74	44.0	56.0
#100	2.35	10.46	8.11	23.85	56.0	44.0
#200	2.32	8.68	6.36	30.21	65.5	34.5

Data entered by: DLS Date: 10/06/99
Data checked by: SR Date: 10-6-99
FileName: SOH00930

ADVANCED TERRA TESTING, INC.

HYDROMETER ANALYSIS - SEDIMENTATION DATA

CLIENT Stone & Webster JOB NO. 2162-07

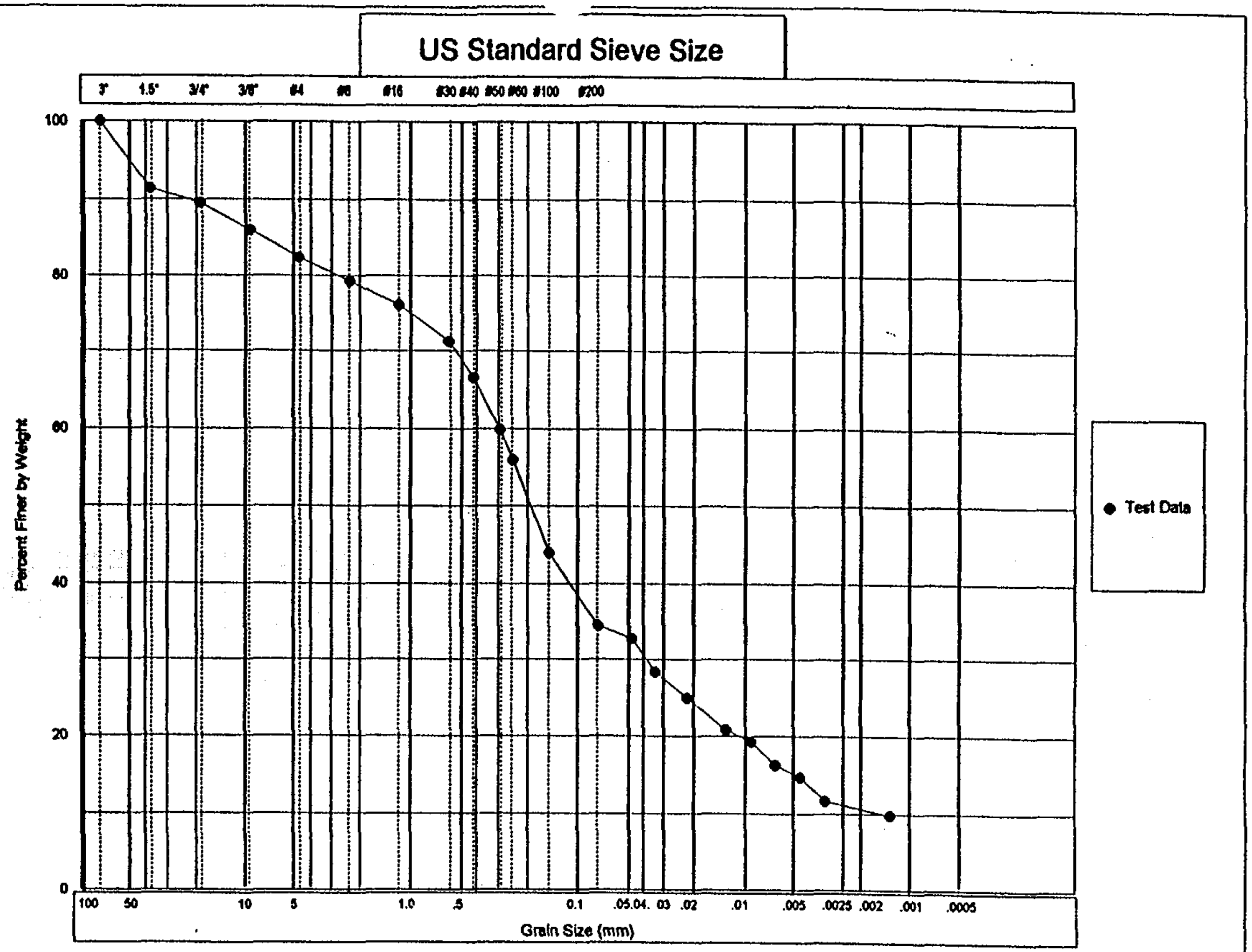
BORING NO.	MISS-TP5SSUPER20-00930	SAMPLED	8-18-99 KG/BM
DEPTH	3.0-6.0'	DATE TESTED	9-28-99 RV
SAMPLE NO. & TIME	MISS-00930, 1550	WASH SIEVE	Yes
		DRY SIEVE	No
SOIL DESCR.	FUSRAP Maywood Superfund Site; Proj# 085750303		

Hydrometer #	ASTM 152 H	Temp., Deg. C	23.1
Sp. Gr. of Soil	2.55	Temp. Coef. K	0.01356
Value of "alpha"	1.02	Wt. Dry Sample "W"	67.567
Deflocculant	Sodium Hexametaphosphate	% of Total Sample	100.0
Defloc. Corr'n	3.3		
Meniscus Corr'n	-1.0		

T Elapsed Time (min)	Hydrometer Reading Original	Corrected "R"	100Ra/W	% Total Sample	Effective Depth L	Grain Diameter (mm)
0.0	--	--	--	--	--	--
0.5	--	--	--	--	--	--
1.0	26.00	21.75	32.8	32.8	12.03	0.0470
2.0	23.00	18.75	28.3	28.3	12.52	0.0339
5.0	20.75	16.50	24.9	24.9	12.89	0.0218
15.0	18.00	13.75	20.8	20.8	13.34	0.0128
30.0	17.00	12.75	19.2	19.2	13.50	0.0091
60.0	15.00	10.75	16.2	16.2	13.83	0.0065
120.0	14.00	9.75	14.7	14.7	13.99	0.0046
250.0	12.00	7.75	11.7	11.7	14.32	0.0032
1515.0	10.75	6.50	9.8	9.8	14.53	0.0013

Grain Diameter = K*(SQRT(L/T))

Data entered by: DLS Date: 10/06/99
Data checked by: SR Date: 10-6-99
FileName:SOH00930 ADVANCED TERRA TESTING, INC.



COBBLES	GRAVEL		SAND			SILT OR CLAY	USCS
	COARSE	FINE	CRS	MEDIUM	FINE		

COBBLES TO BOULDERS	PEBBLE GRAVEL				SAND			SILT	CLAY	WENTWORTH
	COARSE	MED	FINE	GRAN	COARSE	MED	FINE			

Client: Stone & Webster Boring No.: MISS-TP5SSUPER20-00930 Sample No. & Time: MISS-00930, 1550
Depth: 3.0-6.0' Job Number: 2162-07
Classification:____________________

Advanced Terra Testing, Inc.

MECHANICAL ANALYSIS - SIEVE TEST DATA
ASTM D 422

CLIENT Stone & Webster JOB NO. 2162-07

BORING NO.	MISS-TP5SSLWERO-0092X	SAMPLED	8-18-99
DEPTH	7.0'	DATE TESTED	9-25-99 AH
SAMPLE NO. & TIME	MISS-0092X; 1530	WASH SIEVE	Yes
		DRY SIEVE	No

SOIL DESCR. FUSRAP Maywood Superfund Site; Proj# 085750303

MOISTURE DATA

HYGROSCOPIC	Yes	
NATURAL	No	
Wt. Wet Soil & Pan	(g)	120.89
Wt. Dry Soil & Pan	(g)	119.27
Wt. Lost Moisture	(g)	1.62
Wt. of Pan Only	(g)	3.86
Wt. of Dry Soil	(g)	115.41
Moisture Content	%	1.4
Wt. Hydrom. Sample Wet	(g)	56.71
Wt. Hydrom. Sample Dry	(g)	55.92

WASH SIEVE ANALYSIS

Wt. Total Sample Wet (g)	3961.91
Weight of + #8 Before Washing (g)	349.00
Weight of + #8 After Washing (g)	270.54
Weight of - #8 Wet (g)	3612.91
Weight of - #8 Dry (g)	3640.27
Wt. Total Sample Dry (g)	3910.81
Calc. Wt. "W" (g)	60.08
Calc. Mass + #8	4.16

Sieve Number (Size)	Pan Weight (g)	Indiv. Wt. + Pan (g)	Indiv. Wt. Retain.	Cum. Wt. Retain.	Cum. % Retain.	% Finer By Wt.
3"	0.00	0.00	0.00	0.00	0.0	100.0
1 1/2"	0.00	0.00	0.00	0.00	0.0	100.0
3/4"	0.00	72.65	72.65	72.65	1.9	98.1
3/8"	0.00	69.48	69.48	142.13	3.6	96.4
#4	0.00	46.49	46.49	188.62	4.8	95.2
#8	0.00	81.92	81.92	270.54	6.9	93.1
#16	1.00	2.46	1.46	1.46	9.3	90.7
#30	0.97	3.75	2.78	4.24	14.0	86.0
#40	0.97	4.61	3.64	7.88	20.0	80.0
#50	0.99	6.44	5.45	13.33	29.1	70.9
#60	1.00	5.65	4.65	17.98	36.8	63.2
#100	0.98	12.00	11.02	29.00	55.2	44.8
#200	0.98	7.45	6.47	35.47	66.0	34.0

Data entered by: DLS Date: 10/06/99
Data checked by: SA Date: 10-6-99
FileName: SOH0092X

ADVANCED TERRA TESTING, INC.

HYDROMETER ANALYSIS - SEDIMENTATION DATA

CLIENT	Stone & Webster	JOB NO.	2162-07
BORING NO.	MISS-TP5SSLWERO-0092X	SAMPLED	8-18-99
DEPTH	7.0'	DATE TESTED	9-25-99 AH
SAMPLE NO. & TIME	MISS-0092X; 1530	WASH SIEVE	Yes
		DRY SIEVE	No
SOIL DESCR.	FUSRAP Maywood Superfund Site; Proj# 085750303		

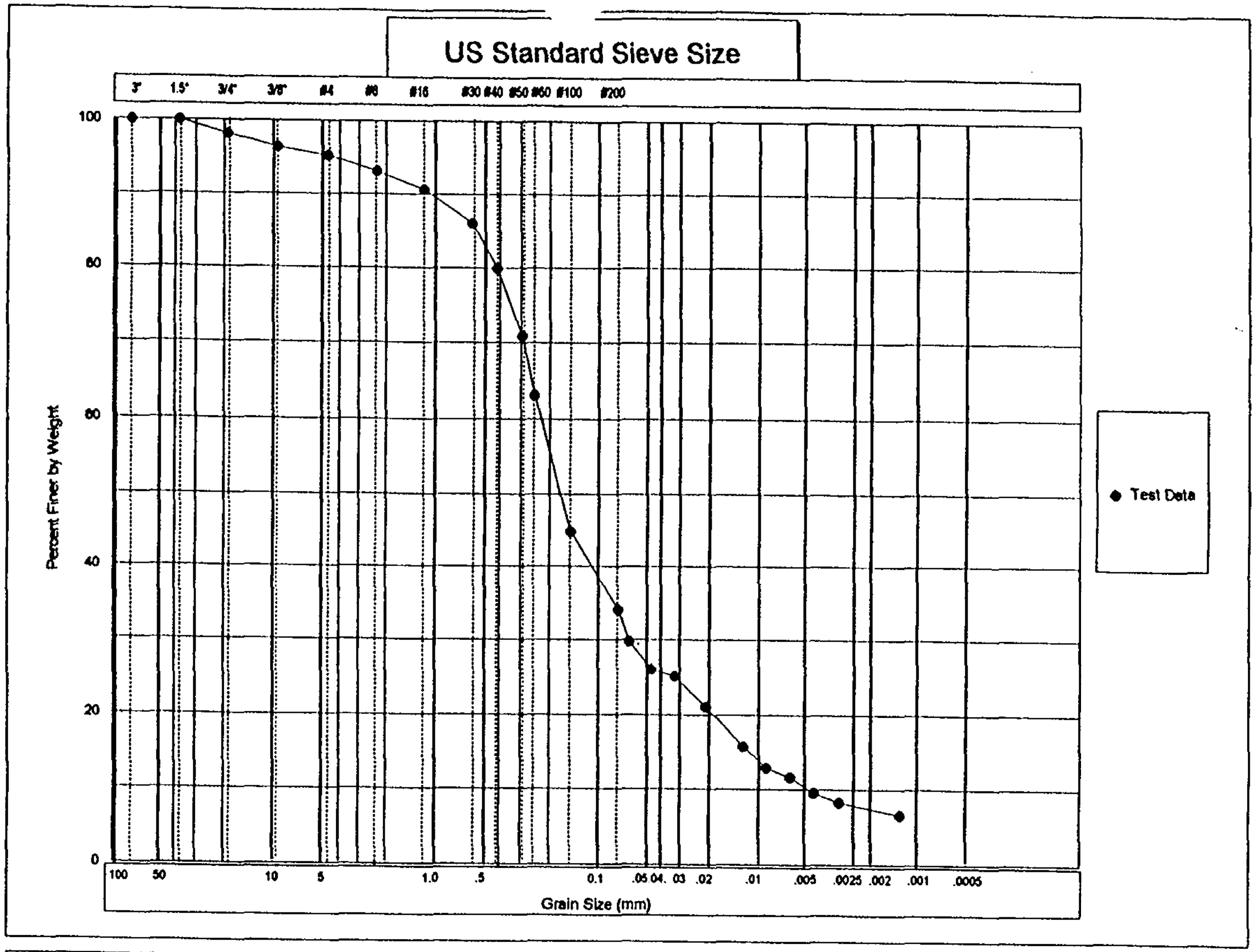
Hydrometer #	ASTM 152 H	Temp., Deg. C	24.1
Sp. Gr. of Soil	2.68	Temp. Coef. K	0.01288
Value of "alpha"	0.99	Wt. Dry Sample "W"	60.076
Deflocculant	Sodium Hexametaphosphate	% of Total Sample	100.0
Defloc. Corr'n	5.0		
Meniscus Corr'n	-1.0		

T Elapsed Time (min)	Hydrometer Reading Original	Hydrometer Reading Corrected "R"	100Ra/W	% Total Sample	Effective Depth L	Grain Diameter (mm)
0.0	--	--	--	--	--	--
0.5	24.00	18.00	29.8	29.8	12.35	0.0640
1.0	21.75	15.75	26.1	26.1	12.72	0.0459
2.0	21.25	15.25	25.2	25.2	12.81	0.0326
5.0	18.75	12.75	21.1	21.1	13.22	0.0209
15.0	15.50	9.50	15.7	15.7	13.75	0.0123
30.0	13.75	7.75	12.8	12.8	14.04	0.0088
60.0	13.00	7.00	11.6	11.6	14.16	0.0063
120.0	11.75	5.75	9.5	9.5	14.36	0.0045
250.0	11.00	5.00	8.3	8.3	14.49	0.0031
1442.0	10.00	4.00	6.6	6.6	14.65	0.0013

Grain Diameter = K*(SQRT(L/T))

Data entered by: DLS Date: 10/06/99
Data checked by: SR Date: 10-6-99
FileName:SOH0092X

ADVANCED TERRA TESTING, INC.



COBBLES	GRAVEL		SAND			SILT OR CLAY	
	COARSE	FINE	CRS	MEDIUM	FINE		USCS

COBBLES TO BOULDERS	PEBBLE GRAVEL				SAND			SILT	CLAY	
	COARSE	MED	FINE	GRAN	COARSE	MED	FINE			WENTWORTH

Client: Stone & Webster
Depth: 7.0'
Classification:____________

Boring No.: MISS-TP5SSLWER0-0092X
Job Number: 2162-07

Sample No. & Time: MISS-0092X; 1530

Advanced Terra Testing, Inc.

APPENDIX D

ENGINEERING TEST PITS AT MISS SOIL RADIOLOGICAL DATA RESULTS AND SOR CALCULATION

FUSRAP MAYWOOD SUPERFUND SITE MAYWOOD, NEW JERSEY

Sample Collection and Preparation

Radiological samples were collected from the *composited* geotechnical sample, as described in sections 5.2 and 5.3 of Appendix A of this report. These samples were submitted to the onsite laboratory for wet gamma spectroscopy analysis. Dry gamma spectroscopy analysis was performed after receipt of the chemical results. This was done to ensure that there were no chemical constituents which may have posed a health and safety threat during the radiological sample preparation (e.g., baking to dry the samples to perform dry gamma spectroscopy).

In addition, gamma spectroscopy was performed on fractions of soil supplied by the geotechnical laboratory. Due to the reduced volume of soil returned in the soil fractions, these analyses were performed using petri-dish samples

The soil fractions were composited as follows:

Soil Fraction Designations	
Sample Fraction Designation	*Soil Fractions in Sample*
A	+3"; 1.5" – 3"; 0.75" – 1.5"
B	3/8" – 0/75"; #4 – 3/8"
C	#8 - #4
D	#16 - #8; #30 - #16; #40 - #30
E	#50 - #40; #60 - #50; #100 - #60; #200 - #100
F	Below #200.

Samples which contained coarse material (A and B) were ground and crushed in a rock grinder prior to analysis.

Sample Analysis

A field laboratory was utilized to perform gamma spectroscopy. The field laboratory utilized a Canberra GC3020 detector coupled to an A Module. Data was analyzed by GENII 2000 and Procount 2000 software. The Procedures Manual for the field laboratory is located in Appendix H of the QAPP. For the onsite laboratory, a 500 ml sample was collected for analysis.

For the soil fractions, gamma spectroscopy using the same instrumentation as used on the composite samples was performed. Due to the lower volumes of soil present in the petri-dish samples, the minimum detectable activities (MDAs) for the soil fractions are typically higher than for the composites. This effect creates a high bias in the soil fraction data.

SOR CALCULATION

Field laboratory gamma spectroscopy results were utilized to determine the "Sum of the Ratios" (SOR) for each of the radiological samples collected. The SOR is defined as follows:

$$\text{Sum of the Ratios (SOR)} = \frac{\text{Th-232 concentration}}{\text{Th-232 action level}} + \frac{\text{Ra-226 concentration}}{\text{Ra-226 action level}} + \frac{\text{U-238 concentration}}{\text{U-238 action level}} < 1$$

Action levels area as follows:

Action Levels			
	Surface Soils - (top 6") All Properties	Subsurface Soils - Residential, Commercial and Government vicinity properties	Subsurface Soils - MISS and Stepan
Th-232	5 pCi/g + background	5 pCi/g + background	15 pCi/g + background
Ra-226	5 pCi/g + background	5 pCi/g + background	15 pCi/g + background
U-238	50 pCi/g + background	50 pCi/g + background	50 pCi/g + background

All comparisons at the MISS are to an SOR calculated based on 15 pCi/g, since clean overburden will be supplied across the site. The SOR values in this report do not subtract out background levels. Subtracting the currently utilized background levels would reduce all calculated SORs by approximately 0.17. Not accounting for background is therefore conservative.

SORs were calculated for the following results:

Dry Gamma Spectroscopy on Composites (Table D-1)
Dry Gamma Spectroscopy on Selected Soil Fraction Samples (Table D-2)
Dry Gamma Spectroscopy on Composites (Table D-3)

Dry and wet gamma spectroscopy SORs for the Engineering Test Pits are summarized in Table D-4. The SORs for the soil fractions are summarized in Table D-5.

Gamma spectroscopy results utilized in this report are presented at the back of this appendix.

TABLE D-1
SOR Calculation
Dry Gamma Spectroscopy on Composites

SampleID	TP/Zone	Dry Count Ra-226 pCi/g	Dry Count Ra-226 Error	Dry Count Th-232 pCi/g	Dry Count Th-232 Error	Dry Count U-238 pCi/g	Dry Count U-238 Error	Dry Count SOR (15 pCi)
MISS00140	TP1 - SUOV	1.12	0.05	6.20	0.14	4.23	0.00	0.57
MISS0015X	TP1 - SUUP	0.87	0.05	1.68	0.07	3.03	0.00	0.23
MISS00160	TP1 - SULO	0.68	0.04	0.99	0.05	2.17	0.00	0.15
MISS00170	TP1 - TROV	0.87	0.05	3.42	0.10	3.28	0.00	0.35
MISS00180	TP1 - TRUP	0.98	0.05	3.04	0.10	3.53	0.00	0.34
MISS00190	TP1 - TRLO	0.58	0.04	0.91	0.05	2.16	0.00	0.14
MISS00200	TP1 - REOV	1.12	0.06	6.05	0.14	4.24	0.00	0.56
MISS00210	TP1 - REUP	0.49	0.05	1.14	0.07	3.15	0.00	0.17
MISS00220	TP1 - RELO	0.62	0.04	0.86	0.05	2.25	0.00	0.14
MISS00230	TP1 - REUP2	0.47	0.04	1.14	0.07	2.81	0.00	0.16
MISS00330	TP2 - SUOV	2.18	0.09	9.06	0.22	6.05	0.00	0.87
MISS00340	TP2 - SUUP	2.38	0.10	11.33	0.26	7.06	0.00	1.06
MISS00350	TP2 - SULO	0.80	0.04	0.71	0.06	2.78	0.00	0.16
MISS00360	TP2 - TROV	1.48	0.07	11.86	0.23	6.90	1.81	1.03
MISS0037X	TP2 - TRUP	2.05	0.09	9.08	0.22	6.30	0.00	0.87
MISS00380	TP2 - TRLO	0.48	0.03	0.49	0.04	1.83	0.00	0.10
MISS00390	TP2 - REOV	1.06	0.06	4.73	0.13	4.24	0.00	0.47
MISS00400	TP2 - REUP	2.12	0.09	9.01	0.21	6.28	0.00	0.87
MISS00410	TP2 - RELO	0.45	0.03	0.56	0.04	1.83	0.00	0.10
MISS00430	TP2 - REUP2	2.29	0.09	12.11	0.25	6.62	0.00	1.09
MISS01690	TP2 - F1	3.42	0.17	10.75	0.33	13.90	0.00	1.22

TABLE D-1
SOR Calculation
Dry Gamma Spectroscopy on Composites

SampleID	TP/Zone	Dry Count Ra-226 pCi/g	Dry Count Ra-226 Error	Dry Count Th-232 pCi/g	Dry Count Th-232 Error	Dry Count U-238 pCi/g	Dry Count U-238 Error	Dry Count SOR (15 pCi)
MISS00520	TP3 - SUOV	3.07	0.11	16.48	0.31	7.46	0.00	1.45
MISS0053X	TP3 - SUUP	1.36	0.07	10.59	0.21	5.38	0.00	0.90
MISS00540	TP3 - SULO	0.45	0.03	0.57	0.04	2.37	0.00	0.12
MISS00550	TP3 - TROV	3.42	0.12	16.88	0.32	7.81	0.00	1.51
MISS00560	TP3 - TRUP	10.16	0.31	135.24	1.87	**17.18**	6.12	10.04
MISS00570	TP3 - TRLO	0.45	0.03	0.72	0.05	2.08	0.00	0.12
MISS00580	TP3 - REOV	0.29	0.05	0.38	0.00	4.06	0.00	0.13
MISS00590	TP3 - REUP	1.89	0.10	11.60	0.26	7.72	0.00	1.05
MISS00600	TP3 - RELO	0.50	0.03	0.80	0.05	2.18	0.00	0.13
MISS00610	TP3 - REUP2	1.76	0.12	16.44	0.35	8.73	0.00	1.39
MISS00710	TP4 - SUOV	13.50	0.58	681.81	9.22	135.68	14.24	49.07
MISS00720	TP4 - SUUP	3.20	0.14	71.82	1.04	25.17	4.04	5.50
MISS00730	TP4 - SULO	0.62	0.04	1.43	0.06	**1.40**	0.77	0.16
MISS00740	TP4 - TROV	22.52	0.80	1387.00	18.62	337.88	17.04	100.73
MISS00750	TP4 - TRUP	0.95	0.05	5.90	0.14	6.36	1.40	0.58
MISS00760	TP4 - TRLO	1.07	0.07	15.20	0.27	7.14	1.97	1.23
MISS00770	TP4 - REOV	10.89	0.49	617.53	8.34	126.43	9.11	44.42
MISS0078X	TP4 - REUP	4.31	0.31	241.27	3.35	67.45	7.75	17.72
MISS00790	TP4 - RELO	0.62	0.05	8.40	0.15	4.80	1.42	0.70
MISS00800	TP4 - RELO2	0.44	0.04	3.97	0.10	**1.22**	1.03	0.32
MISS00900	TP5 - OVER	3.54	0.12	19.26	0.34	**4.70**	2.34	1.61
MISS00910	TP5 - UPER	3.20	0.11	3.62	0.13	25.13	2.03	0.96
MISS0092X	TP5 - LWER	0.53	0.03	0.75	0.05	2.28	0.00	0.13
MISS00930	TP5 - UPER2	2.33	0.09	2.99	0.13	23.82	1.87	0.83

Bold indicates result below the MDA

TABLE D-2
SOR Calculation
Dry Gamma Spectroscopy on Selected Soil Fractions

SampleID	TP/Zone	Fraction	Dry Count Ra-226 pCi/g	Dry Count Ra-226 Error	Dry Count Th-232 pCi/g	Dry Count Th-232 Error	Dry Count U-238 pCi/g	Dry Count U-238 Error	Dry Count SOR (15 pCi)
MISS00140	TP1 - SUOV	Composite	1.12	0.05	6.20	0.14	4.23	0.00	0.57
MISS0014A	TP1 - SUOV	> 3/4"	0.30	0.03	0.59	0.04	1.78	0.00	0.09
MISS0014B	TP1 - SUOV	#4 - 3/4"	0.61	0.03	1.01	0.05	2.00	0.00	0.15
MISS0014C	TP1 - SUOV	#8 - #4	0.95	0.04	1.94	0.07	2.60	0.00	0.24
MISS0014D	TP1 - SUOV	#40 - #8	2.59	0.00	4.05	0.00	32.30	8.92	1.09
MISS0014E	TP1 - SUOV	#200 - #40	1.50	0.00	2.62	0.48	18.80	0.00	0.65
MISS0014F	TP1 - SUOV	<#200	3.80	0.46	14.50	0.89	28.50	9.11	1.79
MISS00200	TP1 - REOV	Composite	1.12	0.06	6.05	0.14	4.24	0.00	0.56
MISS0020A	TP1 - REOV	> 3/4"	NO SAMPLE						N/A
MISS0020B	TP1 - REOV	#4 - 3/4"	1.17	0.09	1.96	0.14	5.28	0.00	0.31
MISS0020C	TP1 - REOV	#8 - #4	1.33	0.11	2.32	0.16	5.71	0.00	0.36
MISS0020D	TP1 - REOV	#40 - #8	2.56	0.00	4.42	0.00	31.80	0.00	1.10
MISS0020E	TP1 - REOV	#200 - #40	1.38	0.25	2.77	0.46	15.80	0.00	0.59
MISS0020F	TP1 - REOV	<#200	2.69	0.36	18.18	0.76	23.70	0.00	1.87
MISS00330	TP2 - SUOV	Composite	2.18	0.09	9.06	0.22	6.05	0.00	0.87
MISS0033A	TP2 - SUOV	> 3/4"	0.71	0.04	1.07	0.06	2.70	0.00	0.17
MISS0033B	TP2 - SUOV	#4 - 3/4"	0.63	0.03	1.62	0.06	2.15	0.00	0.19
MISS0033C	TP2 - SUOV	#8 - #4	1.00	0.05	3.97	0.10	3.28	0.00	0.40
MISS0033D	TP2 - SUOV	#40 - #8	1.41	0.33	3.63	0.00	21.30	0.00	0.76
MISS0033E	TP2 - SUOV	#200 - #40	1.97	0.00	5.54	0.60	24.10	0.00	0.98
MISS0033F	TP2 - SUOV	<#200	7.61	0.66	33.50	1.32	39.60	11.58	3.53
MISS00340	TP2 - SUUP	Composite	2.38	0.10	11.33	0.26	7.06	0.00	1.06
MISS0034A	TP2 - SUUP	> 3/4"	0.45	0.00	0.78	0.00	5.48	0.00	0.19
MISS0034B	TP2 - SUUP	#4 - 3/4"	0.38	0.05	0.62	0.09	3.33	0.00	0.13
MISS0034C	TP2 - SUUP	#8 - #4	2.19	0.18	3.65	0.29	10.40	0.00	0.60
MISS0034D	TP2 - SUUP	#40 - #8	3.96	0.00	8.12	1.41	46.60	14.19	1.74
MISS0034E	TP2 - SUUP	#200 - #40	3.36	0.61	11.24	1.16	35.10	10.80	1.68
MISS0034F	TP2 - SUUP	<#200	3.15	0.26	11.79	0.49	15.90	0.00	1.31
MISS0036	TP2 - TROV	Composite	1.48	0.01	11.86	0.23	6.90	1.81	1.03
MISS0036A	TP2-TROV	> 3/4"	0.72	0.00	1.12	0.00	8.39	0.00	0.29
MISS0036B	TP2-TROV	#4 - 3/4"	0.47	0.09	1.25	0.15	5.60	0.00	0.23
MISS0036C	TP2-TROV	#8 - #4	1.32	0.11	2.75	0.16	5.96	1.70	0.39
MISS0036D	TP2-TROV	#40 - #8	3.71	0.00	5.61	0.00	42.90	0.00	1.48
MISS0036E	TP2-TROV	#200 - #40	3.33	0.43	8.18	0.78	26.20	7.66	1.29
MISS0036F	TP2-TROV	<#200	4.84	0.36	16.90	0.65	20.40	0.00	1.86
MISS0037	TP2 - TRUP	Composite	2.05	0.09	9.08	0.22	6.30	0.00	0.87
MISS0037A	TP2 - TRUP	> 3/4"	0.92	0.04	1.30	0.06	2.50	0.00	0.20
MISS0037B	TP2 - TRUP	#4 - 3/4"	0.56	0.04	0.72	0.06	2.43	0.00	0.13
MISS0037C	TP2 - TRUP	#8 - #4	0.84	0.10	2.13	0.17	6.19	0.00	0.32
MISS0037D	TP2 - TRUP	#40 - #8	2.93	0.00	4.88	0.00	37.90	0.00	1.28
MISS0037E	TP2 - TRUP	#200 - #40	2.28	0.00	4.79	0.75	26.80	8.31	1.01
MISS0037F	TP2 - TRUP	<#200	3.15	0.35	6.33	0.57	20.00	0.00	1.03
MISS00400	TP2 - REUP	Composite	2.12	0.09	9.01	0.21	6.28	0.00	0.87
MISS0040A	TP2-REUP	> 3/4"	0.25	0.00	0.42	0.00	3.01	0.00	0.10
MISS0040B	TP2-REUP	#4 - 3/4"	0.59	0.07	0.81	0.11	4.20	0.00	0.18
MISS0040C	TP2-REUP	#8 - #4	1.72	0.12	2.52	0.17	6.17	0.00	0.41
MISS0040D	TP2-REUP	#40 - #8	6.14	0.00	11.30	0.00	87.60	0.00	2.91
MISS0040E	TP2-REUP	#200 - #40	3.41	0.67	8.86	1.02	40.30	11.47	1.62
MISS0040F	TP2-REUP	<#200	4.27	0.43	13.17	0.73	25.60	0.00	1.67

TABLE D-2
SOR Calculation
Dry Gamma Spectroscopy on Selected Soil Fractions

SampleID	TP/Zone	Fraction	Dry Count Ra-226 pCi/g	Dry Count Ra-226 Error	Dry Count Th-232 pCi/g	Dry Count Th-232 Error	Dry Count U-238 pCi/g	Dry Count U-238 Error	Dry Count SOR (15 pCi)
MISS00520	TP3 - SUOV	Composite	3.07	0.11	16.48	0.31	7.46	0.00	1.45
MISS0052A	TP3 - SUOV	> 3/4"	NO SAMPLE						N/A
MISS0052B	TP3 - SUOV	#4 - 3/4"	5.02	0.20	9.68	0.30	**8.69**	2.67	1.15
MISS0052C	TP3 - SUOV	#8 - #4	2.85	0.14	10.56	0.30	7.94	0.00	1.05
MISS0052D	TP3 - SUOV	#40 - #8	4.90	0.59	10.36	0.92	35.40	0.00	1.73
MISS0052E	TP3 - SUOV	#200 - #40	6.88	0.56	23.98	1.07	**32.60**	9.41	2.71
MISS0052F	TP3 - SUOV	<#200	32.77	1.16	147.67	2.99	55.53	17.24	13.14
MISS0053X	TP3 - SUUP	Composite	1.36	0.07	10.59	0.21	5.38	0.00	0.90
MISS0053A	TP3 - SUUP	> 3/4"	NO SAMPLE						N/A
MISS0053B	TP3 - SUUP	#4 - 3/4"	3.09	0.17	3.14	0.22	7.88	0.00	0.57
MISS0053C	TP3 - SUUP	#8 - #4	2.21	0.15	14.59	0.37	10.30	0.00	1.33
MISS0053D	TP3 - SUUP	#40 - #8	2.50	0.00	7.72	0.76	30.60	0.00	1.29
MISS0053E	TP3 - SUUP	#200 - #40	1.75	0.25	7.10	0.43	15.00	0.00	0.89
MISS0053F	TP3 - SUUP	<#200	6.10	0.38	28.17	0.83	**22.90**	6.78	2.74
MISS00550	TP3 - TROV	Composite	3.42	0.12	16.88	0.32	7.81	0.00	1.51
MISS0055A	TP3 - TROV	> 3/4"	NO SAMPLE						N/A
MISS0055B	TP3 - TROV	#4 - 3/4"	2.52	0.15	2.96	0.20	7.53	0.00	0.52
MISS0055C	TP3 - TROV	#8 - #4	2.04	0.10	2.83	0.16	5.29	0.00	0.43
MISS0055D	TP3 - TROV	#40 - #8	2.79	0.37	5.72	0.56	19.90	0.00	0.97
MISS0055E	TP3 - TROV	#200 - #40	3.81	0.49	10.27	0.82	27.80	7.96	1.49
MISS0055F	TP3 - TROV	<#200	8.57	0.90	36.81	1.84	52.70	0.00	4.08
MISS00560	TP3 - TRUP	Composite	10.16	0.31	135.24	1.87	17.18	6.12	10.04
MISS0056A	TP3 - TRUP	> 3/4"	2.99	0.15	3.75	0.20	7.34	0.00	0.60
MISS0056B	TP3 - TRUP	#4 - 3/4"	2.55	0.14	4.42	0.22	7.31	0.00	0.61
MISS0056C	TP3 - TRUP	#8 - #4	3.63	0.20	15.68	0.44	11.60	0.00	1.52
MISS0056D	TP3 - TRUP	#40 - #8	10.58	1.07	37.54	1.94	63.90	0.00	4.49
MISS0056E	TP3 - TRUP	#200 - #40	18.85	1.28	103.08	2.90	71.10	0.00	9.55
MISS0056F	TP3 - TRUP	<#200	38.14	1.15	204.59	3.60	53.00	16.37	17.24
MISS00590	TP3 - REUP	Composite	1.89	0.10	11.60	0.26	7.72	0.00	1.05
MISS0059A	TP3-REUP	> 3/4"	NO SAMPLE						N/A
MISS0059B	TP3-REUP	#4 - 3/4"	NO SAMPLE						N/A
MISS0059C	TP3-REUP	#8 - #4	9.54	0.00	13.30	2.84	113.00	0.00	3.78
MISS0059D	TP3-REUP	#40 - #8	5.87	0.00	12.00	0.00	80.50	0.00	2.80
MISS0059E	TP3-REUP	#200 - #40	4.73	0.00	15.19	1.81	60.60	0.00	2.54
MISS0059F	TP3-REUP	<#200	3.35	0.34	12.74	2.16	21.40	6.46	1.50
MISS00710	TP4 - SUOV	Composite	13.50	0.58	681.81	9.22	135.68	14.24	49.07
MISS0071A	TP4 - SUOV	> 3/4"	NO SAMPLE						N/A
MISS0071B	TP4 - SUOV	#4 - 3/4"	3.13	0.17	18.28	0.46	11.30	3.38	1.65
MISS0071C	TP4 - SUOV	#8 - #4	4.24	0.32	39.68	0.95	21.60	0.00	3.36
MISS0071D	TP4 - SUOV	#40 - #8	18.00	0.00	121.10	7.02	233.00	0.00	13.93
MISS0071E	TP4 - SUOV	#200 - #40	30.29	2.27	529.31	10.35	174.00	54.07	40.79
MISS0071F	TP4 - SUOV	<#200	38.06	1.29	654.01	10.07	169.82	18.14	49.53
MISS00720	TP4 - SUUP	Composite	3.20	0.14	71.82	1.04	21.45	4.04	5.43
MISS0072A	TP4 - SUUP	> 3/4"	2.72	0.16	6.91	0.27	10.25	2.60	0.85
MISS0072B	TP4 - SUUP	#4 - 3/4"	2.40	0.14	7.28	0.25	9.69	2.28	0.84
MISS0072C	TP4 - SUUP	#8 - #4	2.64	0.16	14.19	0.38	10.10	3.11	1.32
MISS0072D	TP4 - SUUP	#40 - #8	3.96	0.62	29.08	1.48	44.10	0.00	3.08
MISS0072E	TP4 - SUUP	#200 - #40	2.90	0.37	42.97	1.11	26.30	0.00	3.58
MISS0072F	TP4 - SUUP	<#200	18.54	0.94	271.05	4.58	62.60	19.38	20.56

TABLE D-2
SOR Calculation
Dry Gamma Spectroscopy on Selected Soil Fractions

SampleID	TP/Zone	Fraction	Dry Count Ra-226 pCi/g	Dry Count Ra-226 Error	Dry Count Th-232 pCi/g	Dry Count Th-232 Error	Dry Count U-238 pCi/g	Dry Count U-238 Error	Dry Count SOR (15 pCi)
MISS00740	TP4 - TROV	Composite	22.52	0.80	1387.00	18.62	337.88	17.04	100.73
MISS0074A	TP4 - TROV	> 3/4"	NO SAMPLE						N/A
MISS0074B	TP4 - TROV	#4 - 3/4"	3.57	0.19	10.66	0.34	9.74	0.00	1.14
MISS0074C	TP4 - TROV	#8 - #4	3.71	0.22	41.26	0.81	15.60	4.72	3.31
MISS0074D	TP4 - TROV	#40 - #8	16.34	2.54	372.45	8.83	185.00	0.00	29.62
MISS0074E	TP4 - TROV	#200 - #40	45.61	3.51	1256.70	20.96	253.00	0.00	91.88
MISS0074F	TP4 - TROV	<#200	95.72	2.34	1955.41	29.44	414.68	32.65	145.04
MISS00760	TP4 - TRLO	Composite	1.07	0.07	15.20	0.27	7.14	1.97	1.23
MISS0076A	TP4 - TRLO	> 3/4"	NO SAMPLE						N/A
MISS0076B	TP4 - TRLO	#4 - 3/4"	2.34	0.31	3.24	0.00	19.60	0.00	0.76
MISS0076C	TP4 - TRLO	#8 - #4	1.80	0.30	2.96	0.46	18.00	0.00	0.68
MISS0076D	TP4 - TRLO	#40 - #8	3.70	0.00	6.85	0.00	45.20	0.00	1.61
MISS0076E	TP4 - TRLO	#200 - #40	1.31	0.00	3.79	0.43	15.80	0.00	0.66
MISS0076F	TP4 - TRLO	<#200	3.01	0.39	22.03	0.95	27.40	8.48	2.22
MISS00770	TP4 - REOV	Composite	10.89	0.49	617.53	8.34	126.43	9.11	44.42
MISS0077A	TP4 - REOV	> 3/4"	NO SAMPLE						N/A
MISS0077B	TP4 - REOV	#4 - 3/4"	3.57	0.25	7.81	0.39	13.00	3.81	1.02
MISS0077C	TP4 - REOV	#8 - #4	6.35	0.46	75.64	1.47	31.20	9.60	6.09
MISS0077D	TP4 - REOV	#40 - #8	11.89	1.72	239.54	5.58	112.00	0.00	19.00
MISS0077E	TP4 - REOV	#200 - #40	43.95	2.53	791.42	13.21	164.00	0.00	58.97
MISS0077F	TP4 - REOV	<#200	47.97	1.78	1105.79	16.91	211.67	35.39	81.15
MISS0078X	TP4 - REUP	Composite	4.31	0.31	241.27	3.35	67.45	7.75	17.72
MISS0078A	TP4 - REUP	> 3/4"	NO SAMPLE						N/A
MISS0078B	TP4 - REUP	#4 - 3/4"	2.66	0.44	9.02	0.80	28.20	0.00	1.34
MISS0078C	TP4 - REUP	#8 - #4	3.80	0.45	28.13	0.99	24.90	7.87	2.63
MISS0078D	TP4 - REUP	#40 - #8	16.60	0.00	268.35	8.91	234.00	68.86	23.68
MISS0078E	TP4 - REUP	#200 - #40	4.71	1.06	86.57	2.81	79.40	24.03	7.67
MISS0078F	TP4 - REUP	<#200	9.43	0.65	239.27	3.95	105.68	15.82	18.69
MISS00790	TP4 - RELO	Composite	0.62	0.05	8.40	0.15	4.80	1.42	0.70
MISS0079A	TP4 - RELO	> 3/4"	NO SAMPLE						N/A
MISS0079B	TP4 - RELO	#4 - 3/4"	11.30	0.00	22.20	0.00	139.00	0.00	5.01
MISS0079C	TP4 - RELO	#8 - #4	2.94	0.00	5.73	0.00	38.80	0.00	1.35
MISS0079D	TP4 - RELO	#40 - #8	3.02	0.00	5.11	0.00	37.90	0.00	1.30
MISS0079E	TP4 - RELO	#200 - #40	1.29	0.00	2.93	0.45	17.60	0.00	0.63
MISS0079F	TP4 - RELO	<#200	1.82	0.33	14.23	0.78	23.40	7.01	1.54

TABLE D-2
SOR Calculation
Dry Gamma Spectroscopy on Selected Soil Fractions

SampleID	TP/Zone	Fraction	Dry Count Ra-226 pCi/g	Dry Count Ra-226 Error	Dry Count Th-232 pCi/g	Dry Count Th-232 Error	Dry Count U-238 pCi/g	Dry Count U-238 Error	Dry Count SOR (15 pCi)
MISS00900	TP5 - OVER	Composite	3.54	0.12	19.26	0.34	4.70	2.34	1.61
MISS0090A	TP5 - OVER	> 3/4"	5.21	0.23	3.52	0.26	9.92	0.00	0.78
MISS0090B	TP5 - OVER	#4 - 3/4"	1.22	0.11	4.99	0.21	6.56	0.00	0.55
MISS0090C	TP5 - OVER	#8 - #4	1.94	0.09	9.46	0.22	6.25	0.00	0.89
MISS0090D	TP5 - OVER	#40 - #8	2.51	0.26	9.49	0.52	17.40	0.00	1.15
MISS0090E	TP5 - OVER	#200 - #40	1.79	0.22	9.29	0.40	12.70	0.00	0.99
MISS0090F	TP5 - OVER	<#200	6.65	0.63	70.84	1.84	44.00	13.23	6.05
MISS00910	TP5 - UPER	Composite	3.20	0.11	3.62	0.13	25.13	2.03	0.96
MISS0091A	TP5 - UPER	> 3/4"	1.51	0.16	2.59	0.26	9.39	0.00	0.46
MISS0091B	TP5 - UPER	#4 - 3/4"	1.29	0.11	1.16	0.16	6.05	0.00	0.28
MISS0091C	TP5 - UPER	#8 - #4	2.33	0.13	2.71	0.16	11.16	2.32	0.56
MISS0091D	TP5 - UPER	#40 - #8	4.53	0.59	5.61	0.00	40.70	12.58	1.49
MISS0091E	TP5 - UPER	#200 - #40	2.39	0.37	3.66	0.57	28.64	7.18	0.98
MISS0091F	TP5 - UPER	<#200	5.93	0.57	7.72	0.78	70.50	11.05	2.32
MISS00930	TP5 - UPER2	Composite	2.25	0.09	2.99	0.13	23.82	1.84	0.83
MISS0093A	TP5 - UPER2	> 3/4"	1.36	0.06	2.16	0.09	3.75	0.00	0.31
MISS0093B	TP5 - UPER2	#4 - 3/4"	1.75	0.10	1.58	0.13	6.83	1.56	0.36
MISS0093C	TP5 - UPER2	#8 - #4	1.52	0.10	1.49	0.12	5.37	0.00	0.31
MISS0093D	TP5 - UPER2	#40 - #8	2.97	0.00	5.21	0.00	43.30	0.00	1.41
MISS0093E	TP5 - UPER2	#200 - #40	1.42	0.00	2.34	0.00	16.90	0.00	0.59
MISS0093F	TP5 - UPER2	<#200	1.56	0.40	2.72	0.60	24.60	7.06	0.78

TABLE D-3
SOR Calculation
Wet Gamma Spectroscopy on Composites

SampleID	TP/Zone	Wet Count Ra-226 pCi/g	Wet Count Ra-226 Error	Wet Count Th-232 pCi/g	Wet Count Th-232 Error	Wet Count U-238 pCi/g	Wet Count U-238 Error	Wet Count SOR (15 pCi)
MISS00140	TP1 - SUOV	0.88	0.05	5.26	0.12	3.81	0.00	0.49
MISS0015X	TP1 - SUUP	0.72	0.04	1.28	0.06	2.47	0.00	0.18
MISS00160	TP1 - SULO	0.50	0.03	0.73	0.04	2.09	0.56	0.12
MISS00170	TP1 - TROV	0.79	0.04	3.13	0.09	3.03	0.00	0.32
MISS00180	TP1 - TRUP	0.59	0.03	1.83	0.06	2.29	0.00	0.21
MISS00190	TP1 - TRLO	0.50	0.03	0.72	0.04	1.69	0.00	0.11
MISS00200	TP1 - REOV	1.04	0.05	5.10	0.12	3.59	0.00	0.48
MISS00210	TP1 - REUP	0.30	0.03	0.48	0.04	1.92	0.00	0.09
MISS00220	TP1 - RELO	0.48	0.03	0.72	0.04	2.04	0.00	0.12
MISS00230	TP-1 - REUP2	0.30	0.03	0.63	0.04	2.10	0.00	0.10
MISS00330	TP2 - SUOV	1.19	0.06	10.42	0.19	5.00	0.00	0.87
MISS00340	TP2 - SUUP	1.37	0.07	7.41	0.17	6.00	1.50	0.71
MISS0035X	TP2 - SULO	0.42	0.03	0.50	0.04	2.23	0.00	0.11
MISS0036	TP2 - TROV	1.06	0.06	5.69	0.14	4.35	0.00	0.54
MISS0037	TP2 - TRUP	0.85	0.05	4.14	0.11	3.44	0.00	0.40
MISS0038	TP2 - TRLO	0.36	0.02	0.42	0.03	1.48	0.46	0.08
MISS00390	TP2 - REOV	0.50	0.04	2.51	0.08	2.63	0.00	0.25
MISS00400	TP2 - REUP	1.53	0.06	6.39	0.15	**1.46**	1.28	0.56
MISS00410	TP2 - RELO	0.35	0.02	0.44	0.03	1.65	0.00	0.09
MISS00430	TP2 - REUP2	1.51	0.06	7.90	0.17	4.84	0.00	0.72
MISS01690	TP2 - F1	1.07	0.07	5.30	0.16	4.78	0.00	0.52
MISS00520	TP3 - SUOV	2.52	0.09	11.92	0.23	5.85	0.00	1.08
MISS0053X	TP3 - SUUP	1.49	0.06	9.43	0.18	4.75	0.00	0.82
MISS00540	TP3 - SULO	0.34	0.02	0.42	0.03	1.44	0.00	0.08
MISS00550	TP3 - TROV	3.04	0.10	12.55	0.24	**0.76**	1.90	1.05
MISS00560	TP3 - TRUP	7.16	0.19	77.83	1.11	16.44	4.45	5.99
MISS00570	TP3 - TRLO	0.35	0.02	0.44	0.03	1.69	0.00	0.09
MISS00580	TP3 -REOV	0.14	0.02	0.14	0.00	1.66	0.00	0.05
MISS00590	TP3 - REUP	0.70	0.05	5.25	0.13	4.00	0.00	0.48
MISS00600	TP3 - RELO	0.36	0.02	0.73	0.04	1.71	0.00	0.11
MISS00610	TP3 - REUP2	0.80	0.05	6.56	0.15	4.34	0.00	0.58

TABLE D-3
SOR Calculation
Wet Gamma Spectroscopy on Composites

SampleID	TP/Zone	Wet Count Ra-226 pCi/g	Wet Count Ra-226 Error	Wet Count Th-232 pCi/g	Wet Count Th-232 Error	Wet Count U-238 pCi/g	Wet Count U-238 Error	Wet Count SOR (15 pCi)
MISS00710	TP4 - SUOV	8.31	0.25	352.69	4.77	79.61	8.33	25.66
MISS00720	TP4 - SUUP	2.80	0.13	54.79	0.79	15.74	2.90	4.15
MISS00730	TP4 - SULO	0.49	0.03	0.81	0.04	2.05	0.70	0.13
MISS00740	TP4 - TROV	14.47	0.38	698.06	9.34	162.12	9.13	50.74
MISS00750	TP4 - TRUP	0.93	0.05	4.22	0.10	4.64	1.15	0.44
MISS00760	TP4 - TRLO	1.12	0.05	12.92	0.22	5.86	1.70	1.05
MISS00770	TP4 - REOV	13.60	0.34	373.05	5.00	52.32	8.17	26.82
MISS0078X	TP4 - REUP	3.28	0.16	114.04	1.58	47.72	4.20	8.78
MISS00790	TP4 - RELO	0.55	0.04	6.77	0.14	3.88	0.00	0.57
MISS00800	TP4 - RELO2	0.36	0.03	2.69	0.05	**0.88**	0.81	0.22
MISS01870	TP4 - Special	1.00		102.30		51.29		7.91
MISS00900	TP-5 OVER	1.94	0.08	14.95	0.25	6.06	0.00	1.25
MISS00910	TP-5 UPER	1.24	0.05	2.30	0.08	19.04	1.37	0.62
MISS0092X	TP-5 LWER	0.38	0.02	0.56	0.03	1.48	0.00	0.09
MISS00930	TP-5 UPER2	0.92	0.05	1.78	0.07	17.07	1.35	0.52

Bold indicates result below the MDA

TABLE D-4

SOR by Zone (Wet & Dry gamma-spec)
Dry Gamma-spec is the basis for the regulatory limits.

Test Pit 1 SOR (based on 15 pCi/g)

SUOV	Dry	0.57	TROV	Dry	0.35	REOV	Dry	0.56
	Wet	0.49		Wet	0.32		Wet	0.48
SUUP	Dry	0.23	TRUP	Dry	0.34	REUP	Dry	0.17
	Wet	0.18		Wet	0.21		Wet	0.09
SULO	Dry	0.15	TRLO	Dry	0.14	RELO	Dry	0.14
	Wet	0.12		Wet	0.11		Wet	0.12

Test Pit 2 SOR (based on 15 pCi/g)

SUOV	Dry	0.87	TROV	Dry	1.03	REOV	Dry	0.47
	Wet	0.87		Wet	0.54		Wet	0.25
SUUP	Dry	1.06	TRUP	Dry	0.87	REUP	Dry	1.09
	Wet	0.71		Wet	0.40		Wet	0.72
SULO	Dry	0.16	TRLO	Dry	0.10	RELO	Dry	0.10
	Wet	0.11		Wet	0.08		Wet	0.09

Test Pit 3 SOR (based on 15 pCi/g)

SUOV	Dry	1.45	TROV	Dry	1.51	REOV	Dry	0.13
	Wet	1.08		Wet	1.17		Wet	0.05
SUUP	Dry	0.90	TRUP	Dry	10.04	REUP	Dry	1.39
	Wet	0.82		Wet	5.99		Wet	0.58
SULO	Dry	0.12	TRLO	Dry	0.12	RELO	Dry	0.13
	Wet	0.08		Wet	0.09		Wet	0.11

Test Pit 4 SOR (based on 15 pCi/g)

SUOV	Dry	49.07	TROV	Dry	100.73	REOV	Dry	44.42
	Wet	25.66		Wet	50.74		Wet	26.82
SUUP	Dry	5.50	TRUP	Dry	0.58	REUP	Dry	17.72
	Wet	4.15		Wet	0.44		Wet	8.78
SULO	Dry	0.16	TRLO	Dry	1.23	RELO	Dry	0.70
	Wet	0.13		Wet	1.05		Wet	0.57

Test Pit 5 SOR (based on 15 pCi/g)

OVER	Dry	1.61
	Wet	1.25
UPER	Dry	0.96
	Wet	0.62
LWER	Dry	0.13
	Wet	0.09

TABLE D-5
Geotechnical Samples for Radiological Analysis and SOR for Fractions

Zone	SOR (Dry Count) Based on 15 pCi/g	Sample # (Composite Of:)	Fractions (weight %) .75" - 3" (1.5" - 3", .75" - 1.5")	#4 - .75" (3/8" - .75", #4 - 3/8")	#8 - #4 (#8 - #4)	#40 - #8 (#16 - #8, #30 - #16, #40-#30)	#200 - #40 (#50 - #40, #60 - #50, #100 - #60, #200 - #100)	Below #200
			A	B	C	D	E	F
Test Pit 1								
SUOV	0.57	MISS-0014	0.199	0.089	0.041	0.141	0.279	0.251
REOV	0.56	MISS-0020	0.019	0.092	0.048	0.167	0.33	0.344
Test Pit 2								
SUOV	0.87	MISS-0033	0.324	0.07	0.049	0.192	0.18	0.185
TROV	**1.03**	MISS-0036	0.172	0.085	0.034	0.117	0.211	0.381
SUUP	**1.06**	MISS-0034	0.192	0.072	0.029	0.103	0.142	0.462
TRUP	0.87	MISS-0037	0.205	0.1	0.035	0.128	0.179	0.353
REUP	0.87	MISS-0040	0.158	0.037	0.019	0.065	0.145	0.576
Test Pit 3								
SUOV	**1.45**	MISS-0052	0.042	0.097	0.067	0.209	0.269	0.316
TROV	**1.51**	MISS-0055	0.025	0.123	0.093	0.316	0.252	0.191
SUUP	0.90	MISS-0053	0.021	0.064	0.045	0.143	0.337	0.39
TRUP	**10.04**	MISS-0056	0.095	0.104	0.055	0.116	0.161	0.469
REUP	**1.05**	MISS-0059	0	0	0.008	0.099	0.144	0.749
Test Pit 4								
SUOV	**49.07**	MISS-0071	0.029	0.051	0.017	0.036	0.124	0.743
TROV	**100.73**	MISS-0074	0.016	0.083	0.04	0.081	0.119	0.661
REOV	**44.42**	MISS-0077	0	0.09	0.038	0.134	0.193	0.545
SUUP	**5.43**	MISS-0072	0.126	0.097	0.027	0.114	0.318	0.318
REUP	**17.72**	MISS-0078	0	0.019	0.009	0.051	0.153	0.768
TRLO	**1.23**	MISS-0076	0	0.015	0.007	0.142	0.443	0.393
RELO	0.70	MISS-0079	0	0.002	0.003	0.169	0.402	0.424
Test Pit 5								
OVER	**1.61**	MISS-0090	0.097	0.227	0.106	0.216	0.174	0.18
UPER	0.96	MISS-0091	0.042	0.009	0.073	0.172	0.31	0.394
UPER2	0.83	MISS-0093	0.105	0.071	0.031	0.127	0.321	0.345

TABLE D-5
Geotechnical Samples for Radiological Analysis and SOR for Fractions

Zone	SOR (Dry Count) Based on 15 pCi/g	Sample # Composite Of:	DRY SOR (Based on 15 pCi/g) .75" - 3" (1.5" - 3", .75" - 1.5") A	#4 - .75" (3/8" - .75", #4 - 3/8") B	#8 - #4 (#8 - #4) C	#40 - #8 (#16 - #8, #30 - #16, #40-#30) D	#200 - #40 (#50 - #40, #60 - #50, #100 - #60, #200 - #100) E	Below #200 F
Test Pit 1								
SUOV	0.57	MISS-0014	0.09	0.15	0.24	**1.09**	0.65	**1.79**
REOV	0.56	MISS-0020	N/A	0.31	0.36	**1.10**	0.59	**1.87**
Test Pit 2								
SUOV	0.87	MISS-0033	0.17	0.19	0.40	0.76	0.98	**3.53**
TROV	**1.03**	MISS-0036	0.29	0.23	0.39	**1.48**	**1.29**	**1.86**
SUUP	**1.06**	MISS-0034	0.19	0.13	0.60	**1.74**	**1.68**	**1.31**
TRUP	0.87	MISS-0037	0.20	0.13	0.32	**1.28**	**1.01**	**1.03**
REUP	0.87	MISS-0040	0.10	0.18	0.41	**2.91**	**1.62**	**1.67**
Test Pit 3								
SUOV	**1.45**	MISS-0052	N/A	**1.15**	**1.05**	**1.73**	**2.71**	**13.14**
TROV	**1.51**	MISS-0055	N/A	0.52	0.43	0.97	**1.49**	**4.08**
SUUP	0.90	MISS-0053	N/A	0.57	**1.33**	**1.29**	0.89	**2.74**
TRUP	**10.04**	MISS-0056	0.60	0.61	**1.52**	**4.49**	**9.55**	**17.24**
REUP	**1.05**	MISS-0059	N/A	N/A	**3.78**	**2.80**	**2.54**	**1.50**
Test Pit 4								
SUOV	**49.07**	MISS-0071	N/A	**1.65**	**3.36**	**13.93**	**40.79**	**49.53**
TROV	**100.73**	MISS-0074	N/A	**1.14**	**3.31**	**29.62**	**91.88**	**145.04**
REOV	**44.42**	MISS-0077	N/A	**1.02**	**6.09**	**19.00**	**58.97**	**81.15**
SUUP	**5.43**	MISS-0072	**0.85**	0.84	**1.32**	**3.08**	**3.58**	**20.56**
REUP	**17.72**	MISS-0078	N/A	**1.34**	**2.63**	**23.68**	**7.67**	**18.69**
TRLO	**1.23**	MISS-0076	N/A	0.76	0.68	**1.61**	0.66	**2.22**
RELO	0.70	MISS-0079	N/A	**5.01**	**1.35**	**1.30**	0.63	**1.54**
Test Pit 5								
OVER	**1.61**	MISS-0090	0.78	0.55	0.89	**1.15**	0.99	**6.05**
UPER	0.96	MISS-0091	0.46	0.28	0.56	**1.49**	0.98	**2.32**
UPER2	0.83	MISS-0093	0.31	0.36	0.31	**1.41**	0.59	0.78

DRY GAMMA SPECTROSCOPY ON COMPOSITES

ENGINEERING TEST PITS AT MISS SOIL RADIOLOGICAL DATA RESULTS AND SOR CALCULATION

FUSRAP MAYWOOD SUPERFUND SITE MAYWOOD, NEW JERSEY

Location:	MAYWOOD		
Site WBS:		Date Entered:	9/29/99
Work Order Number:	99G0005		
Project Number:			
Environmental Cat:	RI		

Sample ID	Date Collected	Date Analyzed	SDG ID	LAB ID	Vol.	W/D	Sample Type	Analyte	Result	Error	Units	Analytical Method	MDA
MISS00140	08/23/99	09/28/99	99G0005		664.9	DRY	REG	K-40	13.57	0.75	PCI/G	GAMMASPEC	0.91
MISS00140	08/23/99	09/28/99	99G0005		664.9	DRY	REG	CS-137	0.13	0.00	PCI/G	GAMMASPEC	0.13
MISS00140	08/23/99	09/28/99	99G0005		664.9	DRY	REG	RA-226	1.12	0.05	PCI/G	GAMMASPEC	0.18
MISS00140	08/23/99	09/28/99	99G0005		664.9	DRY	REG	AC-227	1.13	0.00	PCI/G	GAMMASPEC	1.13
MISS00140	08/23/99	09/28/99	99G0005		664.9	DRY	REG	RA-228	6.20	0.14	PCI/G	GAMMASPEC	0.30
MISS00140	08/23/99	09/28/99	99G0005		664.9	DRY	REG	TH-228	6.20	0.14	PCI/G	GAMMASPEC	0.30
MISS00140	08/23/99	09/28/99	99G0005		664.9	DRY	REG	TH-232	6.20	0.14	PCI/G	GAMMASPEC	0.30
MISS00140	08/23/99	09/28/99	99G0005		664.9	DRY	REG	TH-230	36.70	0.00	PCI/G	GAMMASPEC	36.70
MISS00140	08/23/99	09/28/99	99G0005		664.9	DRY	REG	PA-231	3.91	0.00	PCI/G	GAMMASPEC	3.91
MISS00140	08/23/99	09/28/99	99G0005		664.9	DRY	REG	U-235	0.29	0.04	PCI/G	GAMMASPEC	0.13
MISS00140	08/23/99	09/28/99	99G0005		664.9	DRY	REG	U-238	4.23	0.00	PCI/G	GAMMASPEC	4.23
MISS00140	08/23/99	09/28/99	99G0005		664.9	DRY	REG	AM-241	0.48	0.00	PCI/G	GAMMASPEC	0.48
MISS0015X	08/23/99	09/28/99	99G0005		570.6	DRY	REG	K-40	10.15	0.65	PCI/G	GAMMASPEC	0.72
MISS0015X	08/23/99	09/28/99	99G0005		570.6	DRY	REG	CS-137	0.10	0.00	PCI/G	GAMMASPEC	0.10
MISS0015X	08/23/99	09/28/99	99G0005		570.6	DRY	REG	RA-226	0.87	0.05	PCI/G	GAMMASPEC	0.13
MISS0015X	08/23/99	09/28/99	99G0005		570.6	DRY	REG	AC-227	0.81	0.00	PCI/G	GAMMASPEC	0.81
MISS0015X	08/23/99	09/28/99	99G0005		570.6	DRY	REG	RA-228	1.68	0.07	PCI/G	GAMMASPEC	0.23
MISS0015X	08/23/99	09/28/99	99G0005		570.6	DRY	REG	TH-228	1.68	0.07	PCI/G	GAMMASPEC	0.23
MISS0015X	08/23/99	09/28/99	99G0005		570.6	DRY	REG	TH-232	1.68	0.07	PCI/G	GAMMASPEC	0.23
MISS0015X	08/23/99	09/28/99	99G0005		570.6	DRY	REG	TH-230	24.30	0.00	PCI/G	GAMMASPEC	24.30
MISS0015X	08/23/99	09/28/99	99G0005		570.6	DRY	REG	PA-231	2.61	0.00	PCI/G	GAMMASPEC	2.61
MISS0015X	08/23/99	09/28/99	99G0005		570.6	DRY	REG	U-235	0.16	0.03	PCI/G	GAMMASPEC	0.09
MISS0015X	08/23/99	09/28/99	99G0005		570.6	DRY	REG	U-238	3.03	0.00	PCI/G	GAMMASPEC	3.03
MISS0015X	08/23/99	09/28/99	99G0005		570.6	DRY	REG	AM-241	0.33	0.00	PCI/G	GAMMASPEC	0.33
MISS00160	08/23/99	09/28/99	99G0005		730.5	DRY	REG	K-40	12.31	0.64	PCI/G	GAMMASPEC	0.40
MISS00160	08/23/99	09/28/99	99G0005		730.5	DRY	REG	CS-137	0.06	0.00	PCI/G	GAMMASPEC	0.06
MISS00160	08/23/99	09/28/99	99G0005		730.5	DRY	REG	RA-226	0.68	0.04	PCI/G	GAMMASPEC	0.10
MISS00160	08/23/99	09/28/99	99G0005		730.5	DRY	REG	AC-227	0.64	0.00	PCI/G	GAMMASPEC	0.64

Approved by: ______________________________ Date: ________________

Equivalent values in the "Result" and "MDA" columns indicate that the analyte was either undetected or detected at a level below the MDA.
The results listed at the MDA should have been reported at the actual measurement.

Location:	MAYWOOD		
Site WBS:		Date Entered:	9/29/99
Work Order Number:	99G0005		
Project Number:			
Environmental Cat:	RI		

Sample ID	Date Collected	Date Analyzed	SDG ID	LAB ID	Vol.	W/D	Sample Type	Analyte	Result	Error	Units	Analytical Method	MDA
MISS00160	08/23/99	09/28/99	99G0005		730.5	DRY	REG	RA-228	0.93	0.05	PCI/G	GAMMASPEC	0.14
MISS00160	08/23/99	09/28/99	99G0005		730.5	DRY	REG	TH-228	0.93	0.05	PCI/G	GAMMASPEC	0.14
MISS00160	08/23/99	09/28/99	99G0005		730.5	DRY	REG	TH-232	0.93	0.05	PCI/G	GAMMASPEC	0.14
MISS00160	08/23/99	09/28/99	99G0005		730.5	DRY	REG	TH-230	18.20	0.00	PCI/G	GAMMASPEC	18.20
MISS00160	08/23/99	09/28/99	99G0005		730.5	DRY	REG	PA-231	1.88	0.00	PCI/G	GAMMASPEC	1.88
MISS00160	08/23/99	09/28/99	99G0005		730.5	DRY	REG	U-235	0.09	0.02	PCI/G	GAMMASPEC	0.07
MISS00160	08/23/99	09/28/99	99G0005		730.5	DRY	REG	U-238	2.17	0.00	PCI/G	GAMMASPEC	2.17
MISS00160	08/23/99	09/28/99	99G0005		730.5	DRY	REG	AM-241	0.25	0.00	PCI/G	GAMMASPEC	0.25
MISS00170	08/23/99	09/29/99	99G0005		701.0	DRY	REG	K-40	11.55	0.67	PCI/G	GAMMASPEC	0.92
MISS00170	08/23/99	09/29/99	99G0005		701.0	DRY	REG	CS-137	0.11	0.00	PCI/G	GAMMASPEC	0.11
MISS00170	08/23/99	09/29/99	99G0005		701.0	DRY	REG	RA-226	0.87	0.05	PCI/G	GAMMASPEC	0.14
MISS00170	08/23/99	09/29/99	99G0005		701.0	DRY	REG	AC-227	0.92	0.00	PCI/G	GAMMASPEC	0.92
MISS00170	08/23/99	09/29/99	99G0005		701.0	DRY	REG	RA-228	3.42	0.10	PCI/G	GAMMASPEC	0.25
MISS00170	08/23/99	09/29/99	99G0005		701.0	DRY	REG	TH-228	3.42	0.10	PCI/G	GAMMASPEC	0.25
MISS00170	08/23/99	09/29/99	99G0005		701.0	DRY	REG	TH-232	3.42	0.10	PCI/G	GAMMASPEC	0.25
MISS00170	08/23/99	09/29/99	99G0005		701.0	DRY	REG	TH-230	28.60	0.00	PCI/G	GAMMASPEC	28.60
MISS00170	08/23/99	09/29/99	99G0005		701.0	DRY	REG	PA-231	3.07	0.00	PCI/G	GAMMASPEC	3.07
MISS00170	08/23/99	09/29/99	99G0005		701.0	DRY	REG	U-235	0.14	0.03	PCI/G	GAMMASPEC	0.10
MISS00170	08/23/99	09/29/99	99G0005		701.0	DRY	REG	U-238	3.28	0.00	PCI/G	GAMMASPEC	3.28
MISS00170	08/23/99	09/29/99	99G0005		701.0	DRY	REG	AM-241	0.38	0.00	PCI/G	GAMMASPEC	0.38
MISS00180	08/24/99	09/29/99	99G0005		547.8	DRY	REG	K-40	6.96	0.57	PCI/G	GAMMASPEC	0.98
MISS00180	08/24/99	09/29/99	99G0005		547.8	DRY	REG	CS-137	0.12	0.00	PCI/G	GAMMASPEC	0.12
MISS00180	08/24/99	09/29/99	99G0005		547.8	DRY	REG	RA-226	0.82	0.05	PCI/G	GAMMASPEC	0.14
MISS00180	08/24/99	09/29/99	99G0005		547.8	DRY	REG	AC-227	0.99	0.10	PCI/G	GAMMASPEC	0.99
MISS00180	08/24/99	09/29/99	99G0005		547.8	DRY	REG	RA-228	2.94	0.10	PCI/G	GAMMASPEC	0.27
MISS00180	08/24/99	09/29/99	99G0005		547.8	DRY	REG	TH-228	2.94	0.10	PCI/G	GAMMASPEC	0.27
MISS00180	08/24/99	09/29/99	99G0005		547.8	DRY	REG	TH-232	2.94	0.10	PCI/G	GAMMASPEC	0.27
MISS00180	08/24/99	09/29/99	99G0005		547.8	DRY	REG	TH-230	29.20	0.00	PCI/G	GAMMASPEC	29.20

Approved by: ______________________ Date: ____________

Equivalent values in the "Result" and "MDA" columns indicate that the analyte was either undetected or detected at a level below the MDA. Th results listed at the MDA should have been reported at the actual measuremen

Location:	MAYWOOD		
Site WBS:		Date Entered:	9/29/99
Work Order Number:	99G0005		
Project Number:			
Environmental Cat:	RI		

Sample ID	Date Collected	Date Analyzed	SDG ID	LAB ID	Vol.	W/D	Sample Type	Analyte	Result	Error	Units	Analytical Method	MDA
MISS00180	08/24/99	09/29/99	99G0005		547.8	DRY	REG	PA-231	3.36	0.00	PCI/G	GAMMASPEC	3.36
MISS00180	08/24/99	09/29/99	99G0005		547.8	DRY	REG	U-235	0.12	0.03	PCI/G	GAMMASPEC	0.11
MISS00180	08/24/99	09/29/99	99G0005		547.8	DRY	REG	U-238	3.44	0.00	PCI/G	GAMMASPEC	3.44
MISS00180	08/24/99	09/29/99	99G0005		547.8	DRY	REG	AM-241	0.42	0.00	PCI/G	GAMMASPEC	0.42
MISS00180	08/24/99	09/29/99	99G0005		547.8	DRY	LREP	K-40	8.25	0.59	PCI/G	GAMMASPEC	0.75
MISS00180	08/24/99	09/29/99	99G0005		547.8	DRY	LREP	CS-137	0.12	0.00	PCI/G	GAMMASPEC	0.12
MISS00180	08/24/99	09/29/99	99G0005		547.8	DRY	LREP	RA-226	0.98	0.05	PCI/G	GAMMASPEC	0.15
MISS00180	08/24/99	09/29/99	99G0005		547.8	DRY	LREP	AC-227	0.98	0.00	PCI/G	GAMMASPEC	0.98
MISS00180	08/24/99	09/29/99	99G0005		547.8	DRY	LREP	RA-228	3.04	0.10	PCI/G	GAMMASPEC	0.27
MISS00180	08/24/99	09/29/99	99G0005		547.8	DRY	LREP	TH-228	3.04	0.10	PCI/G	GAMMASPEC	0.27
MISS00180	08/24/99	09/29/99	99G0005		547.8	DRY	LREP	TH-232	3.04	0.10	PCI/G	GAMMASPEC	0.27
MISS00180	08/24/99	09/29/99	99G0005		547.8	DRY	LREP	TH-230	28.70	0.00	PCI/G	GAMMASPEC	28.70
MISS00180	08/24/99	09/29/99	99G0005		547.8	DRY	LREP	PA-231	3.25	0.00	PCI/G	GAMMASPEC	3.25
MISS00180	08/24/99	09/29/99	99G0005		547.8	DRY	LREP	U-235	0.18	0.03	PCI/G	GAMMASPEC	0.11
MISS00180	08/24/99	09/29/99	99G0005		547.8	DRY	LREP	U-238	3.53	0.00	PCI/G	GAMMASPEC	3.53
MISS00180	08/24/99	09/29/99	99G0005		547.8	DRY	LREP	AM-241	0.40	0.00	PCI/G	GAMMASPEC	0.40
MISS00190	08/23/99	09/28/99	99G0005		704.5	DRY	REG	K-40	11.19	0.64	PCI/G	GAMMASPEC	0.76
MISS00190	08/23/99	09/28/99	99G0005		704.5	DRY	REG	CS-137	0.07	0.00	PCI/G	GAMMASPEC	0.07
MISS00190	08/23/99	09/28/99	99G0005		704.5	DRY	REG	RA-226	0.58	0.04	PCI/G	GAMMASPEC	0.12
MISS00190	08/23/99	09/28/99	99G0005		704.5	DRY	REG	AC-227	0.68	0.00	PCI/G	GAMMASPEC	0.68
MISS00190	08/23/99	09/28/99	99G0005		704.5	DRY	REG	RA-228	0.91	0.05	PCI/G	GAMMASPEC	0.16
MISS00190	08/23/99	09/28/99	99G0005		704.5	DRY	REG	TH-228	0.91	0.05	PCI/G	GAMMASPEC	0.16
MISS00190	08/23/99	09/28/99	99G0005		704.5	DRY	REG	TH-232	0.91	0.05	PCI/G	GAMMASPEC	0.16
MISS00190	08/23/99	09/28/99	99G0005		704.5	DRY	REG	TH-230	17.70	0.00	PCI/G	GAMMASPEC	17.70
MISS00190	08/23/99	09/28/99	99G0005		704.5	DRY	REG	PA-231	1.93	0.00	PCI/G	GAMMASPEC	1.93
MISS00190	08/23/99	09/28/99	99G0005		704.5	DRY	REG	U-235	0.15	0.02	PCI/G	GAMMASPEC	0.06
MISS00190	08/23/99	09/28/99	99G0005		704.5	DRY	REG	U-238	2.16	0.00	PCI/G	GAMMASPEC	2.16
MISS00190	08/23/99	09/28/99	99G0005		704.5	DRY	REG	AM-241	0.25	0.00	PCI/G	GAMMASPEC	0.25

Approved by: ______________________ Date: ______________

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Location:	MAYWOOD		
Site WBS:		Date Entered:	9/29/99
Work Order Number:	99G0005		
Project Number:			
Environmental Cat:	RI		

Sample ID	Date Collected	Date Analyzed	SDG ID	LAB ID	Vol.	W/D	Sample Type	Analyte	Result	Error	Units	Analytical Method	MDA
MISS00200	08/23/99	09/29/99	99G0005		691.2	DRY	REG	K-40	12.32	0.73	PCI/G	GAMMASPEC	1.19
MISS00200	08/23/99	09/29/99	99G0005		691.2	DRY	REG	CS-137	0.13	0.00	PCI/G	GAMMASPEC	0.13
MISS00200	08/23/99	09/29/99	99G0005		691.2	DRY	REG	RA-226	1.12	0.06	PCI/G	GAMMASPEC	0.20
MISS00200	08/23/99	09/29/99	99G0005		691.2	DRY	REG	AC-227	1.17	0.00	PCI/G	GAMMASPEC	1.17
MISS00200	08/23/99	09/29/99	99G0005		691.2	DRY	REG	RA-228	6.05	0.14	PCI/G	GAMMASPEC	0.31
MISS00200	08/23/99	09/29/99	99G0005		691.2	DRY	REG	TH-228	6.05	0.14	PCI/G	GAMMASPEC	0.31
MISS00200	08/23/99	09/29/99	99G0005		691.2	DRY	REG	TH-232	6.05	0.14	PCI/G	GAMMASPEC	0.31
MISS00200	08/23/99	09/29/99	99G0005		691.2	DRY	REG	TH-230	35.30	0.00	PCI/G	GAMMASPEC	35.30
MISS00200	08/23/99	09/29/99	99G0005		691.2	DRY	REG	PA-231	3.97	0.00	PCI/G	GAMMASPEC	3.97
MISS00200	08/23/99	09/29/99	99G0005		691.2	DRY	REG	U-235	0.28	0.04	PCI/G	GAMMASPEC	0.13
MISS00200	08/23/99	09/29/99	99G0005		691.2	DRY	REG	U-238	4.24	0.00	PCI/G	GAMMASPEC	4.24
MISS00200	08/23/99	09/29/99	99G0005		691.2	DRY	REG	AM-241	0.47	0.00	PCI/G	GAMMASPEC	0.47
MISS00210	08/23/99	09/29/99	99G0005		382.0	DRY	REG	K-40	4.85	0.53	PCI/G	GAMMASPEC	0.86
MISS00210	08/23/99	09/29/99	99G0005		382.0	DRY	REG	CS-137	0.03	0.02	PCI/G	GAMMASPEC	0.06
MISS00210	08/23/99	09/29/99	99G0005		382.0	DRY	REG	RA-226	0.49	0.05	PCI/G	GAMMASPEC	0.14
MISS00210	08/23/99	09/29/99	99G0005		382.0	DRY	REG	AC-227	0.90	0.00	PCI/G	GAMMASPEC	0.90
MISS00210	08/23/99	09/29/99	99G0005		382.0	DRY	REG	RA-228	1.14	0.07	PCI/G	GAMMASPEC	0.23
MISS00210	08/23/99	09/29/99	99G0005		382.0	DRY	REG	TH-228	1.14	0.07	PCI/G	GAMMASPEC	0.23
MISS00210	08/23/99	09/29/99	99G0005		382.0	DRY	REG	TH-232	1.14	0.07	PCI/G	GAMMASPEC	0.23
MISS00210	08/23/99	09/29/99	99G0005		382.0	DRY	REG	TH-230	24.50	0.00	PCI/G	GAMMASPEC	24.50
MISS00210	08/23/99	09/29/99	99G0005		382.0	DRY	REG	PA-231	2.76	0.00	PCI/G	GAMMASPEC	2.76
MISS00210	08/23/99	09/29/99	99G0005		382.0	DRY	REG	U-235	0.10	0.03	PCI/G	GAMMASPEC	0.11
MISS00210	08/23/99	09/29/99	99G0005		382.0	DRY	REG	U-238	3.15	0.00	PCI/G	GAMMASPEC	3.15
MISS00210	08/23/99	09/29/99	99G0005		382.0	DRY	REG	AM-241	0.33	0.00	PCI/G	GAMMASPEC	0.33
MISS00220	08/23/99	09/29/99	99G0005		670.5	DRY	REG	K-40	11.66	0.65	PCI/G	GAMMASPEC	0.49
MISS00220	08/23/99	09/29/99	99G0005		670.5	DRY	REG	CS-137	0.07	0.00	PCI/G	GAMMASPEC	0.07
MISS00220	08/23/99	09/29/99	99G0005		670.5	DRY	REG	RA-226	0.62	0.04	PCI/G	GAMMASPEC	0.09
MISS00220	08/23/99	09/29/99	99G0005		670.5	DRY	REG	AC-227	0.67	0.00	PCI/G	GAMMASPEC	0.67

Approved by: ______________________ Date: ______________

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Location:	MAYWOOD		
Site WBS:		Date Entered:	9/29/99
Work Order Number:	99G0005		
Project Number:			
Environmental Cat:	RI		

Sample ID	Date Collected	Date Analyzed	SDG ID	LAB ID	Vol.	W/D	Sample Type	Analyte	Result	Error	Units	Analytical Method	MDA
MISS00220	08/23/99	09/29/99	99G0005		670.5	DRY	REG	RA-228	0.86	0.05	PCI/G	GAMMASPEC	0.19
MISS00220	08/23/99	09/29/99	99G0005		670.5	DRY	REG	TH-228	0.86	0.05	PCI/G	GAMMASPEC	0.19
MISS00220	08/23/99	09/29/99	99G0005		670.5	DRY	REG	TH-232	0.86	0.05	PCI/G	GAMMASPEC	0.19
MISS00220	08/23/99	09/29/99	99G0005		670.5	DRY	REG	TH-230	18.50	0.00	PCI/G	GAMMASPEC	18.50
MISS00220	08/23/99	09/29/99	99G0005		670.5	DRY	REG	PA-231	2.03	0.00	PCI/G	GAMMASPEC	2.03
MISS00220	08/23/99	09/29/99	99G0005		670.5	DRY	REG	U-235	0.12	0.02	PCI/G	GAMMASPEC	0.07
MISS00220	08/23/99	09/29/99	99G0005		670.5	DRY	REG	U-238	2.25	0.00	PCI/G	GAMMASPEC	2.25
MISS00220	08/23/99	09/29/99	99G0005		670.5	DRY	REG	AM-241	0.25	0.00	PCI/G	GAMMASPEC	0.25
MISS00230	08/23/99	09/29/99	99G0005		394.2	DRY	REG	K-40	6.03	0.56	PCI/G	GAMMASPEC	0.63
MISS00230	08/23/99	09/29/99	99G0005		394.2	DRY	REG	CS-137	0.11	0.00	PCI/G	GAMMASPEC	0.11
MISS00230	08/23/99	09/29/99	99G0005		394.2	DRY	REG	RA-226	0.47	0.04	PCI/G	GAMMASPEC	0.16
MISS00230	08/23/99	09/29/99	99G0005		394.2	DRY	REG	AC-227	0.86	0.00	PCI/G	GAMMASPEC	0.86
MISS00230	08/23/99	09/29/99	99G0005		394.2	DRY	REG	RA-228	1.14	0.07	PCI/G	GAMMASPEC	0.17
MISS00230	08/23/99	09/29/99	99G0005		394.2	DRY	REG	TH-228	1.14	0.07	PCI/G	GAMMASPEC	0.17
MISS00230	08/23/99	09/29/99	99G0005		394.2	DRY	REG	TH-232	1.14	0.07	PCI/G	GAMMASPEC	0.17
MISS00230	08/23/99	09/29/99	99G0005		394.2	DRY	REG	TH-230	25.70	0.00	PCI/G	GAMMASPEC	25.70
MISS00230	08/23/99	09/29/99	99G0005		394.2	DRY	REG	PA-231	2.75	0.00	PCI/G	GAMMASPEC	2.75
MISS00230	08/23/99	09/29/99	99G0005		394.2	DRY	REG	U-235	0.12	0.00	PCI/G	GAMMASPEC	0.12
MISS00230	08/23/99	09/29/99	99G0005		394.2	DRY	REG	U-238	2.81	0.00	PCI/G	GAMMASPEC	2.81
MISS00230	08/23/99	09/29/99	99G0005		394.2	DRY	REG	AM-241	0.33	0.00	PCI/G	GAMMASPEC	0.33
QCBLANK	09/29/99	09/29/99	99G0005		945.0	DRY	BL	K-40	0.43	0.00	PCI/G	GAMMASPEC	0.43
QCBLANK	09/29/99	09/29/99	99G0005		945.0	DRY	BL	CS-137	0.02	0.00	PCI/G	GAMMASPEC	0.02
QCBLANK	09/29/99	09/29/99	99G0005		945.0	DRY	BL	RA-226	0.04	0.00	PCI/G	GAMMASPEC	0.04
QCBLANK	09/29/99	09/29/99	99G0005		945.0	DRY	BL	AC-227	0.15	0.00	PCI/G	GAMMASPEC	0.15
QCBLANK	09/29/99	09/29/99	99G0005		945.0	DRY	BL	RA-228	0.06	0.00	PCI/G	GAMMASPEC	0.06
QCBLANK	09/29/99	09/29/99	99G0005		945.0	DRY	BL	TH-228	0.06	0.00	PCI/G	GAMMASPEC	0.06
QCBLANK	09/29/99	09/29/99	99G0005		945.0	DRY	BL	TH-232	0.06	0.00	PCI/G	GAMMASPEC	0.06
QCBLANK	09/29/99	09/29/99	99G0005		945.0	DRY	BL	TH-230	5.75	0.00	PCI/G	GAMMASPEC	5.75

Approved by: ______________________ Date: ____________

Equivalent values in the "Result" and "MDA" columns indicate that the analyte was either undetected or detected at a level below the MDA. The results listed at the MDA should have been reported at the actual measurement.

Location:	MAYWOOD		
Site WBS:		Date Entered:	9/29/99
Work Order Number:	99G0005		
Project Number:			
Environmental Cat:	RI		

Sample ID	Date Collected	Date Analyzed	SDG ID	LAB ID	Vol.	W/D	Sample Type	Analyte	Result	Error	Units	Analytical Method	MDA
QCBLANK	09/29/99	09/29/99	99G0005		945.0	DRY	BL	PA-231	0.68	0.00	PCI/G	GAMMASPEC	0.68
QCBLANK	09/29/99	09/29/99	99G0005		945.0	DRY	BL	U-235	0.03	0.00	PCI/G	GAMMASPEC	0.03
QCBLANK	09/29/99	09/29/99	99G0005		945.0	DRY	BL	U-238	0.79	0.00	PCI/G	GAMMASPEC	0.79
QCBLANK	09/29/99	09/29/99	99G0005		945.0	DRY	BL	AM-241	0.07	0.00	PCI/G	GAMMASPEC	0.07
QCSPIKE	04/01/99	09/29/99	99G0005		832.0	DRY	LCSF	CS-137	70.43	2.22	PCI/G	GAMMASPEC	1.04
QCSPIKE	04/01/99	09/29/99	99G0005		832.0	DRY	LCSF	AM-241	163.98	8.30	PCI/G	GAMMASPEC	3.69
QCSPIKE	04/01/99	09/29/99	99G0005		832.0	DRY	LCST	CS-137	68.43	3.22	PCI/G	GAMMASPEC	1.04
QCSPIKE	04/01/99	09/29/99	99G0005		832.0	DRY	LCST	AM-241	165.05	8.25	PCI/G	GAMMASPEC	3.69

Approved by: ______________________ Date: ______________

Equivalent values in the "Result" and "MDA" columns indicate that the analyte was either undetected or detected at a level below the MDA.
T 'sults listed at the MDA should have been reported at the actual measureme

Location:	MAYWOOD		
Site WBS:		Date Entered:	10/20/99
Work Order Number:	99G0009		
Project Number:			
Environmental Cat:	RI		

Sample ID	Date Collected	Date Analyzed	SDG ID	LAB ID	Vol.	W/D	Sample Type	Analyte	Result	Error	Units	Analytical Method	MDA
MISS0520	08/31/99	10/18/99	99G0009		480.6	DRY	SD	K-40	14.72	0.96	PCI/G	GAMMASPEC	1.66
MISS0520	08/31/99	10/18/99	99G0009		480.6	DRY	SD	CS-137	0.24	0.00	PCI/G	GAMMASPEC	0.24
MISS0520	08/31/99	10/18/99	99G0009		480.6	DRY	SD	RA-226	3.07	0.11	PCI/G	GAMMASPEC	0.35
MISS0520	08/31/99	10/18/99	99G0009		480.6	DRY	SD	AC-227	2.03	0.00	PCI/G	GAMMASPEC	2.03
MISS0520	08/31/99	10/18/99	99G0009		480.6	DRY	SD	RA-228	16.48	0.31	PCI/G	GAMMASPEC	0.43
MISS0520	08/31/99	10/18/99	99G0009		480.6	DRY	SD	TH-228	16.48	0.31	PCI/G	GAMMASPEC	0.43
MISS0520	08/31/99	10/18/99	99G0009		480.6	DRY	SD	TH-232	16.48	0.31	PCI/G	GAMMASPEC	0.43
MISS0520	08/31/99	10/18/99	99G0009		480.6	DRY	SD	TH-230	65.30	0.00	PCI/G	GAMMASPEC	65.30
MISS0520	08/31/99	10/18/99	99G0009		480.6	DRY	SD	PA-231	7.44	0.00	PCI/G	GAMMASPEC	7.44
MISS0520	08/31/99	10/18/99	99G0009		480.6	DRY	SD	U-235	0.48	0.08	PCI/G	GAMMASPEC	0.23
MISS0520	08/31/99	10/18/99	99G0009		480.6	DRY	SD	U-238	7.46	0.00	PCI/G	GAMMASPEC	7.46
MISS0520	08/31/99	10/18/99	99G0009		480.6	DRY	SD	AM-241	0.85	0.00	PCI/G	GAMMASPEC	0.85
MISS0540	08/31/99	10/18/99	99G0009		701.9	DRY	SD	K-40	11.26	0.64	PCI/G	GAMMASPEC	0.67
MISS0540	08/31/99	10/18/99	99G0009		701.9	DRY	SD	CS-137	0.06	0.00	PCI/G	GAMMASPEC	0.06
MISS0540	08/31/99	10/18/99	99G0009		701.9	DRY	SD	RA-226	0.45	0.03	PCI/G	GAMMASPEC	0.09
MISS0540	08/31/99	10/18/99	99G0009		701.9	DRY	SD	AC-227	0.59	0.00	PCI/G	GAMMASPEC	0.59
MISS0540	08/31/99	10/18/99	99G0009		701.9	DRY	SD	RA-228	0.57	0.04	PCI/G	GAMMASPEC	0.12
MISS0540	08/31/99	10/18/99	99G0009		701.9	DRY	SD	TH-228	0.57	0.04	PCI/G	GAMMASPEC	0.12
MISS0540	08/31/99	10/18/99	99G0009		701.9	DRY	SD	TH-232	0.57	0.04	PCI/G	GAMMASPEC	0.12
MISS0540	08/31/99	10/18/99	99G0009		701.9	DRY	SD	TH-230	19.20	0.00	PCI/G	GAMMASPEC	19.20
MISS0540	08/31/99	10/18/99	99G0009		701.9	DRY	SD	PA-231	1.80	0.00	PCI/G	GAMMASPEC	1.80
MISS0540	08/31/99	10/18/99	99G0009		701.9	DRY	SD	U-235	0.01	0.03	PCI/G	GAMMASPEC	0.05
MISS0540	08/31/99	10/18/99	99G0009		701.9	DRY	SD	U-238	2.37	0.00	PCI/G	GAMMASPEC	2.37
MISS0540	08/31/99	10/18/99	99G0009		701.9	DRY	SD	AM-241	0.29	0.00	PCI/G	GAMMASPEC	0.29
MISS0550	08/31/99	10/18/99	99G0009		437.1	DRY	SD	K-40	13.73	0.94	PCI/G	GAMMASPEC	1.56
MISS0550	08/31/99	10/18/99	99G0009		437.1	DRY	SD	CS-137	0.25	0.00	PCI/G	GAMMASPEC	0.25
MISS0550	08/31/99	10/18/99	99G0009		437.1	DRY	SD	RA-226	3.42	0.12	PCI/G	GAMMASPEC	0.38
MISS0550	08/31/99	10/18/99	99G0009		437.1	DRY	SD	AC-227	2.27	0.00	PCI/G	GAMMASPEC	2.27

Approved by: ______________________ Date: ____________

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Location:	MAYWOOD		
Site WBS:		Date Entered:	10/20/99
Work Order Number:	99G0009		
Project Number:			
Environmental Cat:	RI		

Sample ID	Date Collected	Date Analyzed	SDG ID	LAB ID	Vol.	W/D	Sample Type	Analyte	Result	Error	Units	Analytical Method	MDA
MISS0550	08/31/99	10/18/99	99G0009		437.1	DRY	SD	RA-228	16.88	0.32	PCI/G	GAMMASPEC	0.58
MISS0550	08/31/99	10/18/99	99G0009		437.1	DRY	SD	TH-228	16.88	0.32	PCI/G	GAMMASPEC	0.58
MISS0550	08/31/99	10/18/99	99G0009		437.1	DRY	SD	TH-232	16.88	0.32	PCI/G	GAMMASPEC	0.58
MISS0550	08/31/99	10/18/99	99G0009		437.1	DRY	SD	TH-230	66.00	0.00	PCI/G	GAMMASPEC	66.00
MISS0550	08/31/99	10/18/99	99G0009		437.1	DRY	SD	PA-231	7.58	0.00	PCI/G	GAMMASPEC	7.58
MISS0550	08/31/99	10/18/99	99G0009		437.1	DRY	SD	U-235	0.50	0.08	PCI/G	GAMMASPEC	0.24
MISS0550	08/31/99	10/18/99	99G0009		437.1	DRY	SD	U-238	7.81	0.00	PCI/G	GAMMASPEC	7.81
MISS0550	08/31/99	10/18/99	99G0009		437.1	DRY	SD	AM-241	0.88	0.00	PCI/G	GAMMASPEC	0.88
MISS0560	08/31/99	10/18/99	99G0009		351.8	DRY	SD	K-40	16.77	1.73	PCI/G	GAMMASPEC	4.73
MISS0560	08/31/99	10/18/99	99G0009		351.8	DRY	SD	CS-137	0.70	0.00	PCI/G	GAMMASPEC	0.70
MISS0560	08/31/99	10/18/99	99G0009		351.8	DRY	SD	RA-226	10.16	0.31	PCI/G	GAMMASPEC	1.02
MISS0560	08/31/99	10/18/99	99G0009		351.8	DRY	SD	AC-227	6.13	0.00	PCI/G	GAMMASPEC	6.13
MISS0560	08/31/99	10/18/99	99G0009		351.8	DRY	SD	RA-228	135.24	1.87	PCI/G	GAMMASPEC	1.24
MISS0560	08/31/99	10/18/99	99G0009		351.8	DRY	SD	TH-228	135.24	1.87	PCI/G	GAMMASPEC	1.24
MISS0560	08/31/99	10/18/99	99G0009		351.8	DRY	SD	TH-232	135.24	1.87	PCI/G	GAMMASPEC	1.24
MISS0560	08/31/99	10/18/99	99G0009		351.8	DRY	SD	TH-230	190.00	0.00	PCI/G	GAMMASPEC	190.00
MISS0560	08/31/99	10/18/99	99G0009		351.8	DRY	SD	PA-231	22.30	0.00	PCI/G	GAMMASPEC	22.30
MISS0560	08/31/99	10/18/99	99G0009		351.8	DRY	SD	U-235	2.98	0.24	PCI/G	GAMMASPEC	0.71
MISS0560	08/31/99	10/18/99	99G0009		351.8	DRY	SD	U-238	17.18	6.12	PCI/G	GAMMASPEC	19.90
MISS0560	08/31/99	10/18/99	99G0009		351.8	DRY	SD	AM-241	2.58	0.00	PCI/G	GAMMASPEC	2.58
MISS0570	08/31/99	10/18/99	99G0009		682.2	DRY	SD	K-40	10.86	0.62	PCI/G	GAMMASPEC	0.60
MISS0570	08/31/99	10/18/99	99G0009		682.2	DRY	SD	CS-137	0.06	0.00	PCI/G	GAMMASPEC	0.06
MISS0570	08/31/99	10/18/99	99G0009		682.2	DRY	SD	RA-226	0.45	0.03	PCI/G	GAMMASPEC	0.09
MISS0570	08/31/99	10/18/99	99G0009		682.2	DRY	SD	AC-227	0.63	0.00	PCI/G	GAMMASPEC	0.63
MISS0570	08/31/99	10/18/99	99G0009		682.2	DRY	SD	RA-228	0.72	0.05	PCI/G	GAMMASPEC	0.14
MISS0570	08/31/99	10/18/99	99G0009		682.2	DRY	SD	TH-228	0.72	0.05	PCI/G	GAMMASPEC	0.14
MISS0570	08/31/99	10/18/99	99G0009		682.2	DRY	SD	TH-232	0.72	0.05	PCI/G	GAMMASPEC	0.14
MISS0570	08/31/99	10/18/99	99G0009		682.2	DRY	SD	TH-230	16.50	0.00	PCI/G	GAMMASPEC	16.50

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T esults listed at the MDA should have been reported at the actual measureme

Location:	MAYWOOD		
Site WBS:		Date Entered:	10/20/99
Work Order Number:	99G0009		
Project Number:			
Environmental Cat:	RI		

Sample ID	Date Collected	Date Analyzed	SDG ID	LAB ID	Vol.	W/D	Sample Type	Analyte	Result	Error	Units	Analytical Method	MDA
MISS0570	08/31/99	10/18/99	99G0009		682.2	DRY	SD	PA-231	1.79	0.00	PCI/G	GAMMASPEC	1.79
MISS0570	08/31/99	10/18/99	99G0009		682.2	DRY	SD	U-235	0.07	0.02	PCI/G	GAMMASPEC	0.07
MISS0570	08/31/99	10/18/99	99G0009		682.2	DRY	SD	U-238	2.08	0.00	PCI/G	GAMMASPEC	2.08
MISS0570	08/31/99	10/18/99	99G0009		682.2	DRY	SD	AM-241	0.23	0.00	PCI/G	GAMMASPEC	0.23
MISS0580	08/31/99	10/18/99	99G0009		222.6	DRY	SD	K-40	2.06	0.00	PCI/G	GAMMASPEC	2.06
MISS0580	08/31/99	10/18/99	99G0009		222.6	DRY	SD	CS-137	0.16	0.00	PCI/G	GAMMASPEC	0.16
MISS0580	08/31/99	10/18/99	99G0009		222.6	DRY	SD	RA-226	0.29	0.05	PCI/G	GAMMASPEC	0.18
MISS0580	08/31/99	10/18/99	99G0009		222.6	DRY	SD	AC-227	0.92	0.00	PCI/G	GAMMASPEC	0.92
MISS0580	08/31/99	10/18/99	99G0009		222.6	DRY	SD	RA-228	0.38	0.00	PCI/G	GAMMASPEC	0.38
MISS0580	08/31/99	10/18/99	99G0009		222.6	DRY	SD	TH-228	0.38	0.00	PCI/G	GAMMASPEC	0.38
MISS0580	08/31/99	10/18/99	99G0009		222.6	DRY	SD	TH-232	0.38	0.00	PCI/G	GAMMASPEC	0.38
MISS0580	08/31/99	10/18/99	99G0009		222.6	DRY	SD	TH-230	28.70	0.00	PCI/G	GAMMASPEC	28.70
MISS0580	08/31/99	10/18/99	99G0009		222.6	DRY	SD	PA-231	3.07	0.00	PCI/G	GAMMASPEC	3.07
MISS0580	08/31/99	10/18/99	99G0009		222.6	DRY	SD	U-235	0.16	0.00	PCI/G	GAMMASPEC	0.16
MISS0580	08/31/99	10/18/99	99G0009		222.6	DRY	SD	U-238	4.06	0.00	PCI/G	GAMMASPEC	4.06
MISS0580	08/31/99	10/18/99	99G0009		222.6	DRY	SD	AM-241	0.40	0.00	PCI/G	GAMMASPEC	0.40
MISS0590	08/31/99	10/18/99	99G0009		320.9	DRY	SD	K-40	3.40	0.62	PCI/G	GAMMASPEC	1.62
MISS0590	08/31/99	10/18/99	99G0009		320.9	DRY	SD	CS-137	0.24	0.00	PCI/G	GAMMASPEC	0.24
MISS0590	08/31/99	10/18/99	99G0009		320.9	DRY	SD	RA-226	1.89	0.10	PCI/G	GAMMASPEC	0.33
MISS0590	08/31/99	10/18/99	99G0009		320.9	DRY	SD	AC-227	1.98	0.00	PCI/G	GAMMASPEC	1.98
MISS0590	08/31/99	10/18/99	99G0009		320.9	DRY	SD	RA-228	11.60	0.26	PCI/G	GAMMASPEC	0.55
MISS0590	08/31/99	10/18/99	99G0009		320.9	DRY	SD	TH-228	11.60	0.26	PCI/G	GAMMASPEC	0.55
MISS0590	08/31/99	10/18/99	99G0009		320.9	DRY	SD	TH-232	11.60	0.26	PCI/G	GAMMASPEC	0.55
MISS0590	08/31/99	10/18/99	99G0009		320.9	DRY	SD	TH-230	62.40	0.00	PCI/G	GAMMASPEC	62.40
MISS0590	08/31/99	10/18/99	99G0009		320.9	DRY	SD	PA-231	7.37	0.00	PCI/G	GAMMASPEC	7.37
MISS0590	08/31/99	10/18/99	99G0009		320.9	DRY	SD	U-235	0.27	0.07	PCI/G	GAMMASPEC	0.24
MISS0590	08/31/99	10/18/99	99G0009		320.9	DRY	SD	U-238	7.72	0.00	PCI/G	GAMMASPEC	7.72
MISS0590	08/31/99	10/18/99	99G0009		320.9	DRY	SD	AM-241	0.87	0.00	PCI/G	GAMMASPEC	0.87

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Location:	MAYWOOD		
Site WBS:		Date Entered:	10/20/99
Work Order Number:	99G0009		
Project Number:			
Environmental Cat:	RI		

Sample ID	Date Collected	Date Analyzed	SDG ID	LAB ID	Vol.	W/D	Sample Type	Analyte	Result	Error	Units	Analytical Method	MDA
MISS0600	08/31/99	10/18/99	99G0009		738.5	DRY	SD	K-40	10.08	0.59	PCI/G	GAMMASPEC	0.73
MISS0600	08/31/99	10/18/99	99G0009		738.5	DRY	SD	CS-137	0.07	0.00	PCI/G	GAMMASPEC	0.07
MISS0600	08/31/99	10/18/99	99G0009		738.5	DRY	SD	RA-226	0.50	0.03	PCI/G	GAMMASPEC	0.09
MISS0600	08/31/99	10/18/99	99G0009		738.5	DRY	SD	AC-227	0.61	0.00	PCI/G	GAMMASPEC	0.61
MISS0600	08/31/99	10/18/99	99G0009		738.5	DRY	SD	RA-228	0.80	0.05	PCI/G	GAMMASPEC	0.16
MISS0600	08/31/99	10/18/99	99G0009		738.5	DRY	SD	TH-228	0.80	0.05	PCI/G	GAMMASPEC	0.16
MISS0600	08/31/99	10/18/99	99G0009		738.5	DRY	SD	TH-232	0.80	0.05	PCI/G	GAMMASPEC	0.16
MISS0600	08/31/99	10/18/99	99G0009		738.5	DRY	SD	TH-230	15.90	0.00	PCI/G	GAMMASPEC	15.90
MISS0600	08/31/99	10/18/99	99G0009		738.5	DRY	SD	PA-231	1.82	0.00	PCI/G	GAMMASPEC	1.82
MISS0600	08/31/99	10/18/99	99G0009		738.5	DRY	SD	U-235	0.07	0.02	PCI/G	GAMMASPEC	0.07
MISS0600	08/31/99	10/18/99	99G0009		738.5	DRY	SD	U-238	2.18	0.00	PCI/G	GAMMASPEC	2.18
MISS0600	08/31/99	10/18/99	99G0009		738.5	DRY	SD	AM-241	0.27	0.00	PCI/G	GAMMASPEC	0.27
MISS0900	08/08/99	10/18/99	99G0009		555.7	DRY	SD	K-40	11.11	0.77	PCI/G	GAMMASPEC	1.36
MISS0900	08/08/99	10/18/99	99G0009		555.7	DRY	SD	CS-137	0.23	0.00	PCI/G	GAMMASPEC	0.23
MISS0900	08/08/99	10/18/99	99G0009		555.7	DRY	SD	RA-226	3.54	0.12	PCI/G	GAMMASPEC	0.33
MISS0900	08/08/99	10/18/99	99G0009		555.7	DRY	SD	AC-227	2.16	0.00	PCI/G	GAMMASPEC	2.16
MISS0900	08/08/99	10/18/99	99G0009		555.7	DRY	SD	RA-228	19.26	0.34	PCI/G	GAMMASPEC	0.57
MISS0900	08/08/99	10/18/99	99G0009		555.7	DRY	SD	TH-228	19.26	0.34	PCI/G	GAMMASPEC	0.57
MISS0900	08/08/99	10/18/99	99G0009		555.7	DRY	SD	TH-232	19.26	0.34	PCI/G	GAMMASPEC	0.57
MISS0900	08/08/99	10/18/99	99G0009		555.7	DRY	SD	TH-230	67.30	0.00	PCI/G	GAMMASPEC	67.30
MISS0900	08/08/99	10/18/99	99G0009		555.7	DRY	SD	PA-231	7.26	0.00	PCI/G	GAMMASPEC	7.26
MISS0900	08/08/99	10/18/99	99G0009		555.7	DRY	SD	U-235	0.54	0.08	PCI/G	GAMMASPEC	0.23
MISS0900	08/08/99	10/18/99	99G0009		555.7	DRY	SD	U-238	4.70	2.34	PCI/G	GAMMASPEC	7.66
MISS0900	08/08/99	10/18/99	99G0009		555.7	DRY	SD	AM-241	0.90	0.00	PCI/G	GAMMASPEC	0.90
MISS0910	08/18/99	10/18/99	99G0009		406.7	DRY	SD	K-40	7.95	0.73	PCI/G	GAMMASPEC	1.38
MISS0910	08/18/99	10/18/99	99G0009		406.7	DRY	SD	CS-137	0.17	0.00	PCI/G	GAMMASPEC	0.17
MISS0910	08/18/99	10/18/99	99G0009		406.7	DRY	SD	RA-226	3.20	0.11	PCI/G	GAMMASPEC	0.24
MISS0910	08/18/99	10/18/99	99G0009		406.7	DRY	SD	AC-227	1.65	0.00	PCI/G	GAMMASPEC	1.65

Approved by: ______________________ Date: ______________

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Location:	MAYWOOD		
Site WBS:		Date Entered:	10/20/99
Work Order Number:	99G0009		
Project Number:			
Environmental Cat:	RI		

Sample ID	Date Collected	Date Analyzed	SDG ID	LAB ID	Vol.	W/D	Sample Type	Analyte	Result	Error	Units	Analytical Method	MDA
MISS0910	08/18/99	10/18/99	99G0009		406.7	DRY	SD	RA-228	3.62	0.13	PCI/G	GAMMASPEC	0.41
MISS0910	08/18/99	10/18/99	99G0009		406.7	DRY	SD	TH-228	3.62	0.13	PCI/G	GAMMASPEC	0.41
MISS0910	08/18/99	10/18/99	99G0009		406.7	DRY	SD	TH-232	3.62	0.13	PCI/G	GAMMASPEC	0.41
MISS0910	08/18/99	10/18/99	99G0009		406.7	DRY	SD	TH-230	51.90	0.00	PCI/G	GAMMASPEC	51.90
MISS0910	08/18/99	10/18/99	99G0009		406.7	DRY	SD	PA-231	5.01	0.00	PCI/G	GAMMASPEC	5.01
MISS0910	08/18/99	10/18/99	99G0009		406.7	DRY	SD	U-235	1.61	0.08	PCI/G	GAMMASPEC	0.17
MISS0910	08/18/99	10/18/99	99G0009		406.7	DRY	SD	U-238	25.13	2.03	PCI/G	GAMMASPEC	5.90
MISS0910	08/18/99	10/18/99	99G0009		406.7	DRY	SD	AM-241	0.75	0.00	PCI/G	GAMMASPEC	0.75
MISS092X	08/18/99	10/18/99	99G0009		809.4	DRY	SD	K-40	9.61	0.55	PCI/G	GAMMASPEC	0.64
MISS092X	08/18/99	10/18/99	99G0009		809.4	DRY	SD	CS-137	0.06	0.00	PCI/G	GAMMASPEC	0.06
MISS092X	08/18/99	10/18/99	99G0009		809.4	DRY	SD	RA-226	0.53	0.03	PCI/G	GAMMASPEC	0.09
MISS092X	08/18/99	10/18/99	99G0009		809.4	DRY	SD	AC-227	0.56	0.00	PCI/G	GAMMASPEC	0.56
MISS092X	08/18/99	10/18/99	99G0009		809.4	DRY	SD	RA-228	0.75	0.05	PCI/G	GAMMASPEC	0.13
MISS092X	08/18/99	10/18/99	99G0009		809.4	DRY	SD	TH-228	0.75	0.05	PCI/G	GAMMASPEC	0.13
MISS092X	08/18/99	10/18/99	99G0009		809.4	DRY	SD	TH-232	0.75	0.05	PCI/G	GAMMASPEC	0.13
MISS092X	08/18/99	10/18/99	99G0009		809.4	DRY	SD	TH-230	18.60	0.00	PCI/G	GAMMASPEC	18.60
MISS092X	08/18/99	10/18/99	99G0009		809.4	DRY	SD	PA-231	1.62	0.00	PCI/G	GAMMASPEC	1.62
MISS092X	08/18/99	10/18/99	99G0009		809.4	DRY	SD	U-235	0.07	0.02	PCI/G	GAMMASPEC	0.06
MISS092X	08/18/99	10/18/99	99G0009		809.4	DRY	SD	U-238	2.28	0.00	PCI/G	GAMMASPEC	2.28
MISS092X	08/18/99	10/18/99	99G0009		809.4	DRY	SD	AM-241	0.29	0.00	PCI/G	GAMMASPEC	0.29
MISS0930	08/18/99	10/18/99	99G0009		370.6	DRY	SD	K-40	8.63	0.80	PCI/G	GAMMASPEC	1.57
MISS0930	08/18/99	10/18/99	99G0009		370.6	DRY	SD	CS-137	0.15	0.00	PCI/G	GAMMASPEC	0.15
MISS0930	08/18/99	10/18/99	99G0009		370.6	DRY	SD	RA-226	2.25	0.09	PCI/G	GAMMASPEC	0.22
MISS0930	08/18/99	10/18/99	99G0009		370.6	DRY	SD	AC-227	1.48	0.00	PCI/G	GAMMASPEC	1.48
MISS0930	08/18/99	10/18/99	99G0009		370.6	DRY	SD	RA-228	2.99	0.13	PCI/G	GAMMASPEC	0.35
MISS0930	08/18/99	10/18/99	99G0009		370.6	DRY	SD	TH-228	2.99	0.13	PCI/G	GAMMASPEC	0.35
MISS0930	08/18/99	10/18/99	99G0009		370.6	DRY	SD	TH-232	2.99	0.13	PCI/G	GAMMASPEC	0.35
MISS0930	08/18/99	10/18/99	99G0009		370.6	DRY	SD	TH-230	45.30	0.00	PCI/G	GAMMASPEC	45.30

Approved by: ______________________ Date: ______________

Equivalent values in the "Result" and "MDA" columns indicate that the analyte was either undetected or detected at a level below the MDA. The results listed at the MDA should have been reported at the actual measurement.

Location:	MAYWOOD		
Site WBS:		Date Entered:	10/20/99
Work Order Number:	99G0009		
Project Number:			
Environmental Cat:	RI		

Sample ID	Date Collected	Date Analyzed	SDG ID	LAB ID	Vol.	W/D	Sample Type	Analyte	Result	Error	Units	Analytical Method	MDA
MISS0930	08/18/99	10/18/99	99G0009		370.6	DRY	SD	PA-231	4.83	0.00	PCI/G	GAMMASPEC	4.83
MISS0930	08/18/99	10/18/99	99G0009		370.6	DRY	SD	U-235	1.22	0.06	PCI/G	GAMMASPEC	0.16
MISS0930	08/18/99	10/18/99	99G0009		370.6	DRY	SD	U-238	23.82	1.84	PCI/G	GAMMASPEC	5.03
MISS0930	08/18/99	10/18/99	99G0009		370.6	DRY	SD	AM-241	0.65	0.00	PCI/G	GAMMASPEC	0.65
MISS1690	08/24/99	10/18/99	99G0009		172.2	DRY	SD	K-40	4.38	1.10	PCI/G	GAMMASPEC	3.14
MISS1690	08/24/99	10/18/99	99G0009		172.2	DRY	SD	CS-137	0.22	0.09	PCI/G	GAMMASPEC	0.30
MISS1690	08/24/99	10/18/99	99G0009		172.2	DRY	SD	RA-226	3.42	0.17	PCI/G	GAMMASPEC	0.48
MISS1690	08/24/99	10/18/99	99G0009		172.2	DRY	SD	AC-227	3.03	0.00	PCI/G	GAMMASPEC	3.03
MISS1690	08/24/99	10/18/99	99G0009		172.2	DRY	SD	RA-228	10.75	0.33	PCI/G	GAMMASPEC	0.83
MISS1690	08/24/99	10/18/99	99G0009		172.2	DRY	SD	TH-228	10.75	0.33	PCI/G	GAMMASPEC	0.83
MISS1690	08/24/99	10/18/99	99G0009		172.2	DRY	SD	TH-232	10.75	0.33	PCI/G	GAMMASPEC	0.83
MISS1690	08/24/99	10/18/99	99G0009		172.2	DRY	SD	TH-230	101.00	0.00	PCI/G	GAMMASPEC	101.00
MISS1690	08/24/99	10/18/99	99G0009		172.2	DRY	SD	PA-231	10.50	0.00	PCI/G	GAMMASPEC	10.50
MISS1690	08/24/99	10/18/99	99G0009		172.2	DRY	SD	U-235	0.44	0.11	PCI/G	GAMMASPEC	0.35
MISS1690	08/24/99	10/18/99	99G0009		172.2	DRY	SD	U-238	13.90	0.00	PCI/G	GAMMASPEC	13.90
MISS1690	08/24/99	10/18/99	99G0009		172.2	DRY	SD	AM-241	1.99	0.00	PCI/G	GAMMASPEC	1.99
RISS0930	08/18/99	10/18/99	99G0009		370.6	DRY	SD	K-40	8.85	0.74	PCI/G	GAMMASPEC	1.08
RISS0930	08/18/99	10/18/99	99G0009		370.6	DRY	SD	CS-137	0.15	0.00	PCI/G	GAMMASPEC	0.15
RISS0930	08/18/99	10/18/99	99G0009		370.6	DRY	SD	RA-226	2.33	0.09	PCI/G	GAMMASPEC	0.22
RISS0930	08/18/99	10/18/99	99G0009		370.6	DRY	SD	AC-227	1.49	0.00	PCI/G	GAMMASPEC	1.49
RISS0930	08/18/99	10/18/99	99G0009		370.6	DRY	SD	RA-228	2.94	0.12	PCI/G	GAMMASPEC	0.33
RISS0930	08/18/99	10/18/99	99G0009		370.6	DRY	SD	TH-228	2.94	0.12	PCI/G	GAMMASPEC	0.33
RISS0930	08/18/99	10/18/99	99G0009		370.6	DRY	SD	TH-232	2.94	0.12	PCI/G	GAMMASPEC	0.33
RISS0930	08/18/99	10/18/99	99G0009		370.6	DRY	SD	TH-230	45.60	0.00	PCI/G	GAMMASPEC	45.60
RISS0930	08/18/99	10/18/99	99G0009		370.6	DRY	SD	PA-231	4.53	0.00	PCI/G	GAMMASPEC	4.53
RISS0930	08/18/99	10/18/99	99G0009		370.6	DRY	SD	U-235	1.34	0.07	PCI/G	GAMMASPEC	0.15
RISS0930	08/18/99	10/18/99	99G0009		370.6	DRY	SD	U-238	23.07	1.92	PCI/G	GAMMASPEC	5.50
RISS0930	08/18/99	10/18/99	99G0009		370.6	DRY	SD	AM-241	0.66	0.00	PCI/G	GAMMASPEC	0.66

Approved by: ______________________ Date: ____________

Equivalent values in the "Result" and "MDA" columns indicate that the analyte was either undetected or detected at a level below the MDA. T' results listed at the MDA should have been reported at the actual measuremer

Location:	MAYWOOD		
Site WBS:		Date Entered:	10/20/99
Work Order Number:	99G0009		
Project Number:			
Environmental Cat:	RI		

Sample ID	Date Collected	Date Analyzed	SDG ID	LAB ID	Vol.	W/D	Sample Type	Analyte	Result	Error	Units	Analytical Method	MDA
QCBLANK	10/18/99	10/18/99	99G0009		945.0	DRY	BL	K-40	0.38	0.00	PCI/G	GAMMASPEC	0.38
QCBLANK	10/19/99	10/18/99	99G0009		945.0	DRY	BL	CS-137	0.03	0.00	PCI/G	GAMMASPEC	0.03
QCBLANK	10/20/99	10/18/99	99G0009		945.0	DRY	BL	RA-226	0.05	0.00	PCI/G	GAMMASPEC	0.05
QCBLANK	10/21/99	10/18/99	99G0009		945.0	DRY	BL	AC-227	0.16	0.00	PCI/G	GAMMASPEC	0.16
QCBLANK	10/22/99	10/18/99	99G0009		945.0	DRY	BL	RA-228	0.06	0.00	PCI/G	GAMMASPEC	0.06
QCBLANK	10/23/99	10/18/99	99G0009		945.0	DRY	BL	TH-228	0.06	0.00	PCI/G	GAMMASPEC	0.06
QCBLANK	10/24/99	10/18/99	99G0009		945.0	DRY	BL	TH-232	0.06	0.00	PCI/G	GAMMASPEC	0.06
QCBLANK	10/25/99	10/18/99	99G0009		945.0	DRY	BL	TH-230	5.90	0.00	PCI/G	GAMMASPEC	5.90
QCBLANK	10/26/99	10/18/99	99G0009		945.0	DRY	BL	PA-231	0.66	0.00	PCI/G	GAMMASPEC	0.66
QCBLANK	10/27/99	10/18/99	99G0009		945.0	DRY	BL	U-235	0.03	0.00	PCI/G	GAMMASPEC	0.03
QCBLANK	10/28/99	10/18/99	99G0009		945.0	DRY	BL	U-238	0.69	0.00	PCI/G	GAMMASPEC	0.69
QCBLANK	10/29/99	10/18/99	99G0009		945.0	DRY	BL	AM-241	0.08	0.00	PCI/G	GAMMASPEC	0.08
QCSPIKE	04/01/99	10/18/99	99G0009		832.0	DRY	LCSF	CS-137	70.26	2.21	PCI/G	GAMMASPEC	0.99
QCSPIKE	04/01/99	10/18/99	99G0009		832.0	DRY	LCSF	AM-241	164.83	8.33	PCI/G	GAMMASPEC	3.58
QCSPIKE	04/01/99	10/18/99	99G0009		832.0	DRY	LCST	CS-137	68.43	3.22	PCI/G	GAMMASPEC	0.99
QCSPIKE	04/01/99	10/18/99	99G0009		832.0	DRY	LCST	AM-241	165.05	8.25	PCI/G	GAMMASPEC	3.58

Approved by: ______________________ Date: ______________

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Location:	MAYWOOD		
Site WBS:	12B	Date Entered:	10/26/99
Work Order Number:	99G0011		
Project Number:			
Environmental Cat:	RI		

Sample ID	Date Collected	Date Analyzed	SDG ID	LAB ID	Vol.	W/D	Sample Type	Analyte	Result	Error	Units	Analytical Method	MDA
MISS0160	08/23/99	10/25/99	99G0011		730.5	DRY	REG	K-40	12.07	0.66	PCI/G	GAMMASPEC	0.73
MISS0160	08/23/99	10/25/99	99G0011		730.5	DRY	REG	CS-137	0.07	0.00	PCI/G	GAMMASPEC	0.07
MISS0160	08/23/99	10/25/99	99G0011		730.5	DRY	REG	RA-226	0.67	0.04	PCI/G	GAMMASPEC	0.11
MISS0160	08/23/99	10/25/99	99G0011		730.5	DRY	REG	AC-227	0.66	0.00	PCI/G	GAMMASPEC	0.66
MISS0160	08/23/99	10/25/99	99G0011		730.5	DRY	REG	RA-228	0.99	0.05	PCI/G	GAMMASPEC	0.16
MISS0160	08/23/99	10/25/99	99G0011		730.5	DRY	REG	TH-228	0.99	0.05	PCI/G	GAMMASPEC	0.16
MISS0160	08/23/99	10/25/99	99G0011		730.5	DRY	REG	TH-232	0.99	0.05	PCI/G	GAMMASPEC	0.16
MISS0160	08/23/99	10/25/99	99G0011		730.5	DRY	REG	TH-230	22.30	0.00	PCI/G	GAMMASPEC	22.30
MISS0160	08/23/99	10/25/99	99G0011		730.5	DRY	REG	PA-231	2.00	0.00	PCI/G	GAMMASPEC	2.00
MISS0160	08/23/99	10/25/99	99G0011		730.5	DRY	REG	U-235	0.09	0.02	PCI/G	GAMMASPEC	0.07
MISS0160	08/23/99	10/25/99	99G0011		730.5	DRY	REG	U-238	1.31	0.67	PCI/G	GAMMASPEC	2.18
MISS0160	08/23/99	10/25/99	99G0011		730.5	DRY	REG	AM-241	0.25	0.00	PCI/G	GAMMASPEC	0.25
MISS0160	08/23/99	10/25/99	99G0011		730.5	DRY	LREP	K-40	12.41	0.68	PCI/G	GAMMASPEC	0.79
MISS0160	08/23/99	10/25/99	99G0011		730.5	DRY	LREP	CS-137	0.07	0.00	PCI/G	GAMMASPEC	0.07
MISS0160	08/23/99	10/25/99	99G0011		730.5	DRY	LREP	RA-226	0.68	0.04	PCI/G	GAMMASPEC	0.10
MISS0160	08/23/99	10/25/99	99G0011		730.5	DRY	LREP	AC-227	0.60	0.00	PCI/G	GAMMASPEC	0.60
MISS0160	08/23/99	10/25/99	99G0011		730.5	DRY	LREP	RA-228	0.94	0.05	PCI/G	GAMMASPEC	0.17
MISS0160	08/23/99	10/25/99	99G0011		730.5	DRY	LREP	TH-228	0.94	0.05	PCI/G	GAMMASPEC	0.17
MISS0160	08/23/99	10/25/99	99G0011		730.5	DRY	LREP	TH-232	0.94	0.05	PCI/G	GAMMASPEC	0.17
MISS0160	08/23/99	10/25/99	99G0011		730.5	DRY	LREP	TH-230	21.30	0.00	PCI/G	GAMMASPEC	21.30
MISS0160	08/23/99	10/25/99	99G0011		730.5	DRY	LREP	PA-231	2.11	0.00	PCI/G	GAMMASPEC	2.11
MISS0160	08/23/99	10/25/99	99G0011		730.5	DRY	LREP	U-235	0.09	0.02	PCI/G	GAMMASPEC	0.07
MISS0160	08/23/99	10/25/99	99G0011		730.5	DRY	LREP	U-238	1.73	0.66	PCI/G	GAMMASPEC	2.11
MISS0160	08/23/99	10/25/99	99G0011		730.5	DRY	LREP	AM-241	0.26	0.00	PCI/G	GAMMASPEC	0.26
MISS053X	08/31/99	10/25/99	99G0011		609.6	DRY	REG	K-40	10.97	0.72	PCI/G	GAMMASPEC	1.19
MISS053X	08/31/99	10/25/99	99G0011		609.6	DRY	REG	CS-137	0.17	0.00	PCI/G	GAMMASPEC	0.17
MISS053X	08/31/99	10/25/99	99G0011		609.6	DRY	REG	RA-226	1.36	0.07	PCI/G	GAMMASPEC	0.24
MISS053X	08/31/99	10/25/99	99G0011		609.6	DRY	REG	AC-227	1.51	0.00	PCI/G	GAMMASPEC	1.51

Approved by: ______________________ Date: ______________

Equivalent values in the "Result" and "MDA" columns indicate that the analyte was either undetected or detected at a level below the MDA. Tl ~esults listed at the MDA should have been reported at the actual measuremer

Location:	MAYWOOD		
Site WBS:	12B	Date Entered:	10/26/99
Work Order Number:	99G0011		
Project Number:			
Environmental Cat:	RI		

Sample ID	Date Collected	Date Analyzed	SDG ID	LAB ID	Vol.	W/D	Sample Type	Analyte	Result	Error	Units	Analytical Method	MDA
MISS053X	08/31/99	10/25/99	99G0011		609.6	DRY	REG	RA-228	10.59	0.21	PCI/G	GAMMASPEC	0.29
MISS053X	08/31/99	10/25/99	99G0011		609.6	DRY	REG	TH-228	10.59	0.21	PCI/G	GAMMASPEC	0.29
MISS053X	08/31/99	10/25/99	99G0011		609.6	DRY	REG	TH-232	10.59	0.21	PCI/G	GAMMASPEC	0.29
MISS053X	08/31/99	10/25/99	99G0011		609.6	DRY	REG	TH-230	56.70	0.00	PCI/G	GAMMASPEC	56.70
MISS053X	08/31/99	10/25/99	99G0011		609.6	DRY	REG	PA-231	5.48	0.00	PCI/G	GAMMASPEC	5.48
MISS053X	08/31/99	10/25/99	99G0011		609.6	DRY	REG	U-235	0.31	0.06	PCI/G	GAMMASPEC	0.18
MISS053X	08/31/99	10/25/99	99G0011		609.6	DRY	REG	U-238	5.38	0.00	PCI/G	GAMMASPEC	5.38
MISS053X	08/31/99	10/25/99	99G0011		609.6	DRY	REG	AM-241	0.65	0.00	PCI/G	GAMMASPEC	0.65
MISS0610	08/31/99	10/25/99	99G0011		296.1	DRY	REG	K-40	3.13	0.00	PCI/G	GAMMASPEC	3.13
MISS0610	08/31/99	10/25/99	99G0011		296.1	DRY	REG	CS-137	0.28	0.00	PCI/G	GAMMASPEC	0.28
MISS0610	08/31/99	10/25/99	99G0011		296.1	DRY	REG	RA-226	1.76	0.12	PCI/G	GAMMASPEC	0.41
MISS0610	08/31/99	10/25/99	99G0011		296.1	DRY	REG	AC-227	2.42	0.00	PCI/G	GAMMASPEC	2.42
MISS0610	08/31/99	10/25/99	99G0011		296.1	DRY	REG	RA-228	16.44	0.35	PCI/G	GAMMASPEC	0.61
MISS0610	08/31/99	10/25/99	99G0011		296.1	DRY	REG	TH-228	16.44	0.35	PCI/G	GAMMASPEC	0.61
MISS0610	08/31/99	10/25/99	99G0011		296.1	DRY	REG	TH-232	16.44	0.35	PCI/G	GAMMASPEC	0.61
MISS0610	08/31/99	10/25/99	99G0011		296.1	DRY	REG	TH-230	89.90	0.00	PCI/G	GAMMASPEC	89.90
MISS0610	08/31/99	10/25/99	99G0011		296.1	DRY	REG	PA-231	9.08	0.00	PCI/G	GAMMASPEC	9.08
MISS0610	08/31/99	10/25/99	99G0011		296.1	DRY	REG	U-235	0.46	0.09	PCI/G	GAMMASPEC	0.28
MISS0610	08/31/99	10/25/99	99G0011		296.1	DRY	REG	U-238	8.73	0.00	PCI/G	GAMMASPEC	8.73
MISS0610	08/31/99	10/25/99	99G0011		296.1	DRY	REG	AM-241	1.04	0.00	PCI/G	GAMMASPEC	1.04
MISS0710	09/01/99	10/25/99	99G0011		296.7	DRY	REG	K-40	13.40	0.00	PCI/G	GAMMASPEC	13.40
MISS0710	09/01/99	10/25/99	99G0011		296.7	DRY	REG	CS-137	1.67	0.00	PCI/G	GAMMASPEC	1.67
MISS0710	09/01/99	10/25/99	99G0011		296.7	DRY	REG	RA-226	13.50	0.58	PCI/G	GAMMASPEC	2.40
MISS0710	09/01/99	10/25/99	99G0011		296.7	DRY	REG	AC-227	17.88	0.64	PCI/G	GAMMASPEC	6.84
MISS0710	09/01/99	10/25/99	99G0011		296.7	DRY	REG	RA-228	681.81	9.22	PCI/G	GAMMASPEC	2.95
MISS0710	09/01/99	10/25/99	99G0011		296.7	DRY	REG	TH-228	681.81	9.22	PCI/G	GAMMASPEC	2.95
MISS0710	09/01/99	10/25/99	99G0011		296.7	DRY	REG	TH-232	681.81	9.22	PCI/G	GAMMASPEC	2.95
MISS0710	09/01/99	10/25/99	99G0011		296.7	DRY	REG	TH-230	514.00	0.00	PCI/G	GAMMASPEC	514.00

Approved by: ______________________ Date: ____________

Equivalent values in the "Result" and "MDA" columns indicate that the analyte was either undetected or detected at a level below the MDA. The results listed at the MDA should have been reported at the actual measurement.

Location:	MAYWOOD		
Site WBS:	12B	Date Entered:	10/26/99
Work Order Number:	99G0011		
Project Number:			
Environmental Cat:	RI		

Sample ID	Date Collected	Date Analyzed	SDG ID	LAB ID	Vol.	W/D	Sample Type	Analyte	Result	Error	Units	Analytical Method	MDA
MISS0710	09/01/99	10/25/99	99G0011		296.7	DRY	REG	PA-231	55.00	0.00	PCI/G	GAMMASPEC	55.00
MISS0710	09/01/99	10/25/99	99G0011		296.7	DRY	REG	U-235	9.24	0.35	PCI/G	GAMMASPEC	1.49
MISS0710	09/01/99	10/25/99	99G0011		296.7	DRY	REG	U-238	135.68	14.24	PCI/G	GAMMASPEC	48.50
MISS0710	09/01/99	10/25/99	99G0011		296.7	DRY	REG	AM-241	5.72	0.00	PCI/G	GAMMASPEC	5.72
MISS0730	09/01/99	10/25/99	99G0011		724.9	DRY	REG	K-40	10.29	0.58	PCI/G	GAMMASPEC	0.50
MISS0730	09/01/99	10/25/99	99G0011		724.9	DRY	REG	CS-137	0.07	0.00	PCI/G	GAMMASPEC	0.07
MISS0730	09/01/99	10/25/99	99G0011		724.9	DRY	REG	RA-226	0.62	0.04	PCI/G	GAMMASPEC	0.10
MISS0730	09/01/99	10/25/99	99G0011		724.9	DRY	REG	AC-227	0.71	0.00	PCI/G	GAMMASPEC	0.71
MISS0730	09/01/99	10/25/99	99G0011		724.9	DRY	REG	RA-228	1.43	0.06	PCI/G	GAMMASPEC	0.18
MISS0730	09/01/99	10/25/99	99G0011		724.9	DRY	REG	TH-228	1.43	0.06	PCI/G	GAMMASPEC	0.18
MISS0730	09/01/99	10/25/99	99G0011		724.9	DRY	REG	TH-232	1.43	0.06	PCI/G	GAMMASPEC	0.18
MISS0730	09/01/99	10/25/99	99G0011		724.9	DRY	REG	TH-230	25.40	0.00	PCI/G	GAMMASPEC	25.40
MISS0730	09/01/99	10/25/99	99G0011		724.9	DRY	REG	PA-231	2.27	0.00	PCI/G	GAMMASPEC	2.27
MISS0730	09/01/99	10/25/99	99G0011		724.9	DRY	REG	U-235	0.18	0.03	PCI/G	GAMMASPEC	0.07
MISS0730	09/01/99	10/25/99	99G0011		724.9	DRY	REG	U-238	1.40	0.77	PCI/G	GAMMASPEC	2.51
MISS0730	09/01/99	10/25/99	99G0011		724.9	DRY	REG	AM-241	0.28	0.00	PCI/G	GAMMASPEC	0.28
MISS0740	09/01/99	10/25/99	99G0011		283.2	DRY	REG	K-40	19.40	0.00	PCI/G	GAMMASPEC	19.40
MISS0740	09/01/99	10/25/99	99G0011		283.2	DRY	REG	CS-137	2.42	0.00	PCI/G	GAMMASPEC	2.42
MISS0740	09/01/99	10/25/99	99G0011		283.2	DRY	REG	RA-226	22.52	0.80	PCI/G	GAMMASPEC	3.57
MISS0740	09/01/99	10/25/99	99G0011		283.2	DRY	REG	AC-227	20.80	0.00	PCI/G	GAMMASPEC	20.80
MISS0740	09/01/99	10/25/99	99G0011		283.2	DRY	REG	RA-228	1387.00	18.62	PCI/G	GAMMASPEC	4.68
MISS0740	09/01/99	10/25/99	99G0011		283.2	DRY	REG	TH-228	1387.00	18.62	PCI/G	GAMMASPEC	4.68
MISS0740	09/01/99	10/25/99	99G0011		283.2	DRY	REG	TH-232	1387.00	18.62	PCI/G	GAMMASPEC	4.68
MISS0740	09/01/99	10/25/99	99G0011		283.2	DRY	REG	TH-230	748.00	0.00	PCI/G	GAMMASPEC	748.00
MISS0740	09/01/99	10/25/99	99G0011		283.2	DRY	REG	PA-231	80.90	0.00	PCI/G	GAMMASPEC	80.90
MISS0740	09/01/99	10/25/99	99G0011		283.2	DRY	REG	U-235	16.92	0.60	PCI/G	GAMMASPEC	2.10
MISS0740	09/01/99	10/25/99	99G0011		283.2	DRY	REG	U-238	337.88	17.04	PCI/G	GAMMASPEC	70.60
MISS0740	09/01/99	10/25/99	99G0011		283.2	DRY	REG	AM-241	8.32	0.00	PCI/G	GAMMASPEC	8.32

Approved by: ______________________ Date: ____________

Equivalent values in the "Result" and "MDA" columns indicate that the analyte was either undetected or detected at a level below the MDA. Th results listed at the MDA should have been reported at the actual measuremen

Location:	MAYWOOD		
Site WBS:	12B	Date Entered:	10/26/99
Work Order Number:	99G0011		
Project Number:			
Environmental Cat:	RI		

Sample ID	Date Collected	Date Analyzed	SDG ID	LAB ID	Vol.	W/D	Sample Type	Analyte	Result	Error	Units	Analytical Method	MDA
MISS0750	09/01/99	10/25/99	99G0011		626.7	DRY	REG	K-40	8.82	0.62	PCI/G	GAMMASPEC	1.01
MISS0750	09/01/99	10/25/99	99G0011		626.7	DRY	REG	CS-137	0.13	0.00	PCI/G	GAMMASPEC	0.13
MISS0750	09/01/99	10/25/99	99G0011		626.7	DRY	REG	RA-226	0.95	0.05	PCI/G	GAMMASPEC	0.20
MISS0750	09/01/99	10/25/99	99G0011		626.7	DRY	REG	AC-227	1.20	0.00	PCI/G	GAMMASPEC	1.20
MISS0750	09/01/99	10/25/99	99G0011		626.7	DRY	REG	RA-228	5.90	0.14	PCI/G	GAMMASPEC	0.23
MISS0750	09/01/99	10/25/99	99G0011		626.7	DRY	REG	TH-228	5.90	0.14	PCI/G	GAMMASPEC	0.23
MISS0750	09/01/99	10/25/99	99G0011		626.7	DRY	REG	TH-232	5.90	0.14	PCI/G	GAMMASPEC	0.23
MISS0750	09/01/99	10/25/99	99G0011		626.7	DRY	REG	TH-230	44.30	0.00	PCI/G	GAMMASPEC	44.30
MISS0750	09/01/99	10/25/99	99G0011		626.7	DRY	REG	PA-231	4.31	0.00	PCI/G	GAMMASPEC	4.31
MISS0750	09/01/99	10/25/99	99G0011		626.7	DRY	REG	U-235	0.45	0.05	PCI/G	GAMMASPEC	0.13
MISS0750	09/01/99	10/25/99	99G0011		626.7	DRY	REG	U-238	6.36	1.40	PCI/G	GAMMASPEC	4.38
MISS0750	09/01/99	10/25/99	99G0011		626.7	DRY	REG	AM-241	0.52	0.00	PCI/G	GAMMASPEC	0.52
MISS0760	09/01/99	10/25/99	99G0011		657.6	DRY	REG	K-40	11.23	0.68	PCI/G	GAMMASPEC	1.00
MISS0760	09/01/99	10/25/99	99G0011		657.6	DRY	REG	CS-137	0.19	0.00	PCI/G	GAMMASPEC	0.19
MISS0760	09/01/99	10/25/99	99G0011		657.6	DRY	REG	RA-226	1.07	0.07	PCI/G	GAMMASPEC	0.29
MISS0760	09/01/99	10/25/99	99G0011		657.6	DRY	REG	AC-227	1.73	0.00	PCI/G	GAMMASPEC	1.73
MISS0760	09/01/99	10/25/99	99G0011		657.6	DRY	REG	RA-228	15.20	0.27	PCI/G	GAMMASPEC	0.32
MISS0760	09/01/99	10/25/99	99G0011		657.6	DRY	REG	TH-228	15.20	0.27	PCI/G	GAMMASPEC	0.32
MISS0760	09/01/99	10/25/99	99G0011		657.6	DRY	REG	TH-232	15.20	0.27	PCI/G	GAMMASPEC	0.32
MISS0760	09/01/99	10/25/99	99G0011		657.6	DRY	REG	TH-230	65.70	0.00	PCI/G	GAMMASPEC	65.70
MISS0760	09/01/99	10/25/99	99G0011		657.6	DRY	REG	PA-231	6.04	0.00	PCI/G	GAMMASPEC	6.04
MISS0760	09/01/99	10/25/99	99G0011		657.6	DRY	REG	U-235	0.44	0.06	PCI/G	GAMMASPEC	0.19
MISS0760	09/01/99	10/25/99	99G0011		657.6	DRY	REG	U-238	7.14	1.97	PCI/G	GAMMASPEC	6.33
MISS0760	09/01/99	10/25/99	99G0011		657.6	DRY	REG	AM-241	0.74	0.00	PCI/G	GAMMASPEC	0.74
MISS0770	09/01/99	10/25/99	99G0011		385.9	DRY	REG	K-40	11.30	0.00	PCI/G	GAMMASPEC	11.30
MISS0770	09/01/99	10/25/99	99G0011		385.9	DRY	REG	CS-137	1.40	0.00	PCI/G	GAMMASPEC	1.40
MISS0770	09/01/99	10/25/99	99G0011		385.9	DRY	REG	RA-226	10.89	0.49	PCI/G	GAMMASPEC	2.06
MISS0770	09/01/99	10/25/99	99G0011		385.9	DRY	REG	AC-227	12.10	0.00	PCI/G	GAMMASPEC	12.10

Approved by: ______________________ Date: ______________

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Location:	MAYWOOD		
Site WBS:	12B	Date Entered:	10/26/99
Work Order Number:	99G0011		
Project Number:			
Environmental Cat:	RI		

Sample ID	Date Collected	Date Analyzed	SDG ID	LAB ID	Vol.	W/D	Sample Type	Analyte	Result	Error	Units	Analytical Method	MDA
MISS0770	09/01/99	10/25/99	99G0011		385.9	DRY	REG	RA-228	617.53	8.34	PCI/G	GAMMASPEC	2.42
MISS0770	09/01/99	10/25/99	99G0011		385.9	DRY	REG	TH-228	617.53	8.34	PCI/G	GAMMASPEC	2.42
MISS0770	09/01/99	10/25/99	99G0011		385.9	DRY	REG	TH-232	617.53	8.34	PCI/G	GAMMASPEC	2.42
MISS0770	09/01/99	10/25/99	99G0011		385.9	DRY	REG	TH-230	449.00	0.00	PCI/G	GAMMASPEC	449.00
MISS0770	09/01/99	10/25/99	99G0011		385.9	DRY	REG	PA-231	46.30	0.00	PCI/G	GAMMASPEC	46.30
MISS0770	09/01/99	10/25/99	99G0011		385.9	DRY	REG	U-235	5.91	0.27	PCI/G	GAMMASPEC	1.25
MISS0770	09/01/99	10/25/99	99G0011		385.9	DRY	REG	U-238	126.43	9.11	PCI/G	GAMMASPEC	42.40
MISS0770	09/01/99	10/25/99	99G0011		385.9	DRY	REG	AM-241	4.95	0.00	PCI/G	GAMMASPEC	4.95
MISS078X	09/01/99	10/25/99	99G0011		330.3	DRY	REG	K-40	7.86	0.00	PCI/G	GAMMASPEC	7.86
MISS078X	09/01/99	10/25/99	99G0011		330.3	DRY	REG	CS-137	0.94	0.00	PCI/G	GAMMASPEC	0.94
MISS078X	09/01/99	10/25/99	99G0011		330.3	DRY	REG	RA-226	4.31	0.31	PCI/G	GAMMASPEC	1.35
MISS078X	09/01/99	10/25/99	99G0011		330.3	DRY	REG	AC-227	8.13	0.00	PCI/G	GAMMASPEC	8.13
MISS078X	09/01/99	10/25/99	99G0011		330.3	DRY	REG	RA-228	241.27	3.35	PCI/G	GAMMASPEC	1.60
MISS078X	09/01/99	10/25/99	99G0011		330.3	DRY	REG	TH-228	241.27	3.35	PCI/G	GAMMASPEC	1.60
MISS078X	09/01/99	10/25/99	99G0011		330.3	DRY	REG	TH-232	241.27	3.35	PCI/G	GAMMASPEC	1.60
MISS078X	09/01/99	10/25/99	99G0011		330.3	DRY	REG	TH-230	300.00	0.00	PCI/G	GAMMASPEC	300.00
MISS078X	09/01/99	10/25/99	99G0011		330.3	DRY	REG	PA-231	30.60	0.00	PCI/G	GAMMASPEC	30.60
MISS078X	09/01/99	10/25/99	99G0011		330.3	DRY	REG	U-235	4.05	0.30	PCI/G	GAMMASPEC	0.87
MISS078X	09/01/99	10/25/99	99G0011		330.3	DRY	REG	U-238	67.45	7.75	PCI/G	GAMMASPEC	28.80
MISS078X	09/01/99	10/25/99	99G0011		330.3	DRY	REG	AM-241	3.37	0.00	PCI/G	GAMMASPEC	3.37
MISS0790	09/01/99	10/26/99	99G0011		697.5	DRY	REG	K-40	9.98	0.64	PCI/G	GAMMASPEC	1.02
MISS0790	09/01/99	10/26/99	99G0011		697.5	DRY	REG	CS-137	0.13	0.00	PCI/G	GAMMASPEC	0.13
MISS0790	09/01/99	10/26/99	99G0011		697.5	DRY	REG	RA-226	0.62	0.05	PCI/G	GAMMASPEC	0.20
MISS0790	09/01/99	10/26/99	99G0011		697.5	DRY	REG	AC-227	1.29	0.00	PCI/G	GAMMASPEC	1.29
MISS0790	09/01/99	10/26/99	99G0011		697.5	DRY	REG	RA-228	8.40	0.15	PCI/G	GAMMASPEC	0.31
MISS0790	09/01/99	10/26/99	99G0011		697.5	DRY	REG	TH-228	8.40	0.15	PCI/G	GAMMASPEC	0.31
MISS0790	09/01/99	10/26/99	99G0011		697.5	DRY	REG	TH-232	8.40	0.15	PCI/G	GAMMASPEC	0.31
MISS0790	09/01/99	10/26/99	99G0011		697.5	DRY	REG	TH-230	47.60	0.00	PCI/G	GAMMASPEC	47.60

Approved by: ______________________ Date: ______________

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Location:	MAYWOOD		
Site WBS:	12B	Date Entered:	10/26/99
Work Order Number:	99G0011		
Project Number:			
Environmental Cat:	RI		

Sample ID	Date Collected	Date Analyzed	SDG ID	LAB ID	Vol.	W/D	Sample Type	Analyte	Result	Error	Units	Analytical Method	MDA
MISS0790	09/01/99	10/26/99	99G0011		697.5	DRY	REG	PA-231	4.49	0.00	PCI/G	GAMMASPEC	4.49
MISS0790	09/01/99	10/26/99	99G0011		697.5	DRY	REG	U-235	0.25	0.05	PCI/G	GAMMASPEC	0.15
MISS0790	09/01/99	10/26/99	99G0011		697.5	DRY	REG	U-238	4.80	1.42	PCI/G	GAMMASPEC	4.54
MISS0790	09/01/99	10/26/99	99G0011		697.5	DRY	REG	AM-241	0.53	0.00	PCI/G	GAMMASPEC	0.53
MISS0800	09/01/99	10/26/99	99G0011		709.6	DRY	REG	K-40	10.37	0.63	PCI/G	GAMMASPEC	0.90
MISS0800	09/01/99	10/26/99	99G0011		709.6	DRY	REG	CS-137	0.10	0.00	PCI/G	GAMMASPEC	0.10
MISS0800	09/01/99	10/26/99	99G0011		709.6	DRY	REG	RA-226	0.44	0.04	PCI/G	GAMMASPEC	0.17
MISS0800	09/01/99	10/26/99	99G0011		709.6	DRY	REG	AC-227	0.94	0.00	PCI/G	GAMMASPEC	0.94
MISS0800	09/01/99	10/26/99	99G0011		709.6	DRY	REG	RA-228	3.97	0.10	PCI/G	GAMMASPEC	0.23
MISS0800	09/01/99	10/26/99	99G0011		709.6	DRY	REG	TH-228	3.97	0.10	PCI/G	GAMMASPEC	0.23
MISS0800	09/01/99	10/26/99	99G0011		709.6	DRY	REG	TH-232	3.97	0.10	PCI/G	GAMMASPEC	0.23
MISS0800	09/01/99	10/26/99	99G0011		709.6	DRY	REG	TH-230	35.00	0.00	PCI/G	GAMMASPEC	35.00
MISS0800	09/01/99	10/26/99	99G0011		709.6	DRY	REG	PA-231	3.32	0.00	PCI/G	GAMMASPEC	3.32
MISS0800	09/01/99	10/26/99	99G0011		709.6	DRY	REG	U-235	0.16	0.03	PCI/G	GAMMASPEC	0.11
MISS0800	09/01/99	10/26/99	99G0011		709.6	DRY	REG	U-238	1.22	1.03	PCI/G	GAMMASPEC	3.40
MISS0800	09/01/99	10/26/99	99G0011		709.6	DRY	REG	AM-241	0.39	0.00	PCI/G	GAMMASPEC	0.39
QCBLANK	10/25/99	10/25/99	99G0011		945.0	DRY	BL	K-40	0.37	0.00	PCI/G	GAMMASPEC	0.37
QCBLANK	10/25/99	10/25/99	99G0011		945.0	DRY	BL	CS-137	0.03	0.00	PCI/G	GAMMASPEC	0.03
QCBLANK	10/25/99	10/25/99	99G0011		945.0	DRY	BL	RA-226	0.05	0.00	PCI/G	GAMMASPEC	0.05
QCBLANK	10/25/99	10/25/99	99G0011		945.0	DRY	BL	AC-227	0.15	0.00	PCI/G	GAMMASPEC	0.15
QCBLANK	10/25/99	10/25/99	99G0011		945.0	DRY	BL	RA-228	0.05	0.00	PCI/G	GAMMASPEC	0.05
QCBLANK	10/25/99	10/25/99	99G0011		945.0	DRY	BL	TH-228	0.05	0.00	PCI/G	GAMMASPEC	0.05
QCBLANK	10/25/99	10/25/99	99G0011		945.0	DRY	BL	TH-232	0.05	0.00	PCI/G	GAMMASPEC	0.05
QCBLANK	10/25/99	10/25/99	99G0011		945.0	DRY	BL	TH-230	7.44	0.00	PCI/G	GAMMASPEC	7.44
QCBLANK	10/25/99	10/25/99	99G0011		945.0	DRY	BL	PA-231	0.74	0.00	PCI/G	GAMMASPEC	0.74
QCBLANK	10/25/99	10/25/99	99G0011		945.0	DRY	BL	U-235	0.00	0.01	PCI/G	GAMMASPEC	0.03
QCBLANK	10/25/99	10/25/99	99G0011		945.0	DRY	BL	U-238	0.76	0.00	PCI/G	GAMMASPEC	0.76
QCBLANK	10/25/99	10/25/99	99G0011		945.0	DRY	BL	AM-241	0.08	0.00	PCI/G	GAMMASPEC	0.08

Approved by: ______________________ Date: ______________

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Location:	MAYWOOD		
Site WBS:	12B	Date Entered:	10/26/99
Work Order Number:	99G0011		
Project Number:			
Environmental Cat:	RI		

Sample ID	Date Collected	Date Analyzed	SDG ID	LAB ID	Vol.	W/D	Sample Type	Analyte	Result	Error	Units	Analytical Method	MDA
QCSPIKE	04/01/99	10/25/99	99G0011		832.0	DRY	LCSF	CS-137	69.81	2.20	PCI/G	GAMMASPEC	1.00
QCSPIKE	04/01/99	10/25/99	99G0011		832.0	DRY	LCSF	AM-241	165.31	8.25	PCI/G	GAMMASPEC	3.56
QCSPIKE	04/01/99	10/25/99	99G0011		832.0	DRY	LCST	CS-137	68.43	3.22	PCI/G	GAMMASPEC	1.00
QCSPIKE	04/01/99	10/25/99	99G0011		832.0	DRY	LCST	AM-241	165.05	8.25	PCI/G	GAMMASPEC	3.56

Approved by: ______________________ Date: ______________

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PRELIMINARY DATA

Location:	MAYWOOD		
Site WBS:	12B	Date Entered:	10/27/99
Work Order Number:	99G0012		
Project Number:			
Environmental Cat:	RI		

Sample ID	Date Collected	Date Analyzed	SDG ID	LAB ID	Vol.	W/D	Sample Type	Analyte	Result	Error	Units	Analytical Method	MDA
MISS00330	08/25/99	09/30/99	99G0012		422.5	DRY	REG	K-40	11.41	0.84	PCI/G	GAMMASPEC	1.37
MISS00330	08/25/99	09/30/99	99G0012		422.5	DRY	REG	CS-137	0.16	0.05	PCI/G	GAMMASPEC	0.16
MISS00330	08/25/99	09/30/99	99G0012		422.5	DRY	REG	RA-226	2.18	0.09	PCI/G	GAMMASPEC	0.30
MISS00330	08/25/99	09/30/99	99G0012		422.5	DRY	REG	AC-227	1.76	0.00	PCI/G	GAMMASPEC	1.76
MISS00330	08/25/99	09/30/99	99G0012		422.5	DRY	REG	RA-228	9.06	0.22	PCI/G	GAMMASPEC	0.45
MISS00330	08/25/99	09/30/99	99G0012		422.5	DRY	REG	TH-228	9.06	0.22	PCI/G	GAMMASPEC	0.45
MISS00330	08/25/99	09/30/99	99G0012		422.5	DRY	REG	TH-232	9.06	0.22	PCI/G	GAMMASPEC	0.45
MISS00330	08/25/99	09/30/99	99G0012		422.5	DRY	REG	TH-230	53.10	0.00	PCI/G	GAMMASPEC	53.10
MISS00330	08/25/99	09/30/99	99G0012		422.5	DRY	REG	PA-231	5.91	0.00	PCI/G	GAMMASPEC	5.91
MISS00330	08/25/99	09/30/99	99G0012		422.5	DRY	REG	U-235	0.30	0.07	PCI/G	GAMMASPEC	0.21
MISS00330	08/25/99	09/30/99	99G0012		422.5	DRY	REG	U-238	6.05	0.00	PCI/G	GAMMASPEC	6.05
MISS00330	08/25/99	09/30/99	99G0012		422.5	DRY	REG	AM-241	0.71	0.00	PCI/G	GAMMASPEC	0.71
MISS00340	08/25/99	09/30/99	99G0012		384.2	DRY	REG	K-40	4.39	0.71	PCI/G	GAMMASPEC	1.89
MISS00340	08/25/99	09/30/99	99G0012		384.2	DRY	REG	CS-137	0.16	0.07	PCI/G	GAMMASPEC	0.22
MISS00340	08/25/99	09/30/99	99G0012		384.2	DRY	REG	RA-226	2.38	0.10	PCI/G	GAMMASPEC	0.34
MISS00340	08/25/99	09/30/99	99G0012		384.2	DRY	REG	AC-227	1.93	0.00	PCI/G	GAMMASPEC	1.93
MISS00340	08/25/99	09/30/99	99G0012		384.2	DRY	REG	RA-228	11.33	0.26	PCI/G	GAMMASPEC	0.54
MISS00340	08/25/99	09/30/99	99G0012		384.2	DRY	REG	TH-228	11.33	0.26	PCI/G	GAMMASPEC	0.54
MISS00340	08/25/99	09/30/99	99G0012		384.2	DRY	REG	TH-232	11.33	0.26	PCI/G	GAMMASPEC	0.54
MISS00340	08/25/99	09/30/99	99G0012		384.2	DRY	REG	TH-230	57.80	0.00	PCI/G	GAMMASPEC	57.80
MISS00340	08/25/99	09/30/99	99G0012		384.2	DRY	REG	PA-231	6.80	0.00	PCI/G	GAMMASPEC	6.80
MISS00340	08/25/99	09/30/99	99G0012		384.2	DRY	REG	U-235	0.50	0.07	PCI/G	GAMMASPEC	0.22
MISS00340	08/25/99	09/30/99	99G0012		384.2	DRY	REG	U-238	7.06	0.00	PCI/G	GAMMASPEC	7.06
MISS00340	08/25/99	09/30/99	99G0012		384.2	DRY	REG	AM-241	0.78	0.00	PCI/G	GAMMASPEC	0.78
MISS00350	08/26/99	09/30/99	99G0012		533.2	DRY	REG	K-40	11.38	0.70	PCI/G	GAMMASPEC	0.62
MISS00350	08/26/99	09/30/99	99G0012		533.2	DRY	REG	CS-137	0.07	0.00	PCI/G	GAMMASPEC	0.07
MISS00350	08/26/99	09/30/99	99G0012		533.2	DRY	REG	RA-226	0.65	0.04	PCI/G	GAMMASPEC	0.13
MISS00350	08/26/99	09/30/99	99G0012		533.2	DRY	REG	AC-227	0.78	0.00	PCI/G	GAMMASPEC	0.78

Approved by: ______________________ Date: ____________

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Location:	MAYWOOD		
Site WBS:	12B	Date Entered:	10/27/99
Work Order Number:	99G0012		
Project Number:			
Environmental Cat:	RI		

PRELIMINARY DATA

Sample ID	Date Collected	Date Analyzed	SDG ID	LAB ID	Vol.	W/D	Sample Type	Analyte	Result	Error	Units	Analytical Method	MDA
MISS00350	08/26/99	09/30/99	99G0012		533.2	DRY	REG	RA-228	0.75	0.06	PCI/G	GAMMASPEC	0.19
MISS00350	08/26/99	09/30/99	99G0012		533.2	DRY	REG	TH-228	0.75	0.06	PCI/G	GAMMASPEC	0.19
MISS00350	08/26/99	09/30/99	99G0012		533.2	DRY	REG	TH-232	0.75	0.06	PCI/G	GAMMASPEC	0.19
MISS00350	08/26/99	09/30/99	99G0012		533.2	DRY	REG	TH-230	20.40	0.00	PCI/G	GAMMASPEC	20.40
MISS00350	08/26/99	09/30/99	99G0012		533.2	DRY	REG	PA-231	1.99	0.00	PCI/G	GAMMASPEC	1.99
MISS00350	08/26/99	09/30/99	99G0012		533.2	DRY	REG	U-235	0.11	0.03	PCI/G	GAMMASPEC	0.08
MISS00350	08/26/99	09/30/99	99G0012		533.2	DRY	REG	U-238	2.63	0.00	PCI/G	GAMMASPEC	2.63
MISS00350	08/26/99	09/30/99	99G0012		533.2	DRY	REG	AM-241	0.27	0.00	PCI/G	GAMMASPEC	0.27
MISS00360	08/25/99	09/30/99	99G0012		602.0	DRY	REG	K-40	11.36	0.75	PCI/G	GAMMASPEC	1.30
MISS00360	08/25/99	09/30/99	99G0012		602.0	DRY	REG	CS-137	0.18	0.00	PCI/G	GAMMASPEC	0.18
MISS00360	08/25/99	09/30/99	99G0012		602.0	DRY	REG	RA-226	1.48	0.07	PCI/G	GAMMASPEC	0.23
MISS00360	08/25/99	09/30/99	99G0012		602.0	DRY	REG	AC-227	1.59	0.00	PCI/G	GAMMASPEC	1.59
MISS00360	08/25/99	09/30/99	99G0012		602.0	DRY	REG	RA-228	11.86	0.23	PCI/G	GAMMASPEC	0.32
MISS00360	08/25/99	09/30/99	99G0012		602.0	DRY	REG	TH-228	11.86	0.23	PCI/G	GAMMASPEC	0.32
MISS00360	08/25/99	09/30/99	99G0012		602.0	DRY	REG	TH-232	11.86	0.23	PCI/G	GAMMASPEC	0.32
MISS00360	08/25/99	09/30/99	99G0012		602.0	DRY	REG	TH-230	50.50	0.00	PCI/G	GAMMASPEC	50.50
MISS00360	08/25/99	09/30/99	99G0012		602.0	DRY	REG	PA-231	5.48	0.00	PCI/G	GAMMASPEC	5.48
MISS00360	08/25/99	09/30/99	99G0012		602.0	DRY	REG	U-235	0.26	0.06	PCI/G	GAMMASPEC	0.18
MISS00360	08/25/99	09/30/99	99G0012		602.0	DRY	REG	U-238	6.90	1.81	PCI/G	GAMMASPEC	5.77
MISS00360	08/25/99	09/30/99	99G0012		602.0	DRY	REG	AM-241	0.67	0.00	PCI/G	GAMMASPEC	0.67
MISS0037X	08/25/99	09/30/99	99G0012		422.5	DRY	REG	K-40	12.17	0.89	PCI/G	GAMMASPEC	1.51
MISS0037X	08/25/99	09/30/99	99G0012		422.5	DRY	REG	CS-137	0.21	0.00	PCI/G	GAMMASPEC	0.21
MISS0037X	08/25/99	09/30/99	99G0012		422.5	DRY	REG	RA-226	2.05	0.09	PCI/G	GAMMASPEC	0.28
MISS0037X	08/25/99	09/30/99	99G0012		422.5	DRY	REG	AC-227	1.75	0.00	PCI/G	GAMMASPEC	1.75
MISS0037X	08/25/99	09/30/99	99G0012		422.5	DRY	REG	RA-228	9.08	0.22	PCI/G	GAMMASPEC	0.48
MISS0037X	08/25/99	09/30/99	99G0012		422.5	DRY	REG	TH-228	9.08	0.22	PCI/G	GAMMASPEC	0.48
MISS0037X	08/25/99	09/30/99	99G0012		422.5	DRY	REG	TH-232	9.08	0.22	PCI/G	GAMMASPEC	0.48
MISS0037X	08/25/99	09/30/99	99G0012		422.5	DRY	REG	TH-230	52.70	0.00	PCI/G	GAMMASPEC	52.70

Approved by: ______________________ Date: ______________

Equivalent values in the "Result" and "MDA" columns indicate that the analyte was either undetected or detected at a level below the MDA. Th esults listed at the MDA should have been reported at the actual measuremen

Location:	MAYWOOD		
Site WBS:	12B	Date Entered:	10/27/99
Work Order Number:	99G0012		
Project Number:			
Environmental Cat:	RI		

PRELIMINARY DATA

Sample ID	Date Collected	Date Analyzed	SDG ID	LAB ID	Vol.	W/D	Sample Type	Analyte	Result	Error	Units	Analytical Method	MDA
MISS0037X	08/25/99	09/30/99	99G0012		422.5	DRY	REG	PA-231	6.00	0.00	PCI/G	GAMMASPEC	6.00
MISS0037X	08/25/99	09/30/99	99G0012		422.5	DRY	REG	U-235	0.29	0.06	PCI/G	GAMMASPEC	0.20
MISS0037X	08/25/99	09/30/99	99G0012		422.5	DRY	REG	U-238	6.30	0.00	PCI/G	GAMMASPEC	6.30
MISS0037X	08/25/99	09/30/99	99G0012		422.5	DRY	REG	AM-241	0.70	0.00	PCI/G	GAMMASPEC	0.70
MISS00380	08/25/99	09/30/99	99G0012		758.9	DRY	REG	K-40	9.59	0.55	PCI/G	GAMMASPEC	0.44
MISS00380	08/25/99	09/30/99	99G0012		758.9	DRY	REG	CS-137	0.05	0.00	PCI/G	GAMMASPEC	0.05
MISS00380	08/25/99	09/30/99	99G0012		758.9	DRY	REG	RA-226	0.48	0.03	PCI/G	GAMMASPEC	0.05
MISS00380	08/25/99	09/30/99	99G0012		758.9	DRY	REG	AC-227	0.54	0.00	PCI/G	GAMMASPEC	0.54
MISS00380	08/25/99	09/30/99	99G0012		758.9	DRY	REG	RA-228	0.49	0.04	PCI/G	GAMMASPEC	0.14
MISS00380	08/25/99	09/30/99	99G0012		758.9	DRY	REG	TH-228	0.49	0.04	PCI/G	GAMMASPEC	0.14
MISS00380	08/25/99	09/30/99	99G0012		758.9	DRY	REG	TH-232	0.49	0.04	PCI/G	GAMMASPEC	0.14
MISS00380	08/25/99	09/30/99	99G0012		758.9	DRY	REG	TH-230	15.30	0.00	PCI/G	GAMMASPEC	15.30
MISS00380	08/25/99	09/30/99	99G0012		758.9	DRY	REG	PA-231	1.72	0.00	PCI/G	GAMMASPEC	1.72
MISS00380	08/25/99	09/30/99	99G0012		758.9	DRY	REG	U-235	0.05	0.02	PCI/G	GAMMASPEC	0.06
MISS00380	08/25/99	09/30/99	99G0012		758.9	DRY	REG	U-238	1.83	0.00	PCI/G	GAMMASPEC	1.83
MISS00380	08/25/99	09/30/99	99G0012		758.9	DRY	REG	AM-241	0.20	0.00	PCI/G	GAMMASPEC	0.20
MISS00390	08/25/99	09/30/99	99G0012		504.1	DRY	REG	K-40	10.42	0.71	PCI/G	GAMMASPEC	0.94
MISS00390	08/25/99	09/30/99	99G0012		504.1	DRY	REG	CS-137	0.16	0.00	PCI/G	GAMMASPEC	0.16
MISS00390	08/25/99	09/30/99	99G0012		504.1	DRY	REG	RA-226	1.06	0.06	PCI/G	GAMMASPEC	0.18
MISS00390	08/25/99	09/30/99	99G0012		504.1	DRY	REG	AC-227	1.21	0.00	PCI/G	GAMMASPEC	1.21
MISS00390	08/25/99	09/30/99	99G0012		504.1	DRY	REG	RA-228	4.73	0.13	PCI/G	GAMMASPEC	0.32
MISS00390	08/25/99	09/30/99	99G0012		504.1	DRY	REG	TH-228	4.73	0.13	PCI/G	GAMMASPEC	0.32
MISS00390	08/25/99	09/30/99	99G0012		504.1	DRY	REG	TH-232	4.73	0.13	PCI/G	GAMMASPEC	0.32
MISS00390	08/25/99	09/30/99	99G0012		504.1	DRY	REG	TH-230	35.30	0.00	PCI/G	GAMMASPEC	35.30
MISS00390	08/25/99	09/30/99	99G0012		504.1	DRY	REG	PA-231	4.02	0.00	PCI/G	GAMMASPEC	4.02
MISS00390	08/25/99	09/30/99	99G0012		504.1	DRY	REG	U-235	0.16	0.04	PCI/G	GAMMASPEC	0.13
MISS00390	08/25/99	09/30/99	99G0012		504.1	DRY	REG	U-238	4.24	0.00	PCI/G	GAMMASPEC	4.24
MISS00390	08/25/99	09/30/99	99G0012		504.1	DRY	REG	AM-241	0.47	0.00	PCI/G	GAMMASPEC	0.47

Approved by: ______________________ Date: ____________

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Location:	MAYWOOD		
Site WBS:	12B	Date Entered:	10/27/99
Work Order Number:	99G0012		
Project Number:			
Environmental Cat:	RI		

PRELIMINARY DATA

Sample ID	Date Collected	Date Analyzed	SDG ID	LAB ID	Vol.	W/D	Sample Type	Analyte	Result	Error	Units	Analytical Method	MDA
MISS00400	08/25/99	09/30/99	99G0012		424.9	DRY	REG	K-40	5.06	0.60	PCI/G	GAMMASPEC	1.34
MISS00400	08/25/99	09/30/99	99G0012		424.9	DRY	REG	CS-137	0.20	0.00	PCI/G	GAMMASPEC	0.20
MISS00400	08/25/99	09/30/99	99G0012		424.9	DRY	REG	RA-226	2.12	0.09	PCI/G	GAMMASPEC	0.28
MISS00400	08/25/99	09/30/99	99G0012		424.9	DRY	REG	AC-227	1.70	0.00	PCI/G	GAMMASPEC	1.70
MISS00400	08/25/99	09/30/99	99G0012		424.9	DRY	REG	RA-228	9.01	0.21	PCI/G	GAMMASPEC	0.32
MISS00400	08/25/99	09/30/99	99G0012		424.9	DRY	REG	TH-228	9.01	0.21	PCI/G	GAMMASPEC	0.32
MISS00400	08/25/99	09/30/99	99G0012		424.9	DRY	REG	TH-232	9.01	0.21	PCI/G	GAMMASPEC	0.32
MISS00400	08/25/99	09/30/99	99G0012		424.9	DRY	REG	TH-230	52.60	0.00	PCI/G	GAMMASPEC	52.60
MISS00400	08/25/99	09/30/99	99G0012		424.9	DRY	REG	PA-231	5.78	0.00	PCI/G	GAMMASPEC	5.78
MISS00400	08/25/99	09/30/99	99G0012		424.9	DRY	REG	U-235	0.41	0.06	PCI/G	GAMMASPEC	0.20
MISS00400	08/25/99	09/30/99	99G0012		424.9	DRY	REG	U-238	6.28	0.00	PCI/G	GAMMASPEC	6.28
MISS00400	08/25/99	09/30/99	99G0012		424.9	DRY	REG	AM-241	0.69	0.00	PCI/G	GAMMASPEC	0.69
MISS00410	08/25/99	09/30/99	99G0012		739.8	DRY	LREP	K-40	9.55	0.56	PCI/G	GAMMASPEC	0.61
MISS00410	08/25/99	09/30/99	99G0012		739.8	DRY	LREP	CS-137	0.06	0.00	PCI/G	GAMMASPEC	0.06
MISS00410	08/25/99	09/30/99	99G0012		739.8	DRY	LREP	RA-226	0.45	0.03	PCI/G	GAMMASPEC	0.09
MISS00410	08/25/99	09/30/99	99G0012		739.8	DRY	LREP	AC-227	0.53	0.00	PCI/G	GAMMASPEC	0.53
MISS00410	08/25/99	09/30/99	99G0012		739.8	DRY	LREP	RA-228	0.56	0.04	PCI/G	GAMMASPEC	0.15
MISS00410	08/25/99	09/30/99	99G0012		739.8	DRY	LREP	TH-228	0.56	0.04	PCI/G	GAMMASPEC	0.15
MISS00410	08/25/99	09/30/99	99G0012		739.8	DRY	LREP	TH-232	0.56	0.04	PCI/G	GAMMASPEC	0.15
MISS00410	08/25/99	09/30/99	99G0012		739.8	DRY	LREP	TH-230	15.00	0.00	PCI/G	GAMMASPEC	15.00
MISS00410	08/25/99	09/30/99	99G0012		739.8	DRY	LREP	PA-231	1.62	0.00	PCI/G	GAMMASPEC	1.62
MISS00410	08/25/99	09/30/99	99G0012		739.8	DRY	LREP	U-235	0.07	0.02	PCI/G	GAMMASPEC	0.05
MISS00410	08/25/99	09/30/99	99G0012		739.8	DRY	LREP	U-238	0.48	0.54	PCI/G	GAMMASPEC	1.79
MISS00410	08/25/99	09/30/99	99G0012		739.8	DRY	LREP	AM-241	0.20	0.00	PCI/G	GAMMASPEC	0.20
MISS00410	08/25/99	09/30/99	99G0012		739.8	DRY	REG	K-40	10.92	0.61	PCI/G	GAMMASPEC	0.67
MISS00410	08/25/99	09/30/99	99G0012		739.8	DRY	REG	CS-137	0.06	0.00	PCI/G	GAMMASPEC	0.06
MISS00410	08/25/99	09/30/99	99G0012		739.8	DRY	REG	RA-226	0.40	0.03	PCI/G	GAMMASPEC	0.09
MISS00410	08/25/99	09/30/99	99G0012		739.8	DRY	REG	AC-227	0.57	0.00	PCI/G	GAMMASPEC	0.57

Approved by: ______________________ Date: ______________

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T᷊ ·esults listed at the MDA should have been reported at the actual measuremer

PRELIMINARY DATA

Location:	MAYWOOD		
Site WBS:	12B	Date Entered:	10/27/99
Work Order Number:	99G0012		
Project Number:			
Environmental Cat:	RI		

Sample ID	Date Collected	Date Analyzed	SDG ID	LAB ID	Vol.	W/D	Sample Type	Analyte	Result	Error	Units	Analytical Method	MDA
MISS00410	08/25/99	09/30/99	99G0012		739.8	DRY	REG	RA-228	0.54	0.04	PCI/G	GAMMASPEC	0.13
MISS00410	08/25/99	09/30/99	99G0012		739.8	DRY	REG	TH-228	0.54	0.04	PCI/G	GAMMASPEC	0.13
MISS00410	08/25/99	09/30/99	99G0012		739.8	DRY	REG	TH-232	0.54	0.04	PCI/G	GAMMASPEC	0.13
MISS00410	08/25/99	09/30/99	99G0012		739.8	DRY	REG	TH-230	15.80	0.00	PCI/G	GAMMASPEC	15.80
MISS00410	08/25/99	09/30/99	99G0012		739.8	DRY	REG	PA-231	1.61	0.00	PCI/G	GAMMASPEC	1.61
MISS00410	08/25/99	09/30/99	99G0012		739.8	DRY	REG	U-235	0.07	0.02	PCI/G	GAMMASPEC	0.07
MISS00410	08/25/99	09/30/99	99G0012		739.8	DRY	REG	U-238	1.83	0.00	PCI/G	GAMMASPEC	1.83
MISS00410	08/25/99	09/30/99	99G0012		739.8	DRY	REG	AM-241	0.21	0.00	PCI/G	GAMMASPEC	0.21
MISS00430	08/26/99	09/30/99	99G0012		457.9	DRY	REG	K-40	5.72	0.64	PCI/G	GAMMASPEC	1.48
MISS00430	08/26/99	09/30/99	99G0012		457.9	DRY	REG	CS-137	0.21	0.00	PCI/G	GAMMASPEC	0.21
MISS00430	08/26/99	09/30/99	99G0012		457.9	DRY	REG	RA-226	2.29	0.09	PCI/G	GAMMASPEC	0.29
MISS00430	08/26/99	09/30/99	99G0012		457.9	DRY	REG	AC-227	1.88	0.00	PCI/G	GAMMASPEC	1.88
MISS00430	08/26/99	09/30/99	99G0012		457.9	DRY	REG	RA-228	12.11	0.25	PCI/G	GAMMASPEC	0.49
MISS00430	08/26/99	09/30/99	99G0012		457.9	DRY	REG	TH-228	12.11	0.25	PCI/G	GAMMASPEC	0.49
MISS00430	08/26/99	09/30/99	99G0012		457.9	DRY	REG	TH-232	12.11	0.25	PCI/G	GAMMASPEC	0.49
MISS00430	08/26/99	09/30/99	99G0012		457.9	DRY	REG	TH-230	56.40	0.00	PCI/G	GAMMASPEC	56.40
MISS00430	08/26/99	09/30/99	99G0012		457.9	DRY	REG	PA-231	6.28	0.00	PCI/G	GAMMASPEC	6.28
MISS00430	08/26/99	09/30/99	99G0012		457.9	DRY	REG	U-235	0.53	0.07	PCI/G	GAMMASPEC	0.22
MISS00430	08/26/99	09/30/99	99G0012		457.9	DRY	REG	U-238	6.62	0.00	PCI/G	GAMMASPEC	6.62
MISS00430	08/26/99	09/30/99	99G0012		457.9	DRY	REG	AM-241	0.74	0.00	PCI/G	GAMMASPEC	0.74
QCBLANK	09/29/99	09/30/99	99G0012		945.0	DRY	BL	K-40	0.45	0.00	PCI/G	GAMMASPEC	0.45
QCBLANK	09/29/99	09/30/99	99G0012		945.0	DRY	BL	CS-137	0.03	0.00	PCI/G	GAMMASPEC	0.03
QCBLANK	09/29/99	09/30/99	99G0012		945.0	DRY	BL	RA-226	0.05	0.00	PCI/G	GAMMASPEC	0.05
QCBLANK	09/29/99	09/30/99	99G0012		945.0	DRY	BL	AC-227	0.15	0.00	PCI/G	GAMMASPEC	0.15
QCBLANK	09/29/99	09/30/99	99G0012		945.0	DRY	BL	RA-228	0.07	0.00	PCI/G	GAMMASPEC	0.07
QCBLANK	09/29/99	09/30/99	99G0012		945.0	DRY	BL	TH-228	0.07	0.00	PCI/G	GAMMASPEC	0.07
QCBLANK	09/29/99	09/30/99	99G0012		945.0	DRY	BL	TH-232	0.07	0.00	PCI/G	GAMMASPEC	0.07
QCBLANK	09/29/99	09/30/99	99G0012		945.0	DRY	BL	TH-230	5.54	0.00	PCI/G	GAMMASPEC	5.54

Approved by: ______________________ Date: ______________

Equivalent values in the "Result" and "MDA" columns indicate that the analyte was either undetected or detected at a level below the MDA. The results listed at the MDA should have been reported at the actual measurement.

PRELIMINARY

Location:	MAYWOOD		
Site WBS:	12B	Date Entered:	10/27/99
Work Order Number:	99G0012		
Project Number:			
Environmental Cat:	RI		

Sample ID	Date Collected	Date Analyzed	SDG ID	LAB ID	Vol.	W/D	Sample Type	Analyte	Result	Error	Units	Analytical Method	MDA
QCBLANK	09/29/99	09/30/99	99G0012		945.0	DRY	BL	PA-231	0.80	0.00	PCI/G	GAMMASPEC	0.80
QCBLANK	09/29/99	09/30/99	99G0012		945.0	DRY	BL	U-235	0.03	0.00	PCI/G	GAMMASPEC	0.03
QCBLANK	09/29/99	09/30/99	99G0012		945.0	DRY	BL	U-238	0.75	0.00	PCI/G	GAMMASPEC	0.75
QCBLANK	09/29/99	09/30/99	99G0012		945.0	DRY	BL	AM-241	0.08	0.00	PCI/G	GAMMASPEC	0.08
QCSPIKE	04/01/99	09/30/99	99G0012		832.0	DRY	LCSF	CS-137	70.04	2.21	PCI/G	GAMMASPEC	1.04
QCSPIKE	04/01/99	09/30/99	99G0012		832.0	DRY	LCSF	AM-241	163.35	8.26	PCI/G	GAMMASPEC	3.65
QCSPIKE	04/01/99	09/30/99	99G0012		832.0	DRY	LCST	CS-137	68.43	3.22	PCI/G	GAMMASPEC	1.04
QCSPIKE	04/01/99	09/30/99	99G0012		832.0	DRY	LCST	AM-241	165.05	8.25	PCI/G	GAMMASPEC	3.65

Approved by: ______________________ Date: ______________

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DATA

Location:	MAYWOOD		
Site WBS:	12B	Date Entered:	10/27/1999
Work Order Number:	99G0013		
Project Number:			
Environmental Cat:	RI		

Sample ID	Date Collected	Date Analyzed	SDG ID	LAB ID	Vol.	W/D	Sample Type	Analyte	Result	Error	Units	Analytical Method	MDA
MISS0350	08/26/99	10/27/99	99G0013		533.2	DRY	REG	K-40	10.93	0.69	PCI/G	GAMMASPEC	0.76
MISS0350	08/26/99	10/27/99	99G0013		533.2	DRY	REG	CS-137	0.08	0.00	PCI/G	GAMMASPEC	0.08
MISS0350	08/26/99	10/27/99	99G0013		533.2	DRY	REG	RA-226	0.80	0.04	PCI/G	GAMMASPEC	0.12
MISS0350	08/26/99	10/27/99	99G0013		533.2	DRY	REG	AC-227	0.75	0.00	PCI/G	GAMMASPEC	0.75
MISS0350	08/26/99	10/27/99	99G0013		533.2	DRY	REG	RA-228	0.71	0.06	PCI/G	GAMMASPEC	0.20
MISS0350	08/26/99	10/27/99	99G0013		533.2	DRY	REG	TH-228	0.71	0.06	PCI/G	GAMMASPEC	0.20
MISS0350	08/26/99	10/27/99	99G0013		533.2	DRY	REG	TH-232	0.71	0.06	PCI/G	GAMMASPEC	0.20
MISS0350	08/26/99	10/27/99	99G0013		533.2	DRY	REG	TH-230	25.80	0.00	PCI/G	GAMMASPEC	25.80
MISS0350	08/26/99	10/27/99	99G0013		533.2	DRY	REG	PA-231	2.33	0.00	PCI/G	GAMMASPEC	2.33
MISS0350	08/26/99	10/27/99	99G0013		533.2	DRY	REG	U-235	0.15	0.03	PCI/G	GAMMASPEC	0.09
MISS0350	08/26/99	10/27/99	99G0013		533.2	DRY	REG	U-238	2.78	0.00	PCI/G	GAMMASPEC	2.78
MISS0350	08/26/99	10/27/99	99G0013		533.2	DRY	REG	AM-241	0.30	0.00	PCI/G	GAMMASPEC	0.30
MISS0720	09/01/99	10/27/99	99G0013		497.6	DRY	REG	K-40	14.05	1.18	PCI/G	GAMMASPEC	2.94
MISS0720	09/01/99	10/27/99	99G0013		497.6	DRY	REG	CS-137	0.43	0.00	PCI/G	GAMMASPEC	0.43
MISS0720	09/01/99	10/27/99	99G0013		497.6	DRY	REG	RA-226	3.17	0.16	PCI/G	GAMMASPEC	0.64
MISS0720	09/01/99	10/27/99	99G0013		497.6	DRY	REG	AC-227	3.85	0.00	PCI/G	GAMMASPEC	3.85
MISS0720	09/01/99	10/27/99	99G0013		497.6	DRY	REG	RA-228	71.82	1.04	PCI/G	GAMMASPEC	0.72
MISS0720	09/01/99	10/27/99	99G0013		497.6	DRY	REG	TH-228	71.82	1.04	PCI/G	GAMMASPEC	0.72
MISS0720	09/01/99	10/27/99	99G0013		497.6	DRY	REG	TH-232	71.82	1.04	PCI/G	GAMMASPEC	0.72
MISS0720	09/01/99	10/27/99	99G0013		497.6	DRY	REG	TH-230	149.00	0.00	PCI/G	GAMMASPEC	149.00
MISS0720	09/01/99	10/27/99	99G0013		497.6	DRY	REG	PA-231	14.30	0.00	PCI/G	GAMMASPEC	14.30
MISS0720	09/01/99	10/27/99	99G0013		497.6	DRY	REG	U-235	1.24	0.08	PCI/G	GAMMASPEC	0.36
MISS0720	09/01/99	10/27/99	99G0013		497.6	DRY	REG	U-238	21.45	3.80	PCI/G	GAMMASPEC	14.30
MISS0720	09/01/99	10/27/99	99G0013		497.6	DRY	REG	AM-241	1.67	0.00	PCI/G	GAMMASPEC	1.67
MISS0720	09/01/99	10/27/99	99G0013		497.6	DRY	LREP	K-40	13.45	1.16	PCI/G	GAMMASPEC	2.94
MISS0720	09/01/99	10/27/99	99G0013		497.6	DRY	LREP	CS-137	0.43	0.00	PCI/G	GAMMASPEC	0.43
MISS0720	09/01/99	10/27/99	99G0013		497.6	DRY	LREP	RA-226	3.20	0.14	PCI/G	GAMMASPEC	0.64
MISS0720	09/01/99	10/27/99	99G0013		497.6	DRY	LREP	AC-227	3.88	0.00	PCI/G	GAMMASPEC	3.88

Approved by: ______________________ Date: ______________

Equivalent values in the "Result" and "MDA" columns indicate that the analyte was either undetected or detected at a level below the MDA. The results listed at the MDA should have been reported at the actual measurement.

Location:	MAYWOOD		
Site WBS:	12B	Date Entered:	10/27/1999
Work Order Number:	99G0013		
Project Number:			
Environmental Cat:	RI		

Sample ID	Date Collected	Date Analyzed	SDG ID	LAB ID	Vol.	W/D	Sample Type	Analyte	Result	Error	Units	Analytical Method	MDA
MISS0720	09/01/99	10/27/99	99G0013		497.6	DRY	LREP	RA-228	71.80	1.04	PCI/G	GAMMASPEC	0.76
MISS0720	09/01/99	10/27/99	99G0013		497.6	DRY	LREP	TH-228	71.80	1.04	PCI/G	GAMMASPEC	0.76
MISS0720	09/01/99	10/27/99	99G0013		497.6	DRY	LREP	TH-232	71.80	1.04	PCI/G	GAMMASPEC	0.76
MISS0720	09/01/99	10/27/99	99G0013		497.6	DRY	LREP	TH-230	150.00	0.00	PCI/G	GAMMASPEC	150.00
MISS0720	09/01/99	10/27/99	99G0013		497.6	DRY	LREP	PA-231	14.30	0.00	PCI/G	GAMMASPEC	14.30
MISS0720	09/01/99	10/27/99	99G0013		497.6	DRY	LREP	U-235	1.62	0.15	PCI/G	GAMMASPEC	0.45
MISS0720	09/01/99	10/27/99	99G0013		497.6	DRY	LREP	U-238	25.17	4.04	PCI/G	GAMMASPEC	14.10
MISS0720	09/01/99	10/27/99	99G0013		497.6	DRY	LREP	AM-241	1.65	0.00	PCI/G	GAMMASPEC	1.65
QCBLANK	10/27/99	10/27/99	99G0013		945.0	DRY	BL	K-40	0.43	0.00	PCI/G	GAMMASPEC	0.43
QCBLANK	10/27/99	10/27/99	99G0013		945.0	DRY	BL	CS-137	0.03	0.00	PCI/G	GAMMASPEC	0.03
QCBLANK	10/27/99	10/27/99	99G0013		945.0	DRY	BL	RA-226	0.05	0.00	PCI/G	GAMMASPEC	0.05
QCBLANK	10/27/99	10/27/99	99G0013		945.0	DRY	BL	AC-227	0.15	0.00	PCI/G	GAMMASPEC	0.15
QCBLANK	10/27/99	10/27/99	99G0013		945.0	DRY	BL	RA-228	0.07	0.00	PCI/G	GAMMASPEC	0.07
QCBLANK	10/27/99	10/27/99	99G0013		945.0	DRY	BL	TH-228	0.07	0.00	PCI/G	GAMMASPEC	0.07
QCBLANK	10/27/99	10/27/99	99G0013		945.0	DRY	BL	TH-232	0.07	0.00	PCI/G	GAMMASPEC	0.07
QCBLANK	10/27/99	10/27/99	99G0013		945.0	DRY	BL	TH-230	6.62	0.00	PCI/G	GAMMASPEC	6.62
QCBLANK	10/27/99	10/27/99	99G0013		945.0	DRY	BL	PA-231	0.76	0.00	PCI/G	GAMMASPEC	0.76
QCBLANK	10/27/99	10/27/99	99G0013		945.0	DRY	BL	U-235	0.03	0.00	PCI/G	GAMMASPEC	0.03
QCBLANK	10/27/99	10/27/99	99G0013		945.0	DRY	BL	U-238	0.75	0.00	PCI/G	GAMMASPEC	0.75
QCBLANK	10/27/99	10/27/99	99G0013		945.0	DRY	BL	AM-241	0.08	0.00	PCI/G	GAMMASPEC	0.08
QCSPIKE	04/01/99	10/27/99	99G0013		832.0	DRY	LCSF	CS-137	69.29	2.18	PCI/G	GAMMASPEC	0.98
QCSPIKE	04/01/99	10/27/99	99G0013		832.0	DRY	LCSF	AM-241	167.29	8.42	PCI/G	GAMMASPEC	3.68
QCSPIKE	04/01/99	10/27/99	99G0013		832.0	DRY	LCST	CS-137	66.43	3.22	PCI/G	GAMMASPEC	0.98
QCSPIKE	04/01/99	10/27/99	99G0013		832.0	DRY	LCST	AM-241	165.05	8.25	PCI/G	GAMMASPEC	3.68

Approved by: ______________________ Date: ______________

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DRY GAMMA SPECTROSCOPY ON SOIL FRACTIONS

ENGINEERING TEST PITS AT MISS SOIL RADIOLOGICAL DATA RESULTS AND SOR CALCULATION

FUSRAP MAYWOOD SUPERFUND SITE MAYWOOD, NEW JERSEY

Location:	MAYWOOD		
Site WBS:	12B	Date Entered:	12/1/99
Work Order Number:	99G0014		
Project Number:			
Environmental Cat:	RI		

Sample ID	Date Collected	Date Analyzed	SDG ID	LAB ID	Vol.	W/D	Sample Type	Analyte	Result	Error	Units	Analytical Method	MDA
MISS014B	08/23/99	11/09/99	99G0014		821.2	DRY	REG	K-40	11.12	0.60	PCI/G	GAMMASPEC	0.65
MISS014B	08/23/99	11/09/99	99G0014		821.2	DRY	REG	CS-137	0.07	0.00	PCI/G	GAMMASPEC	0.07
MISS014B	08/23/99	11/09/99	99G0014		821.2	DRY	REG	RA-226	0.61	0.03	PCI/G	GAMMASPEC	0.10
MISS014B	08/23/99	11/09/99	99G0014		821.2	DRY	REG	AC-227	0.58	0.00	PCI/G	GAMMASPEC	0.58
MISS014B	08/23/99	11/09/99	99G0014		821.2	DRY	REG	RA-228	1.01	0.05	PCI/G	GAMMASPEC	0.15
MISS014B	08/23/99	11/09/99	99G0014		821.2	DRY	REG	TH-228	1.01	0.05	PCI/G	GAMMASPEC	0.15
MISS014B	08/23/99	11/09/99	99G0014		821.2	DRY	REG	TH-232	1.01	0.05	PCI/G	GAMMASPEC	0.15
MISS014B	08/23/99	11/09/99	99G0014		821.2	DRY	REG	TH-230	21.50	0.00	PCI/G	GAMMASPEC	21.50
MISS014B	08/23/99	11/09/99	99G0014		821.2	DRY	REG	PA-231	1.90	0.00	PCI/G	GAMMASPEC	1.90
MISS014B	08/23/99	11/09/99	99G0014		821.2	DRY	REG	U-235	0.09	0.02	PCI/G	GAMMASPEC	0.07
MISS014B	08/23/99	11/09/99	99G0014		821.2	DRY	REG	U-238	2.00	0.00	PCI/G	GAMMASPEC	2.00
MISS014B	08/23/99	11/09/99	99G0014		821.2	DRY	REG	AM-241	0.24	0.00	PCI/G	GAMMASPEC	0.24
MISS014F	08/23/99	11/09/99	99G0014		15.3	DRY	REG	K-40	33.84	5.64	PCI/G	GAMMASPEC	11.50
MISS014F	08/23/99	11/09/99	99G0014		15.3	DRY	REG	CS-137	1.26	0.00	PCI/G	GAMMASPEC	1.26
MISS014F	08/23/99	11/09/99	99G0014		15.3	DRY	REG	RA-226	3.80	0.46	PCI/G	GAMMASPEC	1.61
MISS014F	08/23/99	11/09/99	99G0014		15.3	DRY	REG	AC-227	9.88	0.00	PCI/G	GAMMASPEC	9.88
MISS014F	08/23/99	11/09/99	99G0014		15.3	DRY	REG	RA-228	14.50	0.89	PCI/G	GAMMASPEC	3.26
MISS014F	08/23/99	11/09/99	99G0014		15.3	DRY	REG	TH-228	14.50	0.89	PCI/G	GAMMASPEC	3.26
MISS014F	08/23/99	11/09/99	99G0014		15.3	DRY	REG	TH-232	14.50	0.89	PCI/G	GAMMASPEC	3.26
MISS014F	08/23/99	11/09/99	99G0014		15.3	DRY	REG	TH-230	289.00	0.00	PCI/G	GAMMASPEC	289.00
MISS014F	08/23/99	11/09/99	99G0014		15.3	DRY	REG	PA-231	34.60	0.00	PCI/G	GAMMASPEC	34.60
MISS014F	08/23/99	11/09/99	99G0014		15.3	DRY	REG	U-235	1.17	0.36	PCI/G	GAMMASPEC	1.10
MISS014F	08/23/99	11/09/99	99G0014		15.3	DRY	REG	U-238	28.50	9.11	PCI/G	GAMMASPEC	28.50
MISS014F	08/23/99	11/09/99	99G0014		15.3	DRY	REG	AM-241	3.52	0.00	PCI/G	GAMMASPEC	3.52
MISS020B	08/23/99	11/09/99	99G0014		104.9	DRY	REG	K-40	17.78	1.61	PCI/G	GAMMASPEC	2.72
MISS020B	08/23/99	11/09/99	99G0014		104.9	DRY	REG	CS-137	0.23	0.00	PCI/G	GAMMASPEC	0.23
MISS020B	08/23/99	11/09/99	99G0014		104.9	DRY	REG	RA-226	1.17	0.09	PCI/G	GAMMASPEC	0.30
MISS020B	08/23/99	11/09/99	99G0014		104.9	DRY	REG	AC-227	1.73	0.00	PCI/G	GAMMASPEC	1.73

Approved by: ______________________ Date: ______________

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Location:	MAYWOOD		
Site WBS:	12B	Date Entered:	12/1/99
Work Order Number:	99G0014		
Project Number:			
Environmental Cat:	RI		

Sample ID	Date Collected	Date Analyzed	SDG ID	LAB ID	Vol.	W/D	Sample Type	Analyte	Result	Error	Units	Analytical Method	MDA
MISS020B	08/23/99	11/09/99	99G0014		104.9	DRY	REG	RA-228	1.96	0.14	PCI/G	GAMMASPEC	0.51
MISS020B	08/23/99	11/09/99	99G0014		104.9	DRY	REG	TH-228	1.96	0.14	PCI/G	GAMMASPEC	0.51
MISS020B	08/23/99	11/09/99	99G0014		104.9	DRY	REG	TH-232	1.96	0.14	PCI/G	GAMMASPEC	0.51
MISS020B	08/23/99	11/09/99	99G0014		104.9	DRY	REG	TH-230	50.20	0.00	PCI/G	GAMMASPEC	50.20
MISS020B	08/23/99	11/09/99	99G0014		104.9	DRY	REG	PA-231	5.80	0.00	PCI/G	GAMMASPEC	5.80
MISS020B	08/23/99	11/09/99	99G0014		104.9	DRY	REG	U-235	0.19	0.06	PCI/G	GAMMASPEC	0.19
MISS020B	08/23/99	11/09/99	99G0014		104.9	DRY	REG	U-238	5.28	0.00	PCI/G	GAMMASPEC	5.28
MISS020B	08/23/99	11/09/99	99G0014		104.9	DRY	REG	AM-241	0.59	0.00	PCI/G	GAMMASPEC	0.59
MISS020F	08/23/99	11/09/99	99G0014		23.5	DRY	REG	K-40	12.42	3.90	PCI/G	GAMMASPEC	11.50
MISS020F	08/23/99	11/09/99	99G0014		23.5	DRY	REG	CS-137	1.04	0.00	PCI/G	GAMMASPEC	1.04
MISS020F	08/23/99	11/09/99	99G0014		23.5	DRY	REG	RA-226	2.69	0.36	PCI/G	GAMMASPEC	1.52
MISS020F	08/23/99	11/09/99	99G0014		23.5	DRY	REG	AC-227	7.56	0.00	PCI/G	GAMMASPEC	7.56
MISS020F	08/23/99	11/09/99	99G0014		23.5	DRY	REG	RA-228	18.18	0.76	PCI/G	GAMMASPEC	2.31
MISS020F	08/23/99	11/09/99	99G0014		23.5	DRY	REG	TH-228	18.18	0.76	PCI/G	GAMMASPEC	2.31
MISS020F	08/23/99	11/09/99	99G0014		23.5	DRY	REG	TH-232	18.18	0.76	PCI/G	GAMMASPEC	2.31
MISS020F	08/23/99	11/09/99	99G0014		23.5	DRY	REG	TH-230	223.00	0.00	PCI/G	GAMMASPEC	223.00
MISS020F	08/23/99	11/09/99	99G0014		23.5	DRY	REG	PA-231	27.30	0.00	PCI/G	GAMMASPEC	27.30
MISS020F	08/23/99	11/09/99	99G0014		23.5	DRY	REG	U-235	0.92	0.27	PCI/G	GAMMASPEC	0.92
MISS020F	08/23/99	11/09/99	99G0014		23.5	DRY	REG	U-238	23.70	0.00	PCI/G	GAMMASPEC	23.70
MISS020F	08/23/99	11/09/99	99G0014		23.5	DRY	REG	AM-241	2.77	0.00	PCI/G	GAMMASPEC	2.77
MISS034A	08/25/99	11/09/99	99G0014		70.5	DRY	REG	K-40	4.06	1.26	PCI/G	GAMMASPEC	4.06
MISS034A	08/25/99	11/09/99	99G0014		70.5	DRY	REG	CS-137	0.23	0.00	PCI/G	GAMMASPEC	0.23
MISS034A	08/25/99	11/09/99	99G0014		70.5	DRY	REG	RA-226	0.45	0.00	PCI/G	GAMMASPEC	0.45
MISS034A	08/25/99	11/09/99	99G0014		70.5	DRY	REG	AC-227	1.43	0.00	PCI/G	GAMMASPEC	1.43
MISS034A	08/25/99	11/09/99	99G0014		70.5	DRY	REG	RA-228	0.78	0.00	PCI/G	GAMMASPEC	0.78
MISS034A	08/25/99	11/09/99	99G0014		70.5	DRY	REG	TH-228	0.78	0.00	PCI/G	GAMMASPEC	0.78
MISS034A	08/25/99	11/09/99	99G0014		70.5	DRY	REG	TH-232	0.78	0.00	PCI/G	GAMMASPEC	0.78
MISS034A	08/25/99	11/09/99	99G0014		70.5	DRY	REG	TH-230	46.60	0.00	PCI/G	GAMMASPEC	46.60

Approved by: ______________________ Date: ______________

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Location:	MAYWOOD		
Site WBS:	12B	Date Entered:	12/1/99
Work Order Number:	99G0014		
Project Number:			
Environmental Cat:	RI		

Sample ID	Date Collected	Date Analyzed	SDG ID	LAB ID	Vol.	W/D	Sample Type	Analyte	Result	Error	Units	Analytical Method	MDA
MISS034A	08/25/99	11/09/99	99G0014		70.5	DRY	REG	PA-231	6.21	0.00	PCI/G	GAMMASPEC	6.21
MISS034A	08/25/99	11/09/99	99G0014		70.5	DRY	REG	U-235	0.22	0.06	PCI/G	GAMMASPEC	0.22
MISS034A	08/25/99	11/09/99	99G0014		70.5	DRY	REG	U-238	5.48	0.00	PCI/G	GAMMASPEC	5.48
MISS034A	08/25/99	11/09/99	99G0014		70.5	DRY	REG	AM-241	0.58	0.00	PCI/G	GAMMASPEC	0.58
MISS034B	08/25/99	11/09/99	99G0014		131.3	DRY	REG	K-40	9.20	1.05	PCI/G	GAMMASPEC	2.06
MISS034B	08/25/99	11/09/99	99G0014		131.3	DRY	REG	CS-137	0.18	0.00	PCI/G	GAMMASPEC	0.18
MISS034B	08/25/99	11/09/99	99G0014		131.3	DRY	REG	RA-226	0.38	0.05	PCI/G	GAMMASPEC	0.21
MISS034B	08/25/99	11/09/99	99G0014		131.3	DRY	REG	AC-227	1.03	0.00	PCI/G	GAMMASPEC	1.03
MISS034B	08/25/99	11/09/99	99G0014		131.3	DRY	REG	RA-228	0.62	0.09	PCI/G	GAMMASPEC	0.36
MISS034B	08/25/99	11/09/99	99G0014		131.3	DRY	REG	TH-228	0.62	0.09	PCI/G	GAMMASPEC	0.36
MISS034B	08/25/99	11/09/99	99G0014		131.3	DRY	REG	TH-232	0.62	0.09	PCI/G	GAMMASPEC	0.36
MISS034B	08/25/99	11/09/99	99G0014		131.3	DRY	REG	TH-230	29.70	0.00	PCI/G	GAMMASPEC	29.70
MISS034B	08/25/99	11/09/99	99G0014		131.3	DRY	REG	PA-231	3.63	0.00	PCI/G	GAMMASPEC	3.63
MISS034B	08/25/99	11/09/99	99G0014		131.3	DRY	REG	U-235	0.14	0.04	PCI/G	GAMMASPEC	0.14
MISS034B	08/25/99	11/09/99	99G0014		131.3	DRY	REG	U-238	3.33	0.00	PCI/G	GAMMASPEC	3.33
MISS034B	08/25/99	11/09/99	99G0014		131.3	DRY	REG	AM-241	0.41	0.00	PCI/G	GAMMASPEC	0.41
MISS034F	08/25/99	11/09/99	99G0014		38.5	DRY	REG	K-40	6.24	1.87	PCI/G	GAMMASPEC	6.24
MISS034F	08/25/99	11/09/99	99G0014		38.5	DRY	REG	CS-137	0.38	0.12	PCI/G	GAMMASPEC	0.37
MISS034F	08/25/99	11/09/99	99G0014		38.5	DRY	REG	RA-226	3.15	0.26	PCI/G	GAMMASPEC	0.94
MISS034F	08/25/99	11/09/99	99G0014		38.5	DRY	REG	AC-227	4.89	0.00	PCI/G	GAMMASPEC	4.89
MISS034F	08/25/99	11/09/99	99G0014		38.5	DRY	REG	RA-228	11.79	0.49	PCI/G	GAMMASPEC	1.51
MISS034F	08/25/99	11/09/99	99G0014		38.5	DRY	REG	TH-228	11.79	0.49	PCI/G	GAMMASPEC	1.51
MISS034F	08/25/99	11/09/99	99G0014		38.5	DRY	REG	TH-232	11.79	0.49	PCI/G	GAMMASPEC	1.51
MISS034F	08/25/99	11/09/99	99G0014		38.5	DRY	REG	TH-230	151.00	0.00	PCI/G	GAMMASPEC	151.00
MISS034F	08/25/99	11/09/99	99G0014		38.5	DRY	REG	PA-231	17.20	0.00	PCI/G	GAMMASPEC	17.20
MISS034F	08/25/99	11/09/99	99G0014		38.5	DRY	REG	U-235	0.58	0.18	PCI/G	GAMMASPEC	0.58
MISS034F	08/25/99	11/09/99	99G0014		38.5	DRY	REG	U-238	15.90	0.00	PCI/G	GAMMASPEC	15.90
MISS034F	08/25/99	11/09/99	99G0014		38.5	DRY	REG	AM-241	1.84	0.00	PCI/G	GAMMASPEC	1.84

Approved by: ______________________ Date: ______________

Equivalent values in the "Result" and "MDA" columns indicate that the analyte was either undetected or detected at a level below the MDA. The results listed at the MDA should have been reported at the actual measurement.

Location:	MAYWOOD		
Site WBS:	12B	Date Entered:	12/1/99
Work Order Number:	99G0014		
Project Number:			
Environmental Cat:	RI		

Sample ID	Date Collected	Date Analyzed	SDG ID	LAB ID	Vol.	W/D	Sample Type	Analyte	Result	Error	Units	Analytical Method	MDA
MISS037F	08/25/99	11/10/99	99G0014		22.9	DRY	REG	K-40	13.00	3.95	PCI/G	GAMMASPEC	13.00
MISS037F	08/25/99	11/10/99	99G0014		22.9	DRY	REG	CS-137	0.82	0.00	PCI/G	GAMMASPEC	0.82
MISS037F	08/25/99	11/10/99	99G0014		22.9	DRY	REG	RA-226	3.15	0.35	PCI/G	GAMMASPEC	1.08
MISS037F	08/25/99	11/10/99	99G0014		22.9	DRY	REG	AC-227	6.70	0.00	PCI/G	GAMMASPEC	6.70
MISS037F	08/25/99	11/10/99	99G0014		22.9	DRY	REG	RA-228	6.33	0.57	PCI/G	GAMMASPEC	2.06
MISS037F	08/25/99	11/10/99	99G0014		22.9	DRY	REG	TH-228	6.33	0.57	PCI/G	GAMMASPEC	2.06
MISS037F	08/25/99	11/10/99	99G0014		22.9	DRY	REG	TH-232	6.33	0.57	PCI/G	GAMMASPEC	2.06
MISS037F	08/25/99	11/10/99	99G0014		22.9	DRY	REG	TH-230	192.00	0.00	PCI/G	GAMMASPEC	192.00
MISS037F	08/25/99	11/10/99	99G0014		22.9	DRY	REG	PA-231	24.40	0.00	PCI/G	GAMMASPEC	24.40
MISS037F	08/25/99	11/10/99	99G0014		22.9	DRY	REG	U-235	0.82	0.24	PCI/G	GAMMASPEC	0.73
MISS037F	08/25/99	11/10/99	99G0014		22.9	DRY	REG	U-238	20.00	0.00	PCI/G	GAMMASPEC	20.00
MISS037F	08/25/99	11/10/99	99G0014		22.9	DRY	REG	AM-241	2.28	0.00	PCI/G	GAMMASPEC	2.28
MISS053F	08/31/99	11/10/99	99G0014		35.8	DRY	REG	K-40	17.08	3.30	PCI/G	GAMMASPEC	8.74
MISS053F	08/31/99	11/10/99	99G0014		35.8	DRY	REG	CS-137	0.89	0.00	PCI/G	GAMMASPEC	0.89
MISS053F	08/31/99	11/10/99	99G0014		35.8	DRY	REG	RA-226	6.10	0.38	PCI/G	GAMMASPEC	1.17
MISS053F	08/31/99	11/10/99	99G0014		35.8	DRY	REG	AC-227	6.66	0.00	PCI/G	GAMMASPEC	6.66
MISS053F	08/31/99	11/10/99	99G0014		35.8	DRY	REG	RA-228	28.17	0.83	PCI/G	GAMMASPEC	2.27
MISS053F	08/31/99	11/10/99	99G0014		35.8	DRY	REG	TH-228	28.17	0.83	PCI/G	GAMMASPEC	2.27
MISS053F	08/31/99	11/10/99	99G0014		35.8	DRY	REG	TH-232	28.17	0.83	PCI/G	GAMMASPEC	2.27
MISS053F	08/31/99	11/10/99	99G0014		35.8	DRY	REG	TH-230	222.00	0.00	PCI/G	GAMMASPEC	222.00
MISS053F	08/31/99	11/10/99	99G0014		35.8	DRY	REG	PA-231	24.20	0.00	PCI/G	GAMMASPEC	24.20
MISS053F	08/31/99	11/10/99	99G0014		35.8	DRY	REG	U-235	0.81	0.25	PCI/G	GAMMASPEC	0.81
MISS053F	08/31/99	11/10/99	99G0014		35.8	DRY	REG	U-238	22.90	6.78	PCI/G	GAMMASPEC	22.90
MISS053F	08/31/99	11/10/99	99G0014		35.8	DRY	REG	AM-241	2.59	0.00	PCI/G	GAMMASPEC	2.59
MISS093A	08/18/99	11/08/99	99G0014		434.0	DRY	REG	K-40	4.76	0.48	PCI/G	GAMMASPEC	0.69
MISS093A	08/18/99	11/08/99	99G0014		434.0	DRY	REG	CS-137	0.11	0.00	PCI/G	GAMMASPEC	0.11
MISS093A	08/18/99	11/08/99	99G0014		434.0	DRY	REG	RA-226	1.34	0.06	PCI/G	GAMMASPEC	0.08
MISS093A	08/18/99	11/08/99	99G0014		434.0	DRY	REG	AC-227	1.04	0.00	PCI/G	GAMMASPEC	1.04

Approved by: ______________________ Date: __________

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Location:	MAYWOOD		
Site WBS:	12B	Date Entered:	12/1/99
Work Order Number:	99G0014		
Project Number:			
Environmental Cat:	RI		

Sample ID	Date Collected	Date Analyzed	SDG ID	LAB ID	Vol.	W/D	Sample Type	Analyte	Result	Error	Units	Analytical Method	MDA
MISS093A	08/18/99	11/08/99	99G0014		434.0	DRY	REG	RA-228	1.98	0.09	PCI/G	GAMMASPEC	0.27
MISS093A	08/18/99	11/08/99	99G0014		434.0	DRY	REG	TH-228	1.98	0.09	PCI/G	GAMMASPEC	0.27
MISS093A	08/18/99	11/08/99	99G0014		434.0	DRY	REG	TH-232	1.98	0.09	PCI/G	GAMMASPEC	0.27
MISS093A	08/18/99	11/08/99	99G0014		434.0	DRY	REG	TH-230	36.70	0.00	PCI/G	GAMMASPEC	36.70
MISS093A	08/18/99	11/08/99	99G0014		434.0	DRY	REG	PA-231	3.48	0.00	PCI/G	GAMMASPEC	3.48
MISS093A	08/18/99	11/08/99	99G0014		434.0	DRY	REG	U-235	0.19	0.04	PCI/G	GAMMASPEC	0.12
MISS093A	08/18/99	11/08/99	99G0014		434.0	DRY	REG	U-238	3.46	1.09	PCI/G	GAMMASPEC	3.46
MISS093A	08/18/99	11/08/99	99G0014		434.0	DRY	REG	AM-241	0.41	0.00	PCI/G	GAMMASPEC	0.41
MISS093A	08/18/99	11/09/99	99G0014		434.0	DRY	LREP	K-40	5.46	0.54	PCI/G	GAMMASPEC	0.95
MISS093A	08/18/99	11/09/99	99G0014		434.0	DRY	LREP	CS-137	0.11	0.00	PCI/G	GAMMASPEC	0.11
MISS093A	08/18/99	11/09/99	99G0014		434.0	DRY	LREP	RA-226	1.36	0.06	PCI/G	GAMMASPEC	0.17
MISS093A	08/18/99	11/09/99	99G0014		434.0	DRY	LREP	AC-227	1.07	0.00	PCI/G	GAMMASPEC	1.07
MISS093A	08/18/99	11/09/99	99G0014		434.0	DRY	LREP	RA-228	2.16	0.09	PCI/G	GAMMASPEC	0.27
MISS093A	08/18/99	11/09/99	99G0014		434.0	DRY	LREP	TH-228	2.16	0.09	PCI/G	GAMMASPEC	0.27
MISS093A	08/18/99	11/09/99	99G0014		434.0	DRY	LREP	TH-232	2.16	0.09	PCI/G	GAMMASPEC	0.27
MISS093A	08/18/99	11/09/99	99G0014		434.0	DRY	LREP	TH-230	36.20	0.00	PCI/G	GAMMASPEC	36.20
MISS093A	08/18/99	11/09/99	99G0014		434.0	DRY	LREP	PA-231	3.40	0.00	PCI/G	GAMMASPEC	3.40
MISS093A	08/18/99	11/09/99	99G0014		434.0	DRY	LREP	U-235	0.17	0.04	PCI/G	GAMMASPEC	0.12
MISS093A	08/18/99	11/09/99	99G0014		434.0	DRY	LREP	U-238	3.75	0.00	PCI/G	GAMMASPEC	3.75
MISS093A	08/18/99	11/09/99	99G0014		434.0	DRY	LREP	AM-241	0.42	0.00	PCI/G	GAMMASPEC	0.42
MISS093B	08/18/99	11/09/99	99G0014		101.7	DRY	REG	K-40	11.89	1.23	PCI/G	GAMMASPEC	1.93
MISS093B	08/18/99	11/09/99	99G0014		101.7	DRY	REG	CS-137	0.21	0.00	PCI/G	GAMMASPEC	0.21
MISS093B	08/18/99	11/09/99	99G0014		101.7	DRY	REG	RA-226	1.75	0.10	PCI/G	GAMMASPEC	0.28
MISS093B	08/18/99	11/09/99	99G0014		101.7	DRY	REG	AC-227	1.76	0.00	PCI/G	GAMMASPEC	1.76
MISS093B	08/18/99	11/09/99	99G0014		101.7	DRY	REG	RA-228	1.57	0.13	PCI/G	GAMMASPEC	0.48
MISS093B	08/18/99	11/09/99	99G0014		101.7	DRY	REG	TH-228	1.57	0.13	PCI/G	GAMMASPEC	0.48
MISS093B	08/18/99	11/09/99	99G0014		101.7	DRY	REG	TH-232	1.57	0.13	PCI/G	GAMMASPEC	0.48
MISS093B	08/18/99	11/09/99	99G0014		101.7	DRY	REG	TH-230	48.90	0.00	PCI/G	GAMMASPEC	48.90

Approved by: ______________________ Date: ______________

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Location:	MAYWOOD		
Site WBS:	12B	Date Entered:	12/1/99
Work Order Number:	99G0014		
Project Number:			
Environmental Cat:	RI		

Sample ID	Date Collected	Date Analyzed	SDG ID	LAB ID	Vol.	W/D	Sample Type	Analyte	Result	Error	Units	Analytical Method	MDA
MISS093B	08/18/99	11/09/99	99G0014		101.7	DRY	REG	PA-231	5.52	0.00	PCI/G	GAMMASPEC	5.52
MISS093B	08/18/99	11/09/99	99G0014		101.7	DRY	REG	U-235	0.39	0.06	PCI/G	GAMMASPEC	0.18
MISS093B	08/18/99	11/09/99	99G0014		101.7	DRY	REG	U-238	6.83	1.56	PCI/G	GAMMASPEC	4.64
MISS093B	08/18/99	11/09/99	99G0014		101.7	DRY	REG	AM-241	0.59	0.00	PCI/G	GAMMASPEC	0.59
MISS093B	08/18/99	11/09/99	99G0014		101.7	DRY	LREP	K-40	6.08	1.15	PCI/G	GAMMASPEC	3.01
MISS093B	08/18/99	11/09/99	99G0014		101.7	DRY	LREP	CS-137	0.19	0.00	PCI/G	GAMMASPEC	0.19
MISS093B	08/18/99	11/09/99	99G0014		101.7	DRY	LREP	RA-226	1.74	0.10	PCI/G	GAMMASPEC	0.30
MISS093B	08/18/99	11/09/99	99G0014		101.7	DRY	LREP	AC-227	1.77	0.00	PCI/G	GAMMASPEC	1.77
MISS093B	08/18/99	11/09/99	99G0014		101.7	DRY	LREP	RA-228	1.58	0.13	PCI/G	GAMMASPEC	0.46
MISS093B	08/18/99	11/09/99	99G0014		101.7	DRY	LREP	TH-228	1.58	0.13	PCI/G	GAMMASPEC	0.46
MISS093B	08/18/99	11/09/99	99G0014		101.7	DRY	LREP	TH-232	1.58	0.13	PCI/G	GAMMASPEC	0.46
MISS093B	08/18/99	11/09/99	99G0014		101.7	DRY	LREP	TH-230	47.70	0.00	PCI/G	GAMMASPEC	47.70
MISS093B	08/18/99	11/09/99	99G0014		101.7	DRY	LREP	PA-231	5.44	0.00	PCI/G	GAMMASPEC	5.44
MISS093B	08/18/99	11/09/99	99G0014		101.7	DRY	LREP	U-235	0.26	0.07	PCI/G	GAMMASPEC	0.20
MISS093B	08/18/99	11/09/99	99G0014		101.7	DRY	LREP	U-238	5.28	1.54	PCI/G	GAMMASPEC	5.28
MISS093B	08/18/99	11/09/99	99G0014		101.7	DRY	LREP	AM-241	0.58	0.00	PCI/G	GAMMASPEC	0.58
MISS093F	08/18/99	11/08/99	99G0014		15.8	DRY	REG	K-40	26.78	5.04	PCI/G	GAMMASPEC	10.70
MISS093F	08/18/99	11/08/99	99G0014		15.8	DRY	REG	CS-137	0.98	0.00	PCI/G	GAMMASPEC	0.98
MISS093F	08/18/99	11/08/99	99G0014		15.8	DRY	REG	RA-226	1.56	0.40	PCI/G	GAMMASPEC	1.56
MISS093F	08/18/99	11/08/99	99G0014		15.8	DRY	REG	AC-227	6.74	0.00	PCI/G	GAMMASPEC	6.74
MISS093F	08/18/99	11/08/99	99G0014		15.8	DRY	REG	RA-228	2.72	0.60	PCI/G	GAMMASPEC	2.72
MISS093F	08/18/99	11/08/99	99G0014		15.8	DRY	REG	TH-228	2.72	0.60	PCI/G	GAMMASPEC	2.72
MISS093F	08/18/99	11/08/99	99G0014		15.8	DRY	REG	TH-232	2.72	0.60	PCI/G	GAMMASPEC	2.72
MISS093F	08/18/99	11/08/99	99G0014		15.8	DRY	REG	TH-230	220.00	0.00	PCI/G	GAMMASPEC	220.00
MISS093F	08/18/99	11/08/99	99G0014		15.8	DRY	REG	PA-231	24.90	0.00	PCI/G	GAMMASPEC	24.90
MISS093F	08/18/99	11/08/99	99G0014		15.8	DRY	REG	U-235	1.43	0.30	PCI/G	GAMMASPEC	0.83
MISS093F	08/18/99	11/08/99	99G0014		15.8	DRY	REG	U-238	22.10	7.06	PCI/G	GAMMASPEC	22.10
MISS093F	08/18/99	11/08/99	99G0014		15.8	DRY	REG	AM-241	2.50	0.00	PCI/G	GAMMASPEC	2.50

Approved by: ______________________ Date: ______________

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Location:	MAYWOOD		
Site WBS:	12B	Date Entered:	12/1/99
Work Order Number:	99G0014		
Project Number:			
Environmental Cat:	RI		

Sample ID	Date Collected	Date Analyzed	SDG ID	LAB ID	Vol.	W/D	Sample Type	Analyte	Result	Error	Units	Analytical Method	MDA
QCBLANK	11/08/99	11/08/99	99G0014		945.0	DRY	BL	K-40	0.43	0.00	PCI/G	GAMMASPEC	0.43
QCBLANK	11/08/99	11/08/99	99G0014		945.0	DRY	BL	CS-137	0.02	0.00	PCI/G	GAMMASPEC	0.02
QCBLANK	11/08/99	11/08/99	99G0014		945.0	DRY	BL	RA-226	0.04	0.00	PCI/G	GAMMASPEC	0.04
QCBLANK	11/08/99	11/08/99	99G0014		945.0	DRY	BL	AC-227	0.16	0.00	PCI/G	GAMMASPEC	0.16
QCBLANK	11/08/99	11/08/99	99G0014		945.0	DRY	BL	RA-228	0.07	0.00	PCI/G	GAMMASPEC	0.07
QCBLANK	11/08/99	11/08/99	99G0014		945.0	DRY	BL	TH-228	0.07	0.00	PCI/G	GAMMASPEC	0.07
QCBLANK	11/08/99	11/08/99	99G0014		945.0	DRY	BL	TH-232	0.07	0.00	PCI/G	GAMMASPEC	0.07
QCBLANK	11/08/99	11/08/99	99G0014		945.0	DRY	BL	TH-230	7.51	0.00	PCI/G	GAMMASPEC	7.51
QCBLANK	11/08/99	11/08/99	99G0014		945.0	DRY	BL	PA-231	0.67	0.00	PCI/G	GAMMASPEC	0.67
QCBLANK	11/08/99	11/08/99	99G0014		945.0	DRY	BL	U-235	0.03	0.01	PCI/G	GAMMASPEC	0.03
QCBLANK	11/08/99	11/08/99	99G0014		945.0	DRY	BL	U-238	0.83	0.00	PCI/G	GAMMASPEC	0.83
QCBLANK	11/08/99	11/08/99	99G0014		945.0	DRY	BL	AM-241	0.08	0.00	PCI/G	GAMMASPEC	0.08
QCSPIKEM	04/01/99	11/08/99	99G0014		832.0	DRY	LCSF	CS-137	69.27	2.18	PCI/G	GAMMASPEC	0.96
QCSPIKEM	04/01/99	11/08/99	99G0014		832.0	DRY	LCSF	AM-241	168.14	8.25	PCI/G	GAMMASPEC	3.61
QCSPIKEM	04/01/99	11/08/99	99G0014		832.0	DRY	LCST	CS-137	68.43	3.22	PCI/G	GAMMASPEC	0.96
QCSPIKEM	04/01/99	11/08/99	99G0014		832.0	DRY	LCST	AM-241	165.05	8.53	PCI/G	GAMMASPEC	3.61
QCSPIKEP	04/01/99	11/08/99	99G0014		150.0	DRY	LCSF	CS-137	374.77	13.02	PCI/G	GAMMASPEC	5.12
QCSPIKEP	04/01/99	11/08/99	99G0014		150.0	DRY	LCSF	AM-241	860.24	43.87	PCI/G	GAMMASPEC	15.70
QCSPIKEP	04/01/99	11/08/99	99G0014		150.0	DRY	LCST	CS-137	352.02	16.54	PCI/G	GAMMASPEC	5.12
QCSPIKEP	04/01/99	11/08/99	99G0014		150.0	DRY	LCST	AM-241	849.21	42.46	PCI/G	GAMMASPEC	15.70

Approved by: ______________________ Date: ______________

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Location:	MAYWOOD		
Site WBS:	12B	Date Entered:	11/12/99
Work Order Number:	99G0015		
Project Number:			
Environmental Cat:	RI		

Sample ID	Date Collected	Date Analyzed	SDG ID	LAB ID	Vol.	W/D	Sample Type	Analyte	Result	Error	Units	Analytical Method	MDA
MISS014A	08/23/99	11/10/99	99G0015		787.1	DRY	REG	K-40	10.77	0.60	PCI/G	GAMMASPEC	0.66
MISS014A	08/23/99	11/10/99	99G0015		787.1	DRY	REG	CS-137	0.05	0.00	PCI/G	GAMMASPEC	0.05
MISS014A	08/23/99	11/10/99	99G0015		787.1	DRY	REG	RA-226	0.30	0.03	PCI/G	GAMMASPEC	0.09
MISS014A	08/23/99	11/10/99	99G0015		787.1	DRY	REG	AC-227	0.54	0.00	PCI/G	GAMMASPEC	0.54
MISS014A	08/23/99	11/10/99	99G0015		787.1	DRY	REG	RA-228	0.59	0.04	PCI/G	GAMMASPEC	0.15
MISS014A	08/23/99	11/10/99	99G0015		787.1	DRY	REG	TH-228	0.59	0.04	PCI/G	GAMMASPEC	0.15
MISS014A	08/23/99	11/10/99	99G0015		787.1	DRY	REG	TH-232	0.59	0.04	PCI/G	GAMMASPEC	0.15
MISS014A	08/23/99	11/10/99	99G0015		787.1	DRY	REG	TH-230	18.00	0.00	PCI/G	GAMMASPEC	18.00
MISS014A	08/23/99	11/10/99	99G0015		787.1	DRY	REG	PA-231	1.68	0.00	PCI/G	GAMMASPEC	1.68
MISS014A	08/23/99	11/10/99	99G0015		787.1	DRY	REG	U-235	0.07	0.00	PCI/G	GAMMASPEC	0.07
MISS014A	08/23/99	11/10/99	99G0015		787.1	DRY	REG	U-238	1.78	0.00	PCI/G	GAMMASPEC	1.78
MISS014A	08/23/99	11/10/99	99G0015		787.1	DRY	REG	AM-241	0.21	0.00	PCI/G	GAMMASPEC	0.21
MISS033B	08/25/99	11/10/99	99G0015		859.8	DRY	REG	K-40	8.19	0.49	PCI/G	GAMMASPEC	0.55
MISS033B	08/25/99	11/10/99	99G0015		859.8	DRY	REG	CS-137	0.07	0.00	PCI/G	GAMMASPEC	0.07
MISS033B	08/25/99	11/10/99	99G0015		859.8	DRY	REG	RA-226	0.61	0.03	PCI/G	GAMMASPEC	0.10
MISS033B	08/25/99	11/10/99	99G0015		859.8	DRY	REG	AC-227	0.62	0.00	PCI/G	GAMMASPEC	0.62
MISS033B	08/25/99	11/10/99	99G0015		859.8	DRY	REG	RA-228	1.62	0.06	PCI/G	GAMMASPEC	0.17
MISS033B	08/25/99	11/10/99	99G0015		859.8	DRY	REG	TH-228	1.62	0.06	PCI/G	GAMMASPEC	0.17
MISS033B	08/25/99	11/10/99	99G0015		859.8	DRY	REG	TH-232	1.62	0.06	PCI/G	GAMMASPEC	0.17
MISS033B	08/25/99	11/10/99	99G0015		859.8	DRY	REG	TH-230	21.70	0.00	PCI/G	GAMMASPEC	21.70
MISS033B	08/25/99	11/10/99	99G0015		859.8	DRY	REG	PA-231	2.02	0.00	PCI/G	GAMMASPEC	2.02
MISS033B	08/25/99	11/10/99	99G0015		859.8	DRY	REG	U-235	0.11	0.02	PCI/G	GAMMASPEC	0.07
MISS033B	08/25/99	11/10/99	99G0015		859.8	DRY	REG	U-238	2.15	0.00	PCI/G	GAMMASPEC	2.15
MISS033B	08/25/99	11/10/99	99G0015		859.8	DRY	REG	AM-241	0.24	0.00	PCI/G	GAMMASPEC	0.24
MISS033F	08/25/99	11/10/99	99G0015		15.4	DRY	REG	K-40	28.23	7.14	PCI/G	GAMMASPEC	20.40
MISS033F	08/25/99	11/10/99	99G0015		15.4	DRY	REG	CS-137	1.60	0.00	PCI/G	GAMMASPEC	1.60
MISS033F	08/25/99	11/10/99	99G0015		15.4	DRY	REG	RA-226	7.61	0.66	PCI/G	GAMMASPEC	2.22
MISS033F	08/25/99	11/10/99	99G0015		15.4	DRY	REG	AC-227	12.50	0.00	PCI/G	GAMMASPEC	12.50

Approved by: ______________________________ Date: ________________

Equivalent values in the "Result" and "MDA" columns indicate that the analyte was either undetected or detected at a level below the MDA. The results listed at the MDA should have been reported at the actual measurement.

Location:	MAYWOOD		
Site WBS:	12B	Date Entered:	11/12/99
Work Order Number:	99G0015		
Project Number:			
Environmental Cat:	RI		

Sample ID	Date Collected	Date Analyzed	SDG ID	LAB ID	Vol.	W/D	Sample Type	Analyte	Result	Error	Units	Analytical Method	MDA
MISS033F	08/25/99	11/10/99	99G0015		15.4	DRY	REG	RA-228	33.50	1.32	PCI/G	GAMMASPEC	4.30
MISS033F	08/25/99	11/10/99	99G0015		15.4	DRY	REG	TH-228	33.50	1.32	PCI/G	GAMMASPEC	4.30
MISS033F	08/25/99	11/10/99	99G0015		15.4	DRY	REG	TH-232	33.50	1.32	PCI/G	GAMMASPEC	4.30
MISS033F	08/25/99	11/10/99	99G0015		15.4	DRY	REG	TH-230	384.00	0.00	PCI/G	GAMMASPEC	384.00
MISS033F	08/25/99	11/10/99	99G0015		15.4	DRY	REG	PA-231	44.20	0.00	PCI/G	GAMMASPEC	44.20
MISS033F	08/25/99	11/10/99	99G0015		15.4	DRY	REG	U-235	1.52	0.46	PCI/G	GAMMASPEC	1.52
MISS033F	08/25/99	11/10/99	99G0015		15.4	DRY	REG	U-238	39.60	11.58	PCI/G	GAMMASPEC	39.60
MISS033F	08/25/99	11/10/99	99G0015		15.4	DRY	REG	AM-241	4.55	0.00	PCI/G	GAMMASPEC	4.55
MISS036B	08/25/99	11/11/99	99G0015		74.9	DRY	REG	K-40	16.64	1.85	PCI/G	GAMMASPEC	3.53
MISS036B	08/25/99	11/11/99	99G0015		74.9	DRY	REG	CS-137	0.25	0.00	PCI/G	GAMMASPEC	0.25
MISS036B	08/25/99	11/11/99	99G0015		74.9	DRY	REG	RA-226	0.47	0.09	PCI/G	GAMMASPEC	0.38
MISS036B	08/25/99	11/11/99	99G0015		74.9	DRY	REG	AC-227	1.62	0.00	PCI/G	GAMMASPEC	1.62
MISS036B	08/25/99	11/11/99	99G0015		74.9	DRY	REG	RA-228	1.25	0.15	PCI/G	GAMMASPEC	0.54
MISS036B	08/25/99	11/11/99	99G0015		74.9	DRY	REG	TH-228	1.25	0.15	PCI/G	GAMMASPEC	0.54
MISS036B	08/25/99	11/11/99	99G0015		74.9	DRY	REG	TH-232	1.25	0.15	PCI/G	GAMMASPEC	0.54
MISS036B	08/25/99	11/11/99	99G0015		74.9	DRY	REG	TH-230	54.30	0.00	PCI/G	GAMMASPEC	54.30
MISS036B	08/25/99	11/11/99	99G0015		74.9	DRY	REG	PA-231	6.31	0.00	PCI/G	GAMMASPEC	6.31
MISS036B	08/25/99	11/11/99	99G0015		74.9	DRY	REG	U-235	0.23	0.07	PCI/G	GAMMASPEC	0.23
MISS036B	08/25/99	11/11/99	99G0015		74.9	DRY	REG	U-238	5.60	0.00	PCI/G	GAMMASPEC	5.60
MISS036B	08/25/99	11/11/99	99G0015		74.9	DRY	REG	AM-241	0.63	0.00	PCI/G	GAMMASPEC	0.63
MISS036F	08/25/99	11/11/99	99G0015		32.8	DRY	REG	K-40	13.70	0.00	PCI/G	GAMMASPEC	13.70
MISS036F	08/25/99	11/11/99	99G0015		32.8	DRY	REG	CS-137	0.82	0.00	PCI/G	GAMMASPEC	0.82
MISS036F	08/25/99	11/11/99	99G0015		32.8	DRY	REG	RA-226	4.84	0.36	PCI/G	GAMMASPEC	1.27
MISS036F	08/25/99	11/11/99	99G0015		32.8	DRY	REG	AC-227	5.99	0.00	PCI/G	GAMMASPEC	5.99
MISS036F	08/25/99	11/11/99	99G0015		32.8	DRY	REG	RA-228	16.90	0.65	PCI/G	GAMMASPEC	1.83
MISS036F	08/25/99	11/11/99	99G0015		32.8	DRY	REG	TH-228	16.90	0.65	PCI/G	GAMMASPEC	1.83
MISS036F	08/25/99	11/11/99	99G0015		32.8	DRY	REG	TH-232	16.90	0.65	PCI/G	GAMMASPEC	1.83
MISS036F	08/25/99	11/11/99	99G0015		32.8	DRY	REG	TH-230	185.00	0.00	PCI/G	GAMMASPEC	185.00

Approved by: ______________________ Date: ______________

Equivalent values in the "Result" and "MDA" columns indicate that the analyte was either undetected or detected at a level below the MDA. Th- -esults listed at the MDA should have been reported at the actual measuremen-

Location:	MAYWOOD		
Site WBS:	12B	Date Entered:	11/12/99
Work Order Number:	99G0015		
Project Number:			
Environmental Cat:	RI		

Sample ID	Date Collected	Date Analyzed	SDG ID	LAB ID	Vol.	W/D	Sample Type	Analyte	Result	Error	Units	Analytical Method	MDA
MISS036F	08/25/99	11/11/99	99G0015		32.8	DRY	REG	PA-231	21.30	0.00	PCI/G	GAMMASPEC	21.30
MISS036F	08/25/99	11/11/99	99G0015		32.8	DRY	REG	U-235	0.84	0.21	PCI/G	GAMMASPEC	0.67
MISS036F	08/25/99	11/11/99	99G0015		32.8	DRY	REG	U-238	20.40	0.00	PCI/G	GAMMASPEC	20.40
MISS036F	08/25/99	11/11/99	99G0015		32.8	DRY	REG	AM-241	2.30	0.00	PCI/G	GAMMASPEC	2.30
MISS037A	08/25/99	11/10/99	99G0015		647.2	DRY	REG	K-40	9.03	0.61	PCI/G	GAMMASPEC	0.92
MISS037A	08/25/99	11/10/99	99G0015		647.2	DRY	REG	CS-137	0.09	0.00	PCI/G	GAMMASPEC	0.09
MISS037A	08/25/99	11/10/99	99G0015		647.2	DRY	REG	RA-226	0.92	0.04	PCI/G	GAMMASPEC	0.11
MISS037A	08/25/99	11/10/99	99G0015		647.2	DRY	REG	AC-227	0.75	0.00	PCI/G	GAMMASPEC	0.75
MISS037A	08/25/99	11/10/99	99G0015		647.2	DRY	REG	RA-228	1.30	0.06	PCI/G	GAMMASPEC	0.17
MISS037A	08/25/99	11/10/99	99G0015		647.2	DRY	REG	TH-228	1.30	0.06	PCI/G	GAMMASPEC	0.17
MISS037A	08/25/99	11/10/99	99G0015		647.2	DRY	REG	TH-232	1.30	0.06	PCI/G	GAMMASPEC	0.17
MISS037A	08/25/99	11/10/99	99G0015		647.2	DRY	REG	TH-230	24.70	0.00	PCI/G	GAMMASPEC	24.70
MISS037A	08/25/99	11/10/99	99G0015		647.2	DRY	REG	PA-231	2.36	0.00	PCI/G	GAMMASPEC	2.36
MISS037A	08/25/99	11/10/99	99G0015		647.2	DRY	REG	U-235	0.17	0.03	PCI/G	GAMMASPEC	0.08
MISS037A	08/25/99	11/10/99	99G0015		647.2	DRY	REG	U-238	2.50	0.00	PCI/G	GAMMASPEC	2.50
MISS037A	08/25/99	11/10/99	99G0015		647.2	DRY	REG	AM-241	0.28	0.00	PCI/G	GAMMASPEC	0.28
MISS037B	08/25/99	11/10/99	99G0015		481.5	DRY	REG	K-40	7.97	0.61	PCI/G	GAMMASPEC	0.82
MISS037B	08/25/99	11/10/99	99G0015		481.5	DRY	REG	CS-137	0.09	0.00	PCI/G	GAMMASPEC	0.09
MISS037B	08/25/99	11/10/99	99G0015		481.5	DRY	REG	RA-226	0.56	0.04	PCI/G	GAMMASPEC	0.12
MISS037B	08/25/99	11/10/99	99G0015		481.5	DRY	REG	AC-227	0.79	0.00	PCI/G	GAMMASPEC	0.79
MISS037B	08/25/99	11/10/99	99G0015		481.5	DRY	REG	RA-228	0.72	0.06	PCI/G	GAMMASPEC	0.20
MISS037B	08/25/99	11/10/99	99G0015		481.5	DRY	REG	TH-228	0.72	0.06	PCI/G	GAMMASPEC	0.20
MISS037B	08/25/99	11/10/99	99G0015		481.5	DRY	REG	TH-232	0.72	0.06	PCI/G	GAMMASPEC	0.20
MISS037B	08/25/99	11/10/99	99G0015		481.5	DRY	REG	TH-230	24.80	0.00	PCI/G	GAMMASPEC	24.80
MISS037B	08/25/99	11/10/99	99G0015		481.5	DRY	REG	PA-231	2.52	0.00	PCI/G	GAMMASPEC	2.52
MISS037B	08/25/99	11/10/99	99G0015		481.5	DRY	REG	U-235	0.11	0.00	PCI/G	GAMMASPEC	0.11
MISS037B	08/25/99	11/10/99	99G0015		481.5	DRY	REG	U-238	2.43	0.00	PCI/G	GAMMASPEC	2.43
MISS037B	08/25/99	11/10/99	99G0015		481.5	DRY	REG	AM-241	0.26	0.00	PCI/G	GAMMASPEC	0.26

Approved by: ______________________ Date: ______________

Equivalent values in the "Result" and "MDA" columns indicate that the analyte was either undetected or detected at a level below the MDA. The results listed at the MDA should have been reported at the actual measurement.

Location:	MAYWOOD		
Site WBS:	12B	Date Entered:	11/12/99
Work Order Number:	99G0015		
Project Number:			
Environmental Cat:	RI		

Sample ID	Date Collected	Date Analyzed	SDG ID	LAB ID	Vol.	W/D	Sample Type	Analyte	Result	Error	Units	Analytical Method	MDA
MISS037B	08/25/99	11/11/99	99G0015		481.5	DRY	LREP	K-40	7.87	0.60	PCI/G	GAMMASPEC	0.72
MISS037B	08/25/99	11/11/99	99G0015		481.5	DRY	LREP	CS-137	0.08	0.00	PCI/G	GAMMASPEC	0.08
MISS037B	08/25/99	11/11/99	99G0015		481.5	DRY	LREP	RA-226	0.52	0.04	PCI/G	GAMMASPEC	0.11
MISS037B	08/25/99	11/11/99	99G0015		481.5	DRY	LREP	AC-227	0.74	0.00	PCI/G	GAMMASPEC	0.74
MISS037B	08/25/99	11/11/99	99G0015		481.5	DRY	LREP	RA-228	0.67	0.06	PCI/G	GAMMASPEC	0.19
MISS037B	08/25/99	11/11/99	99G0015		481.5	DRY	LREP	TH-228	0.67	0.06	PCI/G	GAMMASPEC	0.19
MISS037B	08/25/99	11/11/99	99G0015		481.5	DRY	LREP	TH-232	0.67	0.06	PCI/G	GAMMASPEC	0.19
MISS037B	08/25/99	11/11/99	99G0015		481.5	DRY	LREP	TH-230	22.50	0.00	PCI/G	GAMMASPEC	22.50
MISS037B	08/25/99	11/11/99	99G0015		481.5	DRY	LREP	PA-231	2.40	0.00	PCI/G	GAMMASPEC	2.40
MISS037B	08/25/99	11/11/99	99G0015		481.5	DRY	LREP	U-235	0.11	0.00	PCI/G	GAMMASPEC	0.11
MISS037B	08/25/99	11/11/99	99G0015		481.5	DRY	LREP	U-238	2.34	0.00	PCI/G	GAMMASPEC	2.34
MISS037B	08/25/99	11/11/99	99G0015		481.5	DRY	LREP	AM-241	0.28	0.00	PCI/G	GAMMASPEC	0.28
MISS052F	08/31/99	11/11/99	99G0015		22.9	DRY	REG	K-40	27.60	0.00	PCI/G	GAMMASPEC	27.60
MISS052F	08/31/99	11/11/99	99G0015		22.9	DRY	REG	CS-137	2.22	0.00	PCI/G	GAMMASPEC	2.22
MISS052F	08/31/99	11/11/99	99G0015		22.9	DRY	REG	RA-226	32.77	1.16	PCI/G	GAMMASPEC	3.27
MISS052F	08/31/99	11/11/99	99G0015		22.9	DRY	REG	AC-227	17.00	0.00	PCI/G	GAMMASPEC	17.00
MISS052F	08/31/99	11/11/99	99G0015		22.9	DRY	REG	RA-228	147.67	2.99	PCI/G	GAMMASPEC	5.47
MISS052F	08/31/99	11/11/99	99G0015		22.9	DRY	REG	TH-228	147.67	2.99	PCI/G	GAMMASPEC	5.47
MISS052F	08/31/99	11/11/99	99G0015		22.9	DRY	REG	TH-232	147.67	2.99	PCI/G	GAMMASPEC	5.47
MISS052F	08/31/99	11/11/99	99G0015		22.9	DRY	REG	TH-230	573.00	0.00	PCI/G	GAMMASPEC	573.00
MISS052F	08/31/99	11/11/99	99G0015		22.9	DRY	REG	PA-231	64.40	0.00	PCI/G	GAMMASPEC	64.40
MISS052F	08/31/99	11/11/99	99G0015		22.9	DRY	REG	U-235	4.06	0.64	PCI/G	GAMMASPEC	1.95
MISS052F	08/31/99	11/11/99	99G0015		22.9	DRY	REG	U-238	55.53	17.24	PCI/G	GAMMASPEC	55.40
MISS052F	08/31/99	11/11/99	99G0015		22.9	DRY	REG	AM-241	6.83	0.00	PCI/G	GAMMASPEC	6.83
MISS053B	08/31/99	11/10/99	99G0015		72.5	DRY	REG	K-40	17.10	2.08	PCI/G	GAMMASPEC	4.61
MISS053B	08/31/99	11/10/99	99G0015		72.5	DRY	REG	CS-137	0.31	0.00	PCI/G	GAMMASPEC	0.31
MISS053B	08/31/99	11/10/99	99G0015		72.5	DRY	REG	RA-226	3.09	0.17	PCI/G	GAMMASPEC	0.48
MISS053B	08/31/99	11/10/99	99G0015		72.5	DRY	REG	AC-227	2.59	0.00	PCI/G	GAMMASPEC	2.59

Approved by: ______________________ Date: ______________

Equivalent values in the "Result" and "MDA" columns indicate that the analyte was either undetected or detected at a level below the MDA. T[illegible]sults listed at the MDA should have been reported at the actual measuremen[illegible]

Location:	MAYWOOD		
Site WBS:	12B	Date Entered:	11/12/99
Work Order Number:	99G0015		
Project Number:			
Environmental Cat:	RI		

Sample ID	Date Collected	Date Analyzed	SDG ID	LAB ID	Vol.	W/D	Sample Type	Analyte	Result	Error	Units	Analytical Method	MDA
MISS053B	08/31/99	11/10/99	99G0015		72.5	DRY	REG	RA-228	3.14	0.22	PCI/G	GAMMASPEC	0.78
MISS053B	08/31/99	11/10/99	99G0015		72.5	DRY	REG	TH-228	3.14	0.22	PCI/G	GAMMASPEC	0.78
MISS053B	08/31/99	11/10/99	99G0015		72.5	DRY	REG	TH-232	3.14	0.22	PCI/G	GAMMASPEC	0.78
MISS053B	08/31/99	11/10/99	99G0015		72.5	DRY	REG	TH-230	73.40	0.00	PCI/G	GAMMASPEC	73.40
MISS053B	08/31/99	11/10/99	99G0015		72.5	DRY	REG	PA-231	8.33	0.00	PCI/G	GAMMASPEC	8.33
MISS053B	08/31/99	11/10/99	99G0015		72.5	DRY	REG	U-235	0.53	0.10	PCI/G	GAMMASPEC	0.30
MISS053B	08/31/99	11/10/99	99G0015		72.5	DRY	REG	U-238	7.88	0.00	PCI/G	GAMMASPEC	7.88
MISS053B	08/31/99	11/10/99	99G0015		72.5	DRY	REG	AM-241	0.94	0.00	PCI/G	GAMMASPEC	0.94
MISS053B	08/31/99	11/10/99	99G0015		72.5	DRY	LREP	K-40	16.41	2.03	PCI/G	GAMMASPEC	4.49
MISS053B	08/31/99	11/10/99	99G0015		72.5	DRY	LREP	CS-137	0.29	0.00	PCI/G	GAMMASPEC	0.29
MISS053B	08/31/99	11/10/99	99G0015		72.5	DRY	LREP	RA-226	2.76	0.16	PCI/G	GAMMASPEC	0.46
MISS053B	08/31/99	11/10/99	99G0015		72.5	DRY	LREP	AC-227	2.52	0.00	PCI/G	GAMMASPEC	2.52
MISS053B	08/31/99	11/10/99	99G0015		72.5	DRY	LREP	RA-228	3.95	0.21	PCI/G	GAMMASPEC	0.74
MISS053B	08/31/99	11/10/99	99G0015		72.5	DRY	LREP	TH-228	3.95	0.21	PCI/G	GAMMASPEC	0.74
MISS053B	08/31/99	11/10/99	99G0015		72.5	DRY	LREP	TH-232	3.95	0.21	PCI/G	GAMMASPEC	0.74
MISS053B	08/31/99	11/10/99	99G0015		72.5	DRY	LREP	TH-230	76.20	0.00	PCI/G	GAMMASPEC	76.20
MISS053B	08/31/99	11/10/99	99G0015		72.5	DRY	LREP	PA-231	8.62	0.00	PCI/G	GAMMASPEC	8.62
MISS053B	08/31/99	11/10/99	99G0015		72.5	DRY	LREP	U-235	0.34	0.10	PCI/G	GAMMASPEC	0.31
MISS053B	08/31/99	11/10/99	99G0015		72.5	DRY	LREP	U-238	8.00	0.00	PCI/G	GAMMASPEC	8.00
MISS053B	08/31/99	11/10/99	99G0015		72.5	DRY	LREP	AM-241	0.91	0.00	PCI/G	GAMMASPEC	0.91
MISS055B	08/31/99	11/10/99	99G0015		75.2	DRY	REG	K-40	18.80	1.98	PCI/G	GAMMASPEC	3.78
MISS055B	08/31/99	11/10/99	99G0015		75.2	DRY	REG	CS-137	0.31	0.00	PCI/G	GAMMASPEC	0.31
MISS055B	08/31/99	11/10/99	99G0015		75.2	DRY	REG	RA-226	2.52	0.15	PCI/G	GAMMASPEC	0.47
MISS055B	08/31/99	11/10/99	99G0015		75.2	DRY	REG	AC-227	2.52	0.00	PCI/G	GAMMASPEC	2.52
MISS055B	08/31/99	11/10/99	99G0015		75.2	DRY	REG	RA-228	2.96	0.20	PCI/G	GAMMASPEC	0.70
MISS055B	08/31/99	11/10/99	99G0015		75.2	DRY	REG	TH-228	2.96	0.20	PCI/G	GAMMASPEC	0.70
MISS055B	08/31/99	11/10/99	99G0015		75.2	DRY	REG	TH-232	2.96	0.20	PCI/G	GAMMASPEC	0.70
MISS055B	08/31/99	11/10/99	99G0015		75.2	DRY	REG	TH-230	70.00	0.00	PCI/G	GAMMASPEC	70.00

Approved by: ______________________ Date: ______________

Equivalent values in the "Result" and "MDA" columns indicate that the analyte was either undetected or detected at a level below the MDA. The results listed at the MDA should have been reported at the actual measurement.

Location:	MAYWOOD		
Site WBS:	12B	Date Entered:	11/12/99
Work Order Number:	99G0015		
Project Number:			
Environmental Cat:	RI		

Sample ID	Date Collected	Date Analyzed	SDG ID	LAB ID	Vol.	W/D	Sample Type	Analyte	Result	Error	Units	Analytical Method	MDA
MISS055B	08/31/99	11/10/99	99G0015		75.2	DRY	REG	PA-231	8.24	0.00	PCI/G	GAMMASPEC	8.24
MISS055B	08/31/99	11/10/99	99G0015		75.2	DRY	REG	U-235	0.29	0.09	PCI/G	GAMMASPEC	0.29
MISS055B	08/31/99	11/10/99	99G0015		75.2	DRY	REG	U-238	7.53	0.00	PCI/G	GAMMASPEC	7.53
MISS055B	08/31/99	11/10/99	99G0015		75.2	DRY	REG	AM-241	0.83	0.00	PCI/G	GAMMASPEC	0.83
MISS055F	08/31/99	11/10/99	99G0015		9.5	DRY	REG	K-40	26.10	8.38	PCI/G	GAMMASPEC	26.10
MISS055F	08/31/99	11/10/99	99G0015		9.5	DRY	REG	CS-137	2.34	0.00	PCI/G	GAMMASPEC	2.34
MISS055F	08/31/99	11/10/99	99G0015		9.5	DRY	REG	RA-226	8.57	0.90	PCI/G	GAMMASPEC	3.07
MISS055F	08/31/99	11/10/99	99G0015		9.5	DRY	REG	AC-227	18.30	0.00	PCI/G	GAMMASPEC	18.30
MISS055F	08/31/99	11/10/99	99G0015		9.5	DRY	REG	RA-228	36.81	1.84	PCI/G	GAMMASPEC	6.11
MISS055F	08/31/99	11/10/99	99G0015		9.5	DRY	REG	TH-228	36.81	1.84	PCI/G	GAMMASPEC	6.11
MISS055F	08/31/99	11/10/99	99G0015		9.5	DRY	REG	TH-232	36.81	1.84	PCI/G	GAMMASPEC	6.11
MISS055F	08/31/99	11/10/99	99G0015		9.5	DRY	REG	TH-230	538.00	0.00	PCI/G	GAMMASPEC	538.00
MISS055F	08/31/99	11/10/99	99G0015		9.5	DRY	REG	PA-231	64.30	0.00	PCI/G	GAMMASPEC	64.30
MISS055F	08/31/99	11/10/99	99G0015		9.5	DRY	REG	U-235	2.21	0.67	PCI/G	GAMMASPEC	2.21
MISS055F	08/31/99	11/10/99	99G0015		9.5	DRY	REG	U-238	52.70	0.00	PCI/G	GAMMASPEC	52.70
MISS055F	08/31/99	11/10/99	99G0015		9.5	DRY	REG	AM-241	6.53	0.00	PCI/G	GAMMASPEC	6.53
MISS059F	08/31/99	11/10/99	99G0015		24.0	DRY	REG	K-40	12.00	3.46	PCI/G	GAMMASPEC	12.00
MISS059F	08/31/99	11/10/99	99G0015		24.0	DRY	REG	CS-137	0.91	0.00	PCI/G	GAMMASPEC	0.91
MISS059F	08/31/99	11/10/99	99G0015		24.0	DRY	REG	RA-226	3.35	0.34	PCI/G	GAMMASPEC	1.20
MISS059F	08/31/99	11/10/99	99G0015		24.0	DRY	REG	AC-227	7.12	0.00	PCI/G	GAMMASPEC	7.12
MISS059F	08/31/99	11/10/99	99G0015		24.0	DRY	REG	RA-228	12.74	0.70	PCI/G	GAMMASPEC	2.16
MISS059F	08/31/99	11/10/99	99G0015		24.0	DRY	REG	TH-228	12.74	0.70	PCI/G	GAMMASPEC	2.16
MISS059F	08/31/99	11/10/99	99G0015		24.0	DRY	REG	TH-232	12.74	0.70	PCI/G	GAMMASPEC	2.16
MISS059F	08/31/99	11/10/99	99G0015		24.0	DRY	REG	TH-230	205.00	0.00	PCI/G	GAMMASPEC	205.00
MISS059F	08/31/99	11/10/99	99G0015		24.0	DRY	REG	PA-231	25.70	0.00	PCI/G	GAMMASPEC	25.70
MISS059F	08/31/99	11/10/99	99G0015		24.0	DRY	REG	U-235	0.83	0.26	PCI/G	GAMMASPEC	0.83
MISS059F	08/31/99	11/10/99	99G0015		24.0	DRY	REG	U-238	21.40	6.46	PCI/G	GAMMASPEC	21.40
MISS059F	08/31/99	11/10/99	99G0015		24.0	DRY	REG	AM-241	2.73	0.00	PCI/G	GAMMASPEC	2.73

Approved by: ______________________ Date: ____________

Equivalent values in the "Result" and "MDA" columns indicate that the analyte was either undetected or detected at a level below the MDA. T' esults listed at the MDA should have been reported at the actual measuremer

Location:	MAYWOOD		
Site WBS:	12B	Date Entered:	11/12/99
Work Order Number:	99G0015		
Project Number:			
Environmental Cat:	RI		

Sample ID	Date Collected	Date Analyzed	SDG ID	LAB ID	Vol.	W/D	Sample Type	Analyte	Result	Error	Units	Analytical Method	MDA
QCBLANK	11/11/99	11/11/99	99G0015		945.0	DRY	BL	K-40	0.43	0.00	PCI/G	GAMMASPEC	0.43
QCBLANK	11/11/99	11/11/99	99G0015		945.0	DRY	BL	CS-137	0.02	0.00	PCI/G	GAMMASPEC	0.02
QCBLANK	11/11/99	11/11/99	99G0015		945.0	DRY	BL	RA-226	0.05	0.00	PCI/G	GAMMASPEC	0.05
QCBLANK	11/11/99	11/11/99	99G0015		945.0	DRY	BL	AC-227	0.15	0.00	PCI/G	GAMMASPEC	0.15
QCBLANK	11/11/99	11/11/99	99G0015		945.0	DRY	BL	RA-228	0.07	0.00	PCI/G	GAMMASPEC	0.07
QCBLANK	11/11/99	11/11/99	99G0015		945.0	DRY	BL	TH-228	0.07	0.00	PCI/G	GAMMASPEC	0.07
QCBLANK	11/11/99	11/11/99	99G0015		945.0	DRY	BL	TH-232	0.07	0.00	PCI/G	GAMMASPEC	0.07
QCBLANK	11/11/99	11/11/99	99G0015		945.0	DRY	BL	TH-230	6.83	0.00	PCI/G	GAMMASPEC	6.83
QCBLANK	11/11/99	11/11/99	99G0015		945.0	DRY	BL	PA-231	0.72	0.00	PCI/G	GAMMASPEC	0.72
QCBLANK	11/11/99	11/11/99	99G0015		945.0	DRY	BL	U-235	0.03	0.00	PCI/G	GAMMASPEC	0.03
QCBLANK	11/11/99	11/11/99	99G0015		945.0	DRY	BL	U-238	0.77	0.00	PCI/G	GAMMASPEC	0.77
QCBLANK	11/11/99	11/11/99	99G0015		945.0	DRY	BL	AM-241	0.08	0.00	PCI/G	GAMMASPEC	0.08
QCSPIKEM	04/01/99	11/11/99	99G0015		832.0	DRY	LCSF	CS-137	69.58	2.19	PCI/G	GAMMASPEC	0.97
QCSPIKEM	04/01/99	11/11/99	99G0015		832.0	DRY	LCSF	AM-241	171.23	8.68	PCI/G	GAMMASPEC	3.58
QCSPIKEP	04/01/99	11/11/99	99G0015		150.0	DRY	LCSF	CS-137	383.72	13.31	PCI/G	GAMMASPEC	4.97
QCSPIKEP	04/01/99	11/11/99	99G0015		150.0	DRY	LCSF	AM-241	859.49	43.91	PCI/G	GAMMASPEC	15.80
QCSPIKEM	04/01/99	11/11/99	99G0015		832.0	DRY	LCST	CS-137	68.43	3.22	PCI/G	GAMMASPEC	0.97
QCSPIKEM	04/01/99	11/11/99	99G0015		832.0	DRY	LCST	AM-241	165.05	8.25	PCI/G	GAMMASPEC	3.58
QCSPIKEP	04/01/99	11/11/99	99G0015		150.0	DRY	LCST	CS-137	352.02	16.54	PCI/G	GAMMASPEC	4.97
QCSPIKEP	04/01/99	11/11/99	99G0015		150.0	DRY	LCST	AM-241	849.21	42.46	PCI/G	GAMMASPEC	15.80

Approved by: ______________________ Date: ______________

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Equivalent values in the "Result" and "MDA" columns indicate that the analyte was either undetected or detected at a level below the MDA.
T 'sults listed at the MDA should have been reported at the actual measureme

Location:	MAYWOOD		
Site WBS:	12B	Date Entered:	11/14/99
Work Order Number:	99G0016		
Project Number:			
Environmental Cat:	RI		

Sample ID	Date Collected	Date Analyzed	SDG ID	LAB ID	Vol.	W/D	Sample Type	Analyte	Result	Error	Units	Analytical Method	MDA
MISS040A	08/25/99	11/11/99	99G0016		122.9	DRY	REG	K-40	2.96	0.78	PCI/G	GAMMASPEC	2.19
MISS040A	08/25/99	11/11/99	99G0016		122.9	DRY	REG	CS-137	0.13	0.00	PCI/G	GAMMASPEC	0.13
MISS040A	08/25/99	11/11/99	99G0016		122.9	DRY	REG	RA-226	0.25	0.00	PCI/G	GAMMASPEC	0.25
MISS040A	08/25/99	11/11/99	99G0016		122.9	DRY	REG	AC-227	0.84	0.00	PCI/G	GAMMASPEC	0.84
MISS040A	08/25/99	11/11/99	99G0016		122.9	DRY	REG	RA-228	0.42	0.00	PCI/G	GAMMASPEC	0.42
MISS040A	08/25/99	11/11/99	99G0016		122.9	DRY	REG	TH-228	0.42	0.00	PCI/G	GAMMASPEC	0.42
MISS040A	08/25/99	11/11/99	99G0016		122.9	DRY	REG	TH-232	0.42	0.00	PCI/G	GAMMASPEC	0.42
MISS040A	08/25/99	11/11/99	99G0016		122.9	DRY	REG	TH-230	25.70	0.00	PCI/G	GAMMASPEC	25.70
MISS040A	08/25/99	11/11/99	99G0016		122.9	DRY	REG	PA-231	3.64	0.00	PCI/G	GAMMASPEC	3.64
MISS040A	08/25/99	11/11/99	99G0016		122.9	DRY	REG	U-235	0.15	0.04	PCI/G	GAMMASPEC	0.15
MISS040A	08/25/99	11/11/99	99G0016		122.9	DRY	REG	U-238	3.01	0.00	PCI/G	GAMMASPEC	3.01
MISS040A	08/25/99	11/11/99	99G0016		122.9	DRY	REG	AM-241	0.36	0.00	PCI/G	GAMMASPEC	0.36
MISS040F	08/25/99	11/11/99	99G0016		21.0	DRY	REG	K-40	14.80	4.68	PCI/G	GAMMASPEC	14.80
MISS040F	08/25/99	11/11/99	99G0016		21.0	DRY	REG	CS-137	1.01	0.00	PCI/G	GAMMASPEC	1.01
MISS040F	08/25/99	11/11/99	99G0016		21.0	DRY	REG	RA-226	4.27	0.43	PCI/G	GAMMASPEC	1.50
MISS040F	08/25/99	11/11/99	99G0016		21.0	DRY	REG	AC-227	7.92	0.00	PCI/G	GAMMASPEC	7.92
MISS040F	08/25/99	11/11/99	99G0016		21.0	DRY	REG	RA-228	12.68	0.75	PCI/G	GAMMASPEC	2.55
MISS040F	08/25/99	11/11/99	99G0016		21.0	DRY	REG	TH-228	12.68	0.75	PCI/G	GAMMASPEC	2.55
MISS040F	08/25/99	11/11/99	99G0016		21.0	DRY	REG	TH-232	12.68	0.75	PCI/G	GAMMASPEC	2.55
MISS040F	08/25/99	11/11/99	99G0016		21.0	DRY	REG	TH-230	231.00	0.00	PCI/G	GAMMASPEC	231.00
MISS040F	08/25/99	11/11/99	99G0016		21.0	DRY	REG	PA-231	29.20	0.00	PCI/G	GAMMASPEC	29.20
MISS040F	08/25/99	11/11/99	99G0016		21.0	DRY	REG	U-235	0.91	0.29	PCI/G	GAMMASPEC	0.91
MISS040F	08/25/99	11/11/99	99G0016		21.0	DRY	REG	U-238	25.60	0.00	PCI/G	GAMMASPEC	25.60
MISS040F	08/25/99	11/11/99	99G0016		21.0	DRY	REG	AM-241	2.80	0.00	PCI/G	GAMMASPEC	2.80
MISS040F	08/25/99	11/11/99	99G0016		21.0	DRY	LREP	K-40	17.50	0.00	PCI/G	GAMMASPEC	17.50
MISS040F	08/25/99	11/11/99	99G0016		21.0	DRY	LREP	CS-137	1.01	0.00	PCI/G	GAMMASPEC	1.01
MISS040F	08/25/99	11/11/99	99G0016		21.0	DRY	LREP	RA-226	3.97	0.42	PCI/G	GAMMASPEC	1.50
MISS040F	08/25/99	11/11/99	99G0016		21.0	DRY	LREP	AC-227	7.87	0.00	PCI/G	GAMMASPEC	7.87

Approved by: ______________________ Date: ______________

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Location:	MAYWOOD		
Site WBS:	12B	Date Entered:	11/14/99
Work Order Number:	99G0016		
Project Number:			
Environmental Cat:	RI		

Sample ID	Date Collected	Date Analyzed	SDG ID	LAB ID	Vol.	W/D	Sample Type	Analyte	Result	Error	Units	Analytical Method	MDA
MISS040F	08/25/99	11/11/99	99G0016		21.0	DRY	LREP	RA-228	13.17	0.73	PCI/G	GAMMASPEC	2.23
MISS040F	08/25/99	11/11/99	99G0016		21.0	DRY	LREP	TH-228	13.17	0.73	PCI/G	GAMMASPEC	2.23
MISS040F	08/25/99	11/11/99	99G0016		21.0	DRY	LREP	TH-232	13.17	0.73	PCI/G	GAMMASPEC	2.23
MISS040F	08/25/99	11/11/99	99G0016		21.0	DRY	LREP	TH-230	230.00	0.00	PCI/G	GAMMASPEC	230.00
MISS040F	08/25/99	11/11/99	99G0016		21.0	DRY	LREP	PA-231	28.40	0.00	PCI/G	GAMMASPEC	28.40
MISS040F	08/25/99	11/11/99	99G0016		21.0	DRY	LREP	U-235	0.90	0.28	PCI/G	GAMMASPEC	0.90
MISS040F	08/25/99	11/11/99	99G0016		21.0	DRY	LREP	U-238	24.00	0.00	PCI/G	GAMMASPEC	24.00
MISS040F	08/25/99	11/11/99	99G0016		21.0	DRY	LREP	AM-241	2.67	0.00	PCI/G	GAMMASPEC	2.67
MISS052B	08/31/99	11/12/99	99G0016		93.0	DRY	REG	K-40	17.70	1.84	PCI/G	GAMMASPEC	3.83
MISS052B	08/31/99	11/12/99	99G0016		93.0	DRY	REG	CS-137	0.37	0.00	PCI/G	GAMMASPEC	0.37
MISS052B	08/31/99	11/12/99	99G0016		93.0	DRY	REG	RA-226	5.02	0.20	PCI/G	GAMMASPEC	0.45
MISS052B	08/31/99	11/12/99	99G0016		93.0	DRY	REG	AC-227	2.72	0.00	PCI/G	GAMMASPEC	2.72
MISS052B	08/31/99	11/12/99	99G0016		93.0	DRY	REG	RA-228	9.68	0.30	PCI/G	GAMMASPEC	0.77
MISS052B	08/31/99	11/12/99	99G0016		93.0	DRY	REG	TH-228	9.68	0.30	PCI/G	GAMMASPEC	0.77
MISS052B	08/31/99	11/12/99	99G0016		93.0	DRY	REG	TH-232	9.68	0.30	PCI/G	GAMMASPEC	0.77
MISS052B	08/31/99	11/12/99	99G0016		93.0	DRY	REG	TH-230	88.70	0.00	PCI/G	GAMMASPEC	88.70
MISS052B	08/31/99	11/12/99	99G0016		93.0	DRY	REG	PA-231	9.44	0.00	PCI/G	GAMMASPEC	9.44
MISS052B	08/31/99	11/12/99	99G0016		93.0	DRY	REG	U-235	0.52	0.10	PCI/G	GAMMASPEC	0.32
MISS052B	08/31/99	11/12/99	99G0016		93.0	DRY	REG	U-238	8.69	2.67	PCI/G	GAMMASPEC	8.69
MISS052B	08/31/99	11/12/99	99G0016		93.0	DRY	REG	AM-241	1.05	0.00	PCI/G	GAMMASPEC	1.05
MISS056A	08/31/99	11/12/99	99G0016		91.7	DRY	REG	K-40	28.55	2.30	PCI/G	GAMMASPEC	4.00
MISS056A	08/31/99	11/12/99	99G0016		91.7	DRY	REG	CS-137	0.29	0.00	PCI/G	GAMMASPEC	0.29
MISS056A	08/31/99	11/12/99	99G0016		91.7	DRY	REG	RA-226	2.99	0.15	PCI/G	GAMMASPEC	0.42
MISS056A	08/31/99	11/12/99	99G0016		91.7	DRY	REG	AC-227	2.31	0.00	PCI/G	GAMMASPEC	2.31
MISS056A	08/31/99	11/12/99	99G0016		91.7	DRY	REG	RA-228	3.75	0.20	PCI/G	GAMMASPEC	0.65
MISS056A	08/31/99	11/12/99	99G0016		91.7	DRY	REG	TH-228	3.75	0.20	PCI/G	GAMMASPEC	0.65
MISS056A	08/31/99	11/12/99	99G0016		91.7	DRY	REG	TH-232	3.75	0.20	PCI/G	GAMMASPEC	0.65
MISS056A	08/31/99	11/12/99	99G0016		91.7	DRY	REG	TH-230	65.60	0.00	PCI/G	GAMMASPEC	65.60

Approved by: ______________________ Date: ____________

Equivalent values in the "Result" and "MDA" columns indicate that the analyte was either undetected or detected at a level below the MDA. T[illegible] results listed at the MDA should have been reported at the actual measuremen[illegible]

Location:	MAYWOOD		
Site WBS:	12B	Date Entered:	11/14/99
Work Order Number:	99G0016		
Project Number:			
Environmental Cat:	RI		

Sample ID	Date Collected	Date Analyzed	SDG ID	LAB ID	Vol.	W/D	Sample Type	Analyte	Result	Error	Units	Analytical Method	MDA
MISS056A	08/31/99	11/12/99	99G0016		91.7	DRY	REG	PA-231	7.25	0.00	PCI/G	GAMMASPEC	7.25
MISS056A	08/31/99	11/12/99	99G0016		91.7	DRY	REG	U-235	0.39	0.08	PCI/G	GAMMASPEC	0.25
MISS056A	08/31/99	11/12/99	99G0016		91.7	DRY	REG	U-238	7.34	0.00	PCI/G	GAMMASPEC	7.34
MISS056A	08/31/99	11/12/99	99G0016		91.7	DRY	REG	AM-241	0.78	0.00	PCI/G	GAMMASPEC	0.78
MISS056B	08/31/99	11/12/99	99G0016		86.1	DRY	REG	K-40	20.88	1.90	PCI/G	GAMMASPEC	3.12
MISS056B	08/31/99	11/12/99	99G0016		86.1	DRY	REG	CS-137	0.28	0.00	PCI/G	GAMMASPEC	0.28
MISS056B	08/31/99	11/12/99	99G0016		86.1	DRY	REG	RA-226	2.55	0.14	PCI/G	GAMMASPEC	0.41
MISS056B	08/31/99	11/12/99	99G0016		86.1	DRY	REG	AC-227	2.34	0.00	PCI/G	GAMMASPEC	2.34
MISS056B	08/31/99	11/12/99	99G0016		86.1	DRY	REG	RA-228	4.42	0.22	PCI/G	GAMMASPEC	0.78
MISS056B	08/31/99	11/12/99	99G0016		86.1	DRY	REG	TH-228	4.42	0.22	PCI/G	GAMMASPEC	0.78
MISS056B	08/31/99	11/12/99	99G0016		86.1	DRY	REG	TH-232	4.42	0.22	PCI/G	GAMMASPEC	0.78
MISS056B	08/31/99	11/12/99	99G0016		86.1	DRY	REG	TH-230	73.40	0.00	PCI/G	GAMMASPEC	73.40
MISS056B	08/31/99	11/12/99	99G0016		86.1	DRY	REG	PA-231	7.60	0.00	PCI/G	GAMMASPEC	7.60
MISS056B	08/31/99	11/12/99	99G0016		86.1	DRY	REG	U-235	0.30	0.09	PCI/G	GAMMASPEC	0.30
MISS056B	08/31/99	11/12/99	99G0016		86.1	DRY	REG	U-238	7.31	0.00	PCI/G	GAMMASPEC	7.31
MISS056B	08/31/99	11/12/99	99G0016		86.1	DRY	REG	AM-241	0.89	0.00	PCI/G	GAMMASPEC	0.89
MISS056F	08/31/99	11/12/99	99G0016		31.9	DRY	REG	K-40	23.70	0.00	PCI/G	GAMMASPEC	23.70
MISS056F	08/31/99	11/12/99	99G0016		31.9	DRY	REG	CS-137	2.14	0.00	PCI/G	GAMMASPEC	2.14
MISS056F	08/31/99	11/12/99	99G0016		31.9	DRY	REG	RA-226	38.14	1.15	PCI/G	GAMMASPEC	2.89
MISS056F	08/31/99	11/12/99	99G0016		31.9	DRY	REG	AC-227	16.40	0.00	PCI/G	GAMMASPEC	16.40
MISS056F	08/31/99	11/12/99	99G0016		31.9	DRY	REG	RA-228	204.59	3.60	PCI/G	GAMMASPEC	3.70
MISS056F	08/31/99	11/12/99	99G0016		31.9	DRY	REG	TH-228	204.59	3.60	PCI/G	GAMMASPEC	3.70
MISS056F	08/31/99	11/12/99	99G0016		31.9	DRY	REG	TH-232	204.59	3.60	PCI/G	GAMMASPEC	3.70
MISS056F	08/31/99	11/12/99	99G0016		31.9	DRY	REG	TH-230	553.00	0.00	PCI/G	GAMMASPEC	553.00
MISS056F	08/31/99	11/12/99	99G0016		31.9	DRY	REG	PA-231	62.30	0.00	PCI/G	GAMMASPEC	62.30
MISS056F	08/31/99	11/12/99	99G0016		31.9	DRY	REG	U-235	4.50	0.57	PCI/G	GAMMASPEC	1.72
MISS056F	08/31/99	11/12/99	99G0016		31.9	DRY	REG	U-238	53.00	16.37	PCI/G	GAMMASPEC	53.00
MISS056F	08/31/99	11/12/99	99G0016		31.9	DRY	REG	AM-241	6.50	0.00	PCI/G	GAMMASPEC	6.50

Approved by: ______________________ Date: ______________

Equivalent values in the "Result" and "MDA" columns indicate that the analyte was either undetected or detected at a level below the MDA. The results listed at the MDA should have been reported at the actual measurement.

Location:	MAYWOOD		
Site WBS:	12B	Date Entered:	11/14/99
Work Order Number:	99G0016		
Project Number:			
Environmental Cat:	RI		

Sample ID	Date Collected	Date Analyzed	SDG ID	LAB ID	Vol.	W/D	Sample Type	Analyte	Result	Error	Units	Analytical Method	MDA
MISS090F	08/18/99	11/12/99	99G0016		19.4	DRY	REG	K-40	21.63	6.15	PCI/G	GAMMASPEC	18.30
MISS090F	08/18/99	11/12/99	99G0016		19.4	DRY	REG	CS-137	1.82	0.00	PCI/G	GAMMASPEC	1.82
MISS090F	08/18/99	11/12/99	99G0016		19.4	DRY	REG	RA-226	6.65	0.63	PCI/G	GAMMASPEC	2.49
MISS090F	08/18/99	11/12/99	99G0016		19.4	DRY	REG	AC-227	13.10	0.00	PCI/G	GAMMASPEC	13.10
MISS090F	08/18/99	11/12/99	99G0016		19.4	DRY	REG	RA-228	70.84	1.84	PCI/G	GAMMASPEC	4.20
MISS090F	08/18/99	11/12/99	99G0016		19.4	DRY	REG	TH-228	70.84	1.84	PCI/G	GAMMASPEC	4.20
MISS090F	08/18/99	11/12/99	99G0016		19.4	DRY	REG	TH-232	70.84	1.84	PCI/G	GAMMASPEC	4.20
MISS090F	08/18/99	11/12/99	99G0016		19.4	DRY	REG	TH-230	436.00	0.00	PCI/G	GAMMASPEC	436.00
MISS090F	08/18/99	11/12/99	99G0016		19.4	DRY	REG	PA-231	50.70	0.00	PCI/G	GAMMASPEC	50.70
MISS090F	08/18/99	11/12/99	99G0016		19.4	DRY	REG	U-235	1.71	0.48	PCI/G	GAMMASPEC	1.53
MISS090F	08/18/99	11/12/99	99G0016		19.4	DRY	REG	U-238	44.00	13.23	PCI/G	GAMMASPEC	44.00
MISS090F	08/18/99	11/12/99	99G0016		19.4	DRY	REG	AM-241	5.22	0.00	PCI/G	GAMMASPEC	5.22
MISS091F	08/18/99	11/12/99	99G0016		15.6	DRY	REG	K-40	20.49	6.09	PCI/G	GAMMASPEC	17.70
MISS091F	08/18/99	11/12/99	99G0016		15.6	DRY	REG	CS-137	1.15	0.00	PCI/G	GAMMASPEC	1.15
MISS091F	08/18/99	11/12/99	99G0016		15.6	DRY	REG	RA-226	5.93	0.57	PCI/G	GAMMASPEC	1.93
MISS091F	08/18/99	11/12/99	99G0016		15.6	DRY	REG	AC-227	9.93	0.00	PCI/G	GAMMASPEC	9.93
MISS091F	08/18/99	11/12/99	99G0016		15.6	DRY	REG	RA-228	7.72	0.78	PCI/G	GAMMASPEC	3.03
MISS091F	08/18/99	11/12/99	99G0016		15.6	DRY	REG	TH-228	7.72	0.78	PCI/G	GAMMASPEC	3.03
MISS091F	08/18/99	11/12/99	99G0016		15.6	DRY	REG	TH-232	7.72	0.78	PCI/G	GAMMASPEC	3.03
MISS091F	08/18/99	11/12/99	99G0016		15.6	DRY	REG	TH-230	287.00	0.00	PCI/G	GAMMASPEC	287.00
MISS091F	08/18/99	11/12/99	99G0016		15.6	DRY	REG	PA-231	31.70	0.00	PCI/G	GAMMASPEC	31.70
MISS091F	08/18/99	11/12/99	99G0016		15.6	DRY	REG	U-235	3.40	0.41	PCI/G	GAMMASPEC	1.13
MISS091F	08/18/99	11/12/99	99G0016		15.6	DRY	REG	U-238	70.50	11.05	PCI/G	GAMMASPEC	31.00
MISS091F	08/18/99	11/12/99	99G0016		15.6	DRY	REG	AM-241	3.72	0.00	PCI/G	GAMMASPEC	3.72
MISS33A1	08/25/99	11/11/99	99G0016		667.7	DRY	REG	K-40	15.76	0.80	PCI/G	GAMMASPEC	0.80
MISS33A1	08/25/99	11/11/99	99G0016		667.7	DRY	REG	CS-137	0.08	0.00	PCI/G	GAMMASPEC	0.08
MISS33A1	08/25/99	11/11/99	99G0016		667.7	DRY	REG	RA-226	0.68	0.04	PCI/G	GAMMASPEC	0.11
MISS33A1	08/25/99	11/11/99	99G0016		667.7	DRY	REG	AC-227	0.67	0.00	PCI/G	GAMMASPEC	0.67

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Location:	MAYWOOD		
Site WBS:	12B	Date Entered:	11/14/99
Work Order Number:	99G0016		
Project Number:			
Environmental Cat:	RI		

Sample ID	Date Collected	Date Analyzed	SDG ID	LAB ID	Vol.	W/D	Sample Type	Analyte	Result	Error	Units	Analytical Method	MDA
MISS33A1	08/25/99	11/11/99	99G0016		667.7	DRY	REG	RA-228	1.04	0.06	PCI/G	GAMMASPEC	0.18
MISS33A1	08/25/99	11/11/99	99G0016		667.7	DRY	REG	TH-228	1.04	0.06	PCI/G	GAMMASPEC	0.18
MISS33A1	08/25/99	11/11/99	99G0016		667.7	DRY	REG	TH-232	1.04	0.06	PCI/G	GAMMASPEC	0.18
MISS33A1	08/25/99	11/11/99	99G0016		667.7	DRY	REG	TH-230	23.80	0.00	PCI/G	GAMMASPEC	23.80
MISS33A1	08/25/99	11/11/99	99G0016		667.7	DRY	REG	PA-231	2.37	0.00	PCI/G	GAMMASPEC	2.37
MISS33A1	08/25/99	11/11/99	99G0016		667.7	DRY	REG	U-235	0.09	0.02	PCI/G	GAMMASPEC	0.08
MISS33A1	08/25/99	11/11/99	99G0016		667.7	DRY	REG	U-238	2.39	0.00	PCI/G	GAMMASPEC	2.39
MISS33A1	08/25/99	11/11/99	99G0016		667.7	DRY	REG	AM-241	0.26	0.00	PCI/G	GAMMASPEC	0.26
MISS33A1	08/25/99	11/11/99	99G0016		667.7	DRY	LREP	K-40	14.73	0.77	PCI/G	GAMMASPEC	0.84
MISS33A1	08/25/99	11/11/99	99G0016		667.7	DRY	LREP	CS-137	0.08	0.00	PCI/G	GAMMASPEC	0.08
MISS33A1	08/25/99	11/11/99	99G0016		667.7	DRY	LREP	RA-226	0.63	0.04	PCI/G	GAMMASPEC	0.11
MISS33A1	08/25/99	11/11/99	99G0016		667.7	DRY	LREP	AC-227	0.72	0.00	PCI/G	GAMMASPEC	0.72
MISS33A1	08/25/99	11/11/99	99G0016		667.7	DRY	LREP	RA-228	0.93	0.05	PCI/G	GAMMASPEC	0.19
MISS33A1	08/25/99	11/11/99	99G0016		667.7	DRY	LREP	TH-228	0.93	0.05	PCI/G	GAMMASPEC	0.19
MISS33A1	08/25/99	11/11/99	99G0016		667.7	DRY	LREP	TH-232	0.93	0.05	PCI/G	GAMMASPEC	0.19
MISS33A1	08/25/99	11/11/99	99G0016		667.7	DRY	LREP	TH-230	24.20	0.00	PCI/G	GAMMASPEC	24.20
MISS33A1	08/25/99	11/11/99	99G0016		667.7	DRY	LREP	PA-231	2.16	0.00	PCI/G	GAMMASPEC	2.16
MISS33A1	08/25/99	11/11/99	99G0016		667.7	DRY	LREP	U-235	0.10	0.02	PCI/G	GAMMASPEC	0.07
MISS33A1	08/25/99	11/11/99	99G0016		667.7	DRY	LREP	U-238	2.37	0.00	PCI/G	GAMMASPEC	2.37
MISS33A1	08/25/99	11/11/99	99G0016		667.7	DRY	LREP	AM-241	0.27	0.00	PCI/G	GAMMASPEC	0.27
MISS33A2	08/25/99	11/12/99	99G0016		620.9	DRY	REG	K-40	12.56	0.72	PCI/G	GAMMASPEC	0.79
MISS33A2	08/25/99	11/12/99	99G0016		620.9	DRY	REG	CS-137	0.08	0.00	PCI/G	GAMMASPEC	0.08
MISS33A2	08/25/99	11/12/99	99G0016		620.9	DRY	REG	RA-226	0.71	0.04	PCI/G	GAMMASPEC	0.12
MISS33A2	08/25/99	11/12/99	99G0016		620.9	DRY	REG	AC-227	0.74	0.00	PCI/G	GAMMASPEC	0.74
MISS33A2	08/25/99	11/12/99	99G0016		620.9	DRY	REG	RA-228	1.07	0.06	PCI/G	GAMMASPEC	0.21
MISS33A2	08/25/99	11/12/99	99G0016		620.9	DRY	REG	TH-228	1.07	0.06	PCI/G	GAMMASPEC	0.21
MISS33A2	08/25/99	11/12/99	99G0016		620.9	DRY	REG	TH-232	1.07	0.06	PCI/G	GAMMASPEC	0.21
MISS33A2	08/25/99	11/12/99	99G0016		620.9	DRY	REG	TH-230	25.80	0.00	PCI/G	GAMMASPEC	25.80

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Location:	MAYWOOD		
Site WBS:	12B	Date Entered:	11/14/99
Work Order Number:	99G0016		
Project Number:			
Environmental Cat:	RI		

Sample ID	Date Collected	Date Analyzed	SDG ID	LAB ID	Vol.	W/D	Sample Type	Analyte	Result	Error	Units	Analytical Method	MDA
MISS33A2	08/25/99	11/12/99	99G0016		620.9	DRY	REG	PA-231	2.31	0.00	PCI/G	GAMMASPEC	2.31
MISS33A2	08/25/99	11/12/99	99G0016		620.9	DRY	REG	U-235	0.11	0.03	PCI/G	GAMMASPEC	0.08
MISS33A2	08/25/99	11/12/99	99G0016		620.9	DRY	REG	U-238	2.70	0.00	PCI/G	GAMMASPEC	2.70
MISS33A2	08/25/99	11/12/99	99G0016		620.9	DRY	REG	AM-241	0.30	0.00	PCI/G	GAMMASPEC	0.30
MISS40B	08/25/99	11/11/99	99G0016		101.3	DRY	REG	K-40	5.88	1.01	PCI/G	GAMMASPEC	2.40
MISS40B	08/25/99	11/11/99	99G0016		101.3	DRY	REG	CS-137	0.17	0.00	PCI/G	GAMMASPEC	0.17
MISS40B	08/25/99	11/11/99	99G0016		101.3	DRY	REG	RA-226	0.59	0.07	PCI/G	GAMMASPEC	0.26
MISS40B	08/25/99	11/11/99	99G0016		101.3	DRY	REG	AC-227	1.27	0.00	PCI/G	GAMMASPEC	1.27
MISS40B	08/25/99	11/11/99	99G0016		101.3	DRY	REG	RA-228	0.81	0.11	PCI/G	GAMMASPEC	0.44
MISS40B	08/25/99	11/11/99	99G0016		101.3	DRY	REG	TH-228	0.81	0.11	PCI/G	GAMMASPEC	0.44
MISS40B	08/25/99	11/11/99	99G0016		101.3	DRY	REG	TH-232	0.81	0.11	PCI/G	GAMMASPEC	0.44
MISS40B	08/25/99	11/11/99	99G0016		101.3	DRY	REG	TH-230	37.80	0.00	PCI/G	GAMMASPEC	37.80
MISS40B	08/25/99	11/11/99	99G0016		101.3	DRY	REG	PA-231	4.53	0.00	PCI/G	GAMMASPEC	4.53
MISS40B	08/25/99	11/11/99	99G0016		101.3	DRY	REG	U-235	0.20	0.00	PCI/G	GAMMASPEC	0.20
MISS40B	08/25/99	11/11/99	99G0016		101.3	DRY	REG	U-238	4.20	0.00	PCI/G	GAMMASPEC	4.20
MISS40B	08/25/99	11/11/99	99G0016		101.3	DRY	REG	AM-241	0.50	0.00	PCI/G	GAMMASPEC	0.50
QCBLANK	11/12/99	11/12/99	99G0016		945.0	DRY	BL	K-40	0.43	0.00	PCI/G	GAMMASPEC	0.43
QCBLANK	11/12/99	11/12/99	99G0016		945.0	DRY	BL	CS-137	0.03	0.00	PCI/G	GAMMASPEC	0.03
QCBLANK	11/12/99	11/12/99	99G0016		945.0	DRY	BL	RA-226	0.05	0.00	PCI/G	GAMMASPEC	0.05
QCBLANK	11/12/99	11/12/99	99G0016		945.0	DRY	BL	AC-227	0.14	0.00	PCI/G	GAMMASPEC	0.14
QCBLANK	11/12/99	11/12/99	99G0016		945.0	DRY	BL	RA-228	0.08	0.00	PCI/G	GAMMASPEC	0.08
QCBLANK	11/12/99	11/12/99	99G0016		945.0	DRY	BL	TH-228	0.08	0.00	PCI/G	GAMMASPEC	0.08
QCBLANK	11/12/99	11/12/99	99G0016		945.0	DRY	BL	TH-232	0.08	0.00	PCI/G	GAMMASPEC	0.08
QCBLANK	11/12/99	11/12/99	99G0016		945.0	DRY	BL	TH-230	6.26	0.00	PCI/G	GAMMASPEC	6.26
QCBLANK	11/12/99	11/12/99	99G0016		945.0	DRY	BL	PA-231	0.69	0.00	PCI/G	GAMMASPEC	0.69
QCBLANK	11/12/99	11/12/99	99G0016		945.0	DRY	BL	U-235	0.03	0.00	PCI/G	GAMMASPEC	0.03
QCBLANK	11/12/99	11/12/99	99G0016		945.0	DRY	BL	U-238	0.75	0.00	PCI/G	GAMMASPEC	0.75
QCBLANK	11/12/99	11/12/99	99G0016		945.0	DRY	BL	AM-241	0.08	0.00	PCI/G	GAMMASPEC	0.08

Approved by: ______________________ Date: ____________

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T· ·sults listed at the MDA should have been reported at the actual measureme·

Location:	MAYWOOD		
Site WBS:	12B	Date Entered:	11/14/99
Work Order Number:	99G0016		
Project Number:			
Environmental Cat:	RI		

Sample ID	Date Collected	Date Analyzed	SDG ID	LAB ID	Vol.	W/D	Sample Type	Analyte	Result	Error	Units	Analytical Method	MDA
QCSPIKEM	04/01/99	11/12/99	99G0016		832.0	DRY	LCSF	CS-137	69.93	2.20	PCI/G	GAMMASPEC	0.97
QCSPIKEM	04/01/99	11/12/99	99G0016		832.0	DRY	LCSF	AM-241	169.16	8.54	PCI/G	GAMMASPEC	3.59
QCSPIKEM	04/01/99	11/12/99	99G0016		832.0	DRY	LCST	CS-137	68.43	3.22	PCI/G	GAMMASPEC	0.97
QCSPIKEM	04/01/99	11/12/99	99G0016		832.0	DRY	LCST	AM-241	165.05	8.25	PCI/G	GAMMASPEC	3.59
QCSPIKEP	04/01/99	11/12/99	99G0016		150.0	DRY	LCSF	CS-137	387.49	13.45	PCI/G	GAMMASPEC	5.29
QCSPIKEP	04/01/99	11/12/99	99G0016		150.0	DRY	LCSF	AM-241	828.95	41.74	PCI/G	GAMMASPEC	14.30
QCSPIKEP	04/01/99	11/12/99	99G0016		150.0	DRY	LCST	CS-137	352.02	16.54	PCI/G	GAMMASPEC	5.29
QCSPIKEP	04/01/99	11/12/99	99G0016		150.0	DRY	LCST	AM-241	849.21	42.46	PCI/G	GAMMASPEC	14.30

Approved by: ______________________ Date: ____________

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Location:	MAYWOOD		
Site WBS:	12B	Date Entered:	11/21/99
Work Order Number:	99G0017		
Project Number:			
Environmental Cat:	RI		

Sample ID	Date Collected	Date Analyzed	SDG ID	LAB ID	Vol.	W/D	Sample Type	Analyte	Result	Error	Units	Analytical Method	MDA
MISS014D	08/23/99	11/13/99	99G0017		11.4	DRY	REG	K-40	24.52	8.09	PCI/G	GAMMASPEC	24.10
MISS014D	08/23/99	11/13/99	99G0017		11.4	DRY	REG	CS-137	1.46	0.00	PCI/G	GAMMASPEC	1.46
MISS014D	08/23/99	11/13/99	99G0017		11.4	DRY	REG	RA-226	2.59	0.00	PCI/G	GAMMASPEC	2.59
MISS014D	08/23/99	11/13/99	99G0017		11.4	DRY	REG	AC-227	8.40	0.00	PCI/G	GAMMASPEC	8.40
MISS014D	08/23/99	11/13/99	99G0017		11.4	DRY	REG	RA-228	4.05	0.00	PCI/G	GAMMASPEC	4.05
MISS014D	08/23/99	11/13/99	99G0017		11.4	DRY	REG	TH-228	4.05	0.00	PCI/G	GAMMASPEC	4.05
MISS014D	08/23/99	11/13/99	99G0017		11.4	DRY	REG	TH-232	4.05	0.00	PCI/G	GAMMASPEC	4.05
MISS014D	08/23/99	11/13/99	99G0017		11.4	DRY	REG	TH-230	264.00	0.00	PCI/G	GAMMASPEC	264.00
MISS014D	08/23/99	11/13/99	99G0017		11.4	DRY	REG	PA-231	38.40	0.00	PCI/G	GAMMASPEC	38.40
MISS014D	08/23/99	11/13/99	99G0017		11.4	DRY	REG	U-235	1.44	0.43	PCI/G	GAMMASPEC	1.44
MISS014D	08/23/99	11/13/99	99G0017		11.4	DRY	REG	U-238	32.30	8.92	PCI/G	GAMMASPEC	32.30
MISS014D	08/23/99	11/13/99	99G0017		11.4	DRY	REG	AM-241	3.59	0.00	PCI/G	GAMMASPEC	3.59
MISS014E	08/23/99	11/13/99	99G0017		22.0	DRY	REG	K-40	24.19	4.72	PCI/G	GAMMASPEC	12.10
MISS014E	08/23/99	11/13/99	99G0017		22.0	DRY	REG	CS-137	0.72	0.00	PCI/G	GAMMASPEC	0.72
MISS014E	08/23/99	11/13/99	99G0017		22.0	DRY	REG	RA-226	1.50	0.00	PCI/G	GAMMASPEC	1.50
MISS014E	08/23/99	11/13/99	99G0017		22.0	DRY	REG	AC-227	5.28	0.00	PCI/G	GAMMASPEC	5.28
MISS014E	08/23/99	11/13/99	99G0017		22.0	DRY	REG	RA-228	2.62	0.48	PCI/G	GAMMASPEC	1.76
MISS014E	08/23/99	11/13/99	99G0017		22.0	DRY	REG	TH-228	2.62	0.48	PCI/G	GAMMASPEC	1.76
MISS014E	08/23/99	11/13/99	99G0017		22.0	DRY	REG	TH-232	2.62	0.48	PCI/G	GAMMASPEC	1.76
MISS014E	08/23/99	11/13/99	99G0017		22.0	DRY	REG	TH-230	153.00	0.00	PCI/G	GAMMASPEC	153.00
MISS014E	08/23/99	11/13/99	99G0017		22.0	DRY	REG	PA-231	21.60	0.00	PCI/G	GAMMASPEC	21.60
MISS014E	08/23/99	11/13/99	99G0017		22.0	DRY	REG	U-235	0.73	0.23	PCI/G	GAMMASPEC	0.73
MISS014E	08/23/99	11/13/99	99G0017		22.0	DRY	REG	U-238	18.80	0.00	PCI/G	GAMMASPEC	18.80
MISS014E	08/23/99	11/13/99	99G0017		22.0	DRY	REG	AM-241	1.96	0.00	PCI/G	GAMMASPEC	1.96
MISS020D	08/23/99	11/13/99	99G0017		12.4	DRY	REG	K-40	19.10	6.41	PCI/G	GAMMASPEC	19.10
MISS020D	08/23/99	11/13/99	99G0017		12.4	DRY	REG	CS-137	1.42	0.00	PCI/G	GAMMASPEC	1.42
MISS020D	08/23/99	11/13/99	99G0017		12.4	DRY	REG	RA-226	2.56	0.00	PCI/G	GAMMASPEC	2.56
MISS020D	08/23/99	11/13/99	99G0017		12.4	DRY	REG	AC-227	8.02	0.00	PCI/G	GAMMASPEC	8.02

Approved by: ______________________________ Date: ____________

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Location:	MAYWOOD		
Site WBS:	12B	Date Entered:	11/21/99
Work Order Number:	99G0017		
Project Number:			
Environmental Cat:	RI		

Sample ID	Date Collected	Date Analyzed	SDG ID	LAB ID	Vol.	W/D	Sample Type	Analyte	Result	Error	Units	Analytical Method	MDA
MISS020D	08/23/99	11/13/99	99G0017		12.4	DRY	REG	RA-228	4.42	0.00	PCI/G	GAMMASPEC	4.42
MISS020D	08/23/99	11/13/99	99G0017		12.4	DRY	REG	TH-228	4.42	0.00	PCI/G	GAMMASPEC	4.42
MISS020D	08/23/99	11/13/99	99G0017		12.4	DRY	REG	TH-232	4.42	0.00	PCI/G	GAMMASPEC	4.42
MISS020D	08/23/99	11/13/99	99G0017		12.4	DRY	REG	TH-230	268.00	0.00	PCI/G	GAMMASPEC	268.00
MISS020D	08/23/99	11/13/99	99G0017		12.4	DRY	REG	PA-231	36.00	0.00	PCI/G	GAMMASPEC	36.00
MISS020D	08/23/99	11/13/99	99G0017		12.4	DRY	REG	U-235	1.51	0.00	PCI/G	GAMMASPEC	1.51
MISS020D	08/23/99	11/13/99	99G0017		12.4	DRY	REG	U-238	31.80	0.00	PCI/G	GAMMASPEC	31.80
MISS020D	08/23/99	11/13/99	99G0017		12.4	DRY	REG	AM-241	3.42	0.00	PCI/G	GAMMASPEC	3.42
MISS020E	08/23/99	11/13/99	99G0017		25.7	DRY	REG	K-40	15.94	3.92	PCI/G	GAMMASPEC	10.90
MISS020E	08/23/99	11/13/99	99G0017		25.7	DRY	REG	CS-137	0.71	0.00	PCI/G	GAMMASPEC	0.71
MISS020E	08/23/99	11/13/99	99G0017		25.7	DRY	REG	RA-226	1.38	0.25	PCI/G	GAMMASPEC	0.99
MISS020E	08/23/99	11/13/99	99G0017		25.7	DRY	REG	AC-227	5.22	0.00	PCI/G	GAMMASPEC	5.22
MISS020E	08/23/99	11/13/99	99G0017		25.7	DRY	REG	RA-228	2.77	0.46	PCI/G	GAMMASPEC	1.98
MISS020E	08/23/99	11/13/99	99G0017		25.7	DRY	REG	TH-228	2.77	0.46	PCI/G	GAMMASPEC	1.98
MISS020E	08/23/99	11/13/99	99G0017		25.7	DRY	REG	TH-232	2.77	0.46	PCI/G	GAMMASPEC	1.98
MISS020E	08/23/99	11/13/99	99G0017		25.7	DRY	REG	TH-230	147.00	0.00	PCI/G	GAMMASPEC	147.00
MISS020E	08/23/99	11/13/99	99G0017		25.7	DRY	REG	PA-231	16.20	0.00	PCI/G	GAMMASPEC	16.20
MISS020E	08/23/99	11/13/99	99G0017		25.7	DRY	REG	U-235	0.63	0.19	PCI/G	GAMMASPEC	0.63
MISS020E	08/23/99	11/13/99	99G0017		25.7	DRY	REG	U-238	15.80	0.00	PCI/G	GAMMASPEC	15.80
MISS020E	08/23/99	11/13/99	99G0017		25.7	DRY	REG	AM-241	1.80	0.00	PCI/G	GAMMASPEC	1.80
MISS034D	08/25/99	11/15/99	99G0017		8.0	DRY	REG	K-40	49.50	10.49	PCI/G	GAMMASPEC	25.90
MISS034D	08/25/99	11/15/99	99G0017		8.0	DRY	REG	CS-137	2.17	0.00	PCI/G	GAMMASPEC	2.17
MISS034D	08/25/99	11/15/99	99G0017		8.0	DRY	REG	RA-226	3.96	0.00	PCI/G	GAMMASPEC	3.96
MISS034D	08/25/99	11/15/99	99G0017		8.0	DRY	REG	AC-227	14.80	0.00	PCI/G	GAMMASPEC	14.80
MISS034D	08/25/99	11/15/99	99G0017		8.0	DRY	REG	RA-228	8.12	1.41	PCI/G	GAMMASPEC	6.06
MISS034D	08/25/99	11/15/99	99G0017		8.0	DRY	REG	TH-228	8.12	1.41	PCI/G	GAMMASPEC	6.06
MISS034D	08/25/99	11/15/99	99G0017		8.0	DRY	REG	TH-232	8.12	1.41	PCI/G	GAMMASPEC	6.06
MISS034D	08/25/99	11/15/99	99G0017		8.0	DRY	REG	TH-230	427.00	0.00	PCI/G	GAMMASPEC	427.00

Approved by: ______________________ Date: ______________

Equivalent values in the "Result" and "MDA" columns indicate that the analyte was either undetected or detected at a level below the MDA. Th- results listed at the MDA should have been reported at the actual measurement

Location:	MAYWOOD		
Site WBS:	12B	Date Entered:	11/21/99
Work Order Number:	99G0017		
Project Number:			
Environmental Cat:	RI		

Sample ID	Date Collected	Date Analyzed	SDG ID	LAB ID	Vol.	W/D	Sample Type	Analyte	Result	Error	Units	Analytical Method	MDA
MISS034D	08/25/99	11/15/99	99G0017		8.0	DRY	REG	PA-231	56.20	0.00	PCI/G	GAMMASPEC	56.20
MISS034D	08/25/99	11/15/99	99G0017		8.0	DRY	REG	U-235	2.06	0.65	PCI/G	GAMMASPEC	2.06
MISS034D	08/25/99	11/15/99	99G0017		8.0	DRY	REG	U-238	46.60	14.19	PCI/G	GAMMASPEC	46.60
MISS034D	08/25/99	11/15/99	99G0017		8.0	DRY	REG	AM-241	5.52	0.00	PCI/G	GAMMASPEC	5.52
MISS034E	08/25/99	11/15/99	99G0017		10.9	DRY	REG	K-40	43.18	7.10	PCI/G	GAMMASPEC	12.90
MISS034E	08/25/99	11/15/99	99G0017		10.9	DRY	REG	CS-137	1.82	0.00	PCI/G	GAMMASPEC	1.82
MISS034E	08/25/99	11/15/99	99G0017		10.9	DRY	REG	RA-226	3.36	0.61	PCI/G	GAMMASPEC	2.34
MISS034E	08/25/99	11/15/99	99G0017		10.9	DRY	REG	AC-227	12.70	0.00	PCI/G	GAMMASPEC	12.70
MISS034E	08/25/99	11/15/99	99G0017		10.9	DRY	REG	RA-228	11.24	1.16	PCI/G	GAMMASPEC	4.42
MISS034E	08/25/99	11/15/99	99G0017		10.9	DRY	REG	TH-228	11.24	1.16	PCI/G	GAMMASPEC	4.42
MISS034E	08/25/99	11/15/99	99G0017		10.9	DRY	REG	TH-232	11.24	1.16	PCI/G	GAMMASPEC	4.42
MISS034E	08/25/99	11/15/99	99G0017		10.9	DRY	REG	TH-230	344.00	0.00	PCI/G	GAMMASPEC	344.00
MISS034E	08/25/99	11/15/99	99G0017		10.9	DRY	REG	PA-231	44.30	0.00	PCI/G	GAMMASPEC	44.30
MISS034E	08/25/99	11/15/99	99G0017		10.9	DRY	REG	U-235	1.86	0.00	PCI/G	GAMMASPEC	1.86
MISS034E	08/25/99	11/15/99	99G0017		10.9	DRY	REG	U-238	35.10	10.80	PCI/G	GAMMASPEC	35.10
MISS034E	08/25/99	11/15/99	99G0017		10.9	DRY	REG	AM-241	4.16	0.00	PCI/G	GAMMASPEC	4.16
MISS036E	08/25/99	11/15/99	99G0017		15.8	DRY	REG	K-40	44.91	6.06	PCI/G	GAMMASPEC	10.30
MISS036E	08/25/99	11/15/99	99G0017		15.8	DRY	REG	CS-137	1.13	0.00	PCI/G	GAMMASPEC	1.13
MISS036E	08/25/99	11/15/99	99G0017		15.8	DRY	REG	RA-226	3.33	0.43	PCI/G	GAMMASPEC	1.59
MISS036E	08/25/99	11/15/99	99G0017		15.8	DRY	REG	AC-227	8.81	0.00	PCI/G	GAMMASPEC	8.81
MISS036E	08/25/99	11/15/99	99G0017		15.8	DRY	REG	RA-228	8.18	0.78	PCI/G	GAMMASPEC	2.68
MISS036E	08/25/99	11/15/99	99G0017		15.8	DRY	REG	TH-228	8.18	0.78	PCI/G	GAMMASPEC	2.68
MISS036E	08/25/99	11/15/99	99G0017		15.8	DRY	REG	TH-232	8.18	0.78	PCI/G	GAMMASPEC	2.68
MISS036E	08/25/99	11/15/99	99G0017		15.8	DRY	REG	TH-230	252.00	0.00	PCI/G	GAMMASPEC	252.00
MISS036E	08/25/99	11/15/99	99G0017		15.8	DRY	REG	PA-231	33.10	0.00	PCI/G	GAMMASPEC	33.10
MISS036E	08/25/99	11/15/99	99G0017		15.8	DRY	REG	U-235	1.05	0.33	PCI/G	GAMMASPEC	1.05
MISS036E	08/25/99	11/15/99	99G0017		15.8	DRY	REG	U-238	26.20	7.66	PCI/G	GAMMASPEC	23.50
MISS036E	08/25/99	11/15/99	99G0017		15.8	DRY	REG	AM-241	2.96	0.00	PCI/G	GAMMASPEC	2.96

Approved by: ______________________ Date: ____________

Equivalent values in the "Result" and "MDA" columns indicate that the analyte was either undetected or detected at a level below the MDA. The results listed at the MDA should have been reported at the actual measurement.

Location:	MAYWOOD		
Site WBS:	12B	Date Entered:	11/21/99
Work Order Number:	99G0017		
Project Number:			
Environmental Cat:	RI		

Sample ID	Date Collected	Date Analyzed	SDG ID	LAB ID	Vol.	W/D	Sample Type	Analyte	Result	Error	Units	Analytical Method	MDA
MISS090A	08/18/99	11/13/99	99G0017		58.8	DRY	REG	K-40	26.47	2.65	PCI/G	GAMMASPEC	4.85
MISS090A	08/18/99	11/13/99	99G0017		58.8	DRY	REG	CS-137	0.38	0.00	PCI/G	GAMMASPEC	0.38
MISS090A	08/18/99	11/13/99	99G0017		58.8	DRY	REG	RA-226	5.21	0.23	PCI/G	GAMMASPEC	0.53
MISS090A	08/18/99	11/13/99	99G0017		58.8	DRY	REG	AC-227	3.25	0.00	PCI/G	GAMMASPEC	3.25
MISS090A	08/18/99	11/13/99	99G0017		58.8	DRY	REG	RA-228	3.52	0.26	PCI/G	GAMMASPEC	0.90
MISS090A	08/18/99	11/13/99	99G0017		58.8	DRY	REG	TH-228	3.52	0.26	PCI/G	GAMMASPEC	0.90
MISS090A	08/18/99	11/13/99	99G0017		58.8	DRY	REG	TH-232	3.52	0.26	PCI/G	GAMMASPEC	0.90
MISS090A	08/18/99	11/13/99	99G0017		58.8	DRY	REG	TH-230	94.90	0.00	PCI/G	GAMMASPEC	94.90
MISS090A	08/18/99	11/13/99	99G0017		58.8	DRY	REG	PA-231	11.00	0.00	PCI/G	GAMMASPEC	11.00
MISS090A	08/18/99	11/13/99	99G0017		58.8	DRY	REG	U-235	0.60	0.13	PCI/G	GAMMASPEC	0.41
MISS090A	08/18/99	11/13/99	99G0017		58.8	DRY	REG	U-238	9.92	0.00	PCI/G	GAMMASPEC	9.92
MISS090A	08/18/99	11/13/99	99G0017		58.8	DRY	REG	AM-241	1.12	0.00	PCI/G	GAMMASPEC	1.12
MISS090B	08/18/99	11/13/99	99G0017		87.4	DRY	REG	K-40	10.56	1.51	PCI/G	GAMMASPEC	3.56
MISS090B	08/18/99	11/13/99	99G0017		87.4	DRY	REG	CS-137	0.31	0.00	PCI/G	GAMMASPEC	0.31
MISS090B	08/18/99	11/13/99	99G0017		87.4	DRY	REG	RA-226	1.22	0.11	PCI/G	GAMMASPEC	0.38
MISS090B	08/18/99	11/13/99	99G0017		87.4	DRY	REG	AC-227	2.12	0.00	PCI/G	GAMMASPEC	2.12
MISS090B	08/18/99	11/13/99	99G0017		87.4	DRY	REG	RA-228	4.99	0.21	PCI/G	GAMMASPEC	0.53
MISS090B	08/18/99	11/13/99	99G0017		87.4	DRY	REG	TH-228	4.99	0.21	PCI/G	GAMMASPEC	0.53
MISS090B	08/18/99	11/13/99	99G0017		87.4	DRY	REG	TH-232	4.99	0.21	PCI/G	GAMMASPEC	0.53
MISS090B	08/18/99	11/13/99	99G0017		87.4	DRY	REG	TH-230	64.10	0.00	PCI/G	GAMMASPEC	64.10
MISS090B	08/18/99	11/13/99	99G0017		87.4	DRY	REG	PA-231	7.77	0.00	PCI/G	GAMMASPEC	7.77
MISS090B	08/18/99	11/13/99	99G0017		87.4	DRY	REG	U-235	0.24	0.07	PCI/G	GAMMASPEC	0.24
MISS090B	08/18/99	11/13/99	99G0017		87.4	DRY	REG	U-238	6.56	0.00	PCI/G	GAMMASPEC	6.56
MISS090B	08/18/99	11/13/99	99G0017		87.4	DRY	REG	AM-241	0.78	0.00	PCI/G	GAMMASPEC	0.78
MISS090B	08/18/99	11/16/99	99G0017		87.4	DRY	LREP	K-40	15.00	1.51	PCI/G	GAMMASPEC	2.25
MISS090B	08/18/99	11/16/99	99G0017		87.4	DRY	LREP	CS-137	0.29	0.00	PCI/G	GAMMASPEC	0.29
MISS090B	08/18/99	11/16/99	99G0017		87.4	DRY	LREP	RA-226	1.07	0.12	PCI/G	GAMMASPEC	0.43
MISS090B	08/18/99	11/16/99	99G0017		87.4	DRY	LREP	AC-227	2.38	0.00	PCI/G	GAMMASPEC	2.38

Approved by: ______________________ Date: ____________

Equivalent values in the "Result" and "MDA" columns indicate that the analyte was either undetected or detected at a level below the MDA. T[illegible] results listed at the MDA should have been reported at the actual measuremer

Location:	MAYWOOD		
Site WBS:	12B	Date Entered:	11/21/99
Work Order Number:	99G0017		
Project Number:			
Environmental Cat:	RI		

Sample ID	Date Collected	Date Analyzed	SDG ID	LAB ID	Vol.	W/D	Sample Type	Analyte	Result	Error	Units	Analytical Method	MDA
MISS090B	08/18/99	11/16/99	99G0017		87.4	DRY	LREP	RA-228	5.08	0.23	PCI/G	GAMMASPEC	0.61
MISS090B	08/18/99	11/16/99	99G0017		87.4	DRY	LREP	TH-228	5.08	0.23	PCI/G	GAMMASPEC	0.61
MISS090B	08/18/99	11/16/99	99G0017		87.4	DRY	LREP	TH-232	5.08	0.23	PCI/G	GAMMASPEC	0.61
MISS090B	08/18/99	11/16/99	99G0017		87.4	DRY	LREP	TH-230	69.20	0.00	PCI/G	GAMMASPEC	69.20
MISS090B	08/18/99	11/16/99	99G0017		87.4	DRY	LREP	PA-231	7.92	0.00	PCI/G	GAMMASPEC	7.92
MISS090B	08/18/99	11/16/99	99G0017		87.4	DRY	LREP	U-235	0.31	0.00	PCI/G	GAMMASPEC	0.31
MISS090B	08/18/99	11/16/99	99G0017		87.4	DRY	LREP	U-238	7.07	0.00	PCI/G	GAMMASPEC	7.07
MISS090B	08/18/99	11/16/99	99G0017		87.4	DRY	LREP	AM-241	0.82	0.00	PCI/G	GAMMASPEC	0.82
MISS091A	08/18/99	11/14/99	99G0017		50.5	DRY	REG	K-40	12.39	2.25	PCI/G	GAMMASPEC	5.74
MISS091A	08/18/99	11/14/99	99G0017		50.5	DRY	REG	CS-137	0.41	0.00	PCI/G	GAMMASPEC	0.41
MISS091A	08/18/99	11/14/99	99G0017		50.5	DRY	REG	RA-226	1.51	0.16	PCI/G	GAMMASPEC	0.53
MISS091A	08/18/99	11/14/99	99G0017		50.5	DRY	REG	AC-227	2.88	0.00	PCI/G	GAMMASPEC	2.88
MISS091A	08/18/99	11/14/99	99G0017		50.5	DRY	REG	RA-228	2.59	0.26	PCI/G	GAMMASPEC	0.81
MISS091A	08/18/99	11/14/99	99G0017		50.5	DRY	REG	TH-228	2.59	0.26	PCI/G	GAMMASPEC	0.81
MISS091A	08/18/99	11/14/99	99G0017		50.5	DRY	REG	TH-232	2.59	0.26	PCI/G	GAMMASPEC	0.81
MISS091A	08/18/99	11/14/99	99G0017		50.5	DRY	REG	TH-230	83.90	0.00	PCI/G	GAMMASPEC	83.90
MISS091A	08/18/99	11/14/99	99G0017		50.5	DRY	REG	PA-231	10.70	0.00	PCI/G	GAMMASPEC	10.70
MISS091A	08/18/99	11/14/99	99G0017		50.5	DRY	REG	U-235	0.33	0.11	PCI/G	GAMMASPEC	0.34
MISS091A	08/18/99	11/14/99	99G0017		50.5	DRY	REG	U-238	9.39	0.00	PCI/G	GAMMASPEC	9.39
MISS091A	08/18/99	11/14/99	99G0017		50.5	DRY	REG	AM-241	1.13	0.00	PCI/G	GAMMASPEC	1.13
MISS091B	08/18/99	11/14/99	99G0017		75.0	DRY	REG	K-40	13.28	1.73	PCI/G	GAMMASPEC	3.76
MISS091B	08/18/99	11/14/99	99G0017		75.0	DRY	REG	CS-137	0.26	0.00	PCI/G	GAMMASPEC	0.26
MISS091B	08/18/99	11/14/99	99G0017		75.0	DRY	REG	RA-226	1.29	0.11	PCI/G	GAMMASPEC	0.35
MISS091B	08/18/99	11/14/99	99G0017		75.0	DRY	REG	AC-227	1.84	0.00	PCI/G	GAMMASPEC	1.84
MISS091B	08/18/99	11/14/99	99G0017		75.0	DRY	REG	RA-228	1.16	0.16	PCI/G	GAMMASPEC	0.55
MISS091B	08/18/99	11/14/99	99G0017		75.0	DRY	REG	TH-228	1.16	0.16	PCI/G	GAMMASPEC	0.55
MISS091B	08/18/99	11/14/99	99G0017		75.0	DRY	REG	TH-232	1.16	0.16	PCI/G	GAMMASPEC	0.55
MISS091B	08/18/99	11/14/99	99G0017		75.0	DRY	REG	TH-230	56.80	0.00	PCI/G	GAMMASPEC	56.80

Approved by: ______________________ Date: ______________

Equivalent values in the "Result" and "MDA" columns indicate that the analyte was either undetected or detected at a level below the MDA. The results listed at the MDA should have been reported at the actual measurement.

Location:	MAYWOOD		
Site WBS:	12B	Date Entered:	11/21/99
Work Order Number:	99G0017		
Project Number:			
Environmental Cat:	RI		

Sample ID	Date Collected	Date Analyzed	SDG ID	LAB ID	Vol.	W/D	Sample Type	Analyte	Result	Error	Units	Analytical Method	MDA
MISS091B	08/18/99	11/14/99	99G0017		75.0	DRY	REG	PA-231	6.37	0.00	PCI/G	GAMMASPEC	6.37
MISS091B	08/18/99	11/14/99	99G0017		75.0	DRY	REG	U-235	0.27	0.08	PCI/G	GAMMASPEC	0.27
MISS091B	08/18/99	11/14/99	99G0017		75.0	DRY	REG	U-238	6.05	0.00	PCI/G	GAMMASPEC	6.05
MISS091B	08/18/99	11/14/99	99G0017		75.0	DRY	REG	AM-241	0.69	0.00	PCI/G	GAMMASPEC	0.69
QCBLANK	11/14/99	11/14/99	99G0017		945.0	DRY	BL	K-40	0.27	0.09	PCI/G	GAMMASPEC	0.27
QCBLANK	11/14/99	11/14/99	99G0017		945.0	DRY	BL	CS-137	0.03	0.00	PCI/G	GAMMASPEC	0.03
QCBLANK	11/14/99	11/14/99	99G0017		945.0	DRY	BL	RA-226	0.05	0.00	PCI/G	GAMMASPEC	0.05
QCBLANK	11/14/99	11/14/99	99G0017		945.0	DRY	BL	AC-227	0.15	0.00	PCI/G	GAMMASPEC	0.15
QCBLANK	11/14/99	11/14/99	99G0017		945.0	DRY	BL	RA-228	0.07	0.00	PCI/G	GAMMASPEC	0.07
QCBLANK	11/14/99	11/14/99	99G0017		945.0	DRY	BL	TH-228	0.07	0.00	PCI/G	GAMMASPEC	0.07
QCBLANK	11/14/99	11/14/99	99G0017		945.0	DRY	BL	TH-232	0.07	0.00	PCI/G	GAMMASPEC	0.07
QCBLANK	11/14/99	11/14/99	99G0017		945.0	DRY	BL	TH-230	6.26	0.00	PCI/G	GAMMASPEC	6.26
QCBLANK	11/14/99	11/14/99	99G0017		945.0	DRY	BL	PA-231	0.76	0.00	PCI/G	GAMMASPEC	0.76
QCBLANK	11/14/99	11/14/99	99G0017		945.0	DRY	BL	U-235	0.03	0.00	PCI/G	GAMMASPEC	0.03
QCBLANK	11/14/99	11/14/99	99G0017		945.0	DRY	BL	U-238	0.78	0.00	PCI/G	GAMMASPEC	0.78
QCBLANK	11/14/99	11/14/99	99G0017		945.0	DRY	BL	AM-241	0.08	0.00	PCI/G	GAMMASPEC	0.08
QCSPIKEP	04/01/99	11/14/99	99G0017		150.0	DRY	LCSF	CS-137	378.28	13.14	PCI/G	GAMMASPEC	5.08
QCSPIKEP	04/01/99	11/14/99	99G0017		150.0	DRY	LCSF	AM-241	837.73	42.77	PCI/G	GAMMASPEC	15.80
QCSPIKEP	04/01/99	11/14/99	99G0017		150.0	DRY	LCST	CS-137	352.02	16.54	PCI/G	GAMMASPEC	5.08
QCSPIKEP	04/01/99	11/14/99	99G0017		150.0	DRY	LCST	AM-241	849.21	42.46	PCI/G	GAMMASPEC	15.80

Approved by: ______________________ Date: ______________

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Location:	MAYWOOD		
Site WBS:	12B	Date Entered:	11/21/99
Work Order Number:	99G0018		
Project Number:			
Environmental Cat:	RI		

Sample ID	Date Collected	Date Analyzed	SDG ID	LAB ID	Vol.	W/D	Sample Type	Analyte	Result	Error	Units	Analytical Method	MDA
MISS036D	08/25/99	11/15/99	99G0018		9.0	DRY	REG	K-40	63.44	9.78	PCI/G	GAMMASPEC	18.70
MISS036D	08/25/99	11/15/99	99G0018		9.0	DRY	REG	CS-137	2.04	0.00	PCI/G	GAMMASPEC	2.04
MISS036D	08/25/99	11/15/99	99G0018		9.0	DRY	REG	RA-226	3.71	0.00	PCI/G	GAMMASPEC	3.71
MISS036D	08/25/99	11/15/99	99G0018		9.0	DRY	REG	AC-227	10.60	0.00	PCI/G	GAMMASPEC	10.60
MISS036D	08/25/99	11/15/99	99G0018		9.0	DRY	REG	RA-228	5.61	0.00	PCI/G	GAMMASPEC	5.61
MISS036D	08/25/99	11/15/99	99G0018		9.0	DRY	REG	TH-228	5.61	0.00	PCI/G	GAMMASPEC	5.61
MISS036D	08/25/99	11/15/99	99G0018		9.0	DRY	REG	TH-232	5.61	0.00	PCI/G	GAMMASPEC	5.61
MISS036D	08/25/99	11/15/99	99G0018		9.0	DRY	REG	TH-230	369.00	0.00	PCI/G	GAMMASPEC	369.00
MISS036D	08/25/99	11/15/99	99G0018		9.0	DRY	REG	PA-231	45.50	0.00	PCI/G	GAMMASPEC	45.50
MISS036D	08/25/99	11/15/99	99G0018		9.0	DRY	REG	U-235	1.96	0.00	PCI/G	GAMMASPEC	1.96
MISS036D	08/25/99	11/15/99	99G0018		9.0	DRY	REG	U-238	42.90	0.00	PCI/G	GAMMASPEC	42.90
MISS036D	08/25/99	11/15/99	99G0018		9.0	DRY	REG	AM-241	4.42	0.00	PCI/G	GAMMASPEC	4.42
MISS037D	08/25/99	11/16/99	99G0018		9.8	DRY	REG	K-40	46.09	7.80	PCI/G	GAMMASPEC	14.40
MISS037D	08/25/99	11/16/99	99G0018		9.8	DRY	REG	CS-137	1.73	0.00	PCI/G	GAMMASPEC	1.73
MISS037D	08/25/99	11/16/99	99G0018		9.8	DRY	REG	RA-226	2.93	0.00	PCI/G	GAMMASPEC	2.93
MISS037D	08/25/99	11/16/99	99G0018		9.8	DRY	REG	AC-227	10.00	0.00	PCI/G	GAMMASPEC	10.00
MISS037D	08/25/99	11/16/99	99G0018		9.8	DRY	REG	RA-228	4.88	0.00	PCI/G	GAMMASPEC	4.88
MISS037D	08/25/99	11/16/99	99G0018		9.8	DRY	REG	TH-228	4.88	0.00	PCI/G	GAMMASPEC	4.88
MISS037D	08/25/99	11/16/99	99G0018		9.8	DRY	REG	TH-232	4.88	0.00	PCI/G	GAMMASPEC	4.88
MISS037D	08/25/99	11/16/99	99G0018		9.8	DRY	REG	TH-230	330.00	0.00	PCI/G	GAMMASPEC	330.00
MISS037D	08/25/99	11/16/99	99G0018		9.8	DRY	REG	PA-231	44.70	0.00	PCI/G	GAMMASPEC	44.70
MISS037D	08/25/99	11/16/99	99G0018		9.8	DRY	REG	U-235	1.80	0.54	PCI/G	GAMMASPEC	1.80
MISS037D	08/25/99	11/16/99	99G0018		9.8	DRY	REG	U-238	37.90	0.00	PCI/G	GAMMASPEC	37.90
MISS037D	08/25/99	11/16/99	99G0018		9.8	DRY	REG	AM-241	4.08	0.00	PCI/G	GAMMASPEC	4.08
MISS037E	08/25/99	11/16/99	99G0018		13.7	DRY	REG	K-40	38.08	5.36	PCI/G	GAMMASPEC	1.91
MISS037E	08/25/99	11/16/99	99G0018		13.7	DRY	REG	CS-137	1.20	0.00	PCI/G	GAMMASPEC	1.20
MISS037E	08/25/99	11/16/99	99G0018		13.7	DRY	REG	RA-226	2.28	0.00	PCI/G	GAMMASPEC	2.28
MISS037E	08/25/99	11/16/99	99G0018		13.7	DRY	REG	AC-227	8.50	0.00	PCI/G	GAMMASPEC	8.50

Approved by: ______________________________ Date: ______________

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Location:	MAYWOOD		
Site WBS:	12B	Date Entered:	11/21/99
Work Order Number:	99G0018		
Project Number:			
Environmental Cat:	RI		

Sample ID	Date Collected	Date Analyzed	SDG ID	LAB ID	Vol.	W/D	Sample Type	Analyte	Result	Error	Units	Analytical Method	MDA
MISS037E	08/25/99	11/16/99	99G0018		13.7	DRY	REG	RA-228	4.79	0.75	PCI/G	GAMMASPEC	3.05
MISS037E	08/25/99	11/16/99	99G0018		13.7	DRY	REG	TH-228	4.79	0.75	PCI/G	GAMMASPEC	3.05
MISS037E	08/25/99	11/16/99	99G0018		13.7	DRY	REG	TH-232	4.79	0.75	PCI/G	GAMMASPEC	3.05
MISS037E	08/25/99	11/16/99	99G0018		13.7	DRY	REG	TH-230	255.00	0.00	PCI/G	GAMMASPEC	255.00
MISS037E	08/25/99	11/16/99	99G0018		13.7	DRY	REG	PA-231	33.40	0.00	PCI/G	GAMMASPEC	33.40
MISS037E	08/25/99	11/16/99	99G0018		13.7	DRY	REG	U-235	1.23	0.37	PCI/G	GAMMASPEC	1.23
MISS037E	08/25/99	11/16/99	99G0018		13.7	DRY	REG	U-238	26.80	8.31	PCI/G	GAMMASPEC	26.80
MISS037E	08/25/99	11/16/99	99G0018		13.7	DRY	REG	AM-241	3.31	0.00	PCI/G	GAMMASPEC	3.31
MISS040D	08/25/99	11/16/99	99G0018		4.5	DRY	REG	K-40	101.12	18.08	PCI/G	GAMMASPEC	38.40
MISS040D	08/25/99	11/16/99	99G0018		4.5	DRY	REG	CS-137	3.37	0.00	PCI/G	GAMMASPEC	3.37
MISS040D	08/25/99	11/16/99	99G0018		4.5	DRY	REG	RA-226	6.14	0.00	PCI/G	GAMMASPEC	6.14
MISS040D	08/25/99	11/16/99	99G0018		4.5	DRY	REG	AC-227	19.90	0.00	PCI/G	GAMMASPEC	19.90
MISS040D	08/25/99	11/16/99	99G0018		4.5	DRY	REG	RA-228	11.30	0.00	PCI/G	GAMMASPEC	11.30
MISS040D	08/25/99	11/16/99	99G0018		4.5	DRY	REG	TH-228	11.30	0.00	PCI/G	GAMMASPEC	11.30
MISS040D	08/25/99	11/16/99	99G0018		4.5	DRY	REG	TH-232	11.30	0.00	PCI/G	GAMMASPEC	11.30
MISS040D	08/25/99	11/16/99	99G0018		4.5	DRY	REG	TH-230	745.00	0.00	PCI/G	GAMMASPEC	745.00
MISS040D	08/25/99	11/16/99	99G0018		4.5	DRY	REG	PA-231	86.50	0.00	PCI/G	GAMMASPEC	86.50
MISS040D	08/25/99	11/16/99	99G0018		4.5	DRY	REG	U-235	4.24	1.26	PCI/G	GAMMASPEC	4.24
MISS040D	08/25/99	11/16/99	99G0018		4.5	DRY	REG	U-238	87.60	0.00	PCI/G	GAMMASPEC	87.60
MISS040D	08/25/99	11/16/99	99G0018		4.5	DRY	REG	AM-241	9.99	0.00	PCI/G	GAMMASPEC	9.99
MISS052D	08/31/99	11/15/99	99G0018		13.1	DRY	REG	K-40	28.52	6.67	PCI/G	GAMMASPEC	17.60
MISS052D	08/31/99	11/15/99	99G0018		13.1	DRY	REG	CS-137	1.35	0.00	PCI/G	GAMMASPEC	1.35
MISS052D	08/31/99	11/15/99	99G0018		13.1	DRY	REG	RA-226	4.90	0.59	PCI/G	GAMMASPEC	2.08
MISS052D	08/31/99	11/15/99	99G0018		13.1	DRY	REG	AC-227	12.10	0.00	PCI/G	GAMMASPEC	12.10
MISS052D	08/31/99	11/15/99	99G0018		13.1	DRY	REG	RA-228	10.36	0.92	PCI/G	GAMMASPEC	3.42
MISS052D	08/31/99	11/15/99	99G0018		13.1	DRY	REG	TH-228	10.36	0.92	PCI/G	GAMMASPEC	3.42
MISS052D	08/31/99	11/15/99	99G0018		13.1	DRY	REG	TH-232	10.36	0.92	PCI/G	GAMMASPEC	3.42
MISS052D	08/31/99	11/15/99	99G0018		13.1	DRY	REG	TH-230	312.00	0.00	PCI/G	GAMMASPEC	312.00

Approved by: ______________________ Date: ______________

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T ·sults listed at the MDA should have been reported at the actual measuremer

Location:	MAYWOOD		
Site WBS:	12B	Date Entered:	11/21/99
Work Order Number:	99G0018		
Project Number:			
Environmental Cat:	RI		

Sample ID	Date Collected	Date Analyzed	SDG ID	LAB ID	Vol.	W/D	Sample Type	Analyte	Result	Error	Units	Analytical Method	MDA
MISS052D	08/31/99	11/15/99	99G0018		13.1	DRY	REG	PA-231	38.00	0.00	PCI/G	GAMMASPEC	38.00
MISS052D	08/31/99	11/15/99	99G0018		13.1	DRY	REG	U-235	1.44	0.43	PCI/G	GAMMASPEC	1.44
MISS052D	08/31/99	11/15/99	99G0018		13.1	DRY	REG	U-238	35.40	0.00	PCI/G	GAMMASPEC	35.40
MISS052D	08/31/99	11/15/99	99G0018		13.1	DRY	REG	AM-241	3.93	0.00	PCI/G	GAMMASPEC	3.93
MISS052E	08/31/99	11/17/99	99G0018		16.8	DRY	REG	K-40	17.60	5.61	PCI/G	GAMMASPEC	17.60
MISS052E	08/31/99	11/17/99	99G0018		16.8	DRY	REG	CS-137	1.45	0.00	PCI/G	GAMMASPEC	1.45
MISS052E	08/31/99	11/17/99	99G0018		16.8	DRY	REG	RA-226	6.88	0.56	PCI/G	GAMMASPEC	1.93
MISS052E	08/31/99	11/17/99	99G0018		16.8	DRY	REG	AC-227	11.70	0.00	PCI/G	GAMMASPEC	11.70
MISS052E	08/31/99	11/17/99	99G0018		16.8	DRY	REG	RA-228	23.98	1.07	PCI/G	GAMMASPEC	3.72
MISS052E	08/31/99	11/17/99	99G0018		16.8	DRY	REG	TH-228	23.98	1.07	PCI/G	GAMMASPEC	3.72
MISS052E	08/31/99	11/17/99	99G0018		16.8	DRY	REG	TH-232	23.98	1.07	PCI/G	GAMMASPEC	3.72
MISS052E	08/31/99	11/17/99	99G0018		16.8	DRY	REG	TH-230	320.00	0.00	PCI/G	GAMMASPEC	320.00
MISS052E	08/31/99	11/17/99	99G0018		16.8	DRY	REG	PA-231	37.50	0.00	PCI/G	GAMMASPEC	37.50
MISS052E	08/31/99	11/17/99	99G0018		16.8	DRY	REG	U-235	1.25	0.39	PCI/G	GAMMASPEC	1.25
MISS052E	08/31/99	11/17/99	99G0018		16.8	DRY	REG	U-238	32.60	9.41	PCI/G	GAMMASPEC	32.60
MISS052E	08/31/99	11/17/99	99G0018		16.8	DRY	REG	AM-241	3.89	0.00	PCI/G	GAMMASPEC	3.89
MISS059D	08/31/99	11/17/99	99G0018		5.0	DRY	REG	K-40	67.90	0.00	PCI/G	GAMMASPEC	67.90
MISS059D	08/31/99	11/17/99	99G0018		5.0	DRY	REG	CS-137	3.18	0.00	PCI/G	GAMMASPEC	3.18
MISS059D	08/31/99	11/17/99	99G0018		5.0	DRY	REG	RA-226	5.87	0.00	PCI/G	GAMMASPEC	5.87
MISS059D	08/31/99	11/17/99	99G0018		5.0	DRY	REG	AC-227	23.80	0.00	PCI/G	GAMMASPEC	23.80
MISS059D	08/31/99	11/17/99	99G0018		5.0	DRY	REG	RA-228	12.00	0.00	PCI/G	GAMMASPEC	12.00
MISS059D	08/31/99	11/17/99	99G0018		5.0	DRY	REG	TH-228	12.00	0.00	PCI/G	GAMMASPEC	12.00
MISS059D	08/31/99	11/17/99	99G0018		5.0	DRY	REG	TH-232	12.00	0.00	PCI/G	GAMMASPEC	12.00
MISS059D	08/31/99	11/17/99	99G0018		5.0	DRY	REG	TH-230	661.00	0.00	PCI/G	GAMMASPEC	661.00
MISS059D	08/31/99	11/17/99	99G0018		5.0	DRY	REG	PA-231	85.60	0.00	PCI/G	GAMMASPEC	85.60
MISS059D	08/31/99	11/17/99	99G0018		5.0	DRY	REG	U-235	3.62	0.00	PCI/G	GAMMASPEC	3.62
MISS059D	08/31/99	11/17/99	99G0018		5.0	DRY	REG	U-238	80.50	0.00	PCI/G	GAMMASPEC	80.50
MISS059D	08/31/99	11/17/99	99G0018		5.0	DRY	REG	AM-241	8.18	0.00	PCI/G	GAMMASPEC	8.18

Approved by: ______________________ Date: ______________

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Location:	MAYWOOD		
Site WBS:	12B	Date Entered:	11/21/99
Work Order Number:	99G0018		
Project Number:			
Environmental Cat:	RI		

Sample ID	Date Collected	Date Analyzed	SDG ID	LAB ID	Vol.	W/D	Sample Type	Analyte	Result	Error	Units	Analytical Method	MDA
MISS059E	08/31/99	11/17/99	99G0018		6.9	DRY	REG	K-40	41.70	12.48	PCI/G	GAMMASPEC	41.70
MISS059E	08/31/99	11/17/99	99G0018		6.9	DRY	REG	CS-137	2.51	0.00	PCI/G	GAMMASPEC	2.51
MISS059E	08/31/99	11/17/99	99G0018		6.9	DRY	REG	RA-226	4.73	0.00	PCI/G	GAMMASPEC	4.73
MISS059E	08/31/99	11/17/99	99G0018		6.9	DRY	REG	AC-227	20.50	0.00	PCI/G	GAMMASPEC	20.50
MISS059E	08/31/99	11/17/99	99G0018		6.9	DRY	REG	RA-228	15.19	1.81	PCI/G	GAMMASPEC	7.02
MISS059E	08/31/99	11/17/99	99G0018		6.9	DRY	REG	TH-228	15.19	1.81	PCI/G	GAMMASPEC	7.02
MISS059E	08/31/99	11/17/99	99G0018		6.9	DRY	REG	TH-232	15.19	1.81	PCI/G	GAMMASPEC	7.02
MISS059E	08/31/99	11/17/99	99G0018		6.9	DRY	REG	TH-230	569.00	0.00	PCI/G	GAMMASPEC	569.00
MISS059E	08/31/99	11/17/99	99G0018		6.9	DRY	REG	PA-231	70.60	0.00	PCI/G	GAMMASPEC	70.60
MISS059E	08/31/99	11/17/99	99G0018		6.9	DRY	REG	U-235	2.48	0.77	PCI/G	GAMMASPEC	2.48
MISS059E	08/31/99	11/17/99	99G0018		6.9	DRY	REG	U-238	60.60	0.00	PCI/G	GAMMASPEC	60.60
MISS059E	08/31/99	11/17/99	99G0018		6.9	DRY	REG	AM-241	6.37	0.00	PCI/G	GAMMASPEC	6.37
MISS091D	08/18/99	11/18/99	99G0018		10.0	DRY	REG	K-40	33.90	0.00	PCI/G	GAMMASPEC	33.90
MISS091D	08/18/99	11/18/99	99G0018		10.0	DRY	REG	CS-137	1.75	0.00	PCI/G	GAMMASPEC	1.75
MISS091D	08/18/99	11/18/99	99G0018		10.0	DRY	REG	RA-226	4.53	0.59	PCI/G	GAMMASPEC	1.91
MISS091D	08/18/99	11/18/99	99G0018		10.0	DRY	REG	AC-227	10.90	0.00	PCI/G	GAMMASPEC	10.90
MISS091D	08/18/99	11/18/99	99G0018		10.0	DRY	REG	RA-228	5.61	0.00	PCI/G	GAMMASPEC	5.61
MISS091D	08/18/99	11/18/99	99G0018		10.0	DRY	REG	TH-228	5.61	0.00	PCI/G	GAMMASPEC	5.61
MISS091D	08/18/99	11/18/99	99G0018		10.0	DRY	REG	TH-232	5.61	0.00	PCI/G	GAMMASPEC	5.61
MISS091D	08/18/99	11/18/99	99G0018		10.0	DRY	REG	TH-230	346.00	0.00	PCI/G	GAMMASPEC	346.00
MISS091D	08/18/99	11/18/99	99G0018		10.0	DRY	REG	PA-231	45.40	0.00	PCI/G	GAMMASPEC	45.40
MISS091D	08/18/99	11/18/99	99G0018		10.0	DRY	REG	U-235	1.67	0.53	PCI/G	GAMMASPEC	1.67
MISS091D	08/18/99	11/18/99	99G0018		10.0	DRY	REG	U-238	40.70	12.58	PCI/G	GAMMASPEC	40.70
MISS091D	08/18/99	11/18/99	99G0018		10.0	DRY	REG	AM-241	4.72	0.00	PCI/G	GAMMASPEC	4.72
MISS091D	08/18/99	11/18/99	99G0018		10.0	DRY	LREP	K-40	22.40	7.00	PCI/G	GAMMASPEC	22.40
MISS091D	08/18/99	11/18/99	99G0018		10.0	DRY	LREP	CS-137	1.53	0.00	PCI/G	GAMMASPEC	1.53
MISS091D	08/18/99	11/18/99	99G0018		10.0	DRY	LREP	RA-226	3.48	0.58	PCI/G	GAMMASPEC	2.23
MISS091D	08/18/99	11/18/99	99G0018		10.0	DRY	LREP	AC-227	10.80	0.00	PCI/G	GAMMASPEC	10.80

Approved by: ______________________ Date: ____________

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T[illegible] results listed at the MDA should have been reported at the actual measuremer

Location:	MAYWOOD		
Site WBS:	12B	Date Entered:	11/21/99
Work Order Number:	99G0018		
Project Number:			
Environmental Cat:	RI		

Sample ID	Date Collected	Date Analyzed	SDG ID	LAB ID	Vol.	W/D	Sample Type	Analyte	Result	Error	Units	Analytical Method	MDA
MISS091D	08/18/99	11/18/99	99G0018		10.0	DRY	LREP	RA-228	4.28	0.97	PCI/G	GAMMASPEC	3.86
MISS091D	08/18/99	11/18/99	99G0018		10.0	DRY	LREP	TH-228	4.28	0.97	PCI/G	GAMMASPEC	3.86
MISS091D	08/18/99	11/18/99	99G0018		10.0	DRY	LREP	TH-232	4.28	0.97	PCI/G	GAMMASPEC	3.86
MISS091D	08/18/99	11/18/99	99G0018		10.0	DRY	LREP	TH-230	369.00	0.00	PCI/G	GAMMASPEC	369.00
MISS091D	08/18/99	11/18/99	99G0018		10.0	DRY	LREP	PA-231	42.00	0.00	PCI/G	GAMMASPEC	42.00
MISS091D	08/18/99	11/18/99	99G0018		10.0	DRY	LREP	U-235	1.69	0.52	PCI/G	GAMMASPEC	1.69
MISS091D	08/18/99	11/18/99	99G0018		10.0	DRY	LREP	U-238	40.80	0.00	PCI/G	GAMMASPEC	40.80
MISS091D	08/18/99	11/18/99	99G0018		10.0	DRY	LREP	AM-241	4.46	0.00	PCI/G	GAMMASPEC	4.46
MISS091E	08/18/99	11/17/99	99G0018		17.6	DRY	REG	K-40	14.90	4.43	PCI/G	GAMMASPEC	14.90
MISS091E	08/18/99	11/17/99	99G0018		17.6	DRY	REG	CS-137	0.93	0.00	PCI/G	GAMMASPEC	0.93
MISS091E	08/18/99	11/17/99	99G0018		17.6	DRY	REG	RA-226	2.39	0.37	PCI/G	GAMMASPEC	1.39
MISS091E	08/18/99	11/17/99	99G0018		17.6	DRY	REG	AC-227	6.38	0.00	PCI/G	GAMMASPEC	6.38
MISS091E	08/18/99	11/17/99	99G0018		17.6	DRY	REG	RA-228	3.66	0.57	PCI/G	GAMMASPEC	1.93
MISS091E	08/18/99	11/17/99	99G0018		17.6	DRY	REG	TH-228	3.66	0.57	PCI/G	GAMMASPEC	1.93
MISS091E	08/18/99	11/17/99	99G0018		17.6	DRY	REG	TH-232	3.66	0.57	PCI/G	GAMMASPEC	1.93
MISS091E	08/18/99	11/17/99	99G0018		17.6	DRY	REG	TH-230	203.00	0.00	PCI/G	GAMMASPEC	203.00
MISS091E	08/18/99	11/17/99	99G0018		17.6	DRY	REG	PA-231	24.80	0.00	PCI/G	GAMMASPEC	24.80
MISS091E	08/18/99	11/17/99	99G0018		17.6	DRY	REG	U-235	1.31	0.29	PCI/G	GAMMASPEC	0.88
MISS091E	08/18/99	11/17/99	99G0018		17.6	DRY	REG	U-238	28.64	7.18	PCI/G	GAMMASPEC	21.60
MISS091E	08/18/99	11/17/99	99G0018		17.6	DRY	REG	AM-241	2.61	0.00	PCI/G	GAMMASPEC	2.61
MISS53D	08/31/99	11/17/99	99G0018		14.0	DRY	REG	K-40	21.40	6.61	PCI/G	GAMMASPEC	21.40
MISS53D	08/31/99	11/17/99	99G0018		14.0	DRY	REG	CS-137	1.25	0.00	PCI/G	GAMMASPEC	1.25
MISS53D	08/31/99	11/17/99	99G0018		14.0	DRY	REG	RA-226	2.50	0.00	PCI/G	GAMMASPEC	2.50
MISS53D	08/31/99	11/17/99	99G0018		14.0	DRY	REG	AC-227	9.20	0.00	PCI/G	GAMMASPEC	9.20
MISS53D	08/31/99	11/17/99	99G0018		14.0	DRY	REG	RA-228	7.72	0.76	PCI/G	GAMMASPEC	3.25
MISS53D	08/31/99	11/17/99	99G0018		14.0	DRY	REG	TH-228	7.72	0.76	PCI/G	GAMMASPEC	3.25
MISS53D	08/31/99	11/17/99	99G0018		14.0	DRY	REG	TH-232	7.72	0.76	PCI/G	GAMMASPEC	3.25
MISS53D	08/31/99	11/17/99	99G0018		14.0	DRY	REG	TH-230	264.00	0.00	PCI/G	GAMMASPEC	264.00

Approved by: ______________________ Date: ______________

Equivalent values in the "Result" and "MDA" columns indicate that the analyte was either undetected or detected at a level below the MDA. The results listed at the MDA should have been reported at the actual measurement.

Location:	MAYWOOD		
Site WBS:	12B	Date Entered:	11/21/99
Work Order Number:	99G0018		
Project Number:			
Environmental Cat:	RI		

Sample ID	Date Collected	Date Analyzed	SDG ID	LAB ID	Vol.	W/D	Sample Type	Analyte	Result	Error	Units	Analytical Method	MDA
MISS53D	08/31/99	11/17/99	99G0018		14.0	DRY	REG	PA-231	34.50	0.00	PCI/G	GAMMASPEC	34.50
MISS53D	08/31/99	11/17/99	99G0018		14.0	DRY	REG	U-235	1.04	0.30	PCI/G	GAMMASPEC	1.04
MISS53D	08/31/99	11/17/99	99G0018		14.0	DRY	REG	U-238	30.60	0.00	PCI/G	GAMMASPEC	30.60
MISS53D	08/31/99	11/17/99	99G0018		14.0	DRY	REG	AM-241	3.46	0.00	PCI/G	GAMMASPEC	3.46
MISS53E	08/31/99	11/17/99	99G0018		32.6	DRY	REG	K-40	14.01	2.87	PCI/G	GAMMASPEC	7.27
MISS53E	08/31/99	11/17/99	99G0018		32.6	DRY	REG	CS-137	0.63	0.00	PCI/G	GAMMASPEC	0.63
MISS53E	08/31/99	11/17/99	99G0018		32.6	DRY	REG	RA-226	1.75	0.25	PCI/G	GAMMASPEC	0.97
MISS53E	08/31/99	11/17/99	99G0018		32.6	DRY	REG	AC-227	4.81	0.00	PCI/G	GAMMASPEC	4.81
MISS53E	08/31/99	11/17/99	99G0018		32.6	DRY	REG	RA-228	7.10	0.43	PCI/G	GAMMASPEC	1.47
MISS53E	08/31/99	11/17/99	99G0018		32.6	DRY	REG	TH-228	7.10	0.43	PCI/G	GAMMASPEC	1.47
MISS53E	08/31/99	11/17/99	99G0018		32.6	DRY	REG	TH-232	7.10	0.43	PCI/G	GAMMASPEC	1.47
MISS53E	08/31/99	11/17/99	99G0018		32.6	DRY	REG	TH-230	152.00	0.00	PCI/G	GAMMASPEC	152.00
MISS53E	08/31/99	11/17/99	99G0018		32.6	DRY	REG	PA-231	15.70	0.00	PCI/G	GAMMASPEC	15.70
MISS53E	08/31/99	11/17/99	99G0018		32.6	DRY	REG	U-235	0.68	0.00	PCI/G	GAMMASPEC	0.68
MISS53E	08/31/99	11/17/99	99G0018		32.6	DRY	REG	U-238	15.00	0.00	PCI/G	GAMMASPEC	15.00
MISS53E	08/31/99	11/17/99	99G0018		32.6	DRY	REG	AM-241	1.82	0.00	PCI/G	GAMMASPEC	1.82
MISS55D	08/31/99	11/17/99	99G0018		21.2	DRY	REG	K-40	24.96	4.48	PCI/G	GAMMASPEC	10.50
MISS55D	08/31/99	11/17/99	99G0018		21.2	DRY	REG	CS-137	0.98	0.00	PCI/G	GAMMASPEC	0.98
MISS55D	08/31/99	11/17/99	99G0018		21.2	DRY	REG	RA-226	2.79	0.37	PCI/G	GAMMASPEC	1.38
MISS55D	08/31/99	11/17/99	99G0018		21.2	DRY	REG	AC-227	7.21	0.00	PCI/G	GAMMASPEC	7.21
MISS55D	08/31/99	11/17/99	99G0018		21.2	DRY	REG	RA-228	5.72	0.56	PCI/G	GAMMASPEC	2.33
MISS55D	08/31/99	11/17/99	99G0018		21.2	DRY	REG	TH-228	5.72	0.56	PCI/G	GAMMASPEC	2.33
MISS55D	08/31/99	11/17/99	99G0018		21.2	DRY	REG	TH-232	5.72	0.56	PCI/G	GAMMASPEC	2.33
MISS55D	08/31/99	11/17/99	99G0018		21.2	DRY	REG	TH-230	185.00	0.00	PCI/G	GAMMASPEC	185.00
MISS55D	08/31/99	11/17/99	99G0018		21.2	DRY	REG	PA-231	25.20	0.00	PCI/G	GAMMASPEC	25.20
MISS55D	08/31/99	11/17/99	99G0018		21.2	DRY	REG	U-235	1.10	0.26	PCI/G	GAMMASPEC	0.80
MISS55D	08/31/99	11/17/99	99G0018		21.2	DRY	REG	U-238	19.90	0.00	PCI/G	GAMMASPEC	19.90
MISS55D	08/31/99	11/17/99	99G0018		21.2	DRY	REG	AM-241	2.33	0.00	PCI/G	GAMMASPEC	2.33

Approved by: ______________________ Date: ____________

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Location:	MAYWOOD		
Site WBS:	12B	Date Entered:	11/21/99
Work Order Number:	99G0018		
Project Number:			
Environmental Cat:	RI		

Sample ID	Date Collected	Date Analyzed	SDG ID	LAB ID	Vol.	W/D	Sample Type	Analyte	Result	Error	Units	Analytical Method	MDA
QCBLANK	11/18/99	11/18/99	99G0018		945.0	DRY	BL	K-40	0.43	0.00	PCI/G	GAMMASPEC	0.43
QCBLANK	11/18/99	11/18/99	99G0018		945.0	DRY	BL	CS-137	0.02	0.00	PCI/G	GAMMASPEC	0.02
QCBLANK	11/18/99	11/18/99	99G0018		945.0	DRY	BL	RA-226	0.05	0.00	PCI/G	GAMMASPEC	0.05
QCBLANK	11/18/99	11/18/99	99G0018		945.0	DRY	BL	AC-227	0.16	0.00	PCI/G	GAMMASPEC	0.16
QCBLANK	11/18/99	11/18/99	99G0018		945.0	DRY	BL	RA-228	0.07	0.00	PCI/G	GAMMASPEC	0.07
QCBLANK	11/18/99	11/18/99	99G0018		945.0	DRY	BL	TH-228	0.07	0.00	PCI/G	GAMMASPEC	0.07
QCBLANK	11/18/99	11/18/99	99G0018		945.0	DRY	BL	TH-232	0.07	0.00	PCI/G	GAMMASPEC	0.07
QCBLANK	11/18/99	11/18/99	99G0018		945.0	DRY	BL	TH-230	6.66	0.00	PCI/G	GAMMASPEC	6.66
QCBLANK	11/18/99	11/18/99	99G0018		945.0	DRY	BL	PA-231	0.73	0.00	PCI/G	GAMMASPEC	0.73
QCBLANK	11/18/99	11/18/99	99G0018		945.0	DRY	BL	U-235	0.03	0.00	PCI/G	GAMMASPEC	0.03
QCBLANK	11/18/99	11/18/99	99G0018		945.0	DRY	BL	U-238	0.75	0.00	PCI/G	GAMMASPEC	0.75
QCBLANK	11/18/99	11/18/99	99G0018		945.0	DRY	BL	AM-241	0.07	0.00	PCI/G	GAMMASPEC	0.07
QCSPIKEP	04/01/99	11/18/99	99G0018		150.0	DRY	LCSF	CS-137	385.09	13.36	PCI/G	GAMMASPEC	5.00
QCSPIKEP	04/01/99	11/18/99	99G0018		150.0	DRY	LCSF	AM-241	827.41	41.74	PCI/G	GAMMASPEC	14.40
QCSPIKEP	04/01/99	11/18/99	99G0018		150.0	DRY	LCST	CS-137	352.02	16.54	PCI/G	GAMMASPEC	5.00
QCSPIKEP	04/01/99	11/18/99	99G0018		150.0	DRY	LCST	AM-241	849.21	42.46	PCI/G	GAMMASPEC	14.40

Approved by: ______________________ Date: ______________

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Location:	MAYWOOD		
Site WBS:	12B	Date Entered:	12/1/99
Work Order Number:	99G0019		
Project Number:			
Environmental Cat:	RI		

Sample ID	Date Collected	Date Analyzed	SDG ID	LAB ID	Vol.	W/D	Sample Type	Analyte	Result	Error	Units	Analytical Method	MDA
MISS020C	08/23/99	11/19/99	99G0019		92.5	DRY	REG	K-40	18.94	1.82	PCI/G	GAMMASPEC	3.41
MISS020C	08/23/99	11/19/99	99G0019		92.5	DRY	REG	CS-137	0.26	0.00	PCI/G	GAMMASPEC	0.26
MISS020C	08/23/99	11/19/99	99G0019		92.5	DRY	REG	RA-226	1.33	0.11	PCI/G	GAMMASPEC	0.35
MISS020C	08/23/99	11/19/99	99G0019		92.5	DRY	REG	AC-227	2.01	0.00	PCI/G	GAMMASPEC	2.01
MISS020C	08/23/99	11/19/99	99G0019		92.5	DRY	REG	RA-228	2.32	0.16	PCI/G	GAMMASPEC	0.48
MISS020C	08/23/99	11/19/99	99G0019		92.5	DRY	REG	TH-228	2.32	0.16	PCI/G	GAMMASPEC	0.48
MISS020C	08/23/99	11/19/99	99G0019		92.5	DRY	REG	TH-232	2.32	0.16	PCI/G	GAMMASPEC	0.48
MISS020C	08/23/99	11/19/99	99G0019		92.5	DRY	REG	TH-230	53.30	0.00	PCI/G	GAMMASPEC	53.30
MISS020C	08/23/99	11/19/99	99G0019		92.5	DRY	REG	PA-231	6.37	0.00	PCI/G	GAMMASPEC	6.37
MISS020C	08/23/99	11/19/99	99G0019		92.5	DRY	REG	U-235	0.22	0.07	PCI/G	GAMMASPEC	0.22
MISS020C	08/23/99	11/19/99	99G0019		92.5	DRY	REG	U-238	5.71	0.00	PCI/G	GAMMASPEC	5.71
MISS020C	08/23/99	11/19/99	99G0019		92.5	DRY	REG	AM-241	0.68	0.00	PCI/G	GAMMASPEC	0.68
MISS034C	08/25/99	11/18/99	99G0019		44.8	DRY	REG	K-40	18.53	2.75	PCI/G	GAMMASPEC	6.41
MISS034C	08/25/99	11/18/99	99G0019		44.8	DRY	REG	CS-137	0.50	0.00	PCI/G	GAMMASPEC	0.50
MISS034C	08/25/99	11/18/99	99G0019		44.8	DRY	REG	RA-226	2.19	0.18	PCI/G	GAMMASPEC	0.64
MISS034C	08/25/99	11/18/99	99G0019		44.8	DRY	REG	AC-227	3.86	0.00	PCI/G	GAMMASPEC	3.86
MISS034C	08/25/99	11/18/99	99G0019		44.8	DRY	REG	RA-228	3.65	0.29	PCI/G	GAMMASPEC	1.10
MISS034C	08/25/99	11/18/99	99G0019		44.8	DRY	REG	TH-228	3.65	0.29	PCI/G	GAMMASPEC	1.10
MISS034C	08/25/99	11/18/99	99G0019		44.8	DRY	REG	TH-232	3.65	0.29	PCI/G	GAMMASPEC	1.10
MISS034C	08/25/99	11/18/99	99G0019		44.8	DRY	REG	TH-230	94.60	0.00	PCI/G	GAMMASPEC	94.60
MISS034C	08/25/99	11/18/99	99G0019		44.8	DRY	REG	PA-231	13.00	0.00	PCI/G	GAMMASPEC	13.00
MISS034C	08/25/99	11/18/99	99G0019		44.8	DRY	REG	U-235	0.45	0.13	PCI/G	GAMMASPEC	0.45
MISS034C	08/25/99	11/18/99	99G0019		44.8	DRY	REG	U-238	10.40	0.00	PCI/G	GAMMASPEC	10.40
MISS034C	08/25/99	11/18/99	99G0019		44.8	DRY	REG	AM-241	1.33	0.00	PCI/G	GAMMASPEC	1.33
MISS036C	08/25/99	11/19/99	99G0019		98.9	DRY	REG	K-40	19.69	1.78	PCI/G	GAMMASPEC	3.14
MISS036C	08/25/99	11/19/99	99G0019		98.9	DRY	REG	CS-137	0.25	0.00	PCI/G	GAMMASPEC	0.25
MISS036C	08/25/99	11/19/99	99G0019		98.9	DRY	REG	RA-226	1.32	0.11	PCI/G	GAMMASPEC	0.37
MISS036C	08/25/99	11/19/99	99G0019		98.9	DRY	REG	AC-227	1.78	0.00	PCI/G	GAMMASPEC	1.78

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Location:	MAYWOOD		
Site WBS:	12B	Date Entered:	12/1/99
Work Order Number:	99G0019		
Project Number:			
Environmental Cat:	RI		

Sample ID	Date Collected	Date Analyzed	SDG ID	LAB ID	Vol.	W/D	Sample Type	Analyte	Result	Error	Units	Analytical Method	MDA
MISS036C	08/25/99	11/19/99	99G0019		98.9	DRY	REG	RA-228	2.75	0.16	PCI/G	GAMMASPEC	0.53
MISS036C	08/25/99	11/19/99	99G0019		98.9	DRY	REG	TH-228	2.75	0.16	PCI/G	GAMMASPEC	0.53
MISS036C	08/25/99	11/19/99	99G0019		98.9	DRY	REG	TH-232	2.75	0.16	PCI/G	GAMMASPEC	0.53
MISS036C	08/25/99	11/19/99	99G0019		98.9	DRY	REG	TH-230	53.60	0.00	PCI/G	GAMMASPEC	53.60
MISS036C	08/25/99	11/19/99	99G0019		98.9	DRY	REG	PA-231	6.51	0.00	PCI/G	GAMMASPEC	6.51
MISS036C	08/25/99	11/19/99	99G0019		98.9	DRY	REG	U-235	0.42	0.07	PCI/G	GAMMASPEC	0.20
MISS036C	08/25/99	11/19/99	99G0019		98.9	DRY	REG	U-238	5.96	1.70	PCI/G	GAMMASPEC	5.30
MISS036C	08/25/99	11/19/99	99G0019		98.9	DRY	REG	AM-241	0.66	0.00	PCI/G	GAMMASPEC	0.66
MISS037C	08/25/99	11/18/99	99G0019		81.8	DRY	REG	K-40	8.18	1.31	PCI/G	GAMMASPEC	3.01
MISS037C	08/25/99	11/18/99	99G0019		81.8	DRY	REG	CS-137	0.24	0.00	PCI/G	GAMMASPEC	0.24
MISS037C	08/25/99	11/18/99	99G0019		81.8	DRY	REG	RA-226	0.84	0.10	PCI/G	GAMMASPEC	0.34
MISS037C	08/25/99	11/18/99	99G0019		81.8	DRY	REG	AC-227	1.91	0.00	PCI/G	GAMMASPEC	1.91
MISS037C	08/25/99	11/18/99	99G0019		81.8	DRY	REG	RA-228	2.13	0.17	PCI/G	GAMMASPEC	0.65
MISS037C	08/25/99	11/18/99	99G0019		81.8	DRY	REG	TH-228	2.13	0.17	PCI/G	GAMMASPEC	0.65
MISS037C	08/25/99	11/18/99	99G0019		81.8	DRY	REG	TH-232	2.13	0.17	PCI/G	GAMMASPEC	0.65
MISS037C	08/25/99	11/18/99	99G0019		81.8	DRY	REG	TH-230	56.80	0.00	PCI/G	GAMMASPEC	56.80
MISS037C	08/25/99	11/18/99	99G0019		81.8	DRY	REG	PA-231	6.41	0.00	PCI/G	GAMMASPEC	6.41
MISS037C	08/25/99	11/18/99	99G0019		81.8	DRY	REG	U-235	0.26	0.07	PCI/G	GAMMASPEC	0.22
MISS037C	08/25/99	11/18/99	99G0019		81.8	DRY	REG	U-238	6.19	0.00	PCI/G	GAMMASPEC	6.19
MISS037C	08/25/99	11/18/99	99G0019		81.8	DRY	REG	AM-241	0.72	0.00	PCI/G	GAMMASPEC	0.72
MISS040E	08/25/99	11/19/99	99G0019		10.0	DRY	REG	K-40	21.90	7.02	PCI/G	GAMMASPEC	21.90
MISS040E	08/25/99	11/19/99	99G0019		10.0	DRY	REG	CS-137	1.80	0.00	PCI/G	GAMMASPEC	1.80
MISS040E	08/25/99	11/19/99	99G0019		10.0	DRY	REG	RA-226	3.41	0.67	PCI/G	GAMMASPEC	2.78
MISS040E	08/25/99	11/19/99	99G0019		10.0	DRY	REG	AC-227	13.70	0.00	PCI/G	GAMMASPEC	13.70
MISS040E	08/25/99	11/19/99	99G0019		10.0	DRY	REG	RA-228	8.86	1.02	PCI/G	GAMMASPEC	4.60
MISS040E	08/25/99	11/19/99	99G0019		10.0	DRY	REG	TH-228	8.86	1.02	PCI/G	GAMMASPEC	4.60
MISS040E	08/25/99	11/19/99	99G0019		10.0	DRY	REG	TH-232	8.86	1.02	PCI/G	GAMMASPEC	4.60
MISS040E	08/25/99	11/19/99	99G0019		10.0	DRY	REG	TH-230	354.00	0.00	PCI/G	GAMMASPEC	354.00

Approved by: ________________ Date: ________

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Location:	MAYWOOD		
Site WBS:	12B	Date Entered:	12/1/99
Work Order Number:	99G0019		
Project Number:			
Environmental Cat:	RI		

Sample ID	Date Collected	Date Analyzed	SDG ID	LAB ID	Vol.	W/D	Sample Type	Analyte	Result	Error	Units	Analytical Method	MDA
MISS040E	08/25/99	11/19/99	99G0019		10.0	DRY	REG	PA-231	45.40	0.00	PCI/G	GAMMASPEC	45.40
MISS040E	08/25/99	11/19/99	99G0019		10.0	DRY	REG	U-235	1.76	0.53	PCI/G	GAMMASPEC	1.76
MISS040E	08/25/99	11/19/99	99G0019		10.0	DRY	REG	U-238	40.30	11.47	PCI/G	GAMMASPEC	40.30
MISS040E	08/25/99	11/19/99	99G0019		10.0	DRY	REG	AM-241	4.98	0.00	PCI/G	GAMMASPEC	4.98
MISS052C	08/31/99	11/19/99	99G0019		113.2	DRY	REG	K-40	21.78	1.77	PCI/G	GAMMASPEC	2.97
MISS052C	08/31/99	11/19/99	99G0019		113.2	DRY	REG	CS-137	0.30	0.00	PCI/G	GAMMASPEC	0.30
MISS052C	08/31/99	11/19/99	99G0019		113.2	DRY	REG	RA-226	2.85	0.14	PCI/G	GAMMASPEC	0.43
MISS052C	08/31/99	11/19/99	99G0019		113.2	DRY	REG	AC-227	2.40	0.00	PCI/G	GAMMASPEC	2.40
MISS052C	08/31/99	11/19/99	99G0019		113.2	DRY	REG	RA-228	10.56	0.30	PCI/G	GAMMASPEC	0.76
MISS052C	08/31/99	11/19/99	99G0019		113.2	DRY	REG	TH-228	10.56	0.30	PCI/G	GAMMASPEC	0.76
MISS052C	08/31/99	11/19/99	99G0019		113.2	DRY	REG	TH-232	10.56	0.30	PCI/G	GAMMASPEC	0.76
MISS052C	08/31/99	11/19/99	99G0019		113.2	DRY	REG	TH-230	79.40	0.00	PCI/G	GAMMASPEC	79.40
MISS052C	08/31/99	11/19/99	99G0019		113.2	DRY	REG	PA-231	8.92	0.00	PCI/G	GAMMASPEC	8.92
MISS052C	08/31/99	11/19/99	99G0019		113.2	DRY	REG	U-235	0.34	0.09	PCI/G	GAMMASPEC	0.29
MISS052C	08/31/99	11/19/99	99G0019		113.2	DRY	REG	U-238	7.94	0.00	PCI/G	GAMMASPEC	7.94
MISS052C	08/31/99	11/19/99	99G0019		113.2	DRY	REG	AM-241	0.96	0.00	PCI/G	GAMMASPEC	0.96
MISS053C	08/31/99	11/18/99	99G0019		91.0	DRY	REG	K-40	12.22	1.72	PCI/G	GAMMASPEC	4.29
MISS053C	08/31/99	11/18/99	99G0019		91.0	DRY	REG	CS-137	0.39	0.00	PCI/G	GAMMASPEC	0.39
MISS053C	08/31/99	11/18/99	99G0019		91.0	DRY	REG	RA-226	2.21	0.15	PCI/G	GAMMASPEC	0.53
MISS053C	08/31/99	11/18/99	99G0019		91.0	DRY	REG	AC-227	3.17	0.00	PCI/G	GAMMASPEC	3.17
MISS053C	08/31/99	11/18/99	99G0019		91.0	DRY	REG	RA-228	14.59	0.37	PCI/G	GAMMASPEC	0.97
MISS053C	08/31/99	11/18/99	99G0019		91.0	DRY	REG	TH-228	14.59	0.37	PCI/G	GAMMASPEC	0.97
MISS053C	08/31/99	11/18/99	99G0019		91.0	DRY	REG	TH-232	14.59	0.37	PCI/G	GAMMASPEC	0.97
MISS053C	08/31/99	11/18/99	99G0019		91.0	DRY	REG	TH-230	99.70	0.00	PCI/G	GAMMASPEC	99.70
MISS053C	08/31/99	11/18/99	99G0019		91.0	DRY	REG	PA-231	10.90	0.00	PCI/G	GAMMASPEC	10.90
MISS053C	08/31/99	11/18/99	99G0019		91.0	DRY	REG	U-235	0.36	0.11	PCI/G	GAMMASPEC	0.36
MISS053C	08/31/99	11/18/99	99G0019		91.0	DRY	REG	U-238	10.30	0.00	PCI/G	GAMMASPEC	10.30
MISS053C	08/31/99	11/18/99	99G0019		91.0	DRY	REG	AM-241	1.26	0.00	PCI/G	GAMMASPEC	1.26

Approved by: ______________________ Date: ______________

Equivalent values in the "Result" and "MDA" columns indicate that the analyte was either undetected or detected at a level below the MDA. The results listed at the MDA should have been reported at the actual measurement.

Location:	MAYWOOD		
Site WBS:	12B	Date Entered:	12/1/99
Work Order Number:	99G0019		
Project Number:			
Environmental Cat:	RI		

Sample ID	Date Collected	Date Analyzed	SDG ID	LAB ID	Vol.	W/D	Sample Type	Analyte	Result	Error	Units	Analytical Method	MDA
MISS055C	08/31/99	11/18/99	99G0019		116.2	DRY	REG	K-40	21.42	1.63	PCI/G	GAMMASPEC	2.32
MISS055C	08/31/99	11/18/99	99G0019		116.2	DRY	REG	CS-137	0.21	0.00	PCI/G	GAMMASPEC	0.21
MISS055C	08/31/99	11/18/99	99G0019		116.2	DRY	REG	RA-226	2.04	0.10	PCI/G	GAMMASPEC	0.30
MISS055C	08/31/99	11/18/99	99G0019		116.2	DRY	REG	AC-227	1.83	0.00	PCI/G	GAMMASPEC	1.83
MISS055C	08/31/99	11/18/99	99G0019		116.2	DRY	REG	RA-228	2.85	0.16	PCI/G	GAMMASPEC	0.49
MISS055C	08/31/99	11/18/99	99G0019		116.2	DRY	REG	TH-228	2.85	0.16	PCI/G	GAMMASPEC	0.49
MISS055C	08/31/99	11/18/99	99G0019		116.2	DRY	REG	TH-232	2.85	0.16	PCI/G	GAMMASPEC	0.49
MISS055C	08/31/99	11/18/99	99G0019		116.2	DRY	REG	TH-230	49.90	0.00	PCI/G	GAMMASPEC	49.90
MISS055C	08/31/99	11/18/99	99G0019		116.2	DRY	REG	PA-231	5.78	0.00	PCI/G	GAMMASPEC	5.78
MISS055C	08/31/99	11/18/99	99G0019		116.2	DRY	REG	U-235	0.37	0.07	PCI/G	GAMMASPEC	0.20
MISS055C	08/31/99	11/18/99	99G0019		116.2	DRY	REG	U-238	5.29	0.00	PCI/G	GAMMASPEC	5.29
MISS055C	08/31/99	11/18/99	99G0019		116.2	DRY	REG	AM-241	0.63	0.00	PCI/G	GAMMASPEC	0.63
MISS055E	08/31/99	11/18/99	99G0019		16.8	DRY	LREP	K-40	24.57	6.39	PCI/G	GAMMASPEC	18.30
MISS055E	08/31/99	11/18/99	99G0019		16.8	DRY	LREP	CS-137	1.11	0.00	PCI/G	GAMMASPEC	1.11
MISS055E	08/31/99	11/18/99	99G0019		16.8	DRY	LREP	RA-226	4.30	0.49	PCI/G	GAMMASPEC	1.79
MISS055E	08/31/99	11/18/99	99G0019		16.8	DRY	LREP	AC-227	9.80	0.00	PCI/G	GAMMASPEC	9.80
MISS055E	08/31/99	11/18/99	99G0019		16.8	DRY	LREP	RA-228	11.01	0.82	PCI/G	GAMMASPEC	2.80
MISS055E	08/31/99	11/18/99	99G0019		16.8	DRY	LREP	TH-228	11.01	0.82	PCI/G	GAMMASPEC	2.80
MISS055E	08/31/99	11/18/99	99G0019		16.8	DRY	LREP	TH-232	11.01	0.82	PCI/G	GAMMASPEC	2.80
MISS055E	08/31/99	11/18/99	99G0019		16.8	DRY	LREP	TH-230	251.00	0.00	PCI/G	GAMMASPEC	251.00
MISS055E	08/31/99	11/18/99	99G0019		16.8	DRY	LREP	PA-231	32.40	0.00	PCI/G	GAMMASPEC	32.40
MISS055E	08/31/99	11/18/99	99G0019		16.8	DRY	LREP	U-235	1.12	0.34	PCI/G	GAMMASPEC	1.12
MISS055E	08/31/99	11/18/99	99G0019		16.8	DRY	LREP	U-238	27.80	7.96	PCI/G	GAMMASPEC	27.80
MISS055E	08/31/99	11/18/99	99G0019		16.8	DRY	LREP	AM-241	3.21	0.00	PCI/G	GAMMASPEC	3.21
MISS055E	08/31/99	11/18/99	99G0019		16.8	DRY	REG	K-40	16.60	5.32	PCI/G	GAMMASPEC	16.60
MISS055E	08/31/99	11/18/99	99G0019		16.8	DRY	REG	CS-137	1.16	0.00	PCI/G	GAMMASPEC	1.16
MISS055E	08/31/99	11/18/99	99G0019		16.8	DRY	REG	RA-226	3.81	0.45	PCI/G	GAMMASPEC	1.71
MISS055E	08/31/99	11/18/99	99G0019		16.8	DRY	REG	AC-227	9.51	0.00	PCI/G	GAMMASPEC	9.51

Approved by: ____________________ Date: ____________

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Location:	MAYWOOD		
Site WBS:	12B	Date Entered:	12/1/99
Work Order Number:	99G0019		
Project Number:			
Environmental Cat:	RI		

Sample ID	Date Collected	Date Analyzed	SDG ID	LAB ID	Vol.	W/D	Sample Type	Analyte	Result	Error	Units	Analytical Method	MDA
MISS055E	08/31/99	11/18/99	99G0019		16.8	DRY	REG	RA-228	10.27	0.77	PCI/G	GAMMASPEC	2.57
MISS055E	08/31/99	11/18/99	99G0019		16.8	DRY	REG	TH-228	10.27	0.77	PCI/G	GAMMASPEC	2.57
MISS055E	08/31/99	11/18/99	99G0019		16.8	DRY	REG	TH-232	10.27	0.77	PCI/G	GAMMASPEC	2.57
MISS055E	08/31/99	11/18/99	99G0019		16.8	DRY	REG	TH-230	250.00	0.00	PCI/G	GAMMASPEC	250.00
MISS055E	08/31/99	11/18/99	99G0019		16.8	DRY	REG	PA-231	31.80	0.00	PCI/G	GAMMASPEC	31.80
MISS055E	08/31/99	11/18/99	99G0019		16.8	DRY	REG	U-235	1.21	0.35	PCI/G	GAMMASPEC	1.07
MISS055E	08/31/99	11/18/99	99G0019		16.8	DRY	REG	U-238	26.30	8.13	PCI/G	GAMMASPEC	26.30
MISS055E	08/31/99	11/18/99	99G0019		16.8	DRY	REG	AM-241	3.12	0.00	PCI/G	GAMMASPEC	3.12
MISS056D	08/31/99	11/19/99	99G0019		7.7	DRY	REG	K-40	34.00	10.59	PCI/G	GAMMASPEC	34.00
MISS056D	08/31/99	11/19/99	99G0019		7.7	DRY	REG	CS-137	2.52	0.00	PCI/G	GAMMASPEC	2.52
MISS056D	08/31/99	11/19/99	99G0019		7.7	DRY	REG	RA-226	10.58	1.07	PCI/G	GAMMASPEC	3.59
MISS056D	08/31/99	11/19/99	99G0019		7.7	DRY	REG	AC-227	22.30	0.00	PCI/G	GAMMASPEC	22.30
MISS056D	08/31/99	11/19/99	99G0019		7.7	DRY	REG	RA-228	37.54	1.94	PCI/G	GAMMASPEC	6.47
MISS056D	08/31/99	11/19/99	99G0019		7.7	DRY	REG	TH-228	37.54	1.94	PCI/G	GAMMASPEC	6.47
MISS056D	08/31/99	11/19/99	99G0019		7.7	DRY	REG	TH-232	37.54	1.94	PCI/G	GAMMASPEC	6.47
MISS056D	08/31/99	11/19/99	99G0019		7.7	DRY	REG	TH-230	584.00	0.00	PCI/G	GAMMASPEC	584.00
MISS056D	08/31/99	11/19/99	99G0019		7.7	DRY	REG	PA-231	74.80	0.00	PCI/G	GAMMASPEC	74.80
MISS056D	08/31/99	11/19/99	99G0019		7.7	DRY	REG	U-235	2.63	0.80	PCI/G	GAMMASPEC	2.63
MISS056D	08/31/99	11/19/99	99G0019		7.7	DRY	REG	U-238	63.90	0.00	PCI/G	GAMMASPEC	63.90
MISS056D	08/31/99	11/19/99	99G0019		7.7	DRY	REG	AM-241	7.58	0.00	PCI/G	GAMMASPEC	7.58
MISS056E	08/31/99	11/19/99	99G0019		10.3	DRY	REG	K-40	31.80	10.48	PCI/G	GAMMASPEC	31.80
MISS056E	08/31/99	11/19/99	99G0019		10.3	DRY	REG	CS-137	3.02	0.00	PCI/G	GAMMASPEC	3.02
MISS056E	08/31/99	11/19/99	99G0019		10.3	DRY	REG	RA-226	18.85	1.28	PCI/G	GAMMASPEC	3.97
MISS056E	08/31/99	11/19/99	99G0019		10.3	DRY	REG	AC-227	22.30	0.00	PCI/G	GAMMASPEC	22.30
MISS056E	08/31/99	11/19/99	99G0019		10.3	DRY	REG	RA-228	103.08	2.90	PCI/G	GAMMASPEC	6.91
MISS056E	08/31/99	11/19/99	99G0019		10.3	DRY	REG	TH-228	103.08	2.90	PCI/G	GAMMASPEC	6.91
MISS056E	08/31/99	11/19/99	99G0019		10.3	DRY	REG	TH-232	103.08	2.90	PCI/G	GAMMASPEC	6.91
MISS056E	08/31/99	11/19/99	99G0019		10.3	DRY	REG	TH-230	712.00	0.00	PCI/G	GAMMASPEC	712.00

Approved by: ______________________ Date: ______________

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Location:	MAYWOOD		
Site WBS:	12B	Date Entered:	12/1/99
Work Order Number:	99G0019		
Project Number:			
Environmental Cat:	RI		

Sample ID	Date Collected	Date Analyzed	SDG ID	LAB ID	Vol.	W/D	Sample Type	Analyte	Result	Error	Units	Analytical Method	MDA
MISS056E	08/31/99	11/19/99	99G0019		10.3	DRY	REG	PA-231	84.10	0.00	PCI/G	GAMMASPEC	84.10
MISS056E	08/31/99	11/19/99	99G0019		10.3	DRY	REG	U-235	2.68	0.82	PCI/G	GAMMASPEC	2.68
MISS056E	08/31/99	11/19/99	99G0019		10.3	DRY	REG	U-238	71.10	0.00	PCI/G	GAMMASPEC	71.10
MISS056E	08/31/99	11/19/99	99G0019		10.3	DRY	REG	AM-241	8.29	0.00	PCI/G	GAMMASPEC	8.29
MISS090D	08/18/99	11/19/99	99G0019		31.4	DRY	REG	K-40	10.70	3.41	PCI/G	GAMMASPEC	10.70
MISS090D	08/18/99	11/19/99	99G0019		31.4	DRY	REG	CS-137	0.75	0.00	PCI/G	GAMMASPEC	0.75
MISS090D	08/18/99	11/19/99	99G0019		31.4	DRY	REG	RA-226	2.51	0.26	PCI/G	GAMMASPEC	0.86
MISS090D	08/18/99	11/19/99	99G0019		31.4	DRY	REG	AC-227	5.53	0.00	PCI/G	GAMMASPEC	5.53
MISS090D	08/18/99	11/19/99	99G0019		31.4	DRY	REG	RA-228	9.49	0.52	PCI/G	GAMMASPEC	1.75
MISS090D	08/18/99	11/19/99	99G0019		31.4	DRY	REG	TH-228	9.49	0.52	PCI/G	GAMMASPEC	1.75
MISS090D	08/18/99	11/19/99	99G0019		31.4	DRY	REG	TH-232	9.49	0.52	PCI/G	GAMMASPEC	1.75
MISS090D	08/18/99	11/19/99	99G0019		31.4	DRY	REG	TH-230	162.00	0.00	PCI/G	GAMMASPEC	162.00
MISS090D	08/18/99	11/19/99	99G0019		31.4	DRY	REG	PA-231	19.40	0.00	PCI/G	GAMMASPEC	19.40
MISS090D	08/18/99	11/19/99	99G0019		31.4	DRY	REG	U-235	0.68	0.21	PCI/G	GAMMASPEC	0.68
MISS090D	08/18/99	11/19/99	99G0019		31.4	DRY	REG	U-238	17.40	0.00	PCI/G	GAMMASPEC	17.40
MISS090D	08/18/99	11/19/99	99G0019		31.4	DRY	REG	AM-241	1.99	0.00	PCI/G	GAMMASPEC	1.99
MISS090E	08/18/99	11/18/99	99G0019		44.8	DRY	REG	K-40	10.43	2.40	PCI/G	GAMMASPEC	6.66
MISS090E	08/18/99	11/18/99	99G0019		44.8	DRY	REG	CS-137	0.52	0.00	PCI/G	GAMMASPEC	0.52
MISS090E	08/18/99	11/18/99	99G0019		44.8	DRY	REG	RA-226	1.79	0.22	PCI/G	GAMMASPEC	0.81
MISS090E	08/18/99	11/18/99	99G0019		44.8	DRY	REG	AC-227	4.54	0.00	PCI/G	GAMMASPEC	4.54
MISS090E	08/18/99	11/18/99	99G0019		44.8	DRY	REG	RA-228	9.29	0.40	PCI/G	GAMMASPEC	1.36
MISS090E	08/18/99	11/18/99	99G0019		44.8	DRY	REG	TH-228	9.29	0.40	PCI/G	GAMMASPEC	1.36
MISS090E	08/18/99	11/18/99	99G0019		44.8	DRY	REG	TH-232	9.29	0.40	PCI/G	GAMMASPEC	1.36
MISS090E	08/18/99	11/18/99	99G0019		44.8	DRY	REG	TH-230	116.00	0.00	PCI/G	GAMMASPEC	116.00
MISS090E	08/18/99	11/18/99	99G0019		44.8	DRY	REG	PA-231	13.70	0.00	PCI/G	GAMMASPEC	13.70
MISS090E	08/18/99	11/18/99	99G0019		44.8	DRY	REG	U-235	0.46	0.14	PCI/G	GAMMASPEC	0.46
MISS090E	08/18/99	11/18/99	99G0019		44.8	DRY	REG	U-238	12.70	0.00	PCI/G	GAMMASPEC	12.70
MISS090E	08/18/99	11/18/99	99G0019		44.8	DRY	REG	AM-241	1.50	0.00	PCI/G	GAMMASPEC	1.50

Approved by: ______________________ Date: ______________

Equivalent values in the "Result" and "MDA" columns indicate that the analyte was either undetected or detected at a level below the MDA. T' esults listed at the MDA should have been reported at the actual measuremer

Location:	MAYWOOD		
Site WBS:	12B	Date Entered:	12/1/99
Work Order Number:	99G0019		
Project Number:			
Environmental Cat:	RI		

Sample ID	Date Collected	Date Analyzed	SDG ID	LAB ID	Vol.	W/D	Sample Type	Analyte	Result	Error	Units	Analytical Method	MDA
MISS040C	08/25/99	11/18/99	99G0019		89.7	DRY	REG	K-40	16.43	1.75	PCI/G	GAMMASPEC	3.52
MISS040C	08/25/99	11/18/99	99G0019		89.7	DRY	REG	CS-137	0.25	0.00	PCI/G	GAMMASPEC	0.25
MISS040C	08/25/99	11/18/99	99G0019		89.7	DRY	REG	RA-226	1.72	0.12	PCI/G	GAMMASPEC	0.38
MISS040C	08/25/99	11/18/99	99G0019		89.7	DRY	REG	AC-227	2.13	0.00	PCI/G	GAMMASPEC	2.13
MISS040C	08/25/99	11/18/99	99G0019		89.7	DRY	REG	RA-228	2.52	0.17	PCI/G	GAMMASPEC	0.66
MISS040C	08/25/99	11/18/99	99G0019		89.7	DRY	REG	TH-228	2.52	0.17	PCI/G	GAMMASPEC	0.66
MISS040C	08/25/99	11/18/99	99G0019		89.7	DRY	REG	TH-232	2.52	0.17	PCI/G	GAMMASPEC	0.66
MISS040C	08/25/99	11/18/99	99G0019		89.7	DRY	REG	TH-230	57.50	0.00	PCI/G	GAMMASPEC	57.50
MISS040C	08/25/99	11/18/99	99G0019		89.7	DRY	REG	PA-231	6.56	0.00	PCI/G	GAMMASPEC	6.56
MISS040C	08/25/99	11/18/99	99G0019		89.7	DRY	REG	U-235	0.26	0.08	PCI/G	GAMMASPEC	0.26
MISS040C	08/25/99	11/18/99	99G0019		89.7	DRY	REG	U-238	6.17	0.00	PCI/G	GAMMASPEC	6.17
MISS040C	08/25/99	11/18/99	99G0019		89.7	DRY	REG	AM-241	0.74	0.00	PCI/G	GAMMASPEC	0.74
QCBLANK	11/18/99	11/18/99	99G0019		945.0	DRY	BL	K-40	0.43	0.00	PCI/G	GAMMASPEC	0.43
QCBLANK	11/18/99	11/18/99	99G0019		945.0	DRY	BL	CS-137	0.03	0.00	PCI/G	GAMMASPEC	0.03
QCBLANK	11/18/99	11/18/99	99G0019		945.0	DRY	BL	RA-226	0.05	0.00	PCI/G	GAMMASPEC	0.05
QCBLANK	11/18/99	11/18/99	99G0019		945.0	DRY	BL	AC-227	0.13	0.00	PCI/G	GAMMASPEC	0.13
QCBLANK	11/18/99	11/18/99	99G0019		945.0	DRY	BL	RA-228	0.08	0.00	PCI/G	GAMMASPEC	0.08
QCBLANK	11/18/99	11/18/99	99G0019		945.0	DRY	BL	TH-228	0.08	0.00	PCI/G	GAMMASPEC	0.08
QCBLANK	11/18/99	11/18/99	99G0019		945.0	DRY	BL	TH-232	0.08	0.00	PCI/G	GAMMASPEC	0.08
QCBLANK	11/18/99	11/18/99	99G0019		945.0	DRY	BL	TH-230	7.77	0.00	PCI/G	GAMMASPEC	7.77
QCBLANK	11/18/99	11/18/99	99G0019		945.0	DRY	BL	PA-231	0.77	0.00	PCI/G	GAMMASPEC	0.77
QCBLANK	11/18/99	11/18/99	99G0019		945.0	DRY	BL	U-235	0.03	0.01	PCI/G	GAMMASPEC	0.03
QCBLANK	11/18/99	11/18/99	99G0019		945.0	DRY	BL	U-238	0.68	0.00	PCI/G	GAMMASPEC	0.68
QCBLANK	11/18/99	11/18/99	99G0019		945.0	DRY	BL	AM-241	0.07	0.00	PCI/G	GAMMASPEC	0.07
QCSPIKEP	04/01/99	11/18/99	99G0019		150.0	DRY	LCSF	CS-137	378.03	13.13	PCI/G	GAMMASPEC	5.07
QCSPIKEP	04/01/99	11/18/99	99G0019		150.0	DRY	LCSF	AM-241	869.45	43.93	PCI/G	GAMMASPEC	15.70
QCSPIKEP	04/01/99	11/18/99	99G0019		150.0	DRY	LCST	CS-137	352.02	16.54	PCI/G	GAMMASPEC	5.07
QCSPIKEP	04/01/99	11/18/99	99G0019		150.0	DRY	LCST	AM-241	849.21	42.46	PCI/G	GAMMASPEC	15.70

Approved by: ______________________ Date: ______________

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Equivalent values in the "Result" and "MDA" columns indicate that the analyte was either undetected or detected at a level below the MDA.
T' ·sults listed at the MDA should have been reported at the actual measuremer

Location:	MAYWOOD		
Site WBS:	12B	Date Entered:	11/22/99
Work Order Number:	99G0020		
Project Number:			
Environmental Cat:	RI		

Sample ID	Date Collected	Date Analyzed	SDG ID	LAB ID	Vol.	W/D	Sample Type	Analyte	Result	Error	Units	Analytical Method	MDA
MISS014C	08/23/99	11/20/99	99G0020		758.6	DRY	REG	K-40	11.88	0.64	PCI/G	GAMMASPEC	0.71
MISS014C	08/23/99	11/20/99	99G0020		758.6	DRY	REG	CS-137	0.08	0.00	PCI/G	GAMMASPEC	0.08
MISS014C	08/23/99	11/20/99	99G0020		758.6	DRY	REG	RA-226	0.95	0.04	PCI/G	GAMMASPEC	0.13
MISS014C	08/23/99	11/20/99	99G0020		758.6	DRY	REG	AC-227	0.78	0.00	PCI/G	GAMMASPEC	0.78
MISS014C	08/23/99	11/20/99	99G0020		758.6	DRY	REG	RA-228	1.94	0.07	PCI/G	GAMMASPEC	0.20
MISS014C	08/23/99	11/20/99	99G0020		758.6	DRY	REG	TH-228	1.94	0.07	PCI/G	GAMMASPEC	0.20
MISS014C	08/23/99	11/20/99	99G0020		758.6	DRY	REG	TH-232	1.94	0.07	PCI/G	GAMMASPEC	0.20
MISS014C	08/23/99	11/20/99	99G0020		758.6	DRY	REG	TH-230	26.50	0.00	PCI/G	GAMMASPEC	26.50
MISS014C	08/23/99	11/20/99	99G0020		758.6	DRY	REG	PA-231	2.51	0.00	PCI/G	GAMMASPEC	2.51
MISS014C	08/23/99	11/20/99	99G0020		758.6	DRY	REG	U-235	0.11	0.03	PCI/G	GAMMASPEC	0.09
MISS014C	08/23/99	11/20/99	99G0020		758.6	DRY	REG	U-238	2.60	0.00	PCI/G	GAMMASPEC	2.60
MISS014C	08/23/99	11/20/99	99G0020		758.6	DRY	REG	AM-241	0.29	0.00	PCI/G	GAMMASPEC	0.29
MISS033C	08/25/99	11/20/99	99G0020		786.7	DRY	REG	K-40	15.36	0.75	PCI/G	GAMMASPEC	0.74
MISS033C	08/25/99	11/20/99	99G0020		786.7	DRY	REG	CS-137	0.10	0.00	PCI/G	GAMMASPEC	0.10
MISS033C	08/25/99	11/20/99	99G0020		786.7	DRY	REG	RA-226	1.00	0.05	PCI/G	GAMMASPEC	0.15
MISS033C	08/25/99	11/20/99	99G0020		786.7	DRY	REG	AC-227	0.96	0.00	PCI/G	GAMMASPEC	0.96
MISS033C	08/25/99	11/20/99	99G0020		786.7	DRY	REG	RA-228	3.97	0.10	PCI/G	GAMMASPEC	0.26
MISS033C	08/25/99	11/20/99	99G0020		786.7	DRY	REG	TH-228	3.97	0.10	PCI/G	GAMMASPEC	0.26
MISS033C	08/25/99	11/20/99	99G0020		786.7	DRY	REG	TH-232	3.97	0.10	PCI/G	GAMMASPEC	0.26
MISS033C	08/25/99	11/20/99	99G0020		786.7	DRY	REG	TH-230	33.50	0.00	PCI/G	GAMMASPEC	33.50
MISS033C	08/25/99	11/20/99	99G0020		786.7	DRY	REG	PA-231	3.12	0.00	PCI/G	GAMMASPEC	3.12
MISS033C	08/25/99	11/20/99	99G0020		786.7	DRY	REG	U-235	0.11	0.03	PCI/G	GAMMASPEC	0.11
MISS033C	08/25/99	11/20/99	99G0020		786.7	DRY	REG	U-238	3.28	0.00	PCI/G	GAMMASPEC	3.28
MISS033C	08/25/99	11/20/99	99G0020		786.7	DRY	REG	AM-241	0.37	0.00	PCI/G	GAMMASPEC	0.37
MISS033D	08/25/99	11/20/99	99G0020		18.7	DRY	REG	K-40	16.55	5.13	PCI/G	GAMMASPEC	15.20
MISS033D	08/25/99	11/20/99	99G0020		18.7	DRY	REG	CS-137	0.91	0.00	PCI/G	GAMMASPEC	0.91
MISS033D	08/25/99	11/20/99	99G0020		18.7	DRY	REG	RA-226	1.41	0.33	PCI/G	GAMMASPEC	1.41
MISS033D	08/25/99	11/20/99	99G0020		18.7	DRY	REG	AC-227	6.90	0.00	PCI/G	GAMMASPEC	6.90

Approved by: ______________________ Date: ______________

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Location:	MAYWOOD		
Site WBS:	12B	Date Entered:	11/22/99
Work Order Number:	99G0020		
Project Number:			
Environmental Cat:	RI		

Sample ID	Date Collected	Date Analyzed	SDG ID	LAB ID	Vol.	W/D	Sample Type	Analyte	Result	Error	Units	Analytical Method	MDA
MISS033D	08/25/99	11/20/99	99G0020		18.7	DRY	REG	RA-228	3.63	0.00	PCI/G	GAMMASPEC	3.63
MISS033D	08/25/99	11/20/99	99G0020		18.7	DRY	REG	TH-228	3.63	0.00	PCI/G	GAMMASPEC	3.63
MISS033D	08/25/99	11/20/99	99G0020		18.7	DRY	REG	TH-232	3.63	0.00	PCI/G	GAMMASPEC	3.63
MISS033D	08/25/99	11/20/99	99G0020		18.7	DRY	REG	TH-230	190.00	0.00	PCI/G	GAMMASPEC	190.00
MISS033D	08/25/99	11/20/99	99G0020		18.7	DRY	REG	PA-231	23.30	0.00	PCI/G	GAMMASPEC	23.30
MISS033D	08/25/99	11/20/99	99G0020		18.7	DRY	REG	U-235	1.05	0.00	PCI/G	GAMMASPEC	1.05
MISS033D	08/25/99	11/20/99	99G0020		18.7	DRY	REG	U-238	21.30	0.00	PCI/G	GAMMASPEC	21.30
MISS033D	08/25/99	11/20/99	99G0020		18.7	DRY	REG	AM-241	2.64	0.00	PCI/G	GAMMASPEC	2.64
MISS033E	08/25/99	11/20/99	99G0020		17.0	DRY	REG	K-40	26.50	0.00	PCI/G	GAMMASPEC	26.50
MISS033E	08/25/99	11/20/99	99G0020		17.0	DRY	REG	CS-137	1.07	0.00	PCI/G	GAMMASPEC	1.07
MISS033E	08/25/99	11/20/99	99G0020		17.0	DRY	REG	RA-226	1.97	0.00	PCI/G	GAMMASPEC	1.97
MISS033E	08/25/99	11/20/99	99G0020		17.0	DRY	REG	AC-227	8.03	0.00	PCI/G	GAMMASPEC	8.03
MISS033E	08/25/99	11/20/99	99G0020		17.0	DRY	REG	RA-228	5.54	0.60	PCI/G	GAMMASPEC	2.46
MISS033E	08/25/99	11/20/99	99G0020		17.0	DRY	REG	TH-228	5.54	0.60	PCI/G	GAMMASPEC	2.46
MISS033E	08/25/99	11/20/99	99G0020		17.0	DRY	REG	TH-232	5.54	0.60	PCI/G	GAMMASPEC	2.46
MISS033E	08/25/99	11/20/99	99G0020		17.0	DRY	REG	TH-230	221.00	0.00	PCI/G	GAMMASPEC	221.00
MISS033E	08/25/99	11/20/99	99G0020		17.0	DRY	REG	PA-231	25.60	0.00	PCI/G	GAMMASPEC	25.60
MISS033E	08/25/99	11/20/99	99G0020		17.0	DRY	REG	U-235	0.98	0.29	PCI/G	GAMMASPEC	0.98
MISS033E	08/25/99	11/20/99	99G0020		17.0	DRY	REG	U-238	24.10	0.00	PCI/G	GAMMASPEC	24.10
MISS033E	08/25/99	11/20/99	99G0020		17.0	DRY	REG	AM-241	2.67	0.00	PCI/G	GAMMASPEC	2.67
MISS056C	08/31/99	11/19/99	99G0020		74.9	DRY	REG	K-40	17.48	2.17	PCI/G	GAMMASPEC	5.10
MISS056C	08/31/99	11/19/99	99G0020		74.9	DRY	REG	CS-137	0.45	0.00	PCI/G	GAMMASPEC	0.45
MISS056C	08/31/99	11/19/99	99G0020		74.9	DRY	REG	RA-226	3.63	0.20	PCI/G	GAMMASPEC	0.59
MISS056C	08/31/99	11/19/99	99G0020		74.9	DRY	REG	AC-227	3.52	0.00	PCI/G	GAMMASPEC	3.52
MISS056C	08/31/99	11/19/99	99G0020		74.9	DRY	REG	RA-228	15.71	0.44	PCI/G	GAMMASPEC	1.21
MISS056C	08/31/99	11/19/99	99G0020		74.9	DRY	REG	TH-228	15.71	0.44	PCI/G	GAMMASPEC	1.21
MISS056C	08/31/99	11/19/99	99G0020		74.9	DRY	REG	TH-232	15.71	0.44	PCI/G	GAMMASPEC	1.21
MISS056C	08/31/99	11/19/99	99G0020		74.9	DRY	REG	TH-230	94.40	27.90	PCI/G	GAMMASPEC	94.40

Approved by: ______________________ Date: ____________

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Location:	MAYWOOD		
Site WBS:	12B	Date Entered:	11/22/99
Work Order Number:	99G0020		
Project Number:			
Environmental Cat:	RI		

Sample ID	Date Collected	Date Analyzed	SDG ID	LAB ID	Vol.	W/D	Sample Type	Analyte	Result	Error	Units	Analytical Method	MDA
MISS056C	08/31/99	11/19/99	99G0020		74.9	DRY	REG	PA-231	12.70	0.00	PCI/G	GAMMASPEC	12.70
MISS056C	08/31/99	11/19/99	99G0020		74.9	DRY	REG	U-235	0.46	0.13	PCI/G	GAMMASPEC	0.41
MISS056C	08/31/99	11/19/99	99G0020		74.9	DRY	REG	U-238	11.60	0.00	PCI/G	GAMMASPEC	11.60
MISS056C	08/31/99	11/19/99	99G0020		74.9	DRY	REG	AM-241	1.41	0.00	PCI/G	GAMMASPEC	1.41
MISS059C	08/31/99	11/20/99	99G0020		3.2	DRY	REG	K-40	81.50	22.32	PCI/G	GAMMASPEC	81.50
MISS059C	08/31/99	11/20/99	99G0020		3.2	DRY	REG	CS-137	5.03	0.00	PCI/G	GAMMASPEC	5.03
MISS059C	08/31/99	11/20/99	99G0020		3.2	DRY	REG	RA-226	9.54	0.00	PCI/G	GAMMASPEC	9.54
MISS059C	08/31/99	11/20/99	99G0020		3.2	DRY	REG	AC-227	33.20	0.00	PCI/G	GAMMASPEC	33.20
MISS059C	08/31/99	11/20/99	99G0020		3.2	DRY	REG	RA-228	13.30	2.84	PCI/G	GAMMASPEC	13.30
MISS059C	08/31/99	11/20/99	99G0020		3.2	DRY	REG	TH-228	13.30	2.84	PCI/G	GAMMASPEC	13.30
MISS059C	08/31/99	11/20/99	99G0020		3.2	DRY	REG	TH-232	13.30	2.84	PCI/G	GAMMASPEC	13.30
MISS059C	08/31/99	11/20/99	99G0020		3.2	DRY	REG	TH-230	1030.00	0.00	PCI/G	GAMMASPEC	1030.00
MISS059C	08/31/99	11/20/99	99G0020		3.2	DRY	REG	PA-231	141.00	0.00	PCI/G	GAMMASPEC	141.00
MISS059C	08/31/99	11/20/99	99G0020		3.2	DRY	REG	U-235	5.41	0.00	PCI/G	GAMMASPEC	5.41
MISS059C	08/31/99	11/20/99	99G0020		3.2	DRY	REG	U-238	113.00	0.00	PCI/G	GAMMASPEC	113.00
MISS059C	08/31/99	11/20/99	99G0020		3.2	DRY	REG	AM-241	12.90	0.00	PCI/G	GAMMASPEC	12.90
MISS071C	09/01/99	11/20/99	99G0020		44.7	DRY	REG	K-40	31.35	3.54	PCI/G	GAMMASPEC	7.58
MISS071C	09/01/99	11/20/99	99G0020		44.7	DRY	REG	CS-137	0.80	0.00	PCI/G	GAMMASPEC	0.80
MISS071C	09/01/99	11/20/99	99G0020		44.7	DRY	REG	RA-226	4.24	0.32	PCI/G	GAMMASPEC	1.19
MISS071C	09/01/99	11/20/99	99G0020		44.7	DRY	REG	AC-227	6.30	0.00	PCI/G	GAMMASPEC	6.30
MISS071C	09/01/99	11/20/99	99G0020		44.7	DRY	REG	RA-228	39.73	0.95	PCI/G	GAMMASPEC	1.82
MISS071C	09/01/99	11/20/99	99G0020		44.7	DRY	REG	TH-228	39.73	0.95	PCI/G	GAMMASPEC	1.82
MISS071C	09/01/99	11/20/99	99G0020		44.7	DRY	REG	TH-232	39.73	0.95	PCI/G	GAMMASPEC	1.82
MISS071C	09/01/99	11/20/99	99G0020		44.7	DRY	REG	TH-230	216.00	0.00	PCI/G	GAMMASPEC	216.00
MISS071C	09/01/99	11/20/99	99G0020		44.7	DRY	REG	PA-231	24.70	0.00	PCI/G	GAMMASPEC	24.70
MISS071C	09/01/99	11/20/99	99G0020		44.7	DRY	REG	U-235	1.27	0.24	PCI/G	GAMMASPEC	0.72
MISS071C	09/01/99	11/20/99	99G0020		44.7	DRY	REG	U-238	21.60	0.00	PCI/G	GAMMASPEC	21.60
MISS071C	09/01/99	11/20/99	99G0020		44.7	DRY	REG	AM-241	2.55	0.00	PCI/G	GAMMASPEC	2.55

Approved by: ______________________ Date: ______________

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Location:	MAYWOOD		
Site WBS:	12B	Date Entered:	11/22/99
Work Order Number:	99G0020		
Project Number:			
Environmental Cat:	RI		

Sample ID	Date Collected	Date Analyzed	SDG ID	LAB ID	Vol.	W/D	Sample Type	Analyte	Result	Error	Units	Analytical Method	MDA
MISS071D	09/01/99	11/20/99	99G0020		2.0	DRY	REG	K-40	202.86	38.78	PCI/G	GAMMASPEC	84.60
MISS071D	09/01/99	11/20/99	99G0020		2.0	DRY	REG	CS-137	10.60	0.00	PCI/G	GAMMASPEC	10.60
MISS071D	09/01/99	11/20/99	99G0020		2.0	DRY	REG	RA-226	18.00	0.00	PCI/G	GAMMASPEC	18.00
MISS071D	09/01/99	11/20/99	99G0020		2.0	DRY	REG	AC-227	80.70	0.00	PCI/G	GAMMASPEC	80.70
MISS071D	09/01/99	11/20/99	99G0020		2.0	DRY	REG	RA-228	121.10	7.02	PCI/G	GAMMASPEC	22.10
MISS071D	09/01/99	11/20/99	99G0020		2.0	DRY	REG	TH-228	121.10	7.02	PCI/G	GAMMASPEC	22.10
MISS071D	09/01/99	11/20/99	99G0020		2.0	DRY	REG	TH-232	121.10	7.02	PCI/G	GAMMASPEC	22.10
MISS071D	09/01/99	11/20/99	99G0020		2.0	DRY	REG	TH-230	2170.00	0.00	PCI/G	GAMMASPEC	2170.00
MISS071D	09/01/99	11/20/99	99G0020		2.0	DRY	REG	PA-231	287.00	0.00	PCI/G	GAMMASPEC	287.00
MISS071D	09/01/99	11/20/99	99G0020		2.0	DRY	REG	U-235	8.18	2.60	PCI/G	GAMMASPEC	8.18
MISS071D	09/01/99	11/20/99	99G0020		2.0	DRY	REG	U-238	233.00	0.00	PCI/G	GAMMASPEC	233.00
MISS071D	09/01/99	11/20/99	99G0020		2.0	DRY	REG	AM-241	26.50	0.00	PCI/G	GAMMASPEC	26.50
MISS071E	09/01/99	11/20/99	99G0020		7.1	DRY	REG	K-40	56.50	17.88	PCI/G	GAMMASPEC	56.50
MISS071E	09/01/99	11/20/99	99G0020		7.1	DRY	REG	CS-137	7.26	0.00	PCI/G	GAMMASPEC	7.26
MISS071E	09/01/99	11/20/99	99G0020		7.1	DRY	REG	RA-226	30.29	2.27	PCI/G	GAMMASPEC	9.50
MISS071E	09/01/99	11/20/99	99G0020		7.1	DRY	REG	AC-227	51.50	0.00	PCI/G	GAMMASPEC	51.50
MISS071E	09/01/99	11/20/99	99G0020		7.1	DRY	REG	RA-228	529.31	10.35	PCI/G	GAMMASPEC	16.10
MISS071E	09/01/99	11/20/99	99G0020		7.1	DRY	REG	TH-228	529.31	10.35	PCI/G	GAMMASPEC	16.10
MISS071E	09/01/99	11/20/99	99G0020		7.1	DRY	REG	TH-232	529.31	10.35	PCI/G	GAMMASPEC	16.10
MISS071E	09/01/99	11/20/99	99G0020		7.1	DRY	REG	TH-230	1720.00	0.00	PCI/G	GAMMASPEC	1720.00
MISS071E	09/01/99	11/20/99	99G0020		7.1	DRY	REG	PA-231	203.00	0.00	PCI/G	GAMMASPEC	203.00
MISS071E	09/01/99	11/20/99	99G0020		7.1	DRY	REG	U-235	13.83	1.93	PCI/G	GAMMASPEC	5.81
MISS071E	09/01/99	11/20/99	99G0020		7.1	DRY	REG	U-238	174.00	54.07	PCI/G	GAMMASPEC	174.00
MISS071E	09/01/99	11/20/99	99G0020		7.1	DRY	REG	AM-241	21.20	0.00	PCI/G	GAMMASPEC	21.20
MISS071F	09/01/99	11/20/99	99G0020		42.8	DRY	REG	K-40	31.20	0.00	PCI/G	GAMMASPEC	31.20
MISS071F	09/01/99	11/20/99	99G0020		42.8	DRY	REG	CS-137	3.14	0.00	PCI/G	GAMMASPEC	3.14
MISS071F	09/01/99	11/20/99	99G0020		42.8	DRY	REG	RA-226	37.02	1.31	PCI/G	GAMMASPEC	4.24
MISS071F	09/01/99	11/20/99	99G0020		42.8	DRY	REG	AC-227	23.00	0.00	PCI/G	GAMMASPEC	23.00

Approved by: ______________________ Date: ______________

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T' esults listed at the MDA should have been reported at the actual measuremer

Location:	MAYWOOD		
Site WBS:	12B	Date Entered:	11/22/99
Work Order Number:	99G0020		
Project Number:			
Environmental Cat:	RI		

Sample ID	Date Collected	Date Analyzed	SDG ID	LAB ID	Vol.	W/D	Sample Type	Analyte	Result	Error	Units	Analytical Method	MDA
MISS071F	09/01/99	11/20/99	99G0020		42.8	DRY	REG	RA-228	654.01	10.07	PCI/G	GAMMASPEC	5.07
MISS071F	09/01/99	11/20/99	99G0020		42.8	DRY	REG	TH-228	654.01	10.07	PCI/G	GAMMASPEC	5.07
MISS071F	09/01/99	11/20/99	99G0020		42.8	DRY	REG	TH-232	654.01	10.07	PCI/G	GAMMASPEC	5.07
MISS071F	09/01/99	11/20/99	99G0020		42.8	DRY	REG	TH-230	802.00	0.00	PCI/G	GAMMASPEC	802.00
MISS071F	09/01/99	11/20/99	99G0020		42.8	DRY	REG	PA-231	90.30	0.00	PCI/G	GAMMASPEC	90.30
MISS071F	09/01/99	11/20/99	99G0020		42.8	DRY	REG	U-235	10.01	0.50	PCI/G	GAMMASPEC	2.34
MISS071F	09/01/99	11/20/99	99G0020		42.8	DRY	REG	U-238	161.41	23.20	PCI/G	GAMMASPEC	78.20
MISS071F	09/01/99	11/20/99	99G0020		42.8	DRY	REG	AM-241	9.54	0.00	PCI/G	GAMMASPEC	9.54
MISS071F	09/01/99	11/21/99	99G0020		42.8	DRY	LREP	K-40	79.67	8.99	PCI/G	GAMMASPEC	24.80
MISS071F	09/01/99	11/21/99	99G0020		42.8	DRY	LREP	CS-137	3.11	0.00	PCI/G	GAMMASPEC	3.11
MISS071F	09/01/99	11/21/99	99G0020		42.8	DRY	LREP	RA-226	38.06	1.29	PCI/G	GAMMASPEC	4.17
MISS071F	09/01/99	11/21/99	99G0020		42.8	DRY	LREP	AC-227	22.70	0.00	PCI/G	GAMMASPEC	22.70
MISS071F	09/01/99	11/21/99	99G0020		42.8	DRY	LREP	RA-228	648.95	10.03	PCI/G	GAMMASPEC	4.73
MISS071F	09/01/99	11/21/99	99G0020		42.8	DRY	LREP	TH-228	648.95	10.03	PCI/G	GAMMASPEC	4.73
MISS071F	09/01/99	11/21/99	99G0020		42.8	DRY	LREP	TH-232	648.95	10.03	PCI/G	GAMMASPEC	4.73
MISS071F	09/01/99	11/21/99	99G0020		42.8	DRY	LREP	TH-230	661.00	0.00	PCI/G	GAMMASPEC	661.00
MISS071F	09/01/99	11/21/99	99G0020		42.8	DRY	LREP	PA-231	89.30	0.00	PCI/G	GAMMASPEC	89.30
MISS071F	09/01/99	11/21/99	99G0020		42.8	DRY	LREP	U-235	10.71	0.82	PCI/G	GAMMASPEC	2.66
MISS071F	09/01/99	11/21/99	99G0020		42.8	DRY	LREP	U-238	169.82	18.14	PCI/G	GAMMASPEC	78.10
MISS071F	09/01/99	11/21/99	99G0020		42.8	DRY	LREP	AM-241	9.63	0.00	PCI/G	GAMMASPEC	9.63
MISS090C	08/18/99	11/20/99	99G0020		446.0	DRY	REG	K-40	11.19	0.86	PCI/G	GAMMASPEC	1.67
MISS090C	08/18/99	11/20/99	99G0020		446.0	DRY	REG	CS-137	0.19	0.00	PCI/G	GAMMASPEC	0.19
MISS090C	08/18/99	11/20/99	99G0020		446.0	DRY	REG	RA-226	1.94	0.09	PCI/G	GAMMASPEC	0.28
MISS090C	08/18/99	11/20/99	99G0020		446.0	DRY	REG	AC-227	1.76	0.00	PCI/G	GAMMASPEC	1.76
MISS090C	08/18/99	11/20/99	99G0020		446.0	DRY	REG	RA-228	9.46	0.22	PCI/G	GAMMASPEC	0.44
MISS090C	08/18/99	11/20/99	99G0020		446.0	DRY	REG	TH-228	9.46	0.22	PCI/G	GAMMASPEC	0.44
MISS090C	08/18/99	11/20/99	99G0020		446.0	DRY	REG	TH-232	9.46	0.22	PCI/G	GAMMASPEC	0.44
MISS090C	08/18/99	11/20/99	99G0020		446.0	DRY	REG	TH-230	65.10	0.00	PCI/G	GAMMASPEC	65.10

Approved by: ______________________ Date: ______________

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Location:	MAYWOOD		
Site WBS:	12B	Date Entered:	11/22/99
Work Order Number:	99G0020		
Project Number:			
Environmental Cat:	RI		

Sample ID	Date Collected	Date Analyzed	SDG ID	LAB ID	Vol.	W/D	Sample Type	Analyte	Result	Error	Units	Analytical Method	MDA
MISS090C	08/18/99	11/20/99	99G0020		446.0	DRY	REG	PA-231	6.25	0.00	PCI/G	GAMMASPEC	6.25
MISS090C	08/18/99	11/20/99	99G0020		446.0	DRY	REG	U-235	0.35	0.06	PCI/G	GAMMASPEC	0.20
MISS090C	08/18/99	11/20/99	99G0020		446.0	DRY	REG	U-238	6.25	0.00	PCI/G	GAMMASPEC	6.25
MISS090C	08/18/99	11/20/99	99G0020		446.0	DRY	REG	AM-241	0.72	0.00	PCI/G	GAMMASPEC	0.72
MISS090C	08/18/99	11/21/99	99G0020		446.0	DRY	LREP	K-40	11.04	0.81	PCI/G	GAMMASPEC	1.34
MISS090C	08/18/99	11/21/99	99G0020		446.0	DRY	LREP	CS-137	0.19	0.00	PCI/G	GAMMASPEC	0.19
MISS090C	08/18/99	11/21/99	99G0020		446.0	DRY	LREP	RA-226	2.03	0.09	PCI/G	GAMMASPEC	0.29
MISS090C	08/18/99	11/21/99	99G0020		446.0	DRY	LREP	AC-227	1.78	0.00	PCI/G	GAMMASPEC	1.78
MISS090C	08/18/99	11/21/99	99G0020		446.0	DRY	LREP	RA-228	9.36	0.21	PCI/G	GAMMASPEC	0.45
MISS090C	08/18/99	11/21/99	99G0020		446.0	DRY	LREP	TH-228	9.36	0.21	PCI/G	GAMMASPEC	0.45
MISS090C	08/18/99	11/21/99	99G0020		446.0	DRY	LREP	TH-232	9.36	0.21	PCI/G	GAMMASPEC	0.45
MISS090C	08/18/99	11/21/99	99G0020		446.0	DRY	LREP	TH-230	54.70	0.00	PCI/G	GAMMASPEC	54.70
MISS090C	08/18/99	11/21/99	99G0020		446.0	DRY	LREP	PA-231	6.03	0.00	PCI/G	GAMMASPEC	6.03
MISS090C	08/18/99	11/21/99	99G0020		446.0	DRY	LREP	U-235	0.23	0.06	PCI/G	GAMMASPEC	0.20
MISS090C	08/18/99	11/21/99	99G0020		446.0	DRY	LREP	U-238	6.18	0.00	PCI/G	GAMMASPEC	6.18
MISS090C	08/18/99	11/21/99	99G0020		446.0	DRY	LREP	AM-241	0.70	0.00	PCI/G	GAMMASPEC	0.70
MISS091C	08/18/99	11/20/99	99G0020		87.2	DRY	REG	K-40	12.36	1.62	PCI/G	GAMMASPEC	3.72
MISS091C	08/18/99	11/20/99	99G0020		87.2	DRY	REG	CS-137	0.24	0.00	PCI/G	GAMMASPEC	0.24
MISS091C	08/18/99	11/20/99	99G0020		87.2	DRY	REG	RA-226	2.33	0.13	PCI/G	GAMMASPEC	0.36
MISS091C	08/18/99	11/20/99	99G0020		87.2	DRY	REG	AC-227	2.32	0.00	PCI/G	GAMMASPEC	2.32
MISS091C	08/18/99	11/20/99	99G0020		87.2	DRY	REG	RA-228	2.71	0.16	PCI/G	GAMMASPEC	0.64
MISS091C	08/18/99	11/20/99	99G0020		87.2	DRY	REG	TH-228	2.71	0.16	PCI/G	GAMMASPEC	0.64
MISS091C	08/18/99	11/20/99	99G0020		87.2	DRY	REG	TH-232	2.71	0.16	PCI/G	GAMMASPEC	0.64
MISS091C	08/18/99	11/20/99	99G0020		87.2	DRY	REG	TH-230	68.00	0.00	PCI/G	GAMMASPEC	68.00
MISS091C	08/18/99	11/20/99	99G0020		87.2	DRY	REG	PA-231	7.17	0.00	PCI/G	GAMMASPEC	7.17
MISS091C	08/18/99	11/20/99	99G0020		87.2	DRY	REG	U-235	0.66	0.09	PCI/G	GAMMASPEC	0.27
MISS091C	08/18/99	11/20/99	99G0020		87.2	DRY	REG	U-238	11.16	2.32	PCI/G	GAMMASPEC	7.01
MISS091C	08/18/99	11/20/99	99G0020		87.2	DRY	REG	AM-241	0.82	0.00	PCI/G	GAMMASPEC	0.82

Approved by: ______________________ Date: ______________

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Location:	MAYWOOD		
Site WBS:	12B	Date Entered:	11/22/99
Work Order Number:	99G0020		
Project Number:			
Environmental Cat:	RI		

Sample ID	Date Collected	Date Analyzed	SDG ID	LAB ID	Vol.	W/D	Sample Type	Analyte	Result	Error	Units	Analytical Method	MDA
QCBLANK	11/21/99	11/21/99	99G0020		945.0	DRY	BL	K-40	0.42	0.00	PCI/G	GAMMASPEC	0.42
QCBLANK	11/21/99	11/21/99	99G0020		945.0	DRY	BL	CS-137	0.02	0.00	PCI/G	GAMMASPEC	0.02
QCBLANK	11/21/99	11/21/99	99G0020		945.0	DRY	BL	RA-226	0.05	0.00	PCI/G	GAMMASPEC	0.05
QCBLANK	11/21/99	11/21/99	99G0020		945.0	DRY	BL	AC-227	0.14	0.00	PCI/G	GAMMASPEC	0.14
QCBLANK	11/21/99	11/21/99	99G0020		945.0	DRY	BL	RA-228	0.06	0.00	PCI/G	GAMMASPEC	0.06
QCBLANK	11/21/99	11/21/99	99G0020		945.0	DRY	BL	TH-228	0.06	0.00	PCI/G	GAMMASPEC	0.06
QCBLANK	11/21/99	11/21/99	99G0020		945.0	DRY	BL	TH-232	0.06	0.00	PCI/G	GAMMASPEC	0.06
QCBLANK	11/21/99	11/21/99	99G0020		945.0	DRY	BL	TH-230	5.69	0.00	PCI/G	GAMMASPEC	5.69
QCBLANK	11/21/99	11/21/99	99G0020		945.0	DRY	BL	PA-231	0.73	0.00	PCI/G	GAMMASPEC	0.73
QCBLANK	11/21/99	11/21/99	99G0020		945.0	DRY	BL	U-235	0.03	0.00	PCI/G	GAMMASPEC	0.03
QCBLANK	11/21/99	11/21/99	99G0020		945.0	DRY	BL	U-238	0.71	0.00	PCI/G	GAMMASPEC	0.71
QCBLANK	11/21/99	11/21/99	99G0020		945.0	DRY	BL	AM-241	0.07	0.00	PCI/G	GAMMASPEC	0.07
QCSPIKEM	04/01/99	11/21/99	99G0020		832.0	DRY	LCSF	CS-137	69.53	2.19	PCI/G	GAMMASPEC	0.98
QCSPIKEM	04/01/99	11/21/99	99G0020		832.0	DRY	LCSF	AM-241	164.58	8.34	PCI/G	GAMMASPEC	3.50
QCSPIKEM	04/01/99	11/21/99	99G0020		832.0	DRY	LCST	CS-137	68.43	3.22	PCI/G	GAMMASPEC	0.98
QCSPIKEM	04/01/99	11/21/99	99G0020		832.0	DRY	LCST	AM-241	165.05	8.25	PCI/G	GAMMASPEC	3.50
QCSPIKEP	04/01/99	11/21/99	99G0020		150.0	DRY	LCSF	CS-137	385.60	13.38	PCI/G	GAMMASPEC	5.06
QCSPIKEP	04/01/99	11/21/99	99G0020		150.0	DRY	LCSF	AM-241	866.79	44.17	PCI/G	GAMMASPEC	16.00
QCSPIKEP	04/01/99	11/21/99	99G0020		150.0	DRY	LCST	CS-137	352.02	16.54	PCI/G	GAMMASPEC	5.06
QCSPIKEP	04/01/99	11/21/99	99G0020		150.0	DRY	LCST	AM-241	849.21	42.46	PCI/G	GAMMASPEC	16.00

Approved by: ______________________________ Date: ______________

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'sults listed at the MDA should have been reported at the actual measureme

Location:	MAYWOOD		
Site WBS:	12B	Date Entered:	11/23/99
Work Order Number:	99G0021		
Project Number:			
Environmental Cat:	RI		

Sample ID	Date Collected	Date Analyzed	SDG ID	LAB ID	Vol.	W/D	Sample Type	Analyte	Result	Error	Units	Analytical Method	MDA
MISS072C	09/01/99	11/22/99	99G0021		91.3	DRY	REG	K-40	17.59	1.98	PCI/G	GAMMASPEC	4.46
MISS072C	09/01/99	11/22/99	99G0021		91.3	DRY	REG	CS-137	0.40	0.00	PCI/G	GAMMASPEC	0.40
MISS072C	09/01/99	11/22/99	99G0021		91.3	DRY	REG	RA-226	2.64	0.16	PCI/G	GAMMASPEC	0.53
MISS072C	09/01/99	11/22/99	99G0021		91.3	DRY	REG	AC-227	3.11	0.00	PCI/G	GAMMASPEC	3.11
MISS072C	09/01/99	11/22/99	99G0021		91.3	DRY	REG	RA-228	14.19	0.38	PCI/G	GAMMASPEC	0.98
MISS072C	09/01/99	11/22/99	99G0021		91.3	DRY	REG	TH-228	14.19	0.38	PCI/G	GAMMASPEC	0.98
MISS072C	09/01/99	11/22/99	99G0021		91.3	DRY	REG	TH-232	14.19	0.38	PCI/G	GAMMASPEC	0.98
MISS072C	09/01/99	11/22/99	99G0021		91.3	DRY	REG	TH-230	83.40	0.00	PCI/G	GAMMASPEC	83.40
MISS072C	09/01/99	11/22/99	99G0021		91.3	DRY	REG	PA-231	10.70	0.00	PCI/G	GAMMASPEC	10.70
MISS072C	09/01/99	11/22/99	99G0021		91.3	DRY	REG	U-235	0.86	0.11	PCI/G	GAMMASPEC	0.33
MISS072C	09/01/99	11/22/99	99G0021		91.3	DRY	REG	U-238	10.10	3.11	PCI/G	GAMMASPEC	10.10
MISS072C	09/01/99	11/22/99	99G0021		91.3	DRY	REG	AM-241	1.23	0.00	PCI/G	GAMMASPEC	1.23
MISS072D	09/01/99	11/22/99	99G0021		11.6	DRY	REG	K-40	22.16	6.97	PCI/G	GAMMASPEC	20.00
MISS072D	09/01/99	11/22/99	99G0021		11.6	DRY	REG	CS-137	1.88	0.00	PCI/G	GAMMASPEC	1.88
MISS072D	09/01/99	11/22/99	99G0021		11.6	DRY	REG	RA-226	3.96	0.62	PCI/G	GAMMASPEC	2.20
MISS072D	09/01/99	11/22/99	99G0021		11.6	DRY	REG	AC-227	13.90	0.00	PCI/G	GAMMASPEC	13.90
MISS072D	09/01/99	11/22/99	99G0021		11.6	DRY	REG	RA-228	29.08	1.48	PCI/G	GAMMASPEC	4.53
MISS072D	09/01/99	11/22/99	99G0021		11.6	DRY	REG	TH-228	29.08	1.48	PCI/G	GAMMASPEC	4.53
MISS072D	09/01/99	11/22/99	99G0021		11.6	DRY	REG	TH-232	29.08	1.48	PCI/G	GAMMASPEC	4.53
MISS072D	09/01/99	11/22/99	99G0021		11.6	DRY	REG	TH-230	353.00	0.00	PCI/G	GAMMASPEC	353.00
MISS072D	09/01/99	11/22/99	99G0021		11.6	DRY	REG	PA-231	48.70	0.00	PCI/G	GAMMASPEC	48.70
MISS072D	09/01/99	11/22/99	99G0021		11.6	DRY	REG	U-235	1.97	0.00	PCI/G	GAMMASPEC	1.97
MISS072D	09/01/99	11/22/99	99G0021		11.6	DRY	REG	U-238	44.10	0.00	PCI/G	GAMMASPEC	44.10
MISS072D	09/01/99	11/22/99	99G0021		11.6	DRY	REG	AM-241	5.46	0.00	PCI/G	GAMMASPEC	5.46
MISS072E	09/01/99	11/22/99	99G0021		32.3	DRY	REG	K-40	17.66	4.46	PCI/G	GAMMASPEC	13.20
MISS072E	09/01/99	11/22/99	99G0021		32.3	DRY	REG	CS-137	1.10	0.00	PCI/G	GAMMASPEC	1.10
MISS072E	09/01/99	11/22/99	99G0021		32.3	DRY	REG	RA-226	2.90	0.37	PCI/G	GAMMASPEC	1.31
MISS072E	09/01/99	11/22/99	99G0021		32.3	DRY	REG	AC-227	7.97	0.00	PCI/G	GAMMASPEC	7.97

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Location:	MAYWOOD		
Site WBS:	12B	Date Entered:	11/23/99
Work Order Number:	99G0021		
Project Number:			
Environmental Cat:	RI		

Sample ID	Date Collected	Date Analyzed	SDG ID	LAB ID	Vol.	W/D	Sample Type	Analyte	Result	Error	Units	Analytical Method	MDA
MISS072E	09/01/99	11/22/99	99G0021		32.3	DRY	REG	RA-228	42.97	1.11	PCI/G	GAMMASPEC	2.36
MISS072E	09/01/99	11/22/99	99G0021		32.3	DRY	REG	TH-228	42.97	1.11	PCI/G	GAMMASPEC	2.36
MISS072E	09/01/99	11/22/99	99G0021		32.3	DRY	REG	TH-232	42.97	1.11	PCI/G	GAMMASPEC	2.36
MISS072E	09/01/99	11/22/99	99G0021		32.3	DRY	REG	TH-230	210.00	0.00	PCI/G	GAMMASPEC	210.00
MISS072E	09/01/99	11/22/99	99G0021		32.3	DRY	REG	PA-231	28.10	0.00	PCI/G	GAMMASPEC	28.10
MISS072E	09/01/99	11/22/99	99G0021		32.3	DRY	REG	U-235	1.40	0.29	PCI/G	GAMMASPEC	0.91
MISS072E	09/01/99	11/22/99	99G0021		32.3	DRY	REG	U-238	26.30	0.00	PCI/G	GAMMASPEC	26.30
MISS072E	09/01/99	11/22/99	99G0021		32.3	DRY	REG	AM-241	3.14	0.00	PCI/G	GAMMASPEC	3.14
MISS072F	09/01/99	11/22/99	99G0021		30.2	DRY	REG	K-40	62.91	7.58	PCI/G	GAMMASPEC	19.40
MISS072F	09/01/99	11/22/99	99G0021		30.2	DRY	REG	CS-137	2.45	0.00	PCI/G	GAMMASPEC	2.45
MISS072F	09/01/99	11/22/99	99G0021		30.2	DRY	REG	RA-226	18.54	0.94	PCI/G	GAMMASPEC	3.31
MISS072F	09/01/99	11/22/99	99G0021		30.2	DRY	REG	AC-227	18.00	0.00	PCI/G	GAMMASPEC	18.00
MISS072F	09/01/99	11/22/99	99G0021		30.2	DRY	REG	RA-228	271.05	4.58	PCI/G	GAMMASPEC	4.09
MISS072F	09/01/99	11/22/99	99G0021		30.2	DRY	REG	TH-228	271.05	4.58	PCI/G	GAMMASPEC	4.09
MISS072F	09/01/99	11/22/99	99G0021		30.2	DRY	REG	TH-232	271.05	4.58	PCI/G	GAMMASPEC	4.09
MISS072F	09/01/99	11/22/99	99G0021		30.2	DRY	REG	TH-230	526.00	0.00	PCI/G	GAMMASPEC	526.00
MISS072F	09/01/99	11/22/99	99G0021		30.2	DRY	REG	PA-231	70.30	0.00	PCI/G	GAMMASPEC	70.30
MISS072F	09/01/99	11/22/99	99G0021		30.2	DRY	REG	U-235	3.28	0.66	PCI/G	GAMMASPEC	2.09
MISS072F	09/01/99	11/22/99	99G0021		30.2	DRY	REG	U-238	62.60	19.38	PCI/G	GAMMASPEC	62.60
MISS072F	09/01/99	11/22/99	99G0021		30.2	DRY	REG	AM-241	7.74	0.00	PCI/G	GAMMASPEC	7.74
MISS074B	09/01/99	11/22/99	99G0021		75.7	DRY	REG	K-40	15.81	2.02	PCI/G	GAMMASPEC	4.63
MISS074B	09/01/99	11/22/99	99G0021		75.7	DRY	REG	CS-137	0.41	0.00	PCI/G	GAMMASPEC	0.41
MISS074B	09/01/99	11/22/99	99G0021		75.7	DRY	REG	RA-226	3.57	0.19	PCI/G	GAMMASPEC	0.55
MISS074B	09/01/99	11/22/99	99G0021		75.7	DRY	REG	AC-227	3.01	0.00	PCI/G	GAMMASPEC	3.01
MISS074B	09/01/99	11/22/99	99G0021		75.7	DRY	REG	RA-228	10.66	0.34	PCI/G	GAMMASPEC	0.90
MISS074B	09/01/99	11/22/99	99G0021		75.7	DRY	REG	TH-228	10.66	0.34	PCI/G	GAMMASPEC	0.90
MISS074B	09/01/99	11/22/99	99G0021		75.7	DRY	REG	TH-232	10.66	0.34	PCI/G	GAMMASPEC	0.90
MISS074B	09/01/99	11/22/99	99G0021		75.7	DRY	REG	TH-230	81.30	0.00	PCI/G	GAMMASPEC	81.30

Approved by: ______________________ Date: ____________

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Location:	MAYWOOD		
Site WBS:	12B	Date Entered:	11/23/99
Work Order Number:	99G0021		
Project Number:			
Environmental Cat:	RI		

Sample ID	Date Collected	Date Analyzed	SDG ID	LAB ID	Vol.	W/D	Sample Type	Analyte	Result	Error	Units	Analytical Method	MDA
MISS074B	09/01/99	11/22/99	99G0021		75.7	DRY	REG	PA-231	10.30	0.00	PCI/G	GAMMASPEC	10.30
MISS074B	09/01/99	11/22/99	99G0021		75.7	DRY	REG	U-235	0.42	0.12	PCI/G	GAMMASPEC	0.38
MISS074B	09/01/99	11/22/99	99G0021		75.7	DRY	REG	U-238	9.74	0.00	PCI/G	GAMMASPEC	9.74
MISS074B	09/01/99	11/22/99	99G0021		75.7	DRY	REG	AM-241	1.19	0.00	PCI/G	GAMMASPEC	1.19
MISS074C	09/01/99	11/22/99	99G0021		91.0	DRY	REG	K-40	17.12	2.34	PCI/G	GAMMASPEC	6.20
MISS074C	09/01/99	11/22/99	99G0021		91.0	DRY	REG	CS-137	0.59	0.00	PCI/G	GAMMASPEC	0.59
MISS074C	09/01/99	11/22/99	99G0021		91.0	DRY	REG	RA-226	3.71	0.22	PCI/G	GAMMASPEC	0.82
MISS074C	09/01/99	11/22/99	99G0021		91.0	DRY	REG	AC-227	4.41	0.00	PCI/G	GAMMASPEC	4.41
MISS074C	09/01/99	11/22/99	99G0021		91.0	DRY	REG	RA-228	41.26	0.81	PCI/G	GAMMASPEC	1.45
MISS074C	09/01/99	11/22/99	99G0021		91.0	DRY	REG	TH-228	41.26	0.81	PCI/G	GAMMASPEC	1.45
MISS074C	09/01/99	11/22/99	99G0021		91.0	DRY	REG	TH-232	41.26	0.81	PCI/G	GAMMASPEC	1.45
MISS074C	09/01/99	11/22/99	99G0021		91.0	DRY	REG	TH-230	130.00	0.00	PCI/G	GAMMASPEC	130.00
MISS074C	09/01/99	11/22/99	99G0021		91.0	DRY	REG	PA-231	16.20	0.00	PCI/G	GAMMASPEC	16.20
MISS074C	09/01/99	11/22/99	99G0021		91.0	DRY	REG	U-235	1.05	0.17	PCI/G	GAMMASPEC	0.52
MISS074C	09/01/99	11/22/99	99G0021		91.0	DRY	REG	U-238	15.60	4.72	PCI/G	GAMMASPEC	15.60
MISS074C	09/01/99	11/22/99	99G0021		91.0	DRY	REG	AM-241	1.87	0.00	PCI/G	GAMMASPEC	1.87
MISS074D	09/01/99	11/22/99	99G0021		4.8	DRY	REG	K-40	102.00	0.00	PCI/G	GAMMASPEC	102.00
MISS074D	09/01/99	11/22/99	99G0021		4.8	DRY	REG	CS-137	7.69	0.00	PCI/G	GAMMASPEC	7.69
MISS074D	09/01/99	11/22/99	99G0021		4.8	DRY	REG	RA-226	16.34	2.54	PCI/G	GAMMASPEC	9.88
MISS074D	09/01/99	11/22/99	99G0021		4.8	DRY	REG	AC-227	54.00	0.00	PCI/G	GAMMASPEC	54.00
MISS074D	09/01/99	11/22/99	99G0021		4.8	DRY	REG	RA-228	372.45	8.83	PCI/G	GAMMASPEC	17.50
MISS074D	09/01/99	11/22/99	99G0021		4.8	DRY	REG	TH-228	372.45	8.83	PCI/G	GAMMASPEC	17.50
MISS074D	09/01/99	11/22/99	99G0021		4.8	DRY	REG	TH-232	372.45	8.83	PCI/G	GAMMASPEC	17.50
MISS074D	09/01/99	11/22/99	99G0021		4.8	DRY	REG	TH-230	1530.00	0.00	PCI/G	GAMMASPEC	1530.00
MISS074D	09/01/99	11/22/99	99G0021		4.8	DRY	REG	PA-231	208.00	0.00	PCI/G	GAMMASPEC	208.00
MISS074D	09/01/99	11/22/99	99G0021		4.8	DRY	REG	U-235	8.79	1.98	PCI/G	GAMMASPEC	6.16
MISS074D	09/01/99	11/22/99	99G0021		4.8	DRY	REG	U-238	185.00	0.00	PCI/G	GAMMASPEC	185.00
MISS074D	09/01/99	11/22/99	99G0021		4.8	DRY	REG	AM-241	22.10	0.00	PCI/G	GAMMASPEC	22.10

Approved by: ______________________ Date: ______________

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Location:	MAYWOOD		
Site WBS:	12B	Date Entered:	11/23/99
Work Order Number:	99G0021		
Project Number:			
Environmental Cat:	RI		

Sample ID	Date Collected	Date Analyzed	SDG ID	LAB ID	Vol.	W/D	Sample Type	Analyte	Result	Error	Units	Analytical Method	MDA
MISS074E	09/01/99	11/22/99	99G0021		7.2	DRY	REG	K-40	113.00	0.00	PCI/G	GAMMASPEC	113.00
MISS074E	09/01/99	11/22/99	99G0021		7.2	DRY	REG	CS-137	10.30	0.00	PCI/G	GAMMASPEC	10.30
MISS074E	09/01/99	11/22/99	99G0021		7.2	DRY	REG	RA-226	45.61	3.51	PCI/G	GAMMASPEC	14.10
MISS074E	09/01/99	11/22/99	99G0021		7.2	DRY	REG	AC-227	73.90	0.00	PCI/G	GAMMASPEC	73.90
MISS074E	09/01/99	11/22/99	99G0021		7.2	DRY	REG	RA-228	1256.70	20.96	PCI/G	GAMMASPEC	16.30
MISS074E	09/01/99	11/22/99	99G0021		7.2	DRY	REG	TH-228	1256.70	20.96	PCI/G	GAMMASPEC	16.30
MISS074E	09/01/99	11/22/99	99G0021		7.2	DRY	REG	TH-232	1256.70	20.96	PCI/G	GAMMASPEC	16.30
MISS074E	09/01/99	11/22/99	99G0021		7.2	DRY	REG	TH-230	2120.00	0.00	PCI/G	GAMMASPEC	2120.00
MISS074E	09/01/99	11/22/99	99G0021		7.2	DRY	REG	PA-231	293.00	0.00	PCI/G	GAMMASPEC	293.00
MISS074E	09/01/99	11/22/99	99G0021		7.2	DRY	REG	U-235	15.08	2.71	PCI/G	GAMMASPEC	8.50
MISS074E	09/01/99	11/22/99	99G0021		7.2	DRY	REG	U-238	253.00	0.00	PCI/G	GAMMASPEC	253.00
MISS074E	09/01/99	11/22/99	99G0021		7.2	DRY	REG	AM-241	34.60	10.44	PCI/G	GAMMASPEC	34.60
MISS074E	09/01/99	11/22/99	99G0021		7.2	DRY	LREP	K-40	120.00	0.00	PCI/G	GAMMASPEC	120.00
MISS074E	09/01/99	11/22/99	99G0021		7.2	DRY	LREP	CS-137	10.80	0.00	PCI/G	GAMMASPEC	10.80
MISS074E	09/01/99	11/22/99	99G0021		7.2	DRY	LREP	RA-226	44.74	3.43	PCI/G	GAMMASPEC	13.30
MISS074E	09/01/99	11/22/99	99G0021		7.2	DRY	LREP	AC-227	75.30	0.00	PCI/G	GAMMASPEC	75.30
MISS074E	09/01/99	11/22/99	99G0021		7.2	DRY	LREP	RA-228	1227.72	20.56	PCI/G	GAMMASPEC	17.30
MISS074E	09/01/99	11/22/99	99G0021		7.2	DRY	LREP	TH-228	1227.72	20.56	PCI/G	GAMMASPEC	17.30
MISS074E	09/01/99	11/22/99	99G0021		7.2	DRY	LREP	TH-232	1227.72	20.56	PCI/G	GAMMASPEC	17.30
MISS074E	09/01/99	11/22/99	99G0021		7.2	DRY	LREP	TH-230	2100.00	0.00	PCI/G	GAMMASPEC	2100.00
MISS074E	09/01/99	11/22/99	99G0021		7.2	DRY	LREP	PA-231	291.00	0.00	PCI/G	GAMMASPEC	291.00
MISS074E	09/01/99	11/22/99	99G0021		7.2	DRY	LREP	U-235	12.71	2.51	PCI/G	GAMMASPEC	7.92
MISS074E	09/01/99	11/22/99	99G0021		7.2	DRY	LREP	U-238	250.00	0.00	PCI/G	GAMMASPEC	250.00
MISS074E	09/01/99	11/22/99	99G0021		7.2	DRY	LREP	AM-241	31.20	0.00	PCI/G	GAMMASPEC	31.20
MISS074F	09/01/99	11/22/99	99G0021		38.1	DRY	REG	K-40	59.20	0.00	PCI/G	GAMMASPEC	59.20
MISS074F	09/01/99	11/22/99	99G0021		38.1	DRY	REG	CS-137	5.73	0.00	PCI/G	GAMMASPEC	5.73
MISS074F	09/01/99	11/22/99	99G0021		38.1	DRY	REG	RA-226	95.72	2.34	PCI/G	GAMMASPEC	7.31
MISS074F	09/01/99	11/22/99	99G0021		38.1	DRY	REG	AC-227	41.30	0.00	PCI/G	GAMMASPEC	41.30

Approved by: ______________________ Date: ______________

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T[illegible] esults listed at the MDA should have been reported at the actual measureme[illegible]

Location:	MAYWOOD		
Site WBS:	12B	Date Entered:	11/23/99
Work Order Number:	99G0021		
Project Number:			
Environmental Cat:	RI		

Sample ID	Date Collected	Date Analyzed	SDG ID	LAB ID	Vol.	W/D	Sample Type	Analyte	Result	Error	Units	Analytical Method	MDA
MISS074F	09/01/99	11/22/99	99G0021		38.1	DRY	REG	RA-228	1955.41	29.44	PCI/G	GAMMASPEC	9.26
MISS074F	09/01/99	11/22/99	99G0021		38.1	DRY	REG	TH-228	1955.41	29.44	PCI/G	GAMMASPEC	9.26
MISS074F	09/01/99	11/22/99	99G0021		38.1	DRY	REG	TH-232	1955.41	29.44	PCI/G	GAMMASPEC	9.26
MISS074F	09/01/99	11/22/99	99G0021		38.1	DRY	REG	TH-230	1170.00	0.00	PCI/G	GAMMASPEC	1170.00
MISS074F	09/01/99	11/22/99	99G0021		38.1	DRY	REG	PA-231	163.00	0.00	PCI/G	GAMMASPEC	163.00
MISS074F	09/01/99	11/22/99	99G0021		38.1	DRY	REG	U-235	24.97	1.06	PCI/G	GAMMASPEC	3.95
MISS074F	09/01/99	11/22/99	99G0021		38.1	DRY	REG	U-238	414.68	32.65	PCI/G	GAMMASPEC	139.00
MISS074F	09/01/99	11/22/99	99G0021		38.1	DRY	REG	AM-241	17.10	0.00	PCI/G	GAMMASPEC	17.10
MISS076B	09/01/99	11/22/99	99G0021		19.5	DRY	REG	K-40	24.21	4.98	PCI/G	GAMMASPEC	12.60
MISS076B	09/01/99	11/22/99	99G0021		19.5	DRY	REG	CS-137	0.93	0.00	PCI/G	GAMMASPEC	0.93
MISS076B	09/01/99	11/22/99	99G0021		19.5	DRY	REG	RA-226	2.34	0.31	PCI/G	GAMMASPEC	1.07
MISS076B	09/01/99	11/22/99	99G0021		19.5	DRY	REG	AC-227	6.18	0.00	PCI/G	GAMMASPEC	6.18
MISS076B	09/01/99	11/22/99	99G0021		19.5	DRY	REG	RA-228	3.24	0.00	PCI/G	GAMMASPEC	3.24
MISS076B	09/01/99	11/22/99	99G0021		19.5	DRY	REG	TH-228	3.24	0.00	PCI/G	GAMMASPEC	3.24
MISS076B	09/01/99	11/22/99	99G0021		19.5	DRY	REG	TH-232	3.24	0.00	PCI/G	GAMMASPEC	3.24
MISS076B	09/01/99	11/22/99	99G0021		19.5	DRY	REG	TH-230	153.00	0.00	PCI/G	GAMMASPEC	153.00
MISS076B	09/01/99	11/22/99	99G0021		19.5	DRY	REG	PA-231	21.60	0.00	PCI/G	GAMMASPEC	21.60
MISS076B	09/01/99	11/22/99	99G0021		19.5	DRY	REG	U-235	0.87	0.25	PCI/G	GAMMASPEC	0.87
MISS076B	09/01/99	11/22/99	99G0021		19.5	DRY	REG	U-238	19.60	0.00	PCI/G	GAMMASPEC	19.60
MISS076B	09/01/99	11/22/99	99G0021		19.5	DRY	REG	AM-241	2.28	0.00	PCI/G	GAMMASPEC	2.28
MISS076C	09/01/99	11/22/99	99G0021		23.6	DRY	REG	K-40	13.75	4.39	PCI/G	GAMMASPEC	13.10
MISS076C	09/01/99	11/22/99	99G0021		23.6	DRY	REG	CS-137	0.73	0.00	PCI/G	GAMMASPEC	0.73
MISS076C	09/01/99	11/22/99	99G0021		23.6	DRY	REG	RA-226	1.80	0.30	PCI/G	GAMMASPEC	1.06
MISS076C	09/01/99	11/22/99	99G0021		23.6	DRY	REG	AC-227	5.06	0.00	PCI/G	GAMMASPEC	5.06
MISS076C	09/01/99	11/22/99	99G0021		23.6	DRY	REG	RA-228	2.96	0.46	PCI/G	GAMMASPEC	1.41
MISS076C	09/01/99	11/22/99	99G0021		23.6	DRY	REG	TH-228	2.96	0.46	PCI/G	GAMMASPEC	1.41
MISS076C	09/01/99	11/22/99	99G0021		23.6	DRY	REG	TH-232	2.96	0.46	PCI/G	GAMMASPEC	1.41
MISS076C	09/01/99	11/22/99	99G0021		23.6	DRY	REG	TH-230	138.00	0.00	PCI/G	GAMMASPEC	138.00

Approved by: ______________________ Date: ______________

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Location:	MAYWOOD		
Site WBS:	12B	Date Entered:	11/23/99
Work Order Number:	99G0021		
Project Number:			
Environmental Cat:	RI		

Sample ID	Date Collected	Date Analyzed	SDG ID	LAB ID	Vol.	W/D	Sample Type	Analyte	Result	Error	Units	Analytical Method	MDA
MISS076C	09/01/99	11/22/99	99G0021		23.6	DRY	REG	PA-231	17.20	0.00	PCI/G	GAMMASPEC	17.20
MISS076C	09/01/99	11/22/99	99G0021		23.6	DRY	REG	U-235	0.68	0.21	PCI/G	GAMMASPEC	0.68
MISS076C	09/01/99	11/22/99	99G0021		23.6	DRY	REG	U-238	18.00	0.00	PCI/G	GAMMASPEC	18.00
MISS076C	09/01/99	11/22/99	99G0021		23.6	DRY	REG	AM-241	1.93	0.00	PCI/G	GAMMASPEC	1.93
MISS076D	09/01/99	11/22/99	99G0021		8.0	DRY	REG	K-40	27.70	7.47	PCI/G	GAMMASPEC	27.70
MISS076D	09/01/99	11/22/99	99G0021		8.0	DRY	REG	CS-137	2.18	0.00	PCI/G	GAMMASPEC	2.18
MISS076D	09/01/99	11/22/99	99G0021		8.0	DRY	REG	RA-226	3.70	0.00	PCI/G	GAMMASPEC	3.70
MISS076D	09/01/99	11/22/99	99G0021		8.0	DRY	REG	AC-227	13.60	0.00	PCI/G	GAMMASPEC	13.60
MISS076D	09/01/99	11/22/99	99G0021		8.0	DRY	REG	RA-228	6.85	0.00	PCI/G	GAMMASPEC	6.85
MISS076D	09/01/99	11/22/99	99G0021		8.0	DRY	REG	TH-228	6.85	0.00	PCI/G	GAMMASPEC	6.85
MISS076D	09/01/99	11/22/99	99G0021		8.0	DRY	REG	TH-232	6.85	0.00	PCI/G	GAMMASPEC	6.85
MISS076D	09/01/99	11/22/99	99G0021		8.0	DRY	REG	TH-230	351.00	0.00	PCI/G	GAMMASPEC	351.00
MISS076D	09/01/99	11/22/99	99G0021		8.0	DRY	REG	PA-231	48.50	0.00	PCI/G	GAMMASPEC	48.50
MISS076D	09/01/99	11/22/99	99G0021		8.0	DRY	REG	U-235	2.01	0.59	PCI/G	GAMMASPEC	2.01
MISS076D	09/01/99	11/22/99	99G0021		8.0	DRY	REG	U-238	45.20	0.00	PCI/G	GAMMASPEC	45.20
MISS076D	09/01/99	11/22/99	99G0021		8.0	DRY	REG	AM-241	5.32	0.00	PCI/G	GAMMASPEC	5.32
MISS076E	09/01/99	11/23/99	99G0021		24.6	DRY	REG	K-40	18.02	3.96	PCI/G	GAMMASPEC	10.40
MISS076E	09/01/99	11/23/99	99G0021		24.6	DRY	REG	CS-137	0.66	0.00	PCI/G	GAMMASPEC	0.66
MISS076E	09/01/99	11/23/99	99G0021		24.6	DRY	REG	RA-226	1.31	0.00	PCI/G	GAMMASPEC	1.31
MISS076E	09/01/99	11/23/99	99G0021		24.6	DRY	REG	AC-227	5.35	0.00	PCI/G	GAMMASPEC	5.35
MISS076E	09/01/99	11/23/99	99G0021		24.6	DRY	REG	RA-228	3.79	0.43	PCI/G	GAMMASPEC	1.83
MISS076E	09/01/99	11/23/99	99G0021		24.6	DRY	REG	TH-228	3.79	0.43	PCI/G	GAMMASPEC	1.83
MISS076E	09/01/99	11/23/99	99G0021		24.6	DRY	REG	TH-232	3.79	0.43	PCI/G	GAMMASPEC	1.83
MISS076E	09/01/99	11/23/99	99G0021		24.6	DRY	REG	TH-230	131.00	0.00	PCI/G	GAMMASPEC	131.00
MISS076E	09/01/99	11/23/99	99G0021		24.6	DRY	REG	PA-231	18.30	0.00	PCI/G	GAMMASPEC	18.30
MISS076E	09/01/99	11/23/99	99G0021		24.6	DRY	REG	U-235	0.68	0.00	PCI/G	GAMMASPEC	0.68
MISS076E	09/01/99	11/23/99	99G0021		24.6	DRY	REG	U-238	15.80	0.00	PCI/G	GAMMASPEC	15.80
MISS076E	09/01/99	11/23/99	99G0021		24.6	DRY	REG	AM-241	1.86	0.00	PCI/G	GAMMASPEC	1.86

Approved by: ______________________ Date: ______________

Equivalent values in the "Result" and "MDA" columns indicate that the analyte was either undetected or detected at a level below the MDA. T· ·esults listed at the MDA should have been reported at the actual measuremer

Location:	MAYWOOD		
Site WBS:	12B	Date Entered:	11/23/99
Work Order Number:	99G0021		
Project Number:			
Environmental Cat:	RI		

Sample ID	Date Collected	Date Analyzed	SDG ID	LAB ID	Vol.	W/D	Sample Type	Analyte	Result	Error	Units	Analytical Method	MDA
MISS076F	09/01/99	11/23/99	99G0021		22.4	DRY	REG	K-40	20.51	4.31	PCI/G	GAMMASPEC	11.00
MISS076F	09/01/99	11/23/99	99G0021		22.4	DRY	REG	CS-137	1.14	0.00	PCI/G	GAMMASPEC	1.14
MISS076F	09/01/99	11/23/99	99G0021		22.4	DRY	REG	RA-226	3.01	0.39	PCI/G	GAMMASPEC	1.46
MISS076F	09/01/99	11/23/99	99G0021		22.4	DRY	REG	AC-227	8.30	0.00	PCI/G	GAMMASPEC	8.30
MISS076F	09/01/99	11/23/99	99G0021		22.4	DRY	REG	RA-228	22.03	0.95	PCI/G	GAMMASPEC	2.62
MISS076F	09/01/99	11/23/99	99G0021		22.4	DRY	REG	TH-228	22.03	0.95	PCI/G	GAMMASPEC	2.62
MISS076F	09/01/99	11/23/99	99G0021		22.4	DRY	REG	TH-232	22.03	0.95	PCI/G	GAMMASPEC	2.62
MISS076F	09/01/99	11/23/99	99G0021		22.4	DRY	REG	TH-230	204.00	0.00	PCI/G	GAMMASPEC	204.00
MISS076F	09/01/99	11/23/99	99G0021		22.4	DRY	REG	PA-231	29.50	0.00	PCI/G	GAMMASPEC	29.50
MISS076F	09/01/99	11/23/99	99G0021		22.4	DRY	REG	U-235	1.03	0.30	PCI/G	GAMMASPEC	0.94
MISS076F	09/01/99	11/23/99	99G0021		22.4	DRY	REG	U-238	27.40	8.48	PCI/G	GAMMASPEC	27.40
MISS076F	09/01/99	11/23/99	99G0021		22.4	DRY	REG	AM-241	3.25	0.00	PCI/G	GAMMASPEC	3.25
QCBLANK	11/23/99	11/23/99	99G0021		945.0	DRY	BL	K-40	0.40	0.00	PCI/G	GAMMASPEC	0.40
QCBLANK	11/23/99	11/23/99	99G0021		945.0	DRY	BL	CS-137	0.03	0.00	PCI/G	GAMMASPEC	0.03
QCBLANK	11/23/99	11/23/99	99G0021		945.0	DRY	BL	RA-226	0.05	0.00	PCI/G	GAMMASPEC	0.05
QCBLANK	11/23/99	11/23/99	99G0021		945.0	DRY	BL	AC-227	0.15	0.00	PCI/G	GAMMASPEC	0.15
QCBLANK	11/23/99	11/23/99	99G0021		945.0	DRY	BL	RA-228	0.06	0.00	PCI/G	GAMMASPEC	0.06
QCBLANK	11/23/99	11/23/99	99G0021		945.0	DRY	BL	TH-228	0.06	0.00	PCI/G	GAMMASPEC	0.06
QCBLANK	11/23/99	11/23/99	99G0021		945.0	DRY	BL	TH-232	0.06	0.00	PCI/G	GAMMASPEC	0.06
QCBLANK	11/23/99	11/23/99	99G0021		945.0	DRY	BL	TH-230	5.99	0.00	PCI/G	GAMMASPEC	5.99
QCBLANK	11/23/99	11/23/99	99G0021		945.0	DRY	BL	PA-231	0.70	0.00	PCI/G	GAMMASPEC	0.70
QCBLANK	11/23/99	11/23/99	99G0021		945.0	DRY	BL	U-235	0.03	0.01	PCI/G	GAMMASPEC	0.03
QCBLANK	11/23/99	11/23/99	99G0021		945.0	DRY	BL	U-238	0.71	0.00	PCI/G	GAMMASPEC	0.71
QCBLANK	11/23/99	11/23/99	99G0021		945.0	DRY	BL	AM-241	0.07	0.00	PCI/G	GAMMASPEC	0.07
QCSPIKEP	04/01/99	11/23/99	99G0021		150.0	DRY	LCSF	CS-137	382.03	13.27	PCI/G	GAMMASPEC	5.16
QCSPIKEP	04/01/99	11/23/99	99G0021		150.0	DRY	LCSF	AM-241	861.20	43.73	PCI/G	GAMMASPEC	15.80
QCSPIKEP	04/01/99	11/23/99	99G0021		150.0	DRY	LCST	CS-137	352.02	16.54	PCI/G	GAMMASPEC	5.16
QCSPIKEP	04/01/99	11/23/99	99G0021		150.0	DRY	LCST	AM-241	849.21	42.46	PCI/G	GAMMASPEC	15.80

Approved by: ______________________ Date: ____________

Equivalent values in the "Result" and "MDA" columns indicate that the analyte was either undetected or detected at a level below the MDA. The results listed at the MDA should have been reported at the actual measurement.

Equivalent values in the "Result" and "MDA" columns indicate that the analyte was either undetected or detected at a level below the MDA.
T' esults listed at the MDA should have been reported at the actual measuremer

Location:	MAYWOOD		
Site WBS:	12B	Date Entered:	11/29/99
Work Order Number:	99G0022		
Project Number:			
Environmental Cat:	RI		

Sample ID	Date Collected	Date Analyzed	SDG ID	LAB ID	Vol.	W/D	Sample Type	Analyte	Result	Error	Units	Analytical Method	MDA
MISS071B	09/01/99	11/24/99	99G0022		85.0	DRY	REG	K-40	25.15	2.36	PCI/G	GAMMASPEC	4.70
MISS071B	09/01/99	11/24/99	99G0022		85.0	DRY	REG	CS-137	0.45	0.00	PCI/G	GAMMASPEC	0.45
MISS071B	09/01/99	11/24/99	99G0022		85.0	DRY	REG	RA-226	3.13	0.17	PCI/G	GAMMASPEC	0.58
MISS071B	09/01/99	11/24/99	99G0022		85.0	DRY	REG	AC-227	3.53	0.00	PCI/G	GAMMASPEC	3.53
MISS071B	09/01/99	11/24/99	99G0022		85.0	DRY	REG	RA-228	18.28	0.46	PCI/G	GAMMASPEC	1.01
MISS071B	09/01/99	11/24/99	99G0022		85.0	DRY	REG	TH-228	18.28	0.46	PCI/G	GAMMASPEC	1.01
MISS071B	09/01/99	11/24/99	99G0022		85.0	DRY	REG	TH-232	18.28	0.46	PCI/G	GAMMASPEC	1.01
MISS071B	09/01/99	11/24/99	99G0022		85.0	DRY	REG	TH-230	93.40	0.00	PCI/G	GAMMASPEC	93.40
MISS071B	09/01/99	11/24/99	99G0022		85.0	DRY	REG	PA-231	12.00	0.00	PCI/G	GAMMASPEC	12.00
MISS071B	09/01/99	11/24/99	99G0022		85.0	DRY	REG	U-235	0.38	0.12	PCI/G	GAMMASPEC	0.38
MISS071B	09/01/99	11/24/99	99G0022		85.0	DRY	REG	U-238	11.30	3.38	PCI/G	GAMMASPEC	11.30
MISS071B	09/01/99	11/24/99	99G0022		85.0	DRY	REG	AM-241	1.33	0.00	PCI/G	GAMMASPEC	1.33
MISS072A	09/01/99	11/26/99	99G0022		75.8	DRY	REG	K-40	29.59	2.37	PCI/G	GAMMASPEC	2.80
MISS072A	09/01/99	11/26/99	99G0022		75.8	DRY	REG	CS-137	0.35	0.00	PCI/G	GAMMASPEC	0.35
MISS072A	09/01/99	11/26/99	99G0022		75.8	DRY	REG	RA-226	2.72	0.16	PCI/G	GAMMASPEC	0.49
MISS072A	09/01/99	11/26/99	99G0022		75.8	DRY	REG	AC-227	2.72	0.00	PCI/G	GAMMASPEC	2.72
MISS072A	09/01/99	11/26/99	99G0022		75.8	DRY	REG	RA-228	6.91	0.27	PCI/G	GAMMASPEC	0.82
MISS072A	09/01/99	11/26/99	99G0022		75.8	DRY	REG	TH-228	6.91	0.27	PCI/G	GAMMASPEC	0.82
MISS072A	09/01/99	11/26/99	99G0022		75.8	DRY	REG	TH-232	6.91	0.27	PCI/G	GAMMASPEC	0.82
MISS072A	09/01/99	11/26/99	99G0022		75.8	DRY	REG	TH-230	67.30	0.00	PCI/G	GAMMASPEC	67.30
MISS072A	09/01/99	11/26/99	99G0022		75.8	DRY	REG	PA-231	8.79	0.00	PCI/G	GAMMASPEC	8.79
MISS072A	09/01/99	11/26/99	99G0022		75.8	DRY	REG	U-235	0.66	0.10	PCI/G	GAMMASPEC	0.32
MISS072A	09/01/99	11/26/99	99G0022		75.8	DRY	REG	U-238	10.25	2.60	PCI/G	GAMMASPEC	8.06
MISS072A	09/01/99	11/26/99	99G0022		75.8	DRY	REG	AM-241	1.04	0.00	PCI/G	GAMMASPEC	1.04
MISS077B	09/01/99	11/23/99	99G0022		45.8	DRY	REG	K-40	22.54	2.71	PCI/G	GAMMASPEC	4.94
MISS077B	09/01/99	11/23/99	99G0022		45.8	DRY	REG	CS-137	0.52	0.00	PCI/G	GAMMASPEC	0.52
MISS077B	09/01/99	11/23/99	99G0022		45.8	DRY	REG	RA-226	3.57	0.25	PCI/G	GAMMASPEC	0.82
MISS077B	09/01/99	11/23/99	99G0022		45.8	DRY	REG	AC-227	4.43	0.00	PCI/G	GAMMASPEC	4.43

Approved by: ______________________ Date: ______________

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Location:	MAYWOOD		
Site WBS:	12B	Date Entered:	11/29/99
Work Order Number:	99G0022		
Project Number:			
Environmental Cat:	RI		

Sample ID	Date Collected	Date Analyzed	SDG ID	LAB ID	Vol.	W/D	Sample Type	Analyte	Result	Error	Units	Analytical Method	MDA
MISS077B	09/01/99	11/23/99	99G0022		45.8	DRY	REG	RA-228	7.81	0.39	PCI/G	GAMMASPEC	1.30
MISS077B	09/01/99	11/23/99	99G0022		45.8	DRY	REG	TH-228	7.81	0.39	PCI/G	GAMMASPEC	1.30
MISS077B	09/01/99	11/23/99	99G0022		45.8	DRY	REG	TH-232	7.81	0.39	PCI/G	GAMMASPEC	1.30
MISS077B	09/01/99	11/23/99	99G0022		45.8	DRY	REG	TH-230	104.00	0.00	PCI/G	GAMMASPEC	104.00
MISS077B	09/01/99	11/23/99	99G0022		45.8	DRY	REG	PA-231	12.80	0.00	PCI/G	GAMMASPEC	12.80
MISS077B	09/01/99	11/23/99	99G0022		45.8	DRY	REG	U-235	0.76	0.15	PCI/G	GAMMASPEC	0.44
MISS077B	09/01/99	11/23/99	99G0022		45.8	DRY	REG	U-238	13.00	3.81	PCI/G	GAMMASPEC	13.00
MISS077B	09/01/99	11/23/99	99G0022		45.8	DRY	REG	AM-241	1.59	0.00	PCI/G	GAMMASPEC	1.59
MISS077C	09/01/99	11/23/99	99G0022		37.5	DRY	REG	K-40	31.08	4.53	PCI/G	GAMMASPEC	11.60
MISS077C	09/01/99	11/23/99	99G0022		37.5	DRY	REG	CS-137	1.21	0.00	PCI/G	GAMMASPEC	1.21
MISS077C	09/01/99	11/23/99	99G0022		37.5	DRY	REG	RA-226	6.35	0.46	PCI/G	GAMMASPEC	1.65
MISS077C	09/01/99	11/23/99	99G0022		37.5	DRY	REG	AC-227	9.13	0.00	PCI/G	GAMMASPEC	9.13
MISS077C	09/01/99	11/23/99	99G0022		37.5	DRY	REG	RA-228	75.64	1.47	PCI/G	GAMMASPEC	2.31
MISS077C	09/01/99	11/23/99	99G0022		37.5	DRY	REG	TH-228	75.64	1.47	PCI/G	GAMMASPEC	2.31
MISS077C	09/01/99	11/23/99	99G0022		37.5	DRY	REG	TH-232	75.64	1.47	PCI/G	GAMMASPEC	2.31
MISS077C	09/01/99	11/23/99	99G0022		37.5	DRY	REG	TH-230	270.00	0.00	PCI/G	GAMMASPEC	270.00
MISS077C	09/01/99	11/23/99	99G0022		37.5	DRY	REG	PA-231	33.90	0.00	PCI/G	GAMMASPEC	33.90
MISS077C	09/01/99	11/23/99	99G0022		37.5	DRY	REG	U-235	1.12	0.34	PCI/G	GAMMASPEC	1.12
MISS077C	09/01/99	11/23/99	99G0022		37.5	DRY	REG	U-238	31.20	9.60	PCI/G	GAMMASPEC	31.20
MISS077C	09/01/99	11/23/99	99G0022		37.5	DRY	REG	AM-241	3.78	0.00	PCI/G	GAMMASPEC	3.78
MISS077D	09/01/99	11/23/99	99G0022		8.0	DRY	REG	K-40	50.80	16.07	PCI/G	GAMMASPEC	50.80
MISS077D	09/01/99	11/23/99	99G0022		8.0	DRY	REG	CS-137	4.91	0.00	PCI/G	GAMMASPEC	4.91
MISS077D	09/01/99	11/23/99	99G0022		8.0	DRY	REG	RA-226	11.89	1.72	PCI/G	GAMMASPEC	6.64
MISS077D	09/01/99	11/23/99	99G0022		8.0	DRY	REG	AC-227	34.50	0.00	PCI/G	GAMMASPEC	34.50
MISS077D	09/01/99	11/23/99	99G0022		8.0	DRY	REG	RA-228	239.54	5.58	PCI/G	GAMMASPEC	11.70
MISS077D	09/01/99	11/23/99	99G0022		8.0	DRY	REG	TH-228	239.54	5.58	PCI/G	GAMMASPEC	11.70
MISS077D	09/01/99	11/23/99	99G0022		8.0	DRY	REG	TH-232	239.54	5.58	PCI/G	GAMMASPEC	11.70
MISS077D	09/01/99	11/23/99	99G0022		8.0	DRY	REG	TH-230	940.00	0.00	PCI/G	GAMMASPEC	940.00

Approved by: ______________________ Date: ____________

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Location:	MAYWOOD		
Site WBS:	12B	Date Entered:	11/29/99
Work Order Number:	99G0022		
Project Number:			
Environmental Cat:	RI		

Sample ID	Date Collected	Date Analyzed	SDG ID	LAB ID	Vol.	W/D	Sample Type	Analyte	Result	Error	Units	Analytical Method	MDA
MISS077D	09/01/99	11/23/99	99G0022		8.0	DRY	REG	PA-231	126.00	0.00	PCI/G	GAMMASPEC	126.00
MISS077D	09/01/99	11/23/99	99G0022		8.0	DRY	REG	U-235	3.57	1.11	PCI/G	GAMMASPEC	3.57
MISS077D	09/01/99	11/23/99	99G0022		8.0	DRY	REG	U-238	112.00	0.00	PCI/G	GAMMASPEC	112.00
MISS077D	09/01/99	11/23/99	99G0022		8.0	DRY	REG	AM-241	14.00	0.00	PCI/G	GAMMASPEC	14.00
MISS077E	09/01/99	11/23/99	99G0022		11.4	DRY	REG	K-40	112.11	17.32	PCI/G	GAMMASPEC	47.20
MISS077E	09/01/99	11/23/99	99G0022		11.4	DRY	REG	CS-137	6.89	0.00	PCI/G	GAMMASPEC	6.89
MISS077E	09/01/99	11/23/99	99G0022		11.4	DRY	REG	RA-226	43.95	2.53	PCI/G	GAMMASPEC	8.69
MISS077E	09/01/99	11/23/99	99G0022		11.4	DRY	REG	AC-227	48.10	0.00	PCI/G	GAMMASPEC	48.10
MISS077E	09/01/99	11/23/99	99G0022		11.4	DRY	REG	RA-228	791.42	13.21	PCI/G	GAMMASPEC	11.80
MISS077E	09/01/99	11/23/99	99G0022		11.4	DRY	REG	TH-228	791.42	13.21	PCI/G	GAMMASPEC	11.80
MISS077E	09/01/99	11/23/99	99G0022		11.4	DRY	REG	TH-232	791.42	13.21	PCI/G	GAMMASPEC	11.80
MISS077E	09/01/99	11/23/99	99G0022		11.4	DRY	REG	TH-230	1380.00	0.00	PCI/G	GAMMASPEC	1380.00
MISS077E	09/01/99	11/23/99	99G0022		11.4	DRY	REG	PA-231	186.00	0.00	PCI/G	GAMMASPEC	186.00
MISS077E	09/01/99	11/23/99	99G0022		11.4	DRY	REG	U-235	10.30	1.63	PCI/G	GAMMASPEC	5.07
MISS077E	09/01/99	11/23/99	99G0022		11.4	DRY	REG	U-238	164.00	0.00	PCI/G	GAMMASPEC	164.00
MISS077E	09/01/99	11/23/99	99G0022		11.4	DRY	REG	AM-241	20.40	0.00	PCI/G	GAMMASPEC	20.40
MISS077F	09/01/99	11/23/99	99G0022		33.4	DRY	REG	K-40	124.92	13.45	PCI/G	GAMMASPEC	37.40
MISS077F	09/01/99	11/23/99	99G0022		33.4	DRY	REG	CS-137	4.63	0.00	PCI/G	GAMMASPEC	4.63
MISS077F	09/01/99	11/23/99	99G0022		33.4	DRY	REG	RA-226	47.97	1.78	PCI/G	GAMMASPEC	6.04
MISS077F	09/01/99	11/23/99	99G0022		33.4	DRY	REG	AC-227	32.90	0.00	PCI/G	GAMMASPEC	32.90
MISS077F	09/01/99	11/23/99	99G0022		33.4	DRY	REG	RA-228	1105.79	16.91	PCI/G	GAMMASPEC	7.16
MISS077F	09/01/99	11/23/99	99G0022		33.4	DRY	REG	TH-228	1105.79	16.91	PCI/G	GAMMASPEC	7.16
MISS077F	09/01/99	11/23/99	99G0022		33.4	DRY	REG	TH-232	1105.79	16.91	PCI/G	GAMMASPEC	7.16
MISS077F	09/01/99	11/23/99	99G0022		33.4	DRY	REG	TH-230	938.00	0.00	PCI/G	GAMMASPEC	938.00
MISS077F	09/01/99	11/23/99	99G0022		33.4	DRY	REG	PA-231	129.00	0.00	PCI/G	GAMMASPEC	129.00
MISS077F	09/01/99	11/23/99	99G0022		33.4	DRY	REG	U-235	14.98	1.28	PCI/G	GAMMASPEC	3.76
MISS077F	09/01/99	11/23/99	99G0022		33.4	DRY	REG	U-238	211.67	35.39	PCI/G	GAMMASPEC	111.00
MISS077F	09/01/99	11/23/99	99G0022		33.4	DRY	REG	AM-241	13.80	0.00	PCI/G	GAMMASPEC	13.80

Approved by: ______________________ Date: ______________

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Location:	MAYWOOD		
Site WBS:	12B	Date Entered:	11/29/99
Work Order Number:	99G0022		
Project Number:			
Environmental Cat:	RI		

Sample ID	Date Collected	Date Analyzed	SDG ID	LAB ID	Vol.	W/D	Sample Type	Analyte	Result	Error	Units	Analytical Method	MDA
MISS078D	09/01/99	11/23/99	99G0022		2.7	DRY	LREP	K-40	125.00	0.00	PCI/G	GAMMASPEC	125.00
MISS078D	09/01/99	11/23/99	99G0022		2.7	DRY	LREP	CS-137	9.21	0.00	PCI/G	GAMMASPEC	9.21
MISS078D	09/01/99	11/23/99	99G0022		2.7	DRY	LREP	RA-226	16.60	0.00	PCI/G	GAMMASPEC	16.60
MISS078D	09/01/99	11/23/99	99G0022		2.7	DRY	LREP	AC-227	73.50	0.00	PCI/G	GAMMASPEC	73.50
MISS078D	09/01/99	11/23/99	99G0022		2.7	DRY	LREP	RA-228	267.70	8.74	PCI/G	GAMMASPEC	21.60
MISS078D	09/01/99	11/23/99	99G0022		2.7	DRY	LREP	TH-228	267.70	8.74	PCI/G	GAMMASPEC	21.60
MISS078D	09/01/99	11/23/99	99G0022		2.7	DRY	LREP	TH-232	267.70	8.74	PCI/G	GAMMASPEC	21.60
MISS078D	09/01/99	11/23/99	99G0022		2.7	DRY	LREP	TH-230	1840.00	0.00	PCI/G	GAMMASPEC	1840.00
MISS078D	09/01/99	11/23/99	99G0022		2.7	DRY	LREP	PA-231	255.00	0.00	PCI/G	GAMMASPEC	255.00
MISS078D	09/01/99	11/23/99	99G0022		2.7	DRY	LREP	U-235	8.50	2.53	PCI/G	GAMMASPEC	8.50
MISS078D	09/01/99	11/23/99	99G0022		2.7	DRY	LREP	U-238	234.00	68.86	PCI/G	GAMMASPEC	234.00
MISS078D	09/01/99	11/23/99	99G0022		2.7	DRY	LREP	AM-241	27.00	0.00	PCI/G	GAMMASPEC	27.00
MISS078D	09/01/99	11/23/99	99G0022		2.7	DRY	REG	K-40	92.80	29.54	PCI/G	GAMMASPEC	92.80
MISS078D	09/01/99	11/23/99	99G0022		2.7	DRY	REG	CS-137	9.16	0.00	PCI/G	GAMMASPEC	9.16
MISS078D	09/01/99	11/23/99	99G0022		2.7	DRY	REG	RA-226	16.10	0.00	PCI/G	GAMMASPEC	16.10
MISS078D	09/01/99	11/23/99	99G0022		2.7	DRY	REG	AC-227	68.10	0.00	PCI/G	GAMMASPEC	68.10
MISS078D	09/01/99	11/23/99	99G0022		2.7	DRY	REG	RA-228	268.35	8.91	PCI/G	GAMMASPEC	24.90
MISS078D	09/01/99	11/23/99	99G0022		2.7	DRY	REG	TH-228	268.35	8.91	PCI/G	GAMMASPEC	24.90
MISS078D	09/01/99	11/23/99	99G0022		2.7	DRY	REG	TH-232	268.35	8.91	PCI/G	GAMMASPEC	24.90
MISS078D	09/01/99	11/23/99	99G0022		2.7	DRY	REG	TH-230	1780.00	0.00	PCI/G	GAMMASPEC	1780.00
MISS078D	09/01/99	11/23/99	99G0022		2.7	DRY	REG	PA-231	257.00	0.00	PCI/G	GAMMASPEC	257.00
MISS078D	09/01/99	11/23/99	99G0022		2.7	DRY	REG	U-235	8.29	2.59	PCI/G	GAMMASPEC	8.29
MISS078D	09/01/99	11/23/99	99G0022		2.7	DRY	REG	U-238	228.00	0.00	PCI/G	GAMMASPEC	228.00
MISS078D	09/01/99	11/23/99	99G0022		2.7	DRY	REG	AM-241	27.90	0.00	PCI/G	GAMMASPEC	27.90
MISS078E	09/01/99	11/23/99	99G0022		8.0	DRY	REG	K-40	49.40	0.00	PCI/G	GAMMASPEC	49.40
MISS078E	09/01/99	11/23/99	99G0022		8.0	DRY	REG	CS-137	3.09	0.00	PCI/G	GAMMASPEC	3.09
MISS078E	09/01/99	11/23/99	99G0022		8.0	DRY	REG	RA-226	4.71	1.06	PCI/G	GAMMASPEC	3.99
MISS078E	09/01/99	11/23/99	99G0022		8.0	DRY	REG	AC-227	24.50	0.00	PCI/G	GAMMASPEC	24.50

Approved by: ______________________ Date: ______________

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Location:	MAYWOOD		
Site WBS:	12B	Date Entered:	11/29/99
Work Order Number:	99G0022		
Project Number:			
Environmental Cat:	RI		

Sample ID	Date Collected	Date Analyzed	SDG ID	LAB ID	Vol.	W/D	Sample Type	Analyte	Result	Error	Units	Analytical Method	MDA
MISS078E	09/01/99	11/23/99	99G0022		8.0	DRY	REG	RA-228	86.57	2.81	PCI/G	GAMMASPEC	7.67
MISS078E	09/01/99	11/23/99	99G0022		8.0	DRY	REG	TH-228	86.57	2.81	PCI/G	GAMMASPEC	7.67
MISS078E	09/01/99	11/23/99	99G0022		8.0	DRY	REG	TH-232	86.57	2.81	PCI/G	GAMMASPEC	7.67
MISS078E	09/01/99	11/23/99	99G0022		8.0	DRY	REG	TH-230	637.00	0.00	PCI/G	GAMMASPEC	637.00
MISS078E	09/01/99	11/23/99	99G0022		8.0	DRY	REG	PA-231	87.30	0.00	PCI/G	GAMMASPEC	87.30
MISS078E	09/01/99	11/23/99	99G0022		8.0	DRY	REG	U-235	2.71	0.83	PCI/G	GAMMASPEC	2.71
MISS078E	09/01/99	11/23/99	99G0022		8.0	DRY	REG	U-238	79.40	24.03	PCI/G	GAMMASPEC	79.40
MISS078E	09/01/99	11/23/99	99G0022		8.0	DRY	REG	AM-241	9.09	0.00	PCI/G	GAMMASPEC	9.09
MISS078F	09/01/99	11/23/99	99G0022		41.5	DRY	REG	K-40	28.86	5.66	PCI/G	GAMMASPEC	16.80
MISS078F	09/01/99	11/23/99	99G0022		41.5	DRY	REG	CS-137	2.00	0.00	PCI/G	GAMMASPEC	2.00
MISS078F	09/01/99	11/23/99	99G0022		41.5	DRY	REG	RA-226	9.43	0.65	PCI/G	GAMMASPEC	2.51
MISS078F	09/01/99	11/23/99	99G0022		41.5	DRY	REG	AC-227	14.00	0.00	PCI/G	GAMMASPEC	14.00
MISS078F	09/01/99	11/23/99	99G0022		41.5	DRY	REG	RA-228	239.27	3.95	PCI/G	GAMMASPEC	3.03
MISS078F	09/01/99	11/23/99	99G0022		41.5	DRY	REG	TH-228	239.27	3.95	PCI/G	GAMMASPEC	3.03
MISS078F	09/01/99	11/23/99	99G0022		41.5	DRY	REG	TH-232	239.27	3.95	PCI/G	GAMMASPEC	3.03
MISS078F	09/01/99	11/23/99	99G0022		41.5	DRY	REG	TH-230	410.00	0.00	PCI/G	GAMMASPEC	410.00
MISS078F	09/01/99	11/23/99	99G0022		41.5	DRY	REG	PA-231	55.20	0.00	PCI/G	GAMMASPEC	55.20
MISS078F	09/01/99	11/23/99	99G0022		41.5	DRY	REG	U-235	4.00	0.54	PCI/G	GAMMASPEC	1.65
MISS078F	09/01/99	11/23/99	99G0022		41.5	DRY	REG	U-238	105.68	15.82	PCI/G	GAMMASPEC	48.40
MISS078F	09/01/99	11/23/99	99G0022		41.5	DRY	REG	AM-241	6.06	0.00	PCI/G	GAMMASPEC	6.06
MISS079B	09/01/99	11/23/99	99G0022		2.5	DRY	REG	K-40	97.70	27.75	PCI/G	GAMMASPEC	97.70
MISS079B	09/01/99	11/23/99	99G0022		2.5	DRY	REG	CS-137	6.85	0.00	PCI/G	GAMMASPEC	6.85
MISS079B	09/01/99	11/23/99	99G0022		2.5	DRY	REG	RA-226	11.30	0.00	PCI/G	GAMMASPEC	11.30
MISS079B	09/01/99	11/23/99	99G0022		2.5	DRY	REG	AC-227	36.80	0.00	PCI/G	GAMMASPEC	36.80
MISS079B	09/01/99	11/23/99	99G0022		2.5	DRY	REG	RA-228	22.20	0.00	PCI/G	GAMMASPEC	22.20
MISS079B	09/01/99	11/23/99	99G0022		2.5	DRY	REG	TH-228	22.20	0.00	PCI/G	GAMMASPEC	22.20
MISS079B	09/01/99	11/23/99	99G0022		2.5	DRY	REG	TH-232	22.20	0.00	PCI/G	GAMMASPEC	22.20
MISS079B	09/01/99	11/23/99	99G0022		2.5	DRY	REG	TH-230	1020.00	0.00	PCI/G	GAMMASPEC	1020.00

Approved by: ______________________ Date: ____________

Equivalent values in the "Result" and "MDA" columns indicate that the analyte was either undetected or detected at a level below the MDA. The results listed at the MDA should have been reported at the actual measurement.

Location:	MAYWOOD		
Site WBS:	12B	Date Entered:	11/29/99
Work Order Number:	99G0022		
Project Number:			
Environmental Cat:	RI		

Sample ID	Date Collected	Date Analyzed	SDG ID	LAB ID	Vol.	W/D	Sample Type	Analyte	Result	Error	Units	Analytical Method	MDA
MISS079B	09/01/99	11/23/99	99G0022		2.5	DRY	REG	PA-231	153.00	0.00	PCI/G	GAMMASPEC	153.00
MISS079B	09/01/99	11/23/99	99G0022		2.5	DRY	REG	U-235	6.48	1.92	PCI/G	GAMMASPEC	6.48
MISS079B	09/01/99	11/23/99	99G0022		2.5	DRY	REG	U-238	139.00	0.00	PCI/G	GAMMASPEC	139.00
MISS079B	09/01/99	11/23/99	99G0022		2.5	DRY	REG	AM-241	16.00	0.00	PCI/G	GAMMASPEC	16.00
MISS079C	09/01/99	11/23/99	99G0022		9.2	DRY	REG	K-40	26.10	7.71	PCI/G	GAMMASPEC	26.10
MISS079C	09/01/99	11/23/99	99G0022		9.2	DRY	REG	CS-137	1.59	0.00	PCI/G	GAMMASPEC	1.59
MISS079C	09/01/99	11/23/99	99G0022		9.2	DRY	REG	RA-226	2.94	0.00	PCI/G	GAMMASPEC	2.94
MISS079C	09/01/99	11/23/99	99G0022		9.2	DRY	REG	AC-227	9.53	0.00	PCI/G	GAMMASPEC	9.53
MISS079C	09/01/99	11/23/99	99G0022		9.2	DRY	REG	RA-228	5.73	0.00	PCI/G	GAMMASPEC	5.73
MISS079C	09/01/99	11/23/99	99G0022		9.2	DRY	REG	TH-228	5.73	0.00	PCI/G	GAMMASPEC	5.73
MISS079C	09/01/99	11/23/99	99G0022		9.2	DRY	REG	TH-232	5.73	0.00	PCI/G	GAMMASPEC	5.73
MISS079C	09/01/99	11/23/99	99G0022		9.2	DRY	REG	TH-230	277.00	0.00	PCI/G	GAMMASPEC	277.00
MISS079C	09/01/99	11/23/99	99G0022		9.2	DRY	REG	PA-231	41.20	0.00	PCI/G	GAMMASPEC	41.20
MISS079C	09/01/99	11/23/99	99G0022		9.2	DRY	REG	U-235	1.60	0.48	PCI/G	GAMMASPEC	1.60
MISS079C	09/01/99	11/23/99	99G0022		9.2	DRY	REG	U-238	38.80	0.00	PCI/G	GAMMASPEC	38.80
MISS079C	09/01/99	11/23/99	99G0022		9.2	DRY	REG	AM-241	3.97	0.00	PCI/G	GAMMASPEC	3.97
MISS079D	09/01/99	11/24/99	99G0022		9.1	DRY	REG	K-40	25.60	7.85	PCI/G	GAMMASPEC	25.60
MISS079D	09/01/99	11/24/99	99G0022		9.1	DRY	REG	CS-137	1.47	0.00	PCI/G	GAMMASPEC	1.47
MISS079D	09/01/99	11/24/99	99G0022		9.1	DRY	REG	RA-226	3.02	0.00	PCI/G	GAMMASPEC	3.02
MISS079D	09/01/99	11/24/99	99G0022		9.1	DRY	REG	AC-227	9.75	0.00	PCI/G	GAMMASPEC	9.75
MISS079D	09/01/99	11/24/99	99G0022		9.1	DRY	REG	RA-228	5.11	0.00	PCI/G	GAMMASPEC	5.11
MISS079D	09/01/99	11/24/99	99G0022		9.1	DRY	REG	TH-228	5.11	0.00	PCI/G	GAMMASPEC	5.11
MISS079D	09/01/99	11/24/99	99G0022		9.1	DRY	REG	TH-232	5.11	0.00	PCI/G	GAMMASPEC	5.11
MISS079D	09/01/99	11/24/99	99G0022		9.1	DRY	REG	TH-230	251.00	0.00	PCI/G	GAMMASPEC	251.00
MISS079D	09/01/99	11/24/99	99G0022		9.1	DRY	REG	PA-231	38.50	0.00	PCI/G	GAMMASPEC	38.50
MISS079D	09/01/99	11/24/99	99G0022		9.1	DRY	REG	U-235	1.64	0.48	PCI/G	GAMMASPEC	1.64
MISS079D	09/01/99	11/24/99	99G0022		9.1	DRY	REG	U-238	37.90	0.00	PCI/G	GAMMASPEC	37.90
MISS079D	09/01/99	11/24/99	99G0022		9.1	DRY	REG	AM-241	4.24	0.00	PCI/G	GAMMASPEC	4.24

Approved by: ______________________ Date: ______________

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Location:	MAYWOOD		
Site WBS:	12B	Date Entered:	11/29/99
Work Order Number:	99G0022		
Project Number:			
Environmental Cat:	RI		

Sample ID	Date Collected	Date Analyzed	SDG ID	LAB ID	Vol.	W/D	Sample Type	Analyte	Result	Error	Units	Analytical Method	MDA
MISS093D	08/18/99	11/24/99	99G0022		8.6	DRY	REG	K-40	42.00	0.00	PCI/G	GAMMASPEC	42.00
MISS093D	08/18/99	11/24/99	99G0022		8.6	DRY	REG	CS-137	2.13	0.00	PCI/G	GAMMASPEC	2.13
MISS093D	08/18/99	11/24/99	99G0022		8.6	DRY	REG	RA-226	2.97	0.00	PCI/G	GAMMASPEC	2.97
MISS093D	08/18/99	11/24/99	99G0022		8.6	DRY	REG	AC-227	9.76	0.00	PCI/G	GAMMASPEC	9.76
MISS093D	08/18/99	11/24/99	99G0022		8.6	DRY	REG	RA-228	5.21	0.00	PCI/G	GAMMASPEC	5.21
MISS093D	08/18/99	11/24/99	99G0022		8.6	DRY	REG	TH-228	5.21	0.00	PCI/G	GAMMASPEC	5.21
MISS093D	08/18/99	11/24/99	99G0022.		8.6	DRY	REG	TH-232	5.21	0.00	PCI/G	GAMMASPEC	5.21
MISS093D	08/18/99	11/24/99	99G0022		8.6	DRY	REG	TH-230	310.00	0.00	PCI/G	GAMMASPEC	310.00
MISS093D	08/18/99	11/24/99	99G0022		8.6	DRY	REG	PA-231	44.90	0.00	PCI/G	GAMMASPEC	44.90
MISS093D	08/18/99	11/24/99	99G0022		8.6	DRY	REG	U-235	1.61	0.50	PCI/G	GAMMASPEC	1.61
MISS093D	08/18/99	11/24/99	99G0022		8.6	DRY	REG	U-238	43.30	0.00	PCI/G	GAMMASPEC	43.30
MISS093D	08/18/99	11/24/99	99G0022		8.6	DRY	REG	AM-241	4.28	0.00	PCI/G	GAMMASPEC	4.28
QCBLANK	11/26/99	11/26/99	99G0022		945.0	DRY	BL	K-40	0.42	0.00	PCI/G	GAMMASPEC	0.42
QCBLANK	11/26/99	11/26/99	99G0022		945.0	DRY	BL	CS-137	0.03	0.00	PCI/G	GAMMASPEC	0.03
QCBLANK	11/26/99	11/26/99	99G0022		945.0	DRY	BL	RA-226	0.06	0.00	PCI/G	GAMMASPEC	0.06
QCBLANK	11/26/99	11/26/99	99G0022		945.0	DRY	BL	AC-227	0.13	0.00	PCI/G	GAMMASPEC	0.13
QCBLANK	11/26/99	11/26/99	99G0022		945.0	DRY	BL	RA-228	0.06	0.00	PCI/G	GAMMASPEC	0.06
QCBLANK	11/26/99	11/26/99	99G0022		945.0	DRY	BL	TH-228	0.06	0.00	PCI/G	GAMMASPEC	0.06
QCBLANK	11/26/99	11/26/99	99G0022		945.0	DRY	BL	TH-232	0.06	0.00	PCI/G	GAMMASPEC	0.06
QCBLANK	11/26/99	11/26/99	99G0022		945.0	DRY	BL	TH-230	5.54	0.00	PCI/G	GAMMASPEC	5.54
QCBLANK	11/26/99	11/26/99	99G0022		945.0	DRY	BL	PA-231	0.70	0.00	PCI/G	GAMMASPEC	0.70
QCBLANK	11/26/99	11/26/99	99G0022		945.0	DRY	BL	U-235	0.03	0.00	PCI/G	GAMMASPEC	0.03
QCBLANK	11/26/99	11/26/99	99G0022		945.0	DRY	BL	U-238	0.70	0.00	PCI/G	GAMMASPEC	0.70
QCBLANK	11/26/99	11/26/99	99G0022		945.0	DRY	BL	AM-241	0.09	0.00	PCI/G	GAMMASPEC	0.09
QCSPIKEP	04/01/99	11/26/99	99G0022		150.0	DRY	LCSF	CS-137	379.49	13.18	PCI/G	GAMMASPEC	5.05
QCSPIKEP	04/01/99	11/26/99	99G0022		150.0	DRY	LCSF	AM-241	836.31	41.40	PCI/G	GAMMASPEC	15.30
QCSPIKEP	04/01/99	11/26/99	99G0022		150.0	DRY	LCST	CS-137	352.02	16.54	PCI/G	GAMMASPEC	5.05
QCSPIKEP	04/01/99	11/26/99	99G0022		150.0	DRY	LCST	AM-241	849.21	42.46	PCI/G	GAMMASPEC	15.30

Approved by: ______________________ Date: ____________

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Location:	MAYWOOD		
Site WBS:	12B	Date Entered:	12/1/99
Work Order Number:	99G0023		
Project Number:			
Environmental Cat:	RI		

Sample ID	Date Collected	Date Analyzed	SDG ID	LAB ID	Vol.	W/D	Sample Type	Analyte	Result	Error	Units	Analytical Method	MDA
MISS036A	08/25/99	11/29/99	99G0023		44.4	DRY	REG	K-40	15.70	2.25	PCI/G	GAMMASPEC	4.17
MISS036A	08/25/99	11/29/99	99G0023		44.4	DRY	REG	CS-137	0.45	0.00	PCI/G	GAMMASPEC	0.45
MISS036A	08/25/99	11/29/99	99G0023		44.4	DRY	REG	RA-226	0.72	0.00	PCI/G	GAMMASPEC	0.72
MISS036A	08/25/99	11/29/99	99G0023		44.4	DRY	REG	AC-227	2.20	0.00	PCI/G	GAMMASPEC	2.20
MISS036A	08/25/99	11/29/99	99G0023		44.4	DRY	REG	RA-228	1.12	0.00	PCI/G	GAMMASPEC	1.12
MISS036A	08/25/99	11/29/99	99G0023		44.4	DRY	REG	TH-228	1.12	0.00	PCI/G	GAMMASPEC	1.12
MISS036A	08/25/99	11/29/99	99G0023		44.4	DRY	REG	TH-232	1.12	0.00	PCI/G	GAMMASPEC	1.12
MISS036A	08/25/99	11/29/99	99G0023		44.4	DRY	REG	TH-230	63.50	0.00	PCI/G	GAMMASPEC	63.50
MISS036A	08/25/99	11/29/99	99G0023		44.4	DRY	REG	PA-231	9.37	0.00	PCI/G	GAMMASPEC	9.37
MISS036A	08/25/99	11/29/99	99G0023		44.4	DRY	REG	U-235	0.36	0.11	PCI/G	GAMMASPEC	0.34
MISS036A	08/25/99	11/29/99	99G0023		44.4	DRY	REG	U-238	8.39	0.00	PCI/G	GAMMASPEC	8.39
MISS036A	08/25/99	11/29/99	99G0023		44.4	DRY	REG	AM-241	0.96	0.00	PCI/G	GAMMASPEC	0.96
MISS072B	09/01/99	11/26/99	99G0023		99.2	DRY	REG	K-40	24.23	1.94	PCI/G	GAMMASPEC	2.81
MISS072B	09/01/99	11/26/99	99G0023		99.2	DRY	REG	CS-137	0.27	0.00	PCI/G	GAMMASPEC	0.27
MISS072B	09/01/99	11/26/99	99G0023		99.2	DRY	REG	RA-226	2.40	0.14	PCI/G	GAMMASPEC	0.43
MISS072B	09/01/99	11/26/99	99G0023		99.2	DRY	REG	AC-227	2.36	0.00	PCI/G	GAMMASPEC	2.36
MISS072B	09/01/99	11/26/99	99G0023		99.2	DRY	REG	RA-228	7.28	0.25	PCI/G	GAMMASPEC	0.70
MISS072B	09/01/99	11/26/99	99G0023		99.2	DRY	REG	TH-228	7.28	0.25	PCI/G	GAMMASPEC	0.70
MISS072B	09/01/99	11/26/99	99G0023		99.2	DRY	REG	TH-232	7.28	0.25	PCI/G	GAMMASPEC	0.70
MISS072B	09/01/99	11/26/99	99G0023		99.2	DRY	REG	TH-230	61.50	0.00	PCI/G	GAMMASPEC	61.50
MISS072B	09/01/99	11/26/99	99G0023		99.2	DRY	REG	PA-231	7.75	0.00	PCI/G	GAMMASPEC	7.75
MISS072B	09/01/99	11/26/99	99G0023		99.2	DRY	REG	U-235	0.57	0.09	PCI/G	GAMMASPEC	0.27
MISS072B	09/01/99	11/26/99	99G0023		99.2	DRY	REG	U-238	9.69	2.28	PCI/G	GAMMASPEC	7.05
MISS072B	09/01/99	11/26/99	99G0023		99.2	DRY	REG	AM-241	0.91	0.00	PCI/G	GAMMASPEC	0.91
MISS078B	09/01/99	11/26/99	99G0023		14.6	DRY	REG	K-40	43.09	6.35	PCI/G	GAMMASPEC	11.30
MISS078B	09/01/99	11/26/99	99G0023		14.6	DRY	REG	CS-137	1.09	0.00	PCI/G	GAMMASPEC	1.09
MISS078B	09/01/99	11/26/99	99G0023		14.6	DRY	REG	RA-226	2.66	0.44	PCI/G	GAMMASPEC	1.74
MISS078B	09/01/99	11/26/99	99G0023		14.6	DRY	REG	AC-227	10.00	0.00	PCI/G	GAMMASPEC	10.00

Approved by: ______________________________ Date: ______________

Equivalent values in the "Result" and "MDA" columns indicate that the analyte was either undetected or detected at a level below the MDA. The results listed at the MDA should have been reported at the actual measurement.

Location:	MAYWOOD		
Site WBS:	12B	Date Entered:	12/1/99
Work Order Number:	99G0023		
Project Number:			
Environmental Cat:	RI		

Sample ID	Date Collected	Date Analyzed	SDG ID	LAB ID	Vol.	W/D	Sample Type	Analyte	Result	Error	Units	Analytical Method	MDA
MISS078B	09/01/99	11/26/99	99G0023		14.6	DRY	REG	RA-228	9.02	0.80	PCI/G	GAMMASPEC	2.97
MISS078B	09/01/99	11/26/99	99G0023		14.6	DRY	REG	TH-228	9.02	0.80	PCI/G	GAMMASPEC	2.97
MISS078B	09/01/99	11/26/99	99G0023		14.6	DRY	REG	TH-232	9.02	0.80	PCI/G	GAMMASPEC	2.97
MISS078B	09/01/99	11/26/99	99G0023		14.6	DRY	REG	TH-230	229.00	0.00	PCI/G	GAMMASPEC	229.00
MISS078B	09/01/99	11/26/99	99G0023		14.6	DRY	REG	PA-231	30.10	0.00	PCI/G	GAMMASPEC	30.10
MISS078B	09/01/99	11/26/99	99G0023		14.6	DRY	REG	U-235	1.27	0.31	PCI/G	GAMMASPEC	0.94
MISS078B	09/01/99	11/26/99	99G0023		14.6	DRY	REG	U-238	28.20	0.00	PCI/G	GAMMASPEC	28.20
MISS078B	09/01/99	11/26/99	99G0023		14.6	DRY	REG	AM-241	3.22	0.00	PCI/G	GAMMASPEC	3.22
MISS078C	09/01/99	11/26/99	99G0023		23.3	DRY	REG	K-40	31.74	4.79	PCI/G	GAMMASPEC	10.40
MISS078C	09/01/99	11/26/99	99G0023		23.3	DRY	REG	CS-137	1.14	0.00	PCI/G	GAMMASPEC	1.14
MISS078C	09/01/99	11/26/99	99G0023		23.3	DRY	REG	RA-226	3.80	0.45	PCI/G	GAMMASPEC	1.60
MISS078C	09/01/99	11/26/99	99G0023		23.3	DRY	REG	AC-227	8.54	0.00	PCI/G	GAMMASPEC	8.54
MISS078C	09/01/99	11/26/99	99G0023		23.3	DRY	REG	RA-228	28.13	0.99	PCI/G	GAMMASPEC	2.74
MISS078C	09/01/99	11/26/99	99G0023		23.3	DRY	REG	TH-228	28.13	0.99	PCI/G	GAMMASPEC	2.74
MISS078C	09/01/99	11/26/99	99G0023		23.3	DRY	REG	TH-232	28.13	0.99	PCI/G	GAMMASPEC	2.74
MISS078C	09/01/99	11/26/99	99G0023		23.3	DRY	REG	TH-230	227.00	0.00	PCI/G	GAMMASPEC	227.00
MISS078C	09/01/99	11/26/99	99G0023		23.3	DRY	REG	PA-231	29.50	0.00	PCI/G	GAMMASPEC	29.50
MISS078C	09/01/99	11/26/99	99G0023		23.3	DRY	REG	U-235	1.41	0.30	PCI/G	GAMMASPEC	0.90
MISS078C	09/01/99	11/26/99	99G0023		23.3	DRY	REG	U-238	24.90	7.87	PCI/G	GAMMASPEC	24.90
MISS078C	09/01/99	11/26/99	99G0023		23.3	DRY	REG	AM-241	3.36	0.00	PCI/G	GAMMASPEC	3.36
MISS079E	09/01/99	11/27/99	99G0023		21.3	DRY	REG	K-40	29.02	4.38	PCI/G	GAMMASPEC	8.21
MISS079E	09/01/99	11/27/99	99G0023		21.3	DRY	REG	CS-137	0.78	0.00	PCI/G	GAMMASPEC	0.78
MISS079E	09/01/99	11/27/99	99G0023		21.3	DRY	REG	RA-226	1.29	0.00	PCI/G	GAMMASPEC	1.29
MISS079E	09/01/99	11/27/99	99G0023		21.3	DRY	REG	AC-227	5.06	0.00	PCI/G	GAMMASPEC	5.06
MISS079E	09/01/99	11/27/99	99G0023		21.3	DRY	REG	RA-228	2.93	0.45	PCI/G	GAMMASPEC	1.54
MISS079E	09/01/99	11/27/99	99G0023		21.3	DRY	REG	TH-228	2.93	0.45	PCI/G	GAMMASPEC	1.54
MISS079E	09/01/99	11/27/99	99G0023		21.3	DRY	REG	TH-232	2.93	0.45	PCI/G	GAMMASPEC	1.54
MISS079E	09/01/99	11/27/99	99G0023		21.3	DRY	REG	TH-230	129.00	0.00	PCI/G	GAMMASPEC	129.00

Approved by: ______________________ Date: ____________

Equivalent values in the "Result" and "MDA" columns indicate that the analyte was either undetected or detected at a level below the MDA. Th results listed at the MDA should have been reported at the actual measuremen

Location:	MAYWOOD		
Site WBS:	12B	Date Entered:	12/1/99
Work Order Number:	99G0023		
Project Number:			
Environmental Cat:	RI		

Sample ID	Date Collected	Date Analyzed	SDG ID	LAB ID	Vol.	W/D	Sample Type	Analyte	Result	Error	Units	Analytical Method	MDA
MISS079E	09/01/99	11/27/99	99G0023		21.3	DRY	REG	PA-231	18.10	0.00	PCI/G	GAMMASPEC	18.10
MISS079E	09/01/99	11/27/99	99G0023		21.3	DRY	REG	U-235	0.85	0.21	PCI/G	GAMMASPEC	0.62
MISS079E	09/01/99	11/27/99	99G0023		21.3	DRY	REG	U-238	17.60	0.00	PCI/G	GAMMASPEC	17.60
MISS079E	09/01/99	11/27/99	99G0023		21.3	DRY	REG	AM-241	2.05	0.00	PCI/G	GAMMASPEC	2.05
MISS079F	09/01/99	11/27/99	99G0023		20.8	DRY	REG	K-40	21.00	0.00	PCI/G	GAMMASPEC	21.00
MISS079F	09/01/99	11/27/99	99G0023		20.8	DRY	REG	CS-137	1.07	0.00	PCI/G	GAMMASPEC	1.07
MISS079F	09/01/99	11/27/99	99G0023		20.8	DRY	REG	RA-226	1.82	0.33	PCI/G	GAMMASPEC	1.36
MISS079F	09/01/99	11/27/99	99G0023		20.8	DRY	REG	AC-227	7.50	0.00	PCI/G	GAMMASPEC	7.50
MISS079F	09/01/99	11/27/99	99G0023		20.8	DRY	REG	RA-228	14.23	0.78	PCI/G	GAMMASPEC	2.39
MISS079F	09/01/99	11/27/99	99G0023		20.8	DRY	REG	TH-228	14.23	0.78	PCI/G	GAMMASPEC	2.39
MISS079F	09/01/99	11/27/99	99G0023		20.8	DRY	REG	TH-232	14.23	0.78	PCI/G	GAMMASPEC	2.39
MISS079F	09/01/99	11/27/99	99G0023		20.8	DRY	REG	TH-230	186.00	0.00	PCI/G	GAMMASPEC	186.00
MISS079F	09/01/99	11/27/99	99G0023		20.8	DRY	REG	PA-231	26.70	0.00	PCI/G	GAMMASPEC	26.70
MISS079F	09/01/99	11/27/99	99G0023		20.8	DRY	REG	U-235	0.93	0.28	PCI/G	GAMMASPEC	0.87
MISS079F	09/01/99	11/27/99	99G0023		20.8	DRY	REG	U-238	23.40	7.01	PCI/G	GAMMASPEC	23.40
MISS079F	09/01/99	11/27/99	99G0023		20.8	DRY	REG	AM-241	3.07	0.00	PCI/G	GAMMASPEC	3.07
MISS093C	08/18/99	11/26/99	99G0023		96.4	DRY	REG	K-40	10.34	1.46	PCI/G	GAMMASPEC	3.45
MISS093C	08/18/99	11/26/99	99G0023		96.4	DRY	REG	CS-137	0.19	0.00	PCI/G	GAMMASPEC	0.19
MISS093C	08/18/99	11/26/99	99G0023		96.4	DRY	REG	RA-226	1.43	0.11	PCI/G	GAMMASPEC	0.33
MISS093C	08/18/99	11/26/99	99G0023		96.4	DRY	REG	AC-227	1.63	0.00	PCI/G	GAMMASPEC	1.63
MISS093C	08/18/99	11/26/99	99G0023		96.4	DRY	REG	RA-228	1.34	0.13	PCI/G	GAMMASPEC	0.49
MISS093C	08/18/99	11/26/99	99G0023		96.4	DRY	REG	TH-228	1.34	0.13	PCI/G	GAMMASPEC	0.49
MISS093C	08/18/99	11/26/99	99G0023		96.4	DRY	REG	TH-232	1.34	0.13	PCI/G	GAMMASPEC	0.49
MISS093C	08/18/99	11/26/99	99G0023		96.4	DRY	REG	TH-230	42.10	0.00	PCI/G	GAMMASPEC	42.10
MISS093C	08/18/99	11/26/99	99G0023		96.4	DRY	REG	PA-231	5.22	0.00	PCI/G	GAMMASPEC	5.22
MISS093C	08/18/99	11/26/99	99G0023		96.4	DRY	REG	U-235	0.34	0.06	PCI/G	GAMMASPEC	0.18
MISS093C	08/18/99	11/26/99	99G0023		96.4	DRY	REG	U-238	5.26	0.00	PCI/G	GAMMASPEC	5.26
MISS093C	08/18/99	11/26/99	99G0023		96.4	DRY	REG	AM-241	0.61	0.00	PCI/G	GAMMASPEC	0.61

Approved by: ______________________ Date: ______________

Equivalent values in the "Result" and "MDA" columns indicate that the analyte was either undetected or detected at a level below the MDA. The results listed at the MDA should have been reported at the actual measurement.

Location:	MAYWOOD		
Site WBS:	12B	Date Entered:	12/1/99
Work Order Number:	99G0023		
Project Number:			
Environmental Cat:	RI		

Sample ID	Date Collected	Date Analyzed	SDG ID	LAB ID	Vol.	W/D	Sample Type	Analyte	Result	Error	Units	Analytical Method	MDA
MISS093C	08/18/99	11/26/99	99G0023		96.4	DRY	LREP	K-40	11.70	1.48	PCI/G	GAMMASPEC	3.22
MISS093C	08/18/99	11/26/99	99G0023		96.4	DRY	LREP	CS-137	0.19	0.00	PCI/G	GAMMASPEC	0.19
MISS093C	08/18/99	11/26/99	99G0023		96.4	DRY	LREP	RA-226	1.52	0.10	PCI/G	GAMMASPEC	0.29
MISS093C	08/18/99	11/26/99	99G0023		96.4	DRY	LREP	AC-227	1.65	0.00	PCI/G	GAMMASPEC	1.65
MISS093C	08/18/99	11/26/99	99G0023		96.4	DRY	LREP	RA-228	1.49	0.12	PCI/G	GAMMASPEC	0.46
MISS093C	08/18/99	11/26/99	99G0023		96.4	DRY	LREP	TH-228	1.49	0.12	PCI/G	GAMMASPEC	0.46
MISS093C	08/18/99	11/26/99	99G0023		96.4	DRY	LREP	TH-232	1.49	0.12	PCI/G	GAMMASPEC	0.46
MISS093C	08/18/99	11/26/99	99G0023		96.4	DRY	LREP	TH-230	40.20	0.00	PCI/G	GAMMASPEC	40.20
MISS093C	08/18/99	11/26/99	99G0023		96.4	DRY	LREP	PA-231	5.29	0.00	PCI/G	GAMMASPEC	5.29
MISS093C	08/18/99	11/26/99	99G0023		96.4	DRY	LREP	U-235	0.34	0.06	PCI/G	GAMMASPEC	0.19
MISS093C	08/18/99	11/26/99	99G0023		96.4	DRY	LREP	U-238	5.37	0.00	PCI/G	GAMMASPEC	5.37
MISS093C	08/18/99	11/26/99	99G0023		96.4	DRY	LREP	AM-241	0.57	0.00	PCI/G	GAMMASPEC	0.57
MISS093E	08/18/99	11/27/99	99G0023		21.3	DRY	REG	K-40	19.10	0.00	PCI/G	GAMMASPEC	19.10
MISS093E	08/18/99	11/27/99	99G0023		21.3	DRY	REG	CS-137	0.75	0.00	PCI/G	GAMMASPEC	0.75
MISS093E	08/18/99	11/27/99	99G0023		21.3	DRY	REG	RA-226	1.42	0.00	PCI/G	GAMMASPEC	1.42
MISS093E	08/18/99	11/27/99	99G0023		21.3	DRY	REG	AC-227	3.94	0.00	PCI/G	GAMMASPEC	3.94
MISS093E	08/18/99	11/27/99	99G0023		21.3	DRY	REG	RA-228	2.34	0.00	PCI/G	GAMMASPEC	2.34
MISS093E	08/18/99	11/27/99	99G0023		21.3	DRY	REG	TH-228	2.34	0.00	PCI/G	GAMMASPEC	2.34
MISS093E	08/18/99	11/27/99	99G0023		21.3	DRY	REG	TH-232	2.34	0.00	PCI/G	GAMMASPEC	2.34
MISS093E	08/18/99	11/27/99	99G0023		21.3	DRY	REG	TH-230	119.00	0.00	PCI/G	GAMMASPEC	119.00
MISS093E	08/18/99	11/27/99	99G0023		21.3	DRY	REG	PA-231	18.50	0.00	PCI/G	GAMMASPEC	18.50
MISS093E	08/18/99	11/27/99	99G0023		21.3	DRY	REG	U-235	0.68	0.21	PCI/G	GAMMASPEC	0.68
MISS093E	08/18/99	11/27/99	99G0023		21.3	DRY	REG	U-238	16.90	0.00	PCI/G	GAMMASPEC	16.90
MISS093E	08/18/99	11/27/99	99G0023		21.3	DRY	REG	AM-241	1.97	0.00	PCI/G	GAMMASPEC	1.97
QCBLANK	11/27/99	11/27/99	99G0023		945.0	DRY	BL	K-40	0.38	0.09	PCI/G	GAMMASPEC	0.16
QCBLANK	11/27/99	11/27/99	99G0023		945.0	DRY	BL	CS-137	0.03	0.00	PCI/G	GAMMASPEC	0.03
QCBLANK	11/27/99	11/27/99	99G0023		945.0	DRY	BL	RA-226	0.05	0.00	PCI/G	GAMMASPEC	0.05
QCBLANK	11/27/99	11/27/99	99G0023		945.0	DRY	BL	AC-227	0.15	0.00	PCI/G	GAMMASPEC	0.15

Approved by: ______________________ Date: ____________

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Location:	MAYWOOD		
Site WBS:	12B	Date Entered:	12/1/99
Work Order Number:	99G0023		
Project Number:			
Environmental Cat:	RI		

Sample ID	Date Collected	Date Analyzed	SDG ID	LAB ID	Vol.	W/D	Sample Type	Analyte	Result	Error	Units	Analytical Method	MDA
QCBLANK	11/27/99	11/27/99	99G0023		945.0	DRY	BL	RA-228	0.06	0.00	PCI/G	GAMMASPEC	0.06
QCBLANK	11/27/99	11/27/99	99G0023		945.0	DRY	BL	TH-228	0.06	0.00	PCI/G	GAMMASPEC	0.06
QCBLANK	11/27/99	11/27/99	99G0023		945.0	DRY	BL	TH-232	0.06	0.00	PCI/G	GAMMASPEC	0.06
QCBLANK	11/27/99	11/27/99	99G0023		945.0	DRY	BL	TH-230	6.13	0.00	PCI/G	GAMMASPEC	6.13
QCBLANK	11/27/99	11/27/99	99G0023		945.0	DRY	BL	PA-231	0.66	0.00	PCI/G	GAMMASPEC	0.66
QCBLANK	11/27/99	11/27/99	99G0023		945.0	DRY	BL	U-235	0.03	0.01	PCI/G	GAMMASPEC	0.03
QCBLANK	11/27/99	11/27/99	99G0023		945.0	DRY	BL	U-238	0.72	0.00	PCI/G	GAMMASPEC	0.72
QCBLANK	11/27/99	11/27/99	99G0023		945.0	DRY	BL	AM-241	0.08	0.00	PCI/G	GAMMASPEC	0.08
QCSPIKEP	04/01/99	11/27/99	99G0023		150.0	DRY	LCSF	CS-137	385.10	13.37	PCI/G	GAMMASPEC	5.12
QCSPIKEP	04/01/99	11/27/99	99G0023		150.0	DRY	LCSF	AM-241	863.53	43.28	PCI/G	GAMMASPEC	14.20
QCSPIKEP	04/01/99	11/27/99	99G0023		150.0	DRY	LCST	CS-137	352.02	16.54	PCI/G	GAMMASPEC	5.12
QCSPIKEP	04/01/99	11/27/99	99G0023		150.0	DRY	LCST	AM-241	849.21	42.46	PCI/G	GAMMASPEC	14.20

Approved by: ______________________ Date: ______________

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WET GAMMA SPECTROSCOPY ON COMPOSITES

ENGINEERING TEST PITS AT MISS SOIL RADIOLOGICAL DATA RESULTS AND SOR CALCULATION

FUSRAP MAYWOOD SUPERFUND SITE MAYWOOD, NEW JERSEY

Location:	MAYWOOD		
Site WBS:	FMSS	Date Entered:	8/24/99
Work Order Number:	99G0001		
Project Number:			
Environmental Cat:	EA		

Sample ID	Date Collected	Date Analyzed	SDG ID	LAB ID	Vol.	W/D	Sample Type	Analyte	Result	Error	Units	Analytical Method	MDA
MISS00140	08/23/99	08/23/99	99G0001	N/A	780.7	WET	REG	K-40	10.00	0.59	PCI/G	GAMMASPEC	0.82
MISS00140	08/23/99	08/23/99	99G0001	N/A	780.7	WET	REG	CS-137	0.12	0.00	PCI/G	GAMMASPEC	0.12
MISS00140	08/23/99	08/23/99	99G0001	N/A	780.7	WET	REG	RA-226	0.88	0.05	PCI/G	GAMMASPEC	0.17
MISS00140	08/23/99	08/23/99	99G0001	N/A	780.7	WET	REG	AC-227	1.00	0.00	PCI/G	GAMMASPEC	1.00
MISS00140	08/23/99	08/23/99	99G0001	N/A	780.7	WET	REG	RA-228	5.26	0.12	PCI/G	GAMMASPEC	0.25
MISS00140	08/23/99	08/23/99	99G0001	N/A	780.7	WET	REG	TH-228	5.26	0.12	PCI/G	GAMMASPEC	0.25
MISS00140	08/23/99	08/23/99	99G0001	N/A	780.7	WET	REG	TH-232	5.26	0.12	PCI/G	GAMMASPEC	0.25
MISS00140	08/23/99	08/23/99	99G0001	N/A	780.7	WET	REG	TH-230	38.50	0.00	PCI/G	GAMMASPEC	38.50
MISS00140	08/23/99	08/23/99	99G0001	N/A	780.7	WET	REG	PA-231	3.60	0.00	PCI/G	GAMMASPEC	3.60
MISS00140	08/23/99	08/23/99	99G0001	N/A	780.7	WET	REG	U-235	0.21	0.04	PCI/G	GAMMASPEC	0.11
MISS00140	08/23/99	08/23/99	99G0001	N/A	780.7	WET	REG	U-238	3.81	0.00	PCI/G	GAMMASPEC	3.81
MISS00140	08/23/99	08/23/99	99G0001	N/A	780.7	WET	REG	AM-241	0.44	0.00	PCI/G	GAMMASPEC	0.44
MISS0015X	08/23/99	08/23/99	99G0001	N/A	701.0	WET	REG	K-40	9.17	0.56	PCI/G	GAMMASPEC	0.62
MISS0015X	08/23/99	08/23/99	99G0001	N/A	701.0	WET	REG	CS-137	0.08	0.00	PCI/G	GAMMASPEC	0.08
MISS0015X	08/23/99	08/23/99	99G0001	N/A	701.0	WET	REG	RA-226	0.72	0.04	PCI/G	GAMMASPEC	0.11
MISS0015X	08/23/99	08/23/99	99G0001	N/A	701.0	WET	REG	AC-227	0.71	0.00	PCI/G	GAMMASPEC	0.71
MISS0015X	08/23/99	08/23/99	99G0001	N/A	701.0	WET	REG	RA-228	1.28	0.06	PCI/G	GAMMASPEC	0.19
MISS0015X	08/23/99	08/23/99	99G0001	N/A	701.0	WET	REG	TH-228	1.28	0.06	PCI/G	GAMMASPEC	0.19
MISS0015X	08/23/99	08/23/99	99G0001	N/A	701.0	WET	REG	TH-232	1.28	0.06	PCI/G	GAMMASPEC	0.19
MISS0015X	08/23/99	08/23/99	99G0001	N/A	701.0	WET	REG	TH-230	24.20	0.00	PCI/G	GAMMASPEC	24.20
MISS0015X	08/23/99	08/23/99	99G0001	N/A	701.0	WET	REG	PA-231	2.17	0.00	PCI/G	GAMMASPEC	2.17
MISS0015X	08/23/99	08/23/99	99G0001	N/A	701.0	WET	REG	U-235	0.09	0.03	PCI/G	GAMMASPEC	0.08
MISS0015X	08/23/99	08/23/99	99G0001	N/A	701.0	WET	REG	U-238	2.47	0.00	PCI/G	GAMMASPEC	2.47
MISS0015X	08/23/99	08/23/99	99G0001	N/A	701.0	WET	REG	AM-241	0.28	0.00	PCI/G	GAMMASPEC	0.28
MISS00160	08/23/99	08/24/99	99G0001	N/A	902.9	WET	LREP	K-40	9.54	0.52	PCI/G	GAMMASPEC	0.48
MISS00160	08/23/99	08/24/99	99G0001	N/A	902.9	WET	LREP	CS-137	0.05	0.00	PCI/G	GAMMASPEC	0.05
MISS00160	08/23/99	08/24/99	99G0001	N/A	902.9	WET	LREP	RA-226	0.50	0.03	PCI/G	GAMMASPEC	0.08
MISS00160	08/23/99	08/24/99	99G0001	N/A	902.9	WET	LREP	AC-227	0.56	0.00	PCI/G	GAMMASPEC	0.56

Approved by: ______________________ Date: ______________

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Location:	MAYWOOD		
Site WBS:	FMSS	Date Entered:	8/24/99
Work Order Number:	99G0001		
Project Number:			
Environmental Cat:	EA		

Sample ID	Date Collected	Date Analyzed	SDG ID	LAB ID	Vol.	W/D	Sample Type	Analyte	Result	Error	Units	Analytical Method	MDA
MISS00160	08/23/99	08/24/99	99G0001	N/A	902.9	WET	LREP	RA-228	0.71	0.04	PCI/G	GAMMASPEC	0.14
MISS00160	08/23/99	08/24/99	99G0001	N/A	902.9	WET	LREP	TH-228	0.71	0.04	PCI/G	GAMMASPEC	0.14
MISS00160	08/23/99	08/24/99	99G0001	N/A	902.9	WET	LREP	TH-232	0.71	0.04	PCI/G	GAMMASPEC	0.14
MISS00160	08/23/99	08/24/99	99G0001	N/A	902.9	WET	LREP	TH-230	18.20	0.00	PCI/G	GAMMASPEC	18.20
MISS00160	08/23/99	08/24/99	99G0001	N/A	902.9	WET	LREP	PA-231	1.68	0.00	PCI/G	GAMMASPEC	1.68
MISS00160	08/23/99	08/24/99	99G0001	N/A	902.9	WET	LREP	U-235	0.09	0.02	PCI/G	GAMMASPEC	0.06
MISS00160	08/23/99	08/24/99	99G0001	N/A	902.9	WET	LREP	U-238	1.62	0.53	PCI/G	GAMMASPEC	1.67
MISS00160	08/23/99	08/24/99	99G0001	N/A	902.9	WET	LREP	AM-241	0.20	0.00	PCI/G	GAMMASPEC	0.20
MISS00160	08/23/99	08/23/99	99G0001	N/A	902.9	WET	REG	K-40	9.94	0.53	PCI/G	GAMMASPEC	0.41
MISS00160	08/23/99	08/23/99	99G0001	N/A	902.9	WET	REG	CS-137	0.06	0.00	PCI/G	GAMMASPEC	0.06
MISS00160	08/23/99	08/23/99	99G0001	N/A	902.9	WET	REG	RA-226	0.40	0.03	PCI/G	GAMMASPEC	0.06
MISS00160	08/23/99	08/23/99	99G0001	N/A	902.9	WET	REG	AC-227	0.60	0.00	PCI/G	GAMMASPEC	0.60
MISS00160	08/23/99	08/23/99	99G0001	N/A	902.9	WET	REG	RA-228	0.73	0.04	PCI/G	GAMMASPEC	0.14
MISS00160	08/23/99	08/23/99	99G0001	N/A	902.9	WET	REG	TH-228	0.73	0.04	PCI/G	GAMMASPEC	0.14
MISS00160	08/23/99	08/23/99	99G0001	N/A	902.9	WET	REG	TH-232	0.73	0.04	PCI/G	GAMMASPEC	0.14
MISS00160	08/23/99	08/23/99	99G0001	N/A	902.9	WET	REG	TH-230	18.90	0.00	PCI/G	GAMMASPEC	18.90
MISS00160	08/23/99	08/23/99	99G0001	N/A	902.9	WET	REG	PA-231	2.07	0.00	PCI/G	GAMMASPEC	1.64
MISS00160	08/23/99	08/23/99	99G0001	N/A	902.9	WET	REG	U-235	0.54	0.02	PCI/G	GAMMASPEC	0.07
MISS00160	08/23/99	08/23/99	99G0001	N/A	902.9	WET	REG	U-238	2.09	0.56	PCI/G	GAMMASPEC	1.76
MISS00160	08/23/99	08/23/99	99G0001	N/A	902.9	WET	REG	AM-241	0.20	0.00	PCI/G	GAMMASPEC	0.20
MISS00170	08/23/99	08/24/99	99G0001	N/A	787.5	WET	REG	K-40	10.25	0.59	PCI/G	GAMMASPEC	0.71
MISS00170	08/23/99	08/24/99	99G0001	N/A	787.5	WET	REG	CS-137	0.09	0.00	PCI/G	GAMMASPEC	0.09
MISS00170	08/23/99	08/24/99	99G0001	N/A	787.5	WET	REG	RA-226	0.79	0.04	PCI/G	GAMMASPEC	0.14
MISS00170	08/23/99	08/24/99	99G0001	N/A	787.5	WET	REG	AC-227	0.82	0.00	PCI/G	GAMMASPEC	0.82
MISS00170	08/23/99	08/24/99	99G0001	N/A	787.5	WET	REG	RA-228	3.13	0.09	PCI/G	GAMMASPEC	0.20
MISS00170	08/23/99	08/24/99	99G0001	N/A	787.5	WET	REG	TH-228	3.13	0.09	PCI/G	GAMMASPEC	0.20
MISS00170	08/23/99	08/24/99	99G0001	N/A	787.5	WET	REG	TH-232	3.13	0.09	PCI/G	GAMMASPEC	0.20
MISS00170	08/23/99	08/24/99	99G0001	N/A	787.5	WET	REG	TH-230	31.20	0.00	PCI/G	GAMMASPEC	31.20

Approved by: ______________________ Date: ______________

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Location:	MAYWOOD		
Site WBS:	FMSS	Date Entered:	8/24/99
Work Order Number:	99G0001		
Project Number:			
Environmental Cat:	EA		

Sample ID	Date Collected	Date Analyzed	SDG ID	LAB ID	Vol.	W/D	Sample Type	Analyte	Result	Error	Units	Analytical Method	MDA
MISS00170	08/23/99	08/24/99	99G0001	N/A	787.5	WET	REG	PA-231	2.81	0.00	PCI/G	GAMMASPEC	2.81
MISS00170	08/23/99	08/24/99	99G0001	N/A	787.5	WET	REG	U-235	0.21	0.03	PCI/G	GAMMASPEC	0.09
MISS00170	08/23/99	08/24/99	99G0001	N/A	787.5	WET	REG	U-238	3.03	0.00	PCI/G	GAMMASPEC	3.03
MISS00170	08/23/99	08/24/99	99G0001	N/A	787.5	WET	REG	AM-241	0.34	0.00	PCI/G	GAMMASPEC	0.34
MISS00180	08/23/99	08/24/99	99G0001	N/A	963.9	WET	REG	K-40	4.58	0.33	PCI/G	GAMMASPEC	0.42
MISS00180	08/23/99	08/24/99	99G0001	N/A	963.9	WET	REG	CS-137	0.01	0.01	PCI/G	GAMMASPEC	0.04
MISS00180	08/23/99	08/24/99	99G0001	N/A	963.9	WET	REG	RA-226	0.59	0.03	PCI/G	GAMMASPEC	0.10
MISS00180	08/23/99	08/24/99	99G0001	N/A	963.9	WET	REG	AC-227	0.64	0.00	PCI/G	GAMMASPEC	0.64
MISS00180	08/23/99	08/24/99	99G0001	N/A	963.9	WET	REG	RA-228	1.83	0.06	PCI/G	GAMMASPEC	0.14
MISS00180	08/23/99	08/24/99	99G0001	N/A	963.9	WET	REG	TH-228	1.83	0.06	PCI/G	GAMMASPEC	0.14
MISS00180	08/23/99	08/24/99	99G0001	N/A	963.9	WET	REG	TH-232	1.83	0.06	PCI/G	GAMMASPEC	0.14
MISS00180	08/23/99	08/24/99	99G0001	N/A	963.9	WET	REG	TH-230	22.50	0.00	PCI/G	GAMMASPEC	22.50
MISS00180	08/23/99	08/24/99	99G0001	N/A	963.9	WET	REG	PA-231	2.15	0.00	PCI/G	GAMMASPEC	2.15
MISS00180	08/23/99	08/24/99	99G0001	N/A	963.9	WET	REG	U-235	0.09	0.02	PCI/G	GAMMASPEC	0.07
MISS00180	08/23/99	08/24/99	99G0001	N/A	963.9	WET	REG	U-238	2.29	0.00	PCI/G	GAMMASPEC	2.29
MISS00180	08/23/99	08/24/99	99G0001	N/A	963.9	WET	REG	AM-241	0.26	0.00	PCI/G	GAMMASPEC	0.26
MISS00190	08/23/99	08/24/99	99G0001	N/A	1080.0	WET	REG	K-40	8.80	0.47	PCI/G	GAMMASPEC	0.50
MISS00190	08/23/99	08/24/99	99G0001	N/A	1080.0	WET	REG	CS-137	0.05	0.00	PCI/G	GAMMASPEC	0.05
MISS00190	08/23/99	08/24/99	99G0001	N/A	1080.0	WET	REG	RA-226	0.50	0.03	PCI/G	GAMMASPEC	0.08
MISS00190	08/23/99	08/24/99	99G0001	N/A	1080.0	WET	REG	AC-227	0.49	0.00	PCI/G	GAMMASPEC	0.49
MISS00190	08/23/99	08/24/99	99G0001	N/A	1080.0	WET	REG	RA-228	0.72	0.04	PCI/G	GAMMASPEC	0.12
MISS00190	08/23/99	08/24/99	99G0001	N/A	1080.0	WET	REG	TH-228	0.72	0.04	PCI/G	GAMMASPEC	0.12
MISS00190	08/23/99	08/24/99	99G0001	N/A	1080.0	WET	REG	TH-232	0.72	0.04	PCI/G	GAMMASPEC	0.12
MISS00190	08/23/99	08/24/99	99G0001	N/A	1080.0	WET	REG	TH-230	16.80	0.00	PCI/G	GAMMASPEC	16.80
MISS00190	08/23/99	08/24/99	99G0001	N/A	1080.0	WET	REG	PA-231	1.47	0.00	PCI/G	GAMMASPEC	1.47
MISS00190	08/23/99	08/24/99	99G0001	N/A	1080.0	WET	REG	U-235	0.06	0.02	PCI/G	GAMMASPEC	0.06
MISS00190	08/23/99	08/24/99	99G0001	N/A	1080.0	WET	REG	U-238	1.69	0.00	PCI/G	GAMMASPEC	1.69
MISS00190	08/23/99	08/24/99	99G0001	N/A	1080.0	WET	REG	AM-241	0.18	0.00	PCI/G	GAMMASPEC	0.18

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Location:	MAYWOOD		
Site WBS:	FMSS	Date Entered:	8/24/99
Work Order Number:	99G0001		
Project Number:			
Environmental Cat:	EA		

Sample ID	Date Collected	Date Analyzed	SDG ID	LAB ID	Vol.	W/D	Sample Type	Analyte	Result	Error	Units	Analytical Method	MDA
MISS00200	08/23/99	08/24/99	99G0001	N/A	857.8	WET	REG	K-40	9.17	0.54	PCI/G	GAMMASPEC	0.70
MISS00200	08/23/99	08/24/99	99G0001	N/A	857.8	WET	REG	CS-137	0.00	0.02	PCI/G	GAMMASPEC	0.08
MISS00200	08/23/99	08/24/99	99G0001	N/A	857.8	WET	REG	RA-226	1.04	0.05	PCI/G	GAMMASPEC	0.16
MISS00200	08/23/99	08/24/99	99G0001	N/A	857.8	WET	REG	AC-227	0.96	0.00	PCI/G	GAMMASPEC	0.96
MISS00200	08/23/99	08/24/99	99G0001	N/A	857.8	WET	REG	RA-228	5.10	0.12	PCI/G	GAMMASPEC	0.25
MISS00200	08/23/99	08/24/99	99G0001	N/A	857.8	WET	REG	TH-228	5.10	0.12	PCI/G	GAMMASPEC	0.25
MISS00200	08/23/99	08/24/99	99G0001	N/A	857.8	WET	REG	TH-232	5.10	0.12	PCI/G	GAMMASPEC	0.25
MISS00200	08/23/99	08/24/99	99G0001	N/A	857.8	WET	REG	TH-230	37.80	0.00	PCI/G	GAMMASPEC	37.80
MISS00200	08/23/99	08/24/99	99G0001	N/A	857.8	WET	REG	PA-231	3.37	0.00	PCI/G	GAMMASPEC	3.37
MISS00200	08/23/99	08/24/99	99G0001	N/A	857.8	WET	REG	U-235	0.15	0.03	PCI/G	GAMMASPEC	0.11
MISS00200	08/23/99	08/24/99	99G0001	N/A	857.8	WET	REG	U-238	3.59	0.00	PCI/G	GAMMASPEC	3.59
MISS00200	08/23/99	08/24/99	99G0001	N/A	857.8	WET	REG	AM-241	-0.39	0.12	PCI/G	GAMMASPEC	0.39
MISS00210	08/23/99	08/24/99	99G0001	N/A	601.7	WET	REG	K-40	2.58	0.33	PCI/G	GAMMASPEC	0.68
MISS00210	08/23/99	08/24/99	99G0001	N/A	601.7	WET	REG	CS-137	0.08	0.00	PCI/G	GAMMASPEC	0.08
MISS00210	08/23/99	08/24/99	99G0001	N/A	601.7	WET	REG	RA-226	0.30	0.03	PCI/G	GAMMASPEC	0.08
MISS00210	08/23/99	08/24/99	99G0001	N/A	601.7	WET	REG	AC-227	0.57	0.00	PCI/G	GAMMASPEC	0.57
MISS00210	08/23/99	08/24/99	99G0001	N/A	601.7	WET	REG	RA-228	0.48	0.04	PCI/G	GAMMASPEC	0.15
MISS00210	08/23/99	08/24/99	99G0001	N/A	601.7	WET	REG	TH-228	0.48	0.04	PCI/G	GAMMASPEC	0.15
MISS00210	08/23/99	08/24/99	99G0001	N/A	601.7	WET	REG	TH-232	0.48	0.04	PCI/G	GAMMASPEC	0.15
MISS00210	08/23/99	08/24/99	99G0001	N/A	601.7	WET	REG	TH-230	18.40	0.00	PCI/G	GAMMASPEC	18.40
MISS00210	08/23/99	08/24/99	99G0001	N/A	601.7	WET	REG	PA-231	1.83	0.00	PCI/G	GAMMASPEC	1.83
MISS00210	08/23/99	08/24/99	99G0001	N/A	601.7	WET	REG	U-235	0.08	0.00	PCI/G	GAMMASPEC	0.08
MISS00210	08/23/99	08/24/99	99G0001	N/A	601.7	WET	REG	U-238	1.92	0.00	PCI/G	GAMMASPEC	1.92
MISS00210	08/23/99	08/24/99	99G0001	N/A	601.7	WET	REG	AM-241	0.22	0.00	PCI/G	GAMMASPEC	0.22
MISS00220	08/23/99	08/24/99	99G0001	N/A	794.5	WET	REG	K-40	9.53	0.55	PCI/G	GAMMASPEC	0.55
MISS00220	08/23/99	08/24/99	99G0001	N/A	794.5	WET	REG	CS-137	0.06	0.00	PCI/G	GAMMASPEC	0.06
MISS00220	08/23/99	08/24/99	99G0001	N/A	794.5	WET	REG	RA-226	0.48	0.03	PCI/G	GAMMASPEC	0.09
MISS00220	08/23/99	08/24/99	99G0001	N/A	794.5	WET	REG	AC-227	0.57	0.00	PCI/G	GAMMASPEC	0.57

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Location:	MAYWOOD		
Site WBS:	FMSS	Date Entered:	8/24/99
Work Order Number:	99G0001		
Project Number:			
Environmental Cat:	EA		

Sample ID	Date Collected	Date Analyzed	SDG ID	LAB ID	Vol.	W/D	Sample Type	Analyte	Result	Error	Units	Analytical Method	MDA
MISS00220	08/23/99	08/24/99	99G0001	N/A	794.5	WET	REG	RA-228	0.72	0.04	PCI/G	GAMMASPEC	0.16
MISS00220	08/23/99	08/24/99	99G0001	N/A	794.5	WET	REG	TH-228	0.72	0.04	PCI/G	GAMMASPEC	0.16
MISS00220	08/23/99	08/24/99	99G0001	N/A	794.5	WET	REG	TH-232	0.72	0.04	PCI/G	GAMMASPEC	0.16
MISS00220	08/23/99	08/24/99	99G0001	N/A	794.5	WET	REG	TH-230	18.90	0.00	PCI/G	GAMMASPEC	18.90
MISS00220	08/23/99	08/24/99	99G0001	N/A	794.5	WET	REG	PA-231	1.77	0.00	PCI/G	GAMMASPEC	1.77
MISS00220	08/23/99	08/24/99	99G0001	N/A	794.5	WET	REG	U-235	0.07	0.02	PCI/G	GAMMASPEC	0.06
MISS00220	08/23/99	08/24/99	99G0001	N/A	794.5	WET	REG	U-238	2.04	0.00	PCI/G	GAMMASPEC	2.04
MISS00220	08/23/99	08/24/99	99G0001	N/A	794.5	WET	REG	AM-241	0.22	0.00	PCI/G	GAMMASPEC	0.22
MISS00230	08/23/99	08/24/99	99G0001	N/A	630.0	WET	FREP	K-40	3.32	0.33	PCI/G	GAMMASPEC	0.39
MISS00230	08/23/99	08/24/99	99G0001	N/A	630.0	WET	FREP	CS-137	0.07	0.00	PCI/G	GAMMASPEC	0.07
MISS00230	08/23/99	08/24/99	99G0001	N/A	630.0	WET	FREP	RA-226	0.30	0.03	PCI/G	GAMMASPEC	0.11
MISS00230	08/23/99	08/24/99	99G0001	N/A	630.0	WET	FREP	AC-227	0.57	0.00	PCI/G	GAMMASPEC	0.57
MISS00230	08/23/99	08/24/99	99G0001	N/A	630.0	WET	FREP	RA-228	0.63	0.04	PCI/G	GAMMASPEC	0.13
MISS00230	08/23/99	08/24/99	99G0001	N/A	630.0	WET	FREP	TH-228	0.63	0.04	PCI/G	GAMMASPEC	0.13
MISS00230	08/23/99	08/24/99	99G0001	N/A	630.0	WET	FREP	TH-232	0.63	0.04	PCI/G	GAMMASPEC	0.13
MISS00230	08/23/99	08/24/99	99G0001	N/A	630.0	WET	FREP	TH-230	19.20	0.00	PCI/G	GAMMASPEC	19.20
MISS00230	08/23/99	08/24/99	99G0001	N/A	630.0	WET	FREP	PA-231	1.79	0.00	PCI/G	GAMMASPEC	1.79
MISS00230	08/23/99	08/24/99	99G0001	N/A	630.0	WET	FREP	U-235	0.08	0.00	PCI/G	GAMMASPEC	0.08
MISS00230	08/23/99	08/24/99	99G0001	N/A	630.0	WET	FREP	U-238	2.10	0.00	PCI/G	GAMMASPEC	2.10
MISS00230	08/23/99	08/24/99	99G0001	N/A	630.0	WET	FREP	AM-241	0.24	0.00	PCI/G	GAMMASPEC	0.24
MISS00900	08/18/99	08/18/99	99G0001	N/A	760.3	WET	REG	K-40	7.95	0.40	PCI/G	GAMMASPEC	1.08
MISS00900	08/18/99	08/18/99	99G0001	N/A	760.3	WET	REG	CS-137	0.17	0.00	PCI/G	GAMMASPEC	0.17
MISS00900	08/18/99	08/18/99	99G0001	N/A	760.3	WET	REG	RA-226	1.94	0.08	PCI/G	GAMMASPEC	0.27
MISS00900	08/18/99	08/18/99	99G0001	N/A	760.3	WET	REG	AC-227	2.61	0.00	PCI/G	GAMMASPEC	1.64
MISS00900	08/18/99	08/18/99	99G0001	N/A	760.3	WET	REG	RA-228	14.95	0.25	PCI/G	GAMMASPEC	0.33
MISS00900	08/18/99	08/18/99	99G0001	N/A	760.3	WET	REG	TH-228	14.95	0.25	PCI/G	GAMMASPEC	0.33
MISS00900	08/18/99	08/18/99	99G0001	N/A	760.3	WET	REG	TH-232	14.95	0.25	PCI/G	GAMMASPEC	0.33
MISS00900	08/18/99	08/18/99	99G0001	N/A	760.3	WET	REG	TH-230	61.40	0.00	PCI/G	GAMMASPEC	61.40

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Location:	MAYWOOD		
Site WBS:	FMSS	Date Entered:	8/24/99
Work Order Number:	99G0001		
Project Number:			
Environmental Cat:	EA		

Sample ID	Date Collected	Date Analyzed	SDG ID	LAB ID	Vol.	W/D	Sample Type	Analyte	Result	Error	Units	Analytical Method	MDA
MISS00900	08/18/99	08/18/99	99G0001	N/A	760.3	WET	REG	PA-231	6.11	0.00	PCI/G	GAMMASPEC	5.89
MISS00900	08/18/99	08/18/99	99G0001	N/A	760.3	WET	REG	U-235	0.39	0.06	PCI/G	GAMMASPEC	0.19
MISS00900	08/18/99	08/18/99	99G0001	N/A	760.3	WET	REG	U-238	6.06	0.00	PCI/G	GAMMASPEC	6.06
MISS00900	08/18/99	08/18/99	99G0001	N/A	760.3	WET	REG	AM-241	0.68	0.00	PCI/G	GAMMASPEC	0.68
MISS00910	08/18/99	08/18/99	99G0001	N/A	635.8	WET	REG	K-40	4.05	0.40	PCI/G	GAMMASPEC	0.69
MISS00910	08/18/99	08/18/99	99G0001	N/A	635.8	WET	REG	CS-137	0.10	0.00	PCI/G	GAMMASPEC	0.10
MISS00910	08/18/99	08/18/99	99G0001	N/A	635.8	WET	REG	RA-226	1.24	0.05	PCI/G	GAMMASPEC	0.02
MISS00910	08/18/99	08/18/99	99G0001	N/A	635.8	WET	REG	AC-227	0.67	0.01	PCI/G	GAMMASPEC	0.42
MISS00910	08/18/99	08/18/99	99G0001	N/A	635.8	WET	REG	RA-228	2.30	0.08	PCI/G	GAMMASPEC	0.02
MISS00910	08/18/99	08/18/99	99G0001	N/A	635.8	WET	REG	TH-228	2.30	0.08	PCI/G	GAMMASPEC	0.02
MISS00910	08/18/99	08/18/99	99G0001	N/A	635.8	WET	REG	TH-232	2.30	0.08	PCI/G	GAMMASPEC	0.02
MISS00910	08/18/99	08/18/99	99G0001	N/A	635.8	WET	REG	TH-230	37.60	0.00	PCI/G	GAMMASPEC	37.60
MISS00910	08/18/99	08/18/99	99G0001	N/A	635.8	WET	REG	PA-231	3.52	0.00	PCI/G	GAMMASPEC	3.15
MISS00910	08/18/99	08/18/99	99G0001	N/A	635.8	WET	REG	U-235	1.04	0.05	PCI/G	GAMMASPEC	0.01
MISS00910	08/18/99	08/18/99	99G0001	N/A	635.8	WET	REG	U-238	19.04	1.37	PCI/G	GAMMASPEC	3.68
MISS00910	08/18/99	08/18/99	99G0001	N/A	635.8	WET	REG	AM-241	0.43	0.00	PCI/G	GAMMASPEC	0.43
MISS0092X	08/19/99	08/19/99	99G0001	N/A	1217.6	WET	REG	K-40	7.30	0.40	PCI/G	GAMMASPEC	0.50
MISS0092X	08/19/99	08/19/99	99G0001	N/A	1217.6	WET	REG	CS-137	0.04	0.00	PCI/G	GAMMASPEC	0.04
MISS0092X	08/19/99	08/19/99	99G0001	N/A	1217.6	WET	REG	RA-226	0.38	0.02	PCI/G	GAMMASPEC	0.07
MISS0092X	08/19/99	08/19/99	99G0001	N/A	1217.6	WET	REG	AC-227	0.41	0.00	PCI/G	GAMMASPEC	0.41
MISS0092X	08/19/99	08/19/99	99G0001	N/A	1217.6	WET	REG	RA-228	0.56	0.03	PCI/G	GAMMASPEC	0.08
MISS0092X	08/19/99	08/19/99	99G0001	N/A	1217.6	WET	REG	TH-228	0.56	0.03	PCI/G	GAMMASPEC	0.08
MISS0092X	08/19/99	08/19/99	99G0001	N/A	1217.6	WET	REG	TH-232	0.56	0.03	PCI/G	GAMMASPEC	0.08
MISS0092X	08/19/99	08/19/99	99G0001	N/A	1217.6	WET	REG	TH-230	14.60	0.00	PCI/G	GAMMASPEC	14.60
MISS0092X	08/19/99	08/19/99	99G0001	N/A	1217.6	WET	REG	PA-231	1.27	0.00	PCI/G	GAMMASPEC	1.27
MISS0092X	08/19/99	08/19/99	99G0001	N/A	1217.6	WET	REG	U-235	0.06	0.02	PCI/G	GAMMASPEC	0.05
MISS0092X	08/19/99	08/19/99	99G0001	N/A	1217.6	WET	REG	U-238	1.48	0.00	PCI/G	GAMMASPEC	1.48
MISS0092X	08/19/99	08/19/99	99G0001	N/A	1217.6	WET	REG	AM-241	0.16	0.00	PCI/G	GAMMASPEC	0.16

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Location:	MAYWOOD		
Site WBS:	FMSS	Date Entered:	8/24/99
Work Order Number:	99G0001		
Project Number:			
Environmental Cat:	EA		

Sample ID	Date Collected	Date Analyzed	SDG ID	LAB ID	Vol.	W/D	Sample Type	Analyte	Result	Error	Units	Analytical Method	MDA
MISS00930	08/18/99	08/18/99	99G0001	N/A	610.7	WET	FREP	K-40	4.12	0.41	PCI/G	GAMMASPEC	0.77
MISS00930	08/18/99	08/18/99	99G0001	N/A	610.7	WET	FREP	CS-137	0.08	0.00	PCI/G	GAMMASPEC	0.08
MISS00930	08/18/99	08/18/99	99G0001	N/A	610.7	WET	FREP	RA-226	0.92	0.05	PCI/G	GAMMASPEC	0.14
MISS00930	08/18/99	08/18/99	99G0001	N/A	610.7	WET	FREP	AC-227	0.37	0.06	PCI/G	GAMMASPEC	0.33
MISS00930	08/18/99	08/18/99	99G0001	N/A	610.7	WET	FREP	RA-228	1.78	0.07	PCI/G	GAMMASPEC	0.21
MISS00930	08/18/99	08/18/99	99G0001	N/A	610.7	WET	FREP	TH-228	1.78	0.07	PCI/G	GAMMASPEC	0.21
MISS00930	08/18/99	08/18/99	99G0001	N/A	610.7	WET	FREP	TH-232	1.78	0.07	PCI/G	GAMMASPEC	0.21
MISS00930	08/18/99	08/18/99	99G0001	N/A	610.7	WET	FREP	TH-230	34.80	0.00	PCI/G	GAMMASPEC	34.80
MISS00930	08/18/99	08/18/99	99G0001	N/A	610.7	WET	FREP	PA-231	3.08	0.00	PCI/G	GAMMASPEC	3.03
MISS00930	08/18/99	08/18/99	99G0001	N/A	610.7	WET	FREP	U-235	0.90	0.05	PCI/G	GAMMASPEC	0.10
MISS00930	08/18/99	08/18/99	99G0001	N/A	610.7	WET	FREP	U-238	17.07	1.35	PCI/G	GAMMASPEC	3.08
MISS00930	08/18/99	08/18/99	99G0001	N/A	610.7	WET	FREP	AM-241	0.41	0.00	PCI/G	GAMMASPEC	0.41
QCBLANK	08/24/99	08/24/99	99G0001	N/A	945.0	DRY	BL	K-40	0.45	0.00	PCI/G	GAMMASPEC	0.45
QCBLANK	08/24/99	08/24/99	99G0001	N/A	945.0	DRY	BL	CS-137	0.02	0.00	PCI/G	GAMMASPEC	0.02
QCBLANK	08/24/99	08/24/99	99G0001	N/A	945.0	DRY	BL	RA-226	0.05	0.00	PCI/G	GAMMASPEC	0.05
QCBLANK	08/24/99	08/24/99	99G0001	N/A	945.0	DRY	BL	AC-227	0.15	0.00	PCI/G	GAMMASPEC	0.15
QCBLANK	08/24/99	08/24/99	99G0001	N/A	945.0	DRY	BL	RA-228	0.08	0.00	PCI/G	GAMMASPEC	0.08
QCBLANK	08/24/99	08/24/99	99G0001	N/A	945.0	DRY	BL	TH-228	0.08	0.00	PCI/G	GAMMASPEC	0.08
QCBLANK	08/24/99	08/24/99	99G0001	N/A	945.0	DRY	BL	TH-232	0.08	0.00	PCI/G	GAMMASPEC	0.08
QCBLANK	08/24/99	08/24/99	99G0001	N/A	945.0	DRY	BL	TH-230	6.24	0.00	PCI/G	GAMMASPEC	6.24
QCBLANK	08/24/99	08/24/99	99G0001	N/A	945.0	DRY	BL	PA-231	0.79	0.00	PCI/G	GAMMASPEC	0.79
QCBLANK	08/24/99	08/24/99	99G0001	N/A	945.0	DRY	BL	U-235	0.03	0.00	PCI/G	GAMMASPEC	0.03
QCBLANK	08/24/99	08/24/99	99G0001	N/A	945.0	DRY	BL	U-238	0.76	0.00	PCI/G	GAMMASPEC	0.76
QCBLANK	08/24/99	08/24/99	99G0001	N/A	945.0	DRY	BL	AM-241	0.08	0.00	PCI/G	GAMMASPEC	0.08
QCSPIKE	04/01/99	08/24/99	99G0001	N/A	832.0	DRY	LCSF	CS-137	70.80	2.23	PCI/G	GAMMASPEC	1.16
QCSPIKE	04/01/99	08/24/99	99G0001	N/A	832.0	DRY	LCSF	AM-241	166.36	8.46	PCI/G	GAMMASPEC	3.92
QCSPIKE	04/01/99	08/24/99	99G0001	N/A	832.0	DRY	LCST	CS-137	68.43	3.22	PCI/G	GAMMASPEC	1.16
QCSPIKE	04/01/99	08/24/99	99G0001	N/A	832.0	DRY	LCST	AM-241	165.05	8.25	PCI/G	GAMMASPEC	3.92

Approved by: ______________________________ Date: ______________

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Equivalent values in the "Result" and "MDA" columns indicate that the analyte was either undetected or detected at a level below the MDA. T' ›sults listed at the MDA should have been reported at the actual measuremer

Location:	MAYWOOD		
Site WBS:	FMSS	Date Entered:	8/26/99
Work Order Number:	99G0002		
Project Number:			
Environmental Cat:	EA		

Sample ID	Date Collected	Date Analyzed	SDG ID	LAB ID	Vol.	W/D	Sample Type	Analyte	Result	Error	Units	Analytical Method	MDA
MISS00330	08/25/99	08/26/99	99G0002	N/A	763.8	WET	REG	K-40	9.85	0.64	PCI/G	GAMMASPEC	1.15
MISS00330	08/25/99	08/26/99	99G0002	N/A	763.8	WET	REG	CS-137	0.14	0.00	PCI/G	GAMMASPEC	0.14
MISS00330	08/25/99	08/26/99	99G0002	N/A	763.8	WET	REG	RA-226	1.19	0.06	PCI/G	GAMMASPEC	0.21
MISS00330	08/25/99	08/26/99	99G0002	N/A	763.8	WET	REG	AC-227	1.31	0.00	PCI/G	GAMMASPEC	1.31
MISS00330	08/25/99	08/26/99	99G0002	N/A	763.8	WET	REG	RA-228	10.42	0.19	PCI/G	GAMMASPEC	0.28
MISS00330	08/25/99	08/26/99	99G0002	N/A	763.8	WET	REG	TH-228	10.42	0.19	PCI/G	GAMMASPEC	0.28
MISS00330	08/25/99	08/26/99	99G0002	N/A	763.8	WET	REG	TH-232	10.42	0.19	PCI/G	GAMMASPEC	0.28
MISS00330	08/25/99	08/26/99	99G0002	N/A	763.8	WET	REG	TH-230	52.10	0.00	PCI/G	GAMMASPEC	52.10
MISS00330	08/25/99	08/26/99	99G0002	N/A	763.8	WET	REG	PA-231	4.73	0.00	PCI/G	GAMMASPEC	4.73
MISS00330	08/25/99	08/26/99	99G0002	N/A	763.8	WET	REG	U-235	0.21	0.05	PCI/G	GAMMASPEC	0.16
MISS00330	08/25/99	08/26/99	99G0002	N/A	763.8	WET	REG	U-238	5.00	0.00	PCI/G	GAMMASPEC	5.00
MISS00330	08/25/99	08/26/99	99G0002	N/A	763.8	WET	REG	AM-241	0.56	0.00	PCI/G	GAMMASPEC	0.56
MISS00340	08/25/99	08/26/99	99G0002	N/A	563.6	WET	REG	K-40	3.12	0.44	PCI/G	GAMMASPEC	1.07
MISS00340	08/25/99	08/26/99	99G0002	N/A	563.6	WET	REG	CS-137	0.18	0.04	PCI/G	GAMMASPEC	0.14
MISS00340	08/25/99	08/26/99	99G0002	N/A	563.6	WET	REG	RA-226	1.37	0.07	PCI/G	GAMMASPEC	0.23
MISS00340	08/25/99	08/26/99	99G0002	N/A	563.6	WET	REG	AC-227	1.29	0.00	PCI/G	GAMMASPEC	1.29
MISS00340	08/25/99	08/26/99	99G0002	N/A	563.6	WET	REG	RA-228	7.41	0.17	PCI/G	GAMMASPEC	0.34
MISS00340	08/25/99	08/26/99	99G0002	N/A	563.6	WET	REG	TH-228	7.41	0.17	PCI/G	GAMMASPEC	0.34
MISS00340	08/25/99	08/26/99	99G0002	N/A	563.6	WET	REG	TH-232	7.41	0.17	PCI/G	GAMMASPEC	0.34
MISS00340	08/25/99	08/26/99	99G0002	N/A	563.6	WET	REG	TH-230	49.70	0.00	PCI/G	GAMMASPEC	49.70
MISS00340	08/25/99	08/26/99	99G0002	N/A	563.6	WET	REG	PA-231	4.87	0.00	PCI/G	GAMMASPEC	4.87
MISS00340	08/25/99	08/26/99	99G0002	N/A	563.6	WET	REG	U-235	0.31	0.05	PCI/G	GAMMASPEC	0.16
MISS00340	08/25/99	08/26/99	99G0002	N/A	563.6	WET	REG	U-238	6.00	1.50	PCI/G	GAMMASPEC	4.74
MISS00340	08/25/99	08/26/99	99G0002	N/A	563.6	WET	REG	AM-241	0.56	0.00	PCI/G	GAMMASPEC	0.56
MISS00350	08/25/99	08/26/99	99G0002	N/A	660.1	WET	REG	K-40	6.99	0.50	PCI/G	GAMMASPEC	0.62
MISS00350	08/25/99	08/26/99	99G0002	N/A	660.1	WET	REG	CS-137	0.06	0.00	PCI/G	GAMMASPEC	0.06
MISS00350	08/25/99	08/26/99	99G0002	N/A	660.1	WET	REG	RA-226	0.42	0.03	PCI/G	GAMMASPEC	0.09
MISS00350	08/25/99	08/26/99	99G0002	N/A	660.1	WET	REG	AC-227	0.57	0.00	PCI/G	GAMMASPEC	0.57

Approved by: ______________________ Date: ______________

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Location:	MAYWOOD		
Site WBS:	FMSS	Date Entered:	8/26/99
Work Order Number:	99G0002		
Project Number:			
Environmental Cat:	EA		

Sample ID	Date Collected	Date Analyzed	SDG ID	LAB ID	Vol.	W/D	Sample Type	Analyte	Result	Error	Units	Analytical Method	MDA
MISS00350	08/25/99	08/26/99	99G0002	N/A	660.1	WET	REG	RA-228	0.50	0.04	PCI/G	GAMMASPEC	0.14
MISS00350	08/25/99	08/26/99	99G0002	N/A	660.1	WET	REG	TH-228	0.50	0.04	PCI/G	GAMMASPEC	0.14
MISS00350	08/25/99	08/26/99	99G0002	N/A	660.1	WET	REG	TH-232	0.50	0.04	PCI/G	GAMMASPEC	0.14
MISS00350	08/25/99	08/26/99	99G0002	N/A	660.1	WET	REG	TH-230	20.50	0.00	PCI/G	GAMMASPEC	20.50
MISS00350	08/25/99	08/26/99	99G0002	N/A	660.1	WET	REG	PA-231	1.86	0.00	PCI/G	GAMMASPEC	1.86
MISS00350	08/25/99	08/26/99	99G0002	N/A	660.1	WET	REG	U-235	0.09	0.02	PCI/G	GAMMASPEC	0.07
MISS00350	08/25/99	08/26/99	99G0002	N/A	660.1	WET	REG	U-238	2.23	0.00	PCI/G	GAMMASPEC	2.23
MISS00350	08/25/99	08/26/99	99G0002	N/A	660.1	WET	REG	AM-241	0.22	0.00	PCI/G	GAMMASPEC	0.22
MISS00360	08/25/99	08/26/99	99G0002	N/A	607.0	WET	REG	K-40	6.68	0.54	PCI/G	GAMMASPEC	0.92
MISS00360	08/25/99	08/26/99	99G0002	N/A	607.0	WET	REG	CS-137	0.05	0.04	PCI/G	GAMMASPEC	0.13
MISS00360	08/25/99	08/26/99	99G0002	N/A	607.0	WET	REG	RA-226	1.06	0.06	PCI/G	GAMMASPEC	0.20
MISS00360	08/25/99	08/26/99	99G0002	N/A	607.0	WET	REG	AC-227	1.16	0.00	PCI/G	GAMMASPEC	1.16
MISS00360	08/25/99	08/26/99	99G0002	N/A	607.0	WET	REG	RA-228	5.69	0.14	PCI/G	GAMMASPEC	0.27
MISS00360	08/25/99	08/26/99	99G0002	N/A	607.0	WET	REG	TH-228	5.69	0.14	PCI/G	GAMMASPEC	0.27
MISS00360	08/25/99	08/26/99	99G0002	N/A	607.0	WET	REG	TH-232	5.69	0.14	PCI/G	GAMMASPEC	0.27
MISS00360	08/25/99	08/26/99	99G0002	N/A	607.0	WET	REG	TH-230	44.70	0.00	PCI/G	GAMMASPEC	44.70
MISS00360	08/25/99	08/26/99	99G0002	N/A	607.0	WET	REG	PA-231	4.05	0.00	PCI/G	GAMMASPEC	4.05
MISS00360	08/25/99	08/26/99	99G0002	N/A	607.0	WET	REG	U-235	0.25	0.04	PCI/G	GAMMASPEC	0.13
MISS00360	08/25/99	08/26/99	99G0002	N/A	607.0	WET	REG	U-238	4.35	0.00	PCI/G	GAMMASPEC	4.35
MISS00360	08/25/99	08/26/99	99G0002	N/A	607.0	WET	REG	AM-241	0.50	0.00	PCI/G	GAMMASPEC	0.50
MISS0037X	08/25/99	08/26/99	99G0002	N/A	718.6	WET	REG	K-40	6.21	0.45	PCI/G	GAMMASPEC	0.61
MISS0037X	08/25/99	08/26/99	99G0002	N/A	718.6	WET	REG	CS-137	0.10	0.00	PCI/G	GAMMASPEC	0.10
MISS0037X	08/25/99	08/26/99	99G0002	N/A	718.6	WET	REG	RA-226	0.85	0.05	PCI/G	GAMMASPEC	0.15
MISS0037X	08/25/99	08/26/99	99G0002	N/A	718.6	WET	REG	AC-227	0.98	0.00	PCI/G	GAMMASPEC	0.98
MISS0037X	08/25/99	08/26/99	99G0002	N/A	718.6	WET	REG	RA-228	4.14	0.11	PCI/G	GAMMASPEC	0.22
MISS0037X	08/25/99	08/26/99	99G0002	N/A	718.6	WET	REG	TH-228	4.14	0.11	PCI/G	GAMMASPEC	0.22
MISS0037X	08/25/99	08/26/99	99G0002	N/A	718.6	WET	REG	TH-232	4.14	0.11	PCI/G	GAMMASPEC	0.22
MISS0037X	08/25/99	08/26/99	99G0002	N/A	718.6	WET	REG	TH-230	35.80	0.00	PCI/G	GAMMASPEC	35.80

Approved by: ______________________ Date: ______________

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Location:	MAYWOOD		
Site WBS:	FMSS	Date Entered:	8/26/99
Work Order Number:	99G0002		
Project Number:			
Environmental Cat:	EA		

Sample ID	Date Collected	Date Analyzed	SDG ID	LAB ID	Vol.	W/D	Sample Type	Analyte	Result	Error	Units	Analytical Method	MDA
MISS0037X	08/25/99	08/26/99	99G0002	N/A	718.6	WET	REG	PA-231	3.37	0.00	PCI/G	GAMMASPEC	3.37
MISS0037X	08/25/99	08/26/99	99G0002	N/A	718.6	WET	REG	U-235	0.25	0.04	PCI/G	GAMMASPEC	0.11
MISS0037X	08/25/99	08/26/99	99G0002	N/A	718.6	WET	REG	U-238	3.44	0.00	PCI/G	GAMMASPEC	3.44
MISS0037X	08/25/99	08/26/99	99G0002	N/A	718.6	WET	REG	AM-241	0.40	0.00	PCI/G	GAMMASPEC	0.40
MISS00380	08/25/99	08/26/99	99G0002	N/A	918.9	WET	REG	K-40	8.34	0.48	PCI/G	GAMMASPEC	0.53
MISS00380	08/25/99	08/26/99	99G0002	N/A	918.9	WET	REG	CS-137	0.05	0.00	PCI/G	GAMMASPEC	0.05
MISS00380	08/25/99	08/26/99	99G0002	N/A	918.9	WET	REG	RA-226	0.36	0.02	PCI/G	GAMMASPEC	0.07
MISS00380	08/25/99	08/26/99	99G0002	N/A	918.9	WET	REG	AC-227	0.45	0.00	PCI/G	GAMMASPEC	0.45
MISS00380	08/25/99	08/26/99	99G0002	N/A	918.9	WET	REG	RA-228	0.42	0.03	PCI/G	GAMMASPEC	0.12
MISS00380	08/25/99	08/26/99	99G0002	N/A	918.9	WET	REG	TH-228	0.42	0.03	PCI/G	GAMMASPEC	0.12
MISS00380	08/25/99	08/26/99	99G0002	N/A	918.9	WET	REG	TH-232	0.42	0.03	PCI/G	GAMMASPEC	0.12
MISS00380	08/25/99	08/26/99	99G0002	N/A	918.9	WET	REG	TH-230	15.50	0.00	PCI/G	GAMMASPEC	15.50
MISS00380	08/25/99	08/26/99	99G0002	N/A	918.9	WET	REG	PA-231	1.44	0.00	PCI/G	GAMMASPEC	1.44
MISS00380	08/25/99	08/26/99	99G0002	N/A	918.9	WET	REG	U-235	0.06	0.02	PCI/G	GAMMASPEC	0.05
MISS00380	08/25/99	08/26/99	99G0002	N/A	918.9	WET	REG	U-238	1.28	0.46	PCI/G	GAMMASPEC	1.48
MISS00380	08/25/99	08/26/99	99G0002	N/A	918.9	WET	REG	AM-241	0.18	0.00	PCI/G	GAMMASPEC	0.18
MISS00390	08/25/99	08/26/99	99G0002	N/A	782.4	WET	REG	K-40	6.10	0.45	PCI/G	GAMMASPEC	0.72
MISS00390	08/25/99	08/26/99	99G0002	N/A	782.4	WET	REG	CS-137	0.07	0.02	PCI/G	GAMMASPEC	0.07
MISS00390	08/25/99	08/26/99	99G0002	N/A	782.4	WET	REG	RA-226	0.50	0.04	PCI/G	GAMMASPEC	0.14
MISS00390	08/25/99	08/26/99	99G0002	N/A	782.4	WET	REG	AC-227	0.76	0.00	PCI/G	GAMMASPEC	0.76
MISS00390	08/25/99	08/26/99	99G0002	N/A	782.4	WET	REG	RA-228	2.51	0.08	PCI/G	GAMMASPEC	0.20
MISS00390	08/25/99	08/26/99	99G0002	N/A	782.4	WET	REG	TH-228	2.51	0.08	PCI/G	GAMMASPEC	0.20
MISS00390	08/25/99	08/26/99	99G0002	N/A	782.4	WET	REG	TH-232	2.51	0.08	PCI/G	GAMMASPEC	0.20
MISS00390	08/25/99	08/26/99	99G0002	N/A	782.4	WET	REG	TH-230	27.30	0.00	PCI/G	GAMMASPEC	27.30
MISS00390	08/25/99	08/26/99	99G0002	N/A	782.4	WET	REG	PA-231	2.69	0.00	PCI/G	GAMMASPEC	2.69
MISS00390	08/25/99	08/26/99	99G0002	N/A	782.4	WET	REG	U-235	0.17	0.03	PCI/G	GAMMASPEC	0.08
MISS00390	08/25/99	08/26/99	99G0002	N/A	782.4	WET	REG	U-238	2.63	0.00	PCI/G	GAMMASPEC	2.63
MISS00390	08/25/99	08/26/99	99G0002	N/A	782.4	WET	REG	AM-241	0.30	0.00	PCI/G	GAMMASPEC	0.30

Approved by: ______________________ Date: ______________

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Location:	MAYWOOD		
Site WBS:	FMSS	Date Entered:	8/26/99
Work Order Number:	99G0002		
Project Number:			
Environmental Cat:	EA		

Sample ID	Date Collected	Date Analyzed	SDG ID	LAB ID	Vol.	W/D	Sample Type	Analyte	Result	Error	Units	Analytical Method	MDA
MISS00400	08/25/99	08/26/99	99G0002	N/A	689.5	WET	REG	K-40	3.40	0.41	PCI/G	GAMMASPEC	0.97
MISS00400	08/25/99	08/26/99	99G0002	N/A	689.5	WET	REG	CS-137	0.13	0.00	PCI/G	GAMMASPEC	0.13
MISS00400	08/25/99	08/26/99	99G0002	N/A	689.5	WET	REG	RA-226	1.53	0.06	PCI/G	GAMMASPEC	0.20
MISS00400	08/25/99	08/26/99	99G0002	N/A	689.5	WET	REG	AC-227	1.18	0.00	PCI/G	GAMMASPEC	1.18
MISS00400	08/25/99	08/26/99	99G0002	N/A	689.5	WET	REG	RA-228	6.39	0.15	PCI/G	GAMMASPEC	0.30
MISS00400	08/25/99	08/26/99	99G0002	N/A	689.5	WET	REG	TH-228	6.39	0.15	PCI/G	GAMMASPEC	0.30
MISS00400	08/25/99	08/26/99	99G0002	N/A	689.5	WET	REG	TH-232	6.39	0.15	PCI/G	GAMMASPEC	0.30
MISS00400	08/25/99	08/26/99	99G0002	N/A	689.5	WET	REG	TH-230	43.10	0.00	PCI/G	GAMMASPEC	43.10
MISS00400	08/25/99	08/26/99	99G0002	N/A	689.5	WET	REG	PA-231	4.08	0.00	PCI/G	GAMMASPEC	4.08
MISS00400	08/25/99	08/26/99	99G0002	N/A	689.5	WET	REG	U-235	0.28	0.04	PCI/G	GAMMASPEC	0.14
MISS00400	08/25/99	08/26/99	99G0002	N/A	689.5	WET	REG	U-238	1.46	1.28	PCI/G	GAMMASPEC	4.24
MISS00400	08/25/99	08/26/99	99G0002	N/A	689.5	WET	REG	AM-241	0.49	0.00	PCI/G	GAMMASPEC	0.49
MISS00410	08/25/99	08/26/99	99G0002	N/A	889.6	WET	LREP	K-40	7.10	0.45	PCI/G	GAMMASPEC	0.56
MISS00410	08/25/99	08/26/99	99G0002	N/A	889.6	WET	LREP	CS-137	0.06	0.00	PCI/G	GAMMASPEC	0.06
MISS00410	08/25/99	08/26/99	99G0002	N/A	889.6	WET	LREP	RA-226	0.33	0.02	PCI/G	GAMMASPEC	0.07
MISS00410	08/25/99	08/26/99	99G0002	N/A	889.6	WET	LREP	AC-227	0.46	0.00	PCI/G	GAMMASPEC	0.46
MISS00410	08/25/99	08/26/99	99G0002	N/A	889.6	WET	LREP	RA-228	0.44	0.03	PCI/G	GAMMASPEC	0.11
MISS00410	08/25/99	08/26/99	99G0002	N/A	889.6	WET	LREP	TH-228	0.44	0.03	PCI/G	GAMMASPEC	0.11
MISS00410	08/25/99	08/26/99	99G0002	N/A	889.6	WET	LREP	TH-232	0.44	0.03	PCI/G	GAMMASPEC	0.11
MISS00410	08/25/99	08/26/99	99G0002	N/A	889.6	WET	LREP	TH-230	15.10	0.00	PCI/G	GAMMASPEC	15.10
MISS00410	08/25/99	08/26/99	99G0002	N/A	889.6	WET	LREP	PA-231	1.35	0.00	PCI/G	GAMMASPEC	1.35
MISS00410	08/25/99	08/26/99	99G0002	N/A	889.6	WET	LREP	U-235	0.03	0.02	PCI/G	GAMMASPEC	0.05
MISS00410	08/25/99	08/26/99	99G0002	N/A	889.6	WET	LREP	U-238	0.76	0.46	PCI/G	GAMMASPEC	1.52
MISS00410	08/25/99	08/26/99	99G0002	N/A	889.6	WET	LREP	AM-241	0.18	0.00	PCI/G	GAMMASPEC	0.18
MISS00410	08/25/99	08/26/99	99G0002	N/A	889.6	WET	FREP	K-40	8.11	0.05	PCI/G	GAMMASPEC	0.42
MISS00410	08/25/99	08/26/99	99G0002	N/A	889.6	WET	FREP	CS-137	0.04	0.00	PCI/G	GAMMASPEC	0.04
MISS00410	08/25/99	08/26/99	99G0002	N/A	889.6	WET	FREP	RA-226	0.35	0.02	PCI/G	GAMMASPEC	0.07
MISS00410	08/25/99	08/26/99	99G0002	N/A	889.6	WET	FREP	AC-227	0.46	0.00	PCI/G	GAMMASPEC	0.46

Approved by: ______________________ Date: ______________

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Location:	MAYWOOD		
Site WBS:	FMSS	Date Entered:	8/26/99
Work Order Number:	99G0002		
Project Number:			
Environmental Cat:	EA		

Sample ID	Date Collected	Date Analyzed	SDG ID	LAB ID	Vol.	W/D	Sample Type	Analyte	Result	Error	Units	Analytical Method	MDA
MISS00410	08/25/99	08/26/99	99G0002	N/A	889.6	WET	FREP	RA-228	0.44	0.03	PCI/G	GAMMASPEC	0.09
MISS00410	08/25/99	08/26/99	99G0002	N/A	889.6	WET	FREP	TH-228	0.44	0.03	PCI/G	GAMMASPEC	0.09
MISS00410	08/25/99	08/26/99	99G0002	N/A	889.6	WET	FREP	TH-232	0.44	0.03	PCI/G	GAMMASPEC	0.09
MISS00410	08/25/99	08/26/99	99G0002	N/A	889.6	WET	FREP	TH-230	15.30	0.00	PCI/G	GAMMASPEC	15.30
MISS00410	08/25/99	08/26/99	99G0002	N/A	889.6	WET	FREP	PA-231	1.83	0.00	PCI/G	GAMMASPEC	1.42
MISS00410	08/25/99	08/26/99	99G0002	N/A	889.6	WET	FREP	U-235	0.07	0.02	PCI/G	GAMMASPEC	0.05
MISS00410	08/25/99	08/26/99	99G0002	N/A	889.6	WET	FREP	U-238	1.65	0.00	PCI/G	GAMMASPEC	1.65
MISS00410	08/25/99	08/26/99	99G0002	N/A	889.6	WET	FREP	AM-241	0.17	0.00	PCI/G	GAMMASPEC	0.17
MISS00430	08/25/99	08/26/99	99G0002	N/A	663.8	WET	REG	K-40	3.95	0.43	PCI/G	GAMMASPEC	0.97
MISS00430	08/25/99	08/26/99	99G0002	N/A	663.8	WET	REG	CS-137	0.14	0.00	PCI/G	GAMMASPEC	0.14
MISS00430	08/25/99	08/26/99	99G0002	N/A	663.8	WET	REG	RA-226	1.51	0.06	PCI/G	GAMMASPEC	0.21
MISS00430	08/25/99	08/26/99	99G0002	N/A	663.8	WET	REG	AC-227	1.34	0.00	PCI/G	GAMMASPEC	1.34
MISS00430	08/25/99	08/26/99	99G0002	N/A	663.8	WET	REG	RA-228	7.90	0.17	PCI/G	GAMMASPEC	0.31
MISS00430	08/25/99	08/26/99	99G0002	N/A	663.8	WET	REG	TH-228	7.90	0.17	PCI/G	GAMMASPEC	0.31
MISS00430	08/25/99	08/26/99	99G0002	N/A	663.8	WET	REG	TH-232	7.90	0.17	PCI/G	GAMMASPEC	0.31
MISS00430	08/25/99	08/26/99	99G0002	N/A	663.8	WET	REG	TH-230	50.40	0.00	PCI/G	GAMMASPEC	50.40
MISS00430	08/25/99	08/26/99	99G0002	N/A	663.8	WET	REG	PA-231	4.68	0.00	PCI/G	GAMMASPEC	4.68
MISS00430	08/25/99	08/26/99	99G0002	N/A	663.8	WET	REG	U-235	0.35	0.05	PCI/G	GAMMASPEC	0.14
MISS00430	08/25/99	08/26/99	99G0002	N/A	663.8	WET	REG	U-238	4.84	0.00	PCI/G	GAMMASPEC	4.84
MISS00430	08/25/99	08/26/99	99G0002	N/A	663.8	WET	REG	AM-241	0.55	0.00	PCI/G	GAMMASPEC	0.55
MISS01690	08/24/99	08/26/99	99G0002	N/A	388.8	WET	REG	K-40	2.01	0.41	PCI/G	GAMMASPEC	1.05
MISS01690	08/24/99	08/26/99	99G0002	N/A	388.8	WET	REG	CS-137	0.18	0.00	PCI/G	GAMMASPEC	0.18
MISS01690	08/24/99	08/26/99	99G0002	N/A	388.8	WET	REG	RA-226	1.07	0.07	PCI/G	GAMMASPEC	0.23
MISS01690	08/24/99	08/26/99	99G0002	N/A	388.8	WET	REG	AC-227	1.39	0.00	PCI/G	GAMMASPEC	1.39
MISS01690	08/24/99	08/26/99	99G0002	N/A	388.8	WET	REG	RA-228	5.30	0.16	PCI/G	GAMMASPEC	0.36
MISS01690	08/24/99	08/26/99	99G0002	N/A	388.8	WET	REG	TH-228	5.30	0.16	PCI/G	GAMMASPEC	0.36
MISS01690	08/24/99	08/26/99	99G0002	N/A	388.8	WET	REG	TH-232	5.30	0.16	PCI/G	GAMMASPEC	0.36
MISS01690	08/24/99	08/26/99	99G0002	N/A	388.8	WET	REG	TH-230	49.50	0.00	PCI/G	GAMMASPEC	49.50

Approved by: ______________________ Date: ______________

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Location:	MAYWOOD		
Site WBS:	FMSS	Date Entered:	8/26/99
Work Order Number:	99G0002		
Project Number:			
Environmental Cat:	EA		

Sample ID	*Date Collected*	*Date Analyzed*	*SDG ID*	*LAB ID*	*Vol.*	*W/D*	*Sample Type*	*Analyte*	*Result*	*Error*	*Units*	*Analytical Method*	*MDA*
MISS01690	08/24/99	08/26/99	99G0002	N/A	388.8	WET	REG	PA-231	4.76	0.00	PCI/G	GAMMASPEC	4.76
MISS01690	08/24/99	08/26/99	99G0002	N/A	388.8	WET	REG	U-235	0.15	0.05	PCI/G	GAMMASPEC	0.16
MISS01690	08/24/99	08/26/99	99G0002	N/A	388.8	WET	REG	U-238	4.78	0.00	PCI/G	GAMMASPEC	4.78
MISS01690	08/24/99	08/26/99	99G0002	N/A	388.8	WET	REG	AM-241	0.57	0.00	PCI/G	GAMMASPEC	0.57
QCBLANK	08/26/99	08/26/99	99G0002	N/A	945.0	DRY	BL	K-40	0.40	0.00	PCI/G	GAMMASPEC	0.40
QCBLANK	08/26/99	08/26/99	99G0002	N/A	945.0	DRY	BL	CS-137	0.02	0.00	PCI/G	GAMMASPEC	0.02
QCBLANK	08/26/99	08/26/99	99G0002	N/A	945.0	DRY	BL	RA-226	0.05	0.00	PCI/G	GAMMASPEC	0.05
QCBLANK	08/26/99	08/26/99	99G0002	N/A	945.0	DRY	BL	AC-227	0.15	0.00	PCI/G	GAMMASPEC	0.15
QCBLANK	08/26/99	08/26/99	99G0002	N/A	945.0	DRY	BL	RA-228	0.05	0.00	PCI/G	GAMMASPEC	0.05
QCBLANK	08/26/99	08/26/99	99G0002	N/A	945.0	DRY	BL	TH-228	0.05	0.00	PCI/G	GAMMASPEC	0.05
QCBLANK	08/26/99	08/26/99	99G0002	N/A	945.0	DRY	BL	TH-232	0.05	0.00	PCI/G	GAMMASPEC	0.05
QCBLANK	08/26/99	08/26/99	99G0002	N/A	945.0	DRY	BL	TH-230	7.00	0.00	PCI/G	GAMMASPEC	7.00
QCBLANK	08/26/99	08/26/99	99G0002	N/A	945.0	DRY	BL	PA-231	0.65	0.00	PCI/G	GAMMASPEC	0.65
QCBLANK	08/26/99	08/26/99	99G0002	N/A	945.0	DRY	BL	U-235	0.03	0.00	PCI/G	GAMMASPEC	0.03
QCBLANK	08/26/99	08/26/99	99G0002	N/A	945.0	DRY	BL	U-238	0.67	0.00	PCI/G	GAMMASPEC	0.67
QCBLANK	08/26/99	08/26/99	99G0002	N/A	945.0	DRY	BL	AM-241	0.08	0.00	PCI/G	GAMMASPEC	0.08
QCSPIKE	04/01/99	08/26/99	99G0002	N/A	832.0	DRY	LCSF	CS-137	70.93	2.24	PCI/G	GAMMASPEC	1.12
QCSPIKE	04/01/99	08/26/99	99G0002	N/A	832.0	DRY	LCSF	AM-241	165.74	8.47	PCI/G	GAMMASPEC	3.94
QCSPIKE	04/01/99	08/26/99	99G0002	N/A	832.0	DRY	LCST	CS-137	68.43	3.22	PCI/G	GAMMASPEC	3.94
QCSPIKE	04/01/99	08/26/99	99G0002	N/A	832.0	DRY	LCST	AM-241	165.05	8.25	PCI/G	GAMMASPEC	0.40

Approved by: ______________________ Date: ____________

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Tl -esults listed at the MDA should have been reported at the actual measuremen'

Location:	MAYWOOD		
Site WBS:	FMSS	Date Entered:	9/2/99
Work Order Number:	99G0003		
Project Number:			
Environmental Cat:	EA		

Sample ID	Date Collected	Date Analyzed	SDG ID	LAB ID	Vol.	W/D	Sample Type	Analyte	Result	Error	Units	Analytical Method	MDA
MISS00520	08/31/99	09/01/99	99G0003	N/A	620.1	WET	REG	K-40	10.11	0.72	PCI/G	GAMMASPEC	1.40
MISS00520	08/31/99	09/01/99	99G0003	N/A	620.1	WET	REG	CS-137	0.18	0.00	PCI/G	GAMMASPEC	0.18
MISS00520	08/31/99	09/01/99	99G0003	N/A	620.1	WET	REG	RA-226	2.52	0.09	PCI/G	GAMMASPEC	0.27
MISS00520	08/31/99	09/01/99	99G0003	N/A	620.1	WET	REG	AC-227	1.61	0.00	PCI/G	GAMMASPEC	1.61
MISS00520	08/31/99	09/01/99	99G0003	N/A	620.1	WET	REG	RA-228	11.92	0.23	PCI/G	GAMMASPEC	0.35
MISS00520	08/31/99	09/01/99	99G0003	N/A	620.1	WET	REG	TH-228	11.92	0.23	PCI/G	GAMMASPEC	0.35
MISS00520	08/31/99	09/01/99	99G0003	N/A	620.1	WET	REG	TH-232	11.92	0.23	PCI/G	GAMMASPEC	0.35
MISS00520	08/31/99	09/01/99	99G0003	N/A	620.1	WET	REG	TH-230	60.60	0.00	PCI/G	GAMMASPEC	60.60
MISS00520	08/31/99	09/01/99	99G0003	N/A	620.1	WET	REG	PA-231	5.79	0.00	PCI/G	GAMMASPEC	5.79
MISS00520	08/31/99	09/01/99	99G0003	N/A	620.1	WET	REG	U-235	0.27	0.06	PCI/G	GAMMASPEC	0.18
MISS00520	08/31/99	09/01/99	99G0003	N/A	620.1	WET	REG	U-238	5.85	0.00	PCI/G	GAMMASPEC	5.85
MISS00520	08/31/99	09/01/99	99G0003	N/A	620.1	WET	REG	AM-241	0.69	0.00	PCI/G	GAMMASPEC	0.69
MISS0053X	08/31/99	09/01/99	99G0003	N/A	758.9	WET	REG	K-40	8.74	0.59	PCI/G	GAMMASPEC	1.03
MISS0053X	08/31/99	09/01/99	99G0003	N/A	758.9	WET	REG	CS-137	0.14	0.00	PCI/G	GAMMASPEC	0.14
MISS0053X	08/31/99	09/01/99	99G0003	N/A	758.9	WET	REG	RA-226	1.47	0.06	PCI/G	GAMMASPEC	0.20
MISS0053X	08/31/99	09/01/99	99G0003	N/A	758.9	WET	REG	AC-227	1.31	0.00	PCI/G	GAMMASPEC	1.31
MISS0053X	08/31/99	09/01/99	99G0003	N/A	758.9	WET	REG	RA-228	9.43	0.18	PCI/G	GAMMASPEC	0.27
MISS0053X	08/31/99	09/01/99	99G0003	N/A	758.9	WET	REG	TH-228	9.43	0.18	PCI/G	GAMMASPEC	0.27
MISS0053X	08/31/99	09/01/99	99G0003	N/A	758.9	WET	REG	TH-232	9.43	0.18	PCI/G	GAMMASPEC	0.27
MISS0053X	08/31/99	09/01/99	99G0003	N/A	758.9	WET	REG	TH-230	50.10	0.00	PCI/G	GAMMASPEC	50.10
MISS0053X	08/31/99	09/01/99	99G0003	N/A	758.9	WET	REG	PA-231	4.59	0.00	PCI/G	GAMMASPEC	4.59
MISS0053X	08/31/99	09/01/99	99G0003	N/A	758.9	WET	REG	U-235	0.22	0.05	PCI/G	GAMMASPEC	0.14
MISS0053X	08/31/99	09/01/99	99G0003	N/A	758.9	WET	REG	U-238	4.75	0.00	PCI/G	GAMMASPEC	4.75
MISS0053X	08/31/99	09/01/99	99G0003	N/A	758.9	WET	REG	AM-241	0.56	0.00	PCI/G	GAMMASPEC	0.56
MISS0053X	08/31/99	09/01/99	99G0003	N/A	758.9	WET	LREP	K-40	8.90	0.59	PCI/G	GAMMASPEC	1.01
MISS0053X	08/31/99	09/01/99	99G0003	N/A	758.9	WET	LREP	CS-137	0.14	0.00	PCI/G	GAMMASPEC	0.14
MISS0053X	08/31/99	09/01/99	99G0003	N/A	758.9	WET	LREP	RA-226	1.49	0.06	PCI/G	GAMMASPEC	0.23
MISS0053X	08/31/99	09/01/99	99G0003	N/A	758.9	WET	LREP	AC-227	1.25	0.00	PCI/G	GAMMASPEC	1.25

Approved by: ______________________ Date: ______________

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Location:	MAYWOOD		
Site WBS:	FMSS	Date Entered:	9/2/99
Work Order Number:	99G0003		
Project Number:			
Environmental Cat:	EA		

Sample ID	Date Collected	Date Analyzed	SDG ID	LAB ID	Vol.	W/D	Sample Type	Analyte	Result	Error	Units	Analytical Method	MDA
MISS0053X	08/31/99	09/01/99	99G0003	N/A	758.9	WET	LREP	RA-228	9.40	0.18	PCI/G	GAMMASPEC	0.32
MISS0053X	08/31/99	09/01/99	99G0003	N/A	758.9	WET	LREP	TH-228	9.40	0.18	PCI/G	GAMMASPEC	0.32
MISS0053X	08/31/99	09/01/99	99G0003	N/A	758.9	WET	LREP	TH-232	9.40	0.18	PCI/G	GAMMASPEC	0.32
MISS0053X	08/31/99	09/01/99	99G0003	N/A	758.9	WET	LREP	TH-230	49.50	0.00	PCI/G	GAMMASPEC	49.50
MISS0053X	08/31/99	09/01/99	99G0003	N/A	758.9	WET	LREP	PA-231	4.69	0.00	PCI/G	GAMMASPEC	4.69
MISS0053X	08/31/99	09/01/99	99G0003	N/A	758.9	WET	LREP	U-235	0.35	0.05	PCI/G	GAMMASPEC	0.15
MISS0053X	08/31/99	09/01/99	99G0003	N/A	758.9	WET	LREP	U-238	3.54	1.46	PCI/G	GAMMASPEC	4.74
MISS0053X	08/31/99	09/01/99	99G0003	N/A	758.9	WET	LREP	AM-241	0.56	0.00	PCI/G	GAMMASPEC	0.56
MISS00540	08/31/99	09/01/99	99G0003	N/A	948.4	WET	REG	K-40	8.58	0.46	PCI/G	GAMMASPEC	0.23
MISS00540	08/31/99	09/01/99	99G0003	N/A	948.4	WET	REG	CS-137	0.05	0.00	PCI/G	GAMMASPEC	0.05
MISS00540	08/31/99	09/01/99	99G0003	N/A	948.4	WET	REG	RA-226	0.34	0.02	PCI/G	GAMMASPEC	0.07
MISS00540	08/31/99	09/01/99	99G0003	N/A	948.4	WET	REG	AC-227	0.43	0.00	PCI/G	GAMMASPEC	0.43
MISS00540	08/31/99	09/01/99	99G0003	N/A	948.4	WET	REG	RA-228	0.42	0.03	PCI/G	GAMMASPEC	0.10
MISS00540	08/31/99	09/01/99	99G0003	N/A	948.4	WET	REG	TH-228	0.42	0.03	PCI/G	GAMMASPEC	0.10
MISS00540	08/31/99	09/01/99	99G0003	N/A	948.4	WET	REG	TH-232	0.42	0.03	PCI/G	GAMMASPEC	0.10
MISS00540	08/31/99	09/01/99	99G0003	N/A	948.4	WET	REG	TH-230	14.90	0.00	PCI/G	GAMMASPEC	14.90
MISS00540	08/31/99	09/01/99	99G0003	N/A	948.4	WET	REG	PA-231	1.40	0.00	PCI/G	GAMMASPEC	1.40
MISS00540	08/31/99	09/01/99	99G0003	N/A	948.4	WET	REG	U-235	0.05	0.02	PCI/G	GAMMASPEC	0.05
MISS00540	08/31/99	09/01/99	99G0003	N/A	948.4	WET	REG	U-238	1.44	0.00	PCI/G	GAMMASPEC	1.44
MISS00540	08/31/99	09/01/99	99G0003	N/A	948.4	WET	REG	AM-241	0.18	0.00	PCI/G	GAMMASPEC	0.18
MISS00550	08/31/99	09/01/99	99G0003	N/A	598.1	WET	REG	K-40	8.56	0.71	PCI/G	GAMMASPEC	1.56
MISS00550	08/31/99	09/01/99	99G0003	N/A	598.1	WET	REG	CS-137	0.18	0.00	PCI/G	GAMMASPEC	0.18
MISS00550	08/31/99	09/01/99	99G0003	N/A	598.1	WET	REG	RA-226	3.04	0.10	PCI/G	GAMMASPEC	0.29
MISS00550	08/31/99	09/01/99	99G0003	N/A	598.1	WET	REG	AC-227	1.71	0.00	PCI/G	GAMMASPEC	1.71
MISS00550	08/31/99	09/01/99	99G0003	N/A	598.1	WET	REG	RA-228	12.55	0.24	PCI/G	GAMMASPEC	0.45
MISS00550	08/31/99	09/01/99	99G0003	N/A	598.1	WET	REG	TH-228	12.55	0.24	PCI/G	GAMMASPEC	0.45
MISS00550	08/31/99	09/01/99	99G0003	N/A	598.1	WET	REG	TH-232	12.55	0.24	PCI/G	GAMMASPEC	0.45
MISS00550	08/31/99	09/01/99	99G0003	N/A	598.1	WET	REG	TH-230	65.30	0.00	PCI/G	GAMMASPEC	65.30

Approved by: ______________________ Date: ______________

Equivalent values in the "Result" and "MDA" columns indicate that the analyte was either undetected or detected at a level below the MDA. T' ·esults listed at the MDA should have been reported at the actual measuremer

Location:	MAYWOOD		
Site WBS:	FMSS	Date Entered:	9/2/99
Work Order Number:	99G0003		
Project Number:			
Environmental Cat:	EA		

Sample ID	Date Collected	Date Analyzed	SDG ID	LAB ID	Vol.	W/D	Sample Type	Analyte	Result	Error	Units	Analytical Method	MDA
MISS00550	08/31/99	09/01/99	99G0003	N/A	598.1	WET	REG	PA-231	6.09	0.00	PCI/G	GAMMASPEC	6.09
MISS00550	08/31/99	09/01/99	99G0003	N/A	598.1	WET	REG	U-235	0.36	0.06	PCI/G	GAMMASPEC	0.20
MISS00550	08/31/99	09/01/99	99G0003	N/A	598.1	WET	REG	U-238	0.76	1.90	PCI/G	GAMMASPEC	6.33
MISS00550	08/31/99	09/01/99	99G0003	N/A	598.1	WET	REG	AM-241	0.73	0.00	PCI/G	GAMMASPEC	0.73
MISS00560	08/31/99	09/01/99	99G0003	N/A	559.1	WET	REG	K-40	11.10	1.06	PCI/G	GAMMASPEC	2.81
MISS00560	08/31/99	09/01/99	99G0003	N/A	559.1	WET	REG	CS-137	0.43	0.00	PCI/G	GAMMASPEC	0.43
MISS00560	08/31/99	09/01/99	99G0003	N/A	559.1	WET	REG	RA-226	7.16	0.19	PCI/G	GAMMASPEC	0.65
MISS00560	08/31/99	09/01/99	99G0003	N/A	559.1	WET	REG	AC-227	4.02	0.00	PCI/G	GAMMASPEC	4.02
MISS00560	08/31/99	09/01/99	99G0003	N/A	559.1	WET	REG	RA-228	77.83	1.11	PCI/G	GAMMASPEC	0.78
MISS00560	08/31/99	09/01/99	99G0003	N/A	559.1	WET	REG	TH-228	77.83	1.11	PCI/G	GAMMASPEC	0.78
MISS00560	08/31/99	09/01/99	99G0003	N/A	559.1	WET	REG	TH-232	77.83	1.11	PCI/G	GAMMASPEC	0.78
MISS00560	08/31/99	09/01/99	99G0003	N/A	559.1	WET	REG	TH-230	151.00	0.00	PCI/G	GAMMASPEC	151.00
MISS00560	08/31/99	09/01/99	99G0003	N/A	559.1	WET	REG	PA-231	14.70	0.00	PCI/G	GAMMASPEC	14.70
MISS00560	08/31/99	09/01/99	99G0003	N/A	559.1	WET	REG	U-235	1.43	0.06	PCI/G	GAMMASPEC	0.37
MISS00560	08/31/99	09/01/99	99G0003	N/A	559.1	WET	REG	U-238	16.44	4.45	PCI/G	GAMMASPEC	14.40
MISS00560	08/31/99	09/01/99	99G0003	N/A	559.1	WET	REG	AM-241	1.67	0.00	PCI/G	GAMMASPEC	1.67
MISS00570	08/31/99	09/01/99	99G0003	N/A	908.5	WET	REG	K-40	8.97	0.50	PCI/G	GAMMASPEC	0.53
MISS00570	08/31/99	09/01/99	99G0003	N/A	908.5	WET	REG	CS-137	0.05	0.00	PCI/G	GAMMASPEC	0.05
MISS00570	08/31/99	09/01/99	99G0003	N/A	908.5	WET	REG	RA-226	0.35	0.02	PCI/G	GAMMASPEC	0.08
MISS00570	08/31/99	09/01/99	99G0003	N/A	908.5	WET	REG	AC-227	0.49	0.00	PCI/G	GAMMASPEC	0.49
MISS00570	08/31/99	09/01/99	99G0003	N/A	908.5	WET	REG	RA-228	0.44	0.03	PCI/G	GAMMASPEC	0.09
MISS00570	08/31/99	09/01/99	99G0003	N/A	908.5	WET	REG	TH-228	0.44	0.03	PCI/G	GAMMASPEC	0.09
MISS00570	08/31/99	09/01/99	99G0003	N/A	908.5	WET	REG	TH-232	0.44	0.03	PCI/G	GAMMASPEC	0.09
MISS00570	08/31/99	09/01/99	99G0003	N/A	908.5	WET	REG	TH-230	16.60	0.00	PCI/G	GAMMASPEC	16.60
MISS00570	08/31/99	09/01/99	99G0003	N/A	908.5	WET	REG	PA-231	1.50	0.00	PCI/G	GAMMASPEC	1.50
MISS00570	08/31/99	09/01/99	99G0003	N/A	908.5	WET	REG	U-235	0.10	0.02	PCI/G	GAMMASPEC	0.05
MISS00570	08/31/99	09/01/99	99G0003	N/A	908.5	WET	REG	U-238	1.69	0.00	PCI/G	GAMMASPEC	1.69
MISS00570	08/31/99	09/01/99	99G0003	N/A	908.5	WET	REG	AM-241	0.18	0.00	PCI/G	GAMMASPEC	0.18

Approved by: ______________________ Date: ______________

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Location:	MAYWOOD		
Site WBS:	FMSS	Date Entered:	9/2/99
Work Order Number:	99G0003		
Project Number:			
Environmental Cat:	EA		

Sample ID	Date Collected	Date Analyzed	SDG ID	LAB ID	Vol.	W/D	Sample Type	Analyte	Result	Error	Units	Analytical Method	MDA
MISS00580	08/31/99	09/01/99	99G0003	N/A	520.7	WET	REG	K-40	0.88	0.00	PCI/G	GAMMASPEC	0.88
MISS00580	08/31/99	09/01/99	99G0003	N/A	520.7	WET	REG	CS-137	0.06	0.00	PCI/G	GAMMASPEC	0.06
MISS00580	08/31/99	09/01/99	99G0003	N/A	520.7	WET	REG	RA-226	0.14	0.02	PCI/G	GAMMASPEC	0.06
MISS00580	08/31/99	09/01/99	99G0003	N/A	520.7	WET	REG	AC-227	0.37	0.00	PCI/G	GAMMASPEC	0.37
MISS00580	08/31/99	09/01/99	99G0003	N/A	520.7	WET	REG	RA-228	0.14	0.00	PCI/G	GAMMASPEC	0.14
MISS00580	08/31/99	09/01/99	99G0003	N/A	520.7	WET	REG	TH-228	0.14	0.00	PCI/G	GAMMASPEC	0.14
MISS00580	08/31/99	09/01/99	99G0003	N/A	520.7	WET	REG	TH-232	0.14	0.00	PCI/G	GAMMASPEC	0.14
MISS00580	08/31/99	09/01/99	99G0003	N/A	520.7	WET	REG	TH-230	14.30	0.00	PCI/G	GAMMASPEC	14.30
MISS00580	08/31/99	09/01/99	99G0003	N/A	520.7	WET	REG	PA-231	1.43	0.00	PCI/G	GAMMASPEC	1.43
MISS00580	08/31/99	09/01/99	99G0003	N/A	520.7	WET	REG	U-235	0.04	0.02	PCI/G	GAMMASPEC	0.05
MISS00580	08/31/99	09/01/99	99G0003	N/A	520.7	WET	REG	U-238	1.66	0.00	PCI/G	GAMMASPEC	1.66
MISS00580	08/31/99	09/01/99	99G0003	N/A	520.7	WET	REG	AM-241	0.16	0.00	PCI/G	GAMMASPEC	0.16
MISS00590	08/31/99	09/01/99	99G0003	N/A	713.9	WET	REG	K-40	1.14	0.00	PCI/G	GAMMASPEC	1.14
MISS00590	08/31/99	09/01/99	99G0003	N/A	713.9	WET	REG	CS-137	0.12	0.00	PCI/G	GAMMASPEC	0.12
MISS00590	08/31/99	09/01/99	99G0003	N/A	713.9	WET	REG	RA-226	0.70	0.05	PCI/G	GAMMASPEC	0.18
MISS00590	08/31/99	09/01/99	99G0003	N/A	713.9	WET	REG	AC-227	1.06	0.00	PCI/G	GAMMASPEC	1.06
MISS00590	08/31/99	09/01/99	99G0003	N/A	713.9	WET	REG	RA-228	5.25	0.13	PCI/G	GAMMASPEC	0.29
MISS00590	08/31/99	09/01/99	99G0003	N/A	713.9	WET	REG	TH-228	5.25	0.13	PCI/G	GAMMASPEC	0.29
MISS00590	08/31/99	09/01/99	99G0003	N/A	713.9	WET	REG	TH-232	5.25	0.13	PCI/G	GAMMASPEC	0.29
MISS00590	08/31/99	09/01/99	99G0003	N/A	713.9	WET	REG	TH-230	40.40	0.00	PCI/G	GAMMASPEC	40.40
MISS00590	08/31/99	09/01/99	99G0003	N/A	713.9	WET	REG	PA-231	3.60	0.00	PCI/G	GAMMASPEC	3.60
MISS00590	08/31/99	09/01/99	99G0003	N/A	713.9	WET	REG	U-235	0.16	0.04	PCI/G	GAMMASPEC	0.12
MISS00590	08/31/99	09/01/99	99G0003	N/A	713.9	WET	REG	U-238	4.00	0.00	PCI/G	GAMMASPEC	4.00
MISS00590	08/31/99	09/01/99	99G0003	N/A	713.9	WET	REG	AM-241	0.45	0.00	PCI/G	GAMMASPEC	0.45
MISS00600	08/31/99	09/01/99	99G0003	N/A	964.5	WET	REG	K-40	8.70	0.48	PCI/G	GAMMASPEC	0.47
MISS00600	08/31/99	09/01/99	99G0003	N/A	964.5	WET	REG	CS-137	0.05	0.00	PCI/G	GAMMASPEC	0.05
MISS00600	08/31/99	09/01/99	99G0003	N/A	964.5	WET	REG	RA-226	0.36	0.02	PCI/G	GAMMASPEC	0.08
MISS00600	08/31/99	09/01/99	99G0003	N/A	964.5	WET	REG	AC-227	0.49	0.00	PCI/G	GAMMASPEC	0.49

Approved by: ______________________ Date: ____________

Equivalent values in the "Result" and "MDA" columns indicate that the analyte was either undetected or detected at a level below the MDA. T' esults listed at the MDA should have been reported at the actual measureme

Location:	MAYWOOD		
Site WBS:	FMSS	Date Entered:	9/2/99
Work Order Number:	99G0003		
Project Number:			
Environmental Cat:	EA		

Sample ID	Date Collected	Date Analyzed	SDG ID	LAB ID	Vol.	W/D	Sample Type	Analyte	Result	Error	Units	Analytical Method	MDA
MISS00600	08/31/99	09/01/99	99G0003	N/A	964.5	WET	REG	RA-228	0.73	0.04	PCI/G	GAMMASPEC	0.11
MISS00600	08/31/99	09/01/99	99G0003	N/A	964.5	WET	REG	TH-228	0.73	0.04	PCI/G	GAMMASPEC	0.11
MISS00600	08/31/99	09/01/99	99G0003	N/A	964.5	WET	REG	TH-232	0.73	0.04	PCI/G	GAMMASPEC	0.11
MISS00600	08/31/99	09/01/99	99G0003	N/A	964.5	WET	REG	TH-230	16.80	0.00	PCI/G	GAMMASPEC	16.80
MISS00600	08/31/99	09/01/99	99G0003	N/A	964.5	WET	REG	PA-231	1.46	0.00	PCI/G	GAMMASPEC	1.46
MISS00600	08/31/99	09/01/99	99G0003	N/A	964.5	WET	REG	U-235	0.05	0.02	PCI/G	GAMMASPEC	0.06
MISS00600	08/31/99	09/01/99	99G0003	N/A	964.5	WET	REG	U-238	1.71	0.00	PCI/G	GAMMASPEC	1.71
MISS00600	08/31/99	09/01/99	99G0003	N/A	964.5	WET	REG	AM-241	0.19	0.00	PCI/G	GAMMASPEC	0.19
MISS00610	08/31/99	09/01/99	99G0003	N/A	680.8	WET	FREP	K-40	1.33	0.00	PCI/G	GAMMASPEC	1.33
MISS00610	08/31/99	09/01/99	99G0003	N/A	680.8	WET	FREP	CS-137	0.12	0.00	PCI/G	GAMMASPEC	0.12
MISS00610	08/31/99	09/01/99	99G0003	N/A	680.8	WET	FREP	RA-226	0.80	0.05	PCI/G	GAMMASPEC	0.20
MISS00610	08/31/99	09/01/99	99G0003	N/A	680.8	WET	FREP	AC-227	1.14	0.00	PCI/G	GAMMASPEC	1.14
MISS00610	08/31/99	09/01/99	99G0003	N/A	680.8	WET	FREP	RA-228	6.56	0.15	PCI/G	GAMMASPEC	0.29
MISS00610	08/31/99	09/01/99	99G0003	N/A	680.8	WET	FREP	TH-228	6.56	0.15	PCI/G	GAMMASPEC	0.29
MISS00610	08/31/99	09/01/99	99G0003	N/A	680.8	WET	FREP	TH-232	6.56	0.15	PCI/G	GAMMASPEC	0.29
MISS00610	08/31/99	09/01/99	99G0003	N/A	680.8	WET	FREP	TH-230	45.60	0.00	PCI/G	GAMMASPEC	45.60
MISS00610	08/31/99	09/01/99	99G0003	N/A	680.8	WET	FREP	PA-231	4.11	0.00	PCI/G	GAMMASPEC	4.11
MISS00610	08/31/99	09/01/99	99G0003	N/A	680.8	WET	FREP	U-235	0.20	0.04	PCI/G	GAMMASPEC	0.14
MISS00610	08/31/99	09/01/99	99G0003	N/A	680.8	WET	FREP	U-238	4.34	0.00	PCI/G	GAMMASPEC	4.34
MISS00610	08/31/99	09/01/99	99G0003	N/A	680.8	WET	FREP	AM-241	0.51	0.00	PCI/G	GAMMASPEC	0.51
QCBLANK	09/02/99	09/02/99	99G0003	N/A	945.0	DRY	BL	K-40	0.39	0.00	PCI/G	GAMMASPEC	0.39
QCBLANK	09/02/99	09/02/99	99G0003	N/A	945.0	DRY	BL	CS-137	0.03	0.00	PCI/G	GAMMASPEC	0.03
QCBLANK	09/02/99	09/02/99	99G0003	N/A	945.0	DRY	BL	RA-226	0.05	0.00	PCI/G	GAMMASPEC	0.05
QCBLANK	09/02/99	09/02/99	99G0003	N/A	945.0	DRY	BL	AC-227	0.15	0.00	PCI/G	GAMMASPEC	0.15
QCBLANK	09/02/99	09/02/99	99G0003	N/A	945.0	DRY	BL	RA-228	0.08	0.00	PCI/G	GAMMASPEC	0.08
QCBLANK	09/02/99	09/02/99	99G0003	N/A	945.0	DRY	BL	TH-228	0.08	0.00	PCI/G	GAMMASPEC	0.08
QCBLANK	09/02/99	09/02/99	99G0003	N/A	945.0	DRY	BL	TH-232	0.08	0.00	PCI/G	GAMMASPEC	0.08
QCBLANK	09/02/99	09/02/99	99G0003	N/A	945.0	DRY	BL	TH-230	6.87	0.00	PCI/G	GAMMASPEC	6.87

Approved by: ______________________ Date: ______________

Equivalent values in the "Result" and "MDA" columns indicate that the analyte was either undetected or detected at a level below the MDA. The results listed at the MDA should have been reported at the actual measurement.

Location:	MAYWOOD		
Site WBS:	FMSS	Date Entered:	9/2/99
Work Order Number:	99G0003		
Project Number:			
Environmental Cat:	EA		

Sample ID	Date Collected	Date Analyzed	SDG ID	LAB ID	Vol.	W/D	Sample Type	Analyte	Result	Error	Units	Analytical Method	MDA
QCBLANK	09/02/99	09/02/99	99G0003	N/A	945.0	DRY	BL	PA-231	0.79	0.00	PCI/G	GAMMASPEC	0.79
QCBLANK	09/02/99	09/02/99	99G0003	N/A	945.0	DRY	BL	U-235	0.03	0.00	PCI/G	GAMMASPEC	0.03
QCBLANK	09/02/99	09/02/99	99G0003	N/A	945.0	DRY	BL	U-238	0.72	0.00	PCI/G	GAMMASPEC	0.72
QCBLANK	09/02/99	09/02/99	99G0003	N/A	945.0	DRY	BL	AM-241	0.07	0.00	PCI/G	GAMMASPEC	0.07
QCSPIKE	04/01/99	09/02/99	99G0003	N/A	832.0	DRY	LCSF	CS-137	70.09	2.21	PCI/G	GAMMASPEC	1.08
QCSPIKE	04/01/99	09/02/99	99G0003	N/A	832.0	DRY	LCSF	AM-241	166.30	8.51	PCI/G	GAMMASPEC	3.88
QCSPIKE	04/01/99	09/02/99	99G0003	N/A	832.0	DRY	LCST	CS-137	68.43	3.22	PCI/G	GAMMASPEC	1.08
QCSPIKE	04/01/99	09/02/99	99G0003	N/A	832.0	DRY	LCST	AM-241	165.05	8.25	PCI/G	GAMMASPEC	3.88

Approved by: ______________________ Date: ______________

Equivalent values in the "Result" and "MDA" columns indicate that the analyte was either undetected or detected at a level below the MDA.
T' esults listed at the MDA should have been reported at the actual measuremer

Location:	MAYWOOD		
Site WBS:	FMSS	Date Entered:	9/7/99
Work Order Number:	99G0004		
Project Number:			
Environmental Cat:	EA		

Sample ID	Date Collected	Date Analyzed	SDG ID	LAB ID	Vol.	W/D	Sample Type	Analyte	Result	Error	Units	Analytical Method	MDA
MISS00710	09/01/99	09/02/99	99G0004	NA	484.4	WET	REG	K-40	7.60	0.00	PCI/G	GAMMASPEC	7.60
MISS00710	09/01/99	09/02/99	99G0004	NA	484.4	WET	REG	CS-137	0.93	0.00	PCI/G	GAMMASPEC	0.93
MISS00710	09/01/99	09/02/99	99G0004	NA	484.4	WET	REG	RA-226	8.31	0.25	PCI/G	GAMMASPEC	1.19
MISS00710	09/01/99	09/02/99	99G0004	NA	484.4	WET	REG	AC-227	8.44	0.00	PCI/G	GAMMASPEC	8.44
MISS00710	09/01/99	09/02/99	99G0004	NA	484.4	WET	REG	RA-228	352.69	4.77	PCI/G	GAMMASPEC	1.60
MISS00710	09/01/99	09/02/99	99G0004	NA	484.4	WET	REG	TH-228	352.69	4.77	PCI/G	GAMMASPEC	1.60
MISS00710	09/01/99	09/02/99	99G0004	NA	484.4	WET	REG	TH-232	352.69	4.77	PCI/G	GAMMASPEC	1.60
MISS00710	09/01/99	09/02/99	99G0004	NA	484.4	WET	REG	TH-230	313.00	0.00	PCI/G	GAMMASPEC	313.00
MISS00710	09/01/99	09/02/99	99G0004	NA	484.4	WET	REG	PA-231	32.20	0.00	PCI/G	GAMMASPEC	32.20
MISS00710	09/01/99	09/02/99	99G0004	NA	484.4	WET	REG	U-235	5.07	0.22	PCI/G	GAMMASPEC	0.83
MISS00710	09/01/99	09/02/99	99G0004	NA	484.4	WET	REG	U-238	79.61	8.33	PCI/G	GAMMASPEC	29.70
MISS00710	09/01/99	09/02/99	99G0004	NA	484.4	WET	REG	AM-241	3.45	0.00	PCI/G	GAMMASPEC	3.45
MISS00720	09/01/99	09/02/99	99G0004	NA	646.9	WET	REG	K-40	10.54	0.91	PCI/G	GAMMASPEC	2.33
MISS00720	09/01/99	09/02/99	99G0004	NA	646.9	WET	REG	CS-137	0.34	0.00	PCI/G	GAMMASPEC	0.34
MISS00720	09/01/99	09/02/99	99G0004	NA	646.9	WET	REG	RA-226	2.80	0.13	PCI/G	GAMMASPEC	0.52
MISS00720	09/01/99	09/02/99	99G0004	NA	646.9	WET	REG	AC-227	3.11	0.00	PCI/G	GAMMASPEC	3.11
MISS00720	09/01/99	09/02/99	99G0004	NA	646.9	WET	REG	RA-228	54.79	0.79	PCI/G	GAMMASPEC	0.60
MISS00720	09/01/99	09/02/99	99G0004	NA	646.9	WET	REG	TH-228	54.79	0.79	PCI/G	GAMMASPEC	0.60
MISS00720	09/01/99	09/02/99	99G0004	NA	646.9	WET	REG	TH-232	54.79	0.79	PCI/G	GAMMASPEC	0.60
MISS00720	09/01/99	09/02/99	99G0004	NA	646.9	WET	REG	TH-230	121.00	0.00	PCI/G	GAMMASPEC	121.00
MISS00720	09/01/99	09/02/99	99G0004	NA	646.9	WET	REG	PA-231	11.70	0.00	PCI/G	GAMMASPEC	11.70
MISS00720	09/01/99	09/02/99	99G0004	NA	646.9	WET	REG	U-235	1.06	0.11	PCI/G	GAMMASPEC	0.35
MISS00720	09/01/99	09/02/99	99G0004	NA	646.9	WET	REG	U-238	15.74	2.90	PCI/G	GAMMASPEC	11.50
MISS00720	09/01/99	09/02/99	99G0004	NA	646.9	WET	REG	AM-241	1.34	0.00	PCI/G	GAMMASPEC	1.34
MISS00730	09/01/99	09/02/99	99G0004	NA	842.8	WET	REG	K-40	8.66	0.50	PCI/G	GAMMASPEC	0.46
MISS00730	09/01/99	09/02/99	99G0004	NA	842.8	WET	REG	CS-137	0.06	0.00	PCI/G	GAMMASPEC	0.06
MISS00730	09/01/99	09/02/99	99G0004	NA	842.8	WET	REG	RA-226	0.49	0.03	PCI/G	GAMMASPEC	0.09
MISS00730	09/01/99	09/02/99	99G0004	NA	842.8	WET	REG	AC-227	0.59	0.00	PCI/G	GAMMASPEC	0.59

Approved by: ______________________________ Date: ______________

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Location:	MAYWOOD		
Site WBS:	FMSS	Date Entered:	9/7/99
Work Order Number:	99G0004		
Project Number:			
Environmental Cat:	EA		

Sample ID	Date Collected	Date Analyzed	SDG ID	LAB ID	Vol.	W/D	Sample Type	Analyte	Result	Error	Units	Analytical Method	MDA
MISS00730	09/01/99	09/02/99	99G0004	NA	842.8	WET	REG	RA-228	0.81	0.04	PCI/G	GAMMASPEC	0.13
MISS00730	09/01/99	09/02/99	99G0004	NA	842.8	WET	REG	TH-228	0.81	0.04	PCI/G	GAMMASPEC	0.13
MISS00730	09/01/99	09/02/99	99G0004	NA	842.8	WET	REG	TH-232	0.81	0.04	PCI/G	GAMMASPEC	0.13
MISS00730	09/01/99	09/02/99	99G0004	NA	842.8	WET	REG	TH-230	21.20	0.00	PCI/G	GAMMASPEC	21.20
MISS00730	09/01/99	09/02/99	99G0004	NA	842.8	WET	REG	PA-231	1.83	0.00	PCI/G	GAMMASPEC	1.83
MISS00730	09/01/99	09/02/99	99G0004	NA	842.8	WET	REG	U-235	0.14	0.02	PCI/G	GAMMASPEC	0.07
MISS00730	09/01/99	09/02/99	99G0004	NA	842.8	WET	REG	U-238	2.05	0.70	PCI/G	GAMMASPEC	2.23
MISS00730	09/01/99	09/02/99	99G0004	NA	842.8	WET	REG	AM-241	0.27	0.00	PCI/G	GAMMASPEC	0.27
MISS00740	09/01/99	09/02/99	99G0004	NA	500.4	WET	REG	K-40	10.50	0.00	PCI/G	GAMMASPEC	10.50
MISS00740	09/01/99	09/02/99	99G0004	NA	500.4	WET	REG	CS-137	1.30	0.00	PCI/G	GAMMASPEC	1.30
MISS00740	09/01/99	09/02/99	99G0004	NA	500.4	WET	REG	RA-226	14.47	0.38	PCI/G	GAMMASPEC	1.68
MISS00740	09/01/99	09/02/99	99G0004	NA	500.4	WET	REG	AC-227	11.80	0.00	PCI/G	GAMMASPEC	11.80
MISS00740	09/01/99	09/02/99	99G0004	NA	500.4	WET	REG	RA-228	698.06	9.34	PCI/G	GAMMASPEC	2.44
MISS00740	09/01/99	09/02/99	99G0004	NA	500.4	WET	REG	TH-228	698.06	9.34	PCI/G	GAMMASPEC	2.44
MISS00740	09/01/99	09/02/99	99G0004	NA	500.4	WET	REG	TH-232	698.06	9.34	PCI/G	GAMMASPEC	2.44
MISS00740	09/01/99	09/02/99	99G0004	NA	500.4	WET	REG	TH-230	433.00	0.00	PCI/G	GAMMASPEC	433.00
MISS00740	09/01/99	09/02/99	99G0004	NA	500.4	WET	REG	PA-231	45.00	0.00	PCI/G	GAMMASPEC	45.00
MISS00740	09/01/99	09/02/99	99G0004	NA	500.4	WET	REG	U-235	8.29	0.32	PCI/G	GAMMASPEC	1.21
MISS00740	09/01/99	09/02/99	99G0004	NA	500.4	WET	REG	U-238	162.12	9.13	PCI/G	GAMMASPEC	40.70
MISS00740	09/01/99	09/02/99	99G0004	NA	500.4	WET	REG	AM-241	4.73	0.00	PCI/G	GAMMASPEC	4.73
MISS00750	09/01/99	09/07/99	99G0004	NA	730.3	WET	REG	K-40	8.35	0.55	PCI/G	GAMMASPEC	0.86
MISS00750	09/01/99	09/07/99	99G0004	NA	730.3	WET	REG	CS-137	0.11	0.00	PCI/G	GAMMASPEC	0.11
MISS00750	09/01/99	09/07/99	99G0004	NA	730.3	WET	REG	RA-226	0.91	0.05	PCI/G	GAMMASPEC	0.16
MISS00750	09/01/99	09/07/99	99G0004	NA	730.3	WET	REG	AC-227	0.98	0.00	PCI/G	GAMMASPEC	0.98
MISS00750	09/01/99	09/07/99	99G0004	NA	730.3	WET	REG	RA-228	4.13	0.10	PCI/G	GAMMASPEC	0.19
MISS00750	09/01/99	09/07/99	99G0004	NA	730.3	WET	REG	TH-228	4.13	0.10	PCI/G	GAMMASPEC	0.19
MISS00750	09/01/99	09/07/99	99G0004	NA	730.3	WET	REG	TH-232	4.13	0.10	PCI/G	GAMMASPEC	0.19
MISS00750	09/01/99	09/07/99	99G0004	NA	730.3	WET	REG	TH-230	37.50	0.00	PCI/G	GAMMASPEC	37.50

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Location:	MAYWOOD		
Site WBS:	FMSS	Date Entered:	9/7/99
Work Order Number:	99G0004		
Project Number:			
Environmental Cat:	EA		

Sample ID	Date Collected	Date Analyzed	SDG ID	LAB ID	Vol.	W/D	Sample Type	Analyte	Result	Error	Units	Analytical Method	MDA
MISS00750	09/01/99	09/07/99	99G0004	NA	730.3	WET	REG	PA-231	3.27	0.00	PCI/G	GAMMASPEC	3.27
MISS00750	09/01/99	09/07/99	99G0004	NA	730.3	WET	REG	U-235	0.29	0.04	PCI/G	GAMMASPEC	0.11
MISS00750	09/01/99	09/07/99	99G0004	NA	730.3	WET	REG	U-238	3.83	1.15	PCI/G	GAMMASPEC	3.69
MISS00750	09/01/99	09/07/99	99G0004	NA	730.3	WET	REG	AM-241	0.43	0.00	PCI/G	GAMMASPEC	0.43
MISS00750	09/01/99	09/07/99	99G0004	NA	730.3	WET	LREP	K-40	7.81	0.54	PCI/G	GAMMASPEC	0.91
MISS00750	09/01/99	09/07/99	99G0004	NA	730.3	WET	LREP	CS-137	0.11	0.00	PCI/G	GAMMASPEC	0.11
MISS00750	09/01/99	09/07/99	99G0004	NA	730.3	WET	LREP	RA-226	0.93	0.05	PCI/G	GAMMASPEC	0.16
MISS00750	09/01/99	09/07/99	99G0004	NA	730.3	WET	LREP	AC-227	0.97	0.00	PCI/G	GAMMASPEC	0.97
MISS00750	09/01/99	09/07/99	99G0004	NA	730.3	WET	LREP	RA-228	4.22	0.11	PCI/G	GAMMASPEC	0.23
MISS00750	09/01/99	09/07/99	99G0004	NA	730.3	WET	LREP	TH-228	4.22	0.11	PCI/G	GAMMASPEC	0.23
MISS00750	09/01/99	09/07/99	99G0004	NA	730.3	WET	LREP	TH-232	4.22	0.11	PCI/G	GAMMASPEC	0.23
MISS00750	09/01/99	09/07/99	99G0004	NA	730.3	WET	LREP	TH-230	36.90	0.00	PCI/G	GAMMASPEC	36.90
MISS00750	09/01/99	09/07/99	99G0004	NA	730.3	WET	LREP	PA-231	3.36	0.00	PCI/G	GAMMASPEC	3.36
MISS00750	09/01/99	09/07/99	99G0004	NA	730.3	WET	LREP	U-235	0.35	0.04	PCI/G	GAMMASPEC	0.11
MISS00750	09/01/99	09/07/99	99G0004	NA	730.3	WET	LREP	U-238	4.64	1.13	PCI/G	GAMMASPEC	3.56
MISS00750	09/01/99	09/07/99	99G0004	NA	730.3	WET	LREP	AM-241	0.42	0.00	PCI/G	GAMMASPEC	0.42
MISS00760	09/01/99	09/07/99	99G0004	NA	760.3	WET	REG	K-40	7.42	0.60	PCI/G	GAMMASPEC	1.35
MISS00760	09/01/99	09/07/99	99G0004	NA	760.3	WET	REG	CS-137	0.16	0.00	PCI/G	GAMMASPEC	0.16
MISS00760	09/01/99	09/07/99	99G0004	NA	760.3	WET	REG	RA-226	1.12	0.05	PCI/G	GAMMASPEC	0.20
MISS00760	09/01/99	09/07/99	99G0004	NA	760.3	WET	REG	AC-227	1.43	0.00	PCI/G	GAMMASPEC	1.43
MISS00760	09/01/99	09/07/99	99G0004	NA	760.3	WET	REG	RA-228	12.92	0.22	PCI/G	GAMMASPEC	0.30
MISS00760	09/01/99	09/07/99	99G0004	NA	760.3	WET	REG	TH-228	12.92	0.22	PCI/G	GAMMASPEC	0.30
MISS00760	09/01/99	09/07/99	99G0004	NA	760.3	WET	REG	TH-232	12.92	0.22	PCI/G	GAMMASPEC	0.30
MISS00760	09/01/99	09/07/99	99G0004	NA	760.3	WET	REG	TH-230	57.30	0.00	PCI/G	GAMMASPEC	57.30
MISS00760	09/01/99	09/07/99	99G0004	NA	760.3	WET	REG	PA-231	5.29	0.00	PCI/G	GAMMASPEC	5.29
MISS00760	09/01/99	09/07/99	99G0004	NA	760.3	WET	REG	U-235	0.36	0.06	PCI/G	GAMMASPEC	0.18
MISS00760	09/01/99	09/07/99	99G0004	NA	760.3	WET	REG	U-238	5.86	1.70	PCI/G	GAMMASPEC	5.47
MISS00760	09/01/99	09/07/99	99G0004	NA	760.3	WET	REG	AM-241	0.63	0.00	PCI/G	GAMMASPEC	0.63

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Location:	MAYWOOD		
Site WBS:	FMSS	Date Entered:	9/7/99
Work Order Number:	99G0004		
Project Number:			
Environmental Cat:	EA		

Sample ID	Date Collected	Date Analyzed	SDG ID	LAB ID	Vol.	W/D	Sample Type	Analyte	Result	Error	Units	Analytical Method	MDA
MISS00770	09/01/99	09/07/99	99G0004	NA	584.8	WET	REG	K-40	7.42	0.00	PCI/G	GAMMASPEC	7.42
MISS00770	09/01/99	09/07/99	99G0004	NA	584.8	WET	REG	CS-137	0.89	0.00	PCI/G	GAMMASPEC	0.89
MISS00770	09/01/99	09/07/99	99G0004	NA	584.8	WET	REG	RA-226	13.60	0.34	PCI/G	GAMMASPEC	1.19
MISS00770	09/01/99	09/07/99	99G0004	NA	584.8	WET	REG	AC-227	8.16	0.00	PCI/G	GAMMASPEC	8.16
MISS00770	09/01/99	09/07/99	99G0004	NA	584.8	WET	REG	RA-228	373.05	5.00	PCI/G	GAMMASPEC	1.58
MISS00770	09/01/99	09/07/99	99G0004	NA	584.8	WET	REG	TH-228	373.05	5.00	PCI/G	GAMMASPEC	1.58
MISS00770	09/01/99	09/07/99	99G0004	NA	584.8	WET	REG	TH-232	373.05	5.00	PCI/G	GAMMASPEC	1.58
MISS00770	09/01/99	09/07/99	99G0004	NA	584.8	WET	REG	TH-230	304.00	0.00	PCI/G	GAMMASPEC	304.00
MISS00770	09/01/99	09/07/99	99G0004	NA	584.8	WET	REG	PA-231	30.80	0.00	PCI/G	GAMMASPEC	30.80
MISS00770	09/01/99	09/07/99	99G0004	NA	584.8	WET	REG	U-235	3.95	0.18	PCI/G	GAMMASPEC	0.85
MISS00770	09/01/99	09/07/99	99G0004	NA	584.8	WET	REG	U-238	52.32	8.17	PCI/G	GAMMASPEC	28.80
MISS00770	09/01/99	09/07/99	99G0004	NA	584.8	WET	REG	AM-241	3.34	0.00	PCI/G	GAMMASPEC	3.34
MISS0078X	09/01/99	09/07/99	99G0004	NA	613.4	WET	REG	K-40	4.00	0.00	PCI/G	GAMMASPEC	4.00
MISS0078X	09/01/99	09/07/99	99G0004	NA	613.4	WET	REG	CS-137	0.48	0.00	PCI/G	GAMMASPEC	0.48
MISS0078X	09/01/99	09/07/99	99G0004	NA	613.4	WET	REG	RA-226	3.28	0.16	PCI/G	GAMMASPEC	0.74
MISS0078X	09/01/99	09/07/99	99G0004	NA	613.4	WET	REG	AC-227	4.43	0.00	PCI/G	GAMMASPEC	4.43
MISS0078X	09/01/99	09/07/99	99G0004	NA	613.4	WET	REG	RA-228	114.04	1.58	PCI/G	GAMMASPEC	0.78
MISS0078X	09/01/99	09/07/99	99G0004	NA	613.4	WET	REG	TH-228	114.04	1.58	PCI/G	GAMMASPEC	0.78
MISS0078X	09/01/99	09/07/99	99G0004	NA	613.4	WET	REG	TH-232	114.04	1.58	PCI/G	GAMMASPEC	0.78
MISS0078X	09/01/99	09/07/99	99G0004	NA	613.4	WET	REG	TH-230	172.00	0.00	PCI/G	GAMMASPEC	172.00
MISS0078X	09/01/99	09/07/99	99G0004	NA	613.4	WET	REG	PA-231	16.70	0.00	PCI/G	GAMMASPEC	16.70
MISS0078X	09/01/99	09/07/99	99G0004	NA	613.4	WET	REG	U-235	1.76	0.16	PCI/G	GAMMASPEC	0.49
MISS0078X	09/01/99	09/07/99	99G0004	NA	613.4	WET	REG	U-238	47.72	4.82	PCI/G	GAMMASPEC	16.10
MISS0078X	09/01/99	09/07/99	99G0004	NA	613.4	WET	REG	AM-241	1.88	0.00	PCI/G	GAMMASPEC	1.88
MISS00790	09/01/99	09/07/99	99G0004	NA	895.7	WET	REG	K-40	8.30	0.52	PCI/G	GAMMASPEC	0.82
MISS00790	09/01/99	09/07/99	99G0004	NA	895.7	WET	REG	CS-137	0.11	0.00	PCI/G	GAMMASPEC	0.11
MISS00790	09/01/99	09/07/99	99G0004	NA	895.7	WET	REG	RA-226	0.55	0.04	PCI/G	GAMMASPEC	0.17
MISS00790	09/01/99	09/07/99	99G0004	NA	895.7	WET	REG	AC-227	1.03	0.00	PCI/G	GAMMASPEC	1.03

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Location:	MAYWOOD		
Site WBS:	FMSS	Date Entered:	9/7/99
Work Order Number:	99G0004		
Project Number:			
Environmental Cat:	EA		

Sample ID	Date Collected	Date Analyzed	SDG ID	LAB ID	Vol.	W/D	Sample Type	Analyte	Result	Error	Units	Analytical Method	MDA
MISS00790	09/01/99	09/07/99	99G0004	NA	895.7	WET	REG	RA-228	6.77	0.14	PCI/G	GAMMASPEC	0.26
MISS00790	09/01/99	09/07/99	99G0004	NA	895.7	WET	REG	TH-228	6.77	0.14	PCI/G	GAMMASPEC	0.26
MISS00790	09/01/99	09/07/99	99G0004	NA	895.7	WET	REG	TH-232	6.77	0.14	PCI/G	GAMMASPEC	0.26
MISS00790	09/01/99	09/07/99	99G0004	NA	895.7	WET	REG	TH-230	-7.25	9.60	PCI/G	GAMMASPEC	32.20
MISS00790	09/01/99	09/07/99	99G0004	NA	895.7	WET	REG	PA-231	3.69	0.00	PCI/G	GAMMASPEC	3.69
MISS00790	09/01/99	09/07/99	99G0004	NA	895.7	WET	REG	U-235	0.21	0.04	PCI/G	GAMMASPEC	0.12
MISS00790	09/01/99	09/07/99	99G0004	NA	895.7	WET	REG	U-238	3.88	0.00	PCI/G	GAMMASPEC	3.88
MISS00790	09/01/99	09/07/99	99G0004	NA	895.7	WET	REG	AM-241	0.44	0.00	PCI/G	GAMMASPEC	0.44
MISS00800	09/01/99	09/07/99	99G0004	NA	876.4	WET	FREP	K-40	7.80	0.46	PCI/G	GAMMASPEC	0.48
MISS00800	09/01/99	09/07/99	99G0004	NA	876.4	WET	FREP	CS-137	0.08	0.00	PCI/G	GAMMASPEC	0.08
MISS00800	09/01/99	09/07/99	99G0004	NA	876.4	WET	FREP	RA-226	0.36	0.03	PCI/G	GAMMASPEC	0.12
MISS00800	09/01/99	09/07/99	99G0004	NA	876.4	WET	FREP	AC-227	0.74	0.00	PCI/G	GAMMASPEC	0.74
MISS00800	09/01/99	09/07/99	99G0004	NA	876.4	WET	FREP	RA-228	2.69	0.08	PCI/G	GAMMASPEC	0.18
MISS00800	09/01/99	09/07/99	99G0004	NA	876.4	WET	FREP	TH-228	2.69	0.08	PCI/G	GAMMASPEC	0.18
MISS00800	09/01/99	09/07/99	99G0004	NA	876.4	WET	FREP	TH-232	2.69	0.08	PCI/G	GAMMASPEC	0.18
MISS00800	09/01/99	09/07/99	99G0004	NA	876.4	WET	FREP	TH-230	27.40	0.00	PCI/G	GAMMASPEC	27.40
MISS00800	09/01/99	09/07/99	99G0004	NA	876.4	WET	FREP	PA-231	2.54	0.00	PCI/G	GAMMASPEC	2.54
MISS00800	09/01/99	09/07/99	99G0004	NA	876.4	WET	FREP	U-235	0.15	0.03	PCI/G	GAMMASPEC	0.08
MISS00800	09/01/99	09/07/99	99G0004	NA	876.4	WET	FREP	U-238	0.88	0.81	PCI/G	GAMMASPEC	2.68
MISS00800	09/01/99	09/07/99	99G0004	NA	876.4	WET	FREP	AM-241	0.30	0.00	PCI/G	GAMMASPEC	0.30
QCBLANK	09/07/99	09/07/99	99G0004	NA	945.0	DRY	BL	K-40	0.11	0.09	PCI/G	GAMMASPEC	0.30
QCBLANK	09/07/99	09/07/99	99G0004	NA	945.0	DRY	BL	CS-137	0.02	0.00	PCI/G	GAMMASPEC	0.02
QCBLANK	09/07/99	09/07/99	99G0004	NA	945.0	DRY	BL	RA-226	0.05	0.00	PCI/G	GAMMASPEC	0.05
QCBLANK	09/07/99	09/07/99	99G0004	NA	945.0	DRY	BL	AC-227	0.15	0.00	PCI/G	GAMMASPEC	0.15
QCBLANK	09/07/99	09/07/99	99G0004	NA	945.0	DRY	BL	RA-228	0.07	0.00	PCI/G	GAMMASPEC	0.07
QCBLANK	09/07/99	09/07/99	99G0004	NA	945.0	DRY	BL	TH-228	0.07	0.00	PCI/G	GAMMASPEC	0.07
QCBLANK	09/07/99	09/07/99	99G0004	NA	945.0	DRY	BL	TH-232	0.07	0.00	PCI/G	GAMMASPEC	0.07
QCBLANK	09/07/99	09/07/99	99G0004	NA	945.0	DRY	BL	TH-230	6.34	0.00	PCI/G	GAMMASPEC	6.34

Approved by: ______________________ Date: ______________

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Location:	MAYWOOD		
Site WBS:	FMSS	Date Entered:	9/7/99
Work Order Number:	99G0004		
Project Number:			
Environmental Cat:	EA		

Sample ID	Date Collected	Date Analyzed	SDG ID	LAB ID	Vol.	W/D	Sample Type	Analyte	Result	Error	Units	Analytical Method	MDA
QCBLANK	09/07/99	09/07/99	99G0004	NA	945.0	DRY	BL	PA-231	0.65	0.00	PCI/G	GAMMASPEC	0.65
QCBLANK	09/07/99	09/07/99	99G0004	NA	945.0	DRY	BL	U-235	0.03	0.00	PCI/G	GAMMASPEC	0.03
QCBLANK	09/07/99	09/07/99	99G0004	NA	945.0	DRY	BL	U-238	0.67	0.00	PCI/G	GAMMASPEC	0.67
QCBLANK	09/07/99	09/07/99	99G0004	NA	945.0	DRY	BL	AM-241	0.07	0.00	PCI/G	GAMMASPEC	0.07
QCSPIKE	04/01/99	09/07/99	99G0004	NA	832.0	DRY	LCSF	CS-137	70.62	2.22	PCI/G	GAMMASPEC	1.07
QCSPIKE	04/01/99	09/07/99	99G0004	NA	832.0	DRY	LCSF	AM-241	167.67	8.52	PCI/G	GAMMASPEC	3.83
QCSPIKE	04/01/99	09/07/99	99G0004	NA	832.0	DRY	LCST	CS-137	68.43	3.22	PCI/G	GAMMASPEC	1.07
QCSPIKE	04/01/99	09/07/99	99G0004	NA	832.0	DRY	LCST	AM-241	165.05	8.25	PCI/G	GAMMASPEC	3.83

Approved by: ______________________ Date: ______________

Equivalent values in the "Result" and "MDA" columns indicate that the analyte was either undetected or detected at a level below the MDA. T' ··esults listed at the MDA should have been reported at the actual measuremen·

APPENDIX E

ENGINEERING TEST PITS AT MISS
SOIL CHEMICAL DATA

FUSRAP MAYWOOD SUPERFUND SITE
MAYWOOD, NEW JERSEY

Soil Chemical Data

Appendix E presents the soil chemical data results for the composite samples collected during the engineering test pit program. The following presents brief descriptions of the analysis methods used by the contract laboratory.

Volatile Organic Compounds

EPA SW846 Method 826B is used for the analysis of Volatile Organic Compounds. Helium is bubbled through a sample contained in a specifically designed purging chamber. The purgeables are efficiently transferred from the sample to the vapor phase. The vapor is swept through a sorbent column where the purgeables are trapped. After purging is completed, the sorbent column is heated and backflushed with Helium to desorb the purgeables onto a gas chromatographic column. The gas chromatograph is temperature programmed to separate the purgeables which are then detected with a mass spectrometer. The holding time for aqueous samples is fourteen (14) days from the date of collection, providing that the samples are preserved to pH <2 with HC1 (seven (7) days otherwise). The holding time for soil samples is also fourteen (14) days from collection.

Semivolatile Organic Compounds - Soil

EPA SW846 Methods 3550B and 8270C are used for the extraction and analysis of Semivolatile Organics. A 30 gram sample is sonicated three times with a 1:1 mixture of Methylene Chloride and Acetone. The extracts are then concentrated and analyzed by GC/MS. The holding time for extraction is fourteen (14) days from date of collection. The holding time for analysis is forty (40) days from date of extraction.

Pesticides - Soil

EPA SW846 Methods 3550B and 8081A are used for the extraction and analysis of Pesticides and PCBs. A 30 gram sample aliquot is sonicated three times with a 1:1 mixture of Acetone and Methylene Chloride. The extracts are concentrated and exchanged to Hexane. PCB only samples are treated with sulfuric acid as a cleanup. Pesticide/PCB samples may have florisil cleanup. The extract is then analyzed by gas chromatography and the compounds are measured using an electron capture detector. The holding time for extraction is fourteen (14) days from date of collection. The holding time for analysis is forty (40) days from date of extraction.

PCBs - Soil

PCBs in soils are analyzed using EPA Method 3550B/8082. A 30 gram sample is sonicated tree times with a 1:1 mixture of Acetone and Methylene Chloride. The extracts are concentrated, treated with Sulfuric Acid, and exchanged to Hexane. The extract is then analyzed by gas chromatography with electron capture detector on two different GC columns.

Metals

Metals analysis is based on SW846. Arsenic, Selenium, Thallium and Lead maybe analyzed by furnace AA with Zeeman background correction. Mercury is analyzed by cold vapor technique. All other metals are analyzed by Inductively Coupled Argon Plasma emission spectroscopy (if the ICP61E Trace is used, Arsenic, Selenium, Thallium and Lead can be analyzed by ICP). Samples for ICP analysis are digested with Hydrochloric and Nitric Acids. Samples for furnace analysis are digested with Nitric Acid. Samples for Mercury analysis are digested with Potassium permanganate and Nitric Acid. The holding time for all other Metals is six (6) months.

Chemical Data Results

Since limited chemical data was available on MISS soils, chemical composite samples were collected during the test pit program. The intent of the data collection is for eventual use in characterizing materials processed during the technology demonstration. Processed materials that are determined to be radiologically below criteria may be disposed of as RCRA C or D waste.

Chemical exceedances are noted based on comparison to the non-residential NJ Soil Cleanup Criteria (SCC). Table E-1a presents the NJDEP requirements. Table E-1b summarizes chemical exceedances as determined using the listed criteria.

Chemical results for each composite sample are shown in Tables E-1 through E-5 for SVOCs, VOCs, Metals, Pesticides and PCBs, respectively.

Table E-1a: Chemical Exceedance Criteria
Engineering Test Pit Sampling
Maywood Interim Storage Site, Maywood NJ

Contaminant	*NJDEP Non-Residential Soil Cleanup Criteria*
1,1,1-Trichloroethane	1000 mg/kg
1,1,2,2-Tetrachloroethane	70 mg/kg
1,1,2-Trichloroethane	420 mg/kg
1,1-Dichloroethane	1000 mg/kg
1,1-Dichloroethene	150 mg/kg
1,2,4-Trichlorobenzene	1200 mg/kg
1,2-Dichlorobenzene	10000 mg/kg
1,2-Dichloroethane	24 mg/kg
1,2-Dichloropropane	43 mg/kg
1,3-Dichlorobenzene	10000 mg/kg
1,4-Dichlorobenzene	10000 mg/kg
2,4,5-Trichlorophenol	10000 mg/kg
2,4,6-Trichlorophenol	270 mg/kg
2,4-Dichlorophenol	3100 mg/kg
2,4-Dimethylphenol	10000 mg/kg
2,4-Dinitrophenol	2100 mg/kg
2,4-Dinitrotoluene	4 mg/kg
2-Butanone	1000 mg/kg
2-Chlorophenol	5200 mg/kg
2-Methylphenol	10000 mg/kg
3,3'-Dichlorobenzidine	6 mg/kg
4,4'-DDD	12 mg/kg
4,4'-DDE	9 mg/kg
4,4'-DDT	9 mg/kg
4-Chloro-3-methylphenol	10000 mg/kg
4-Chloroaniline	4200 mg/kg
4-Methyl-2-pentanone	1000 mg/kg
4-Methylphenol	10000 mg/kg
Acenaphthene	10000 mg/kg
Acetone	1000 mg/kg

Table E-1a: Chemical Exceedance Criteria
Engineering Test Pit Sampling
Maywood Interim Storage Site, Maywood NJ

Contaminant	NJDEP Non-Residential Soil Cleanup Criteria
Aldrin	0.17 mg/kg
Anthracene	10000 mg/kg
Antimony	340 mg/kg
Arochlor-1016	2 mg/kg
Arochlor-1221	2 mg/kg
Arochlor-1232	2 mg/kg
Arochlor-1242	2 mg/kg
Arochlor-1248	2 mg/kg
Arochlor-1254	2 mg/kg
Arochlor-1260	2 mg/kg
Arsenic	20 mg/kg
Barium	47000 mg/kg
Benzene	13 mg/kg
Benzo(a)anthracene	4 mg/kg
Benzo(a)pyrene	0.66 mg/kg
Benzo(b)fluoranthene	4 mg/kg
Benzo(k)fluoranthene	4 mg/kg
Beryllium	2 mg/kg
Bis(2-chloroethyl) ether	3 mg/kg
Bis(2-chloroisopropyl) ether	10000 mg/kg
bis(2-ethylhexyl)phthalate	210 mg/kg
Bromodichloromethane	36 mg/kg
Bromoform	370 mg/kg
Bromomethane	1000 mg/kg
Butyl benzyl phthalate	10000 mg/kg
Cadmium	100 mg/kg
Carbon Tetrachloride	4 mg/kg
Chlorobenzene	680 mg/kg
Chloroform	28 mg/kg
Chloromethane	1000 mg/kg

Table E-1a: Chemical Exceedance Criteria
Engineering Test Pit Sampling
Maywood Interim Storage Site, Maywood NJ

Contaminant	*NJDEP Non-Residential Soil Cleanup Criteria*
Chromium (VI)	20 mg/kg
Chrysene	40 mg/kg
cis-1,2-Dichloroethene	1000 mg/kg
cis-1,3-Dichloropropene	5 mg/kg
Copper	600 mg/kg
Cyanide, Amenable	21000 mg/kg
Di-n-butylphthalate	10000 mg/kg
Di-n-octylphthalate	10000 mg/kg
Dibenzo(a,h)anthracene	0.66 mg/kg
Dibromochloromethane	1000 mg/kg
Dieldrin	0.18 mg/kg
Diethylphthalate	10000 mg/kg
Dimethylphthalate	10000 mg/kg
Endosulfan I	6200 mg/kg
Endosulfan II	6200 mg/kg
Endrin	310 mg/kg
Ethylbenzene	1000 mg/kg
Fluoranthene	10000 mg/kg
Fluorene	10000 mg/kg
Gamma-BHC	2.2 mg/kg
Heptachlor	0.65 mg/kg
Hexachlorobenzene	2 mg/kg
Hexachlorobutadiene	21 mg/kg
Hexachlorocyclopentadiene	7300 mg/kg
Hexachloroethane	100 mg/kg
Indeno(1,2,3-cd)pyrene	4 mg/kg
Isophorone	10000 mg/kg
Lead	600 mg/kg
m-Xylenes (Total)	1000 mg/kg
Mercury	270 mg/kg

Table E-1a: Chemical Exceedance Criteria
Engineering Test Pit Sampling
Maywood Interim Storage Site, Maywood NJ

Contaminant	*NJDEP Non-Residential Soil Cleanup Criteria*
Methoxychlor	5200 mg/kg
Methylene Chloride	210 mg/kg
N-nitroso-di-n-propylamine	0.66 mg/kg
N-nitroso-diphenylamine	600 mg/kg
Naphthalene	4200 mg/kg
Nickel	2400 mg/kg
Nitrobenzene	520 mg/kg
Pentachlorophenol	24 mg/kg
Phenol	10000 mg/kg
Pyrene	10000 mg/kg
Selenium	3100 mg/kg
Silver	4100 mg/kg
Styrene	97 mg/kg
Tetrachloroethene	6 mg/kg
Thallium	2 mg/kg
Toluene	1000 mg/kg
Toxaphene	0.2 mg/kg
trans-1,2-Dichloroethene	1000 mg/kg
trans-1,3-Dichloropropene	5 mg/kg
Trichloroethene	54 mg/kg
Vanadium	7100 mg/kg
Vinyl chloride	7 mg/kg
Zinc	1500 mg/kg

Table E-1b: Chemical Exceedances (NDJEP Non-Residential Soil Reuse Criteria)

Engineering Test Pit Sampling

Maywood Interim Storage Site, Maywood

Area	*Zone*	*Chemical*	*Chemical Concentration*	*Units*	*Soil Screening Level Industrial*	*Units*
Test Pit 1	REUP	Arsenic	35.4	mg/kg	20.00	mg/kg
Test Pit 1	REUP	Arsenic	37.3	mg/kg	20.00	mg/kg
Test Pit 1	SUOV	Benzo(a)pyrene	0.74	mg/kg	0.66	mg/kg
Test Pit 2	REOV	Bis(2-chloroethyl) ether	5.2	mg/kg	3.00	mg/kg
Test Pit 2	REUP	Bis(2-chloroethyl) ether	5	mg/kg	3.00	mg/kg
Test Pit 2	REUP	Bis(2-chloroethyl) ether	5.4	mg/kg	3.00	mg/kg
Test Pit 2	SUOV	Benzo(a)pyrene	0.92	mg/kg	0.66	mg/kg
Test Pit 2	SUUP	Bis(2-chloroethyl) ether	7.4	mg/kg	3.00	mg/kg
Test Pit 2	TRUP	Arsenic	24.3	mg/kg	20.00	mg/kg
Test Pit 2	TRUP	Bis(2-chloroethyl) ether	48	mg/kg	3.00	mg/kg
Test Pit 2	TRUP	Copper	962.	mg/kg	600.00	mg/kg
Test Pit 3	REOV	Beryllium	2.32	mg/kg	2.00	mg/kg
Test Pit 3	SUOV	Gamma-BHC	51	mg/kg	2.20	mg/kg
Test Pit 3	SUOV	Arsenic	68.3	mg/kg	20.00	mg/kg

Table E-1b: Chemical Exceedances (NDJEP Non-Residential Soil Reuse Criteria)

Engineering Test Pit Sampling

Maywood Interim Storage Site, Maywood

Area	*Zone*	*Chemical*	*Chemical Concentration*	*Units*	*Soil Screening Level Industrial*	*Units*
Test Pit 3	SUOV	Dieldrin	19	mg/kg	0.18	mg/kg
Test Pit 3	SUUP	Arsenic	46.0	mg/kg	20.00	mg/kg
Test Pit 3	SUUP	Gamma-BHC	12	mg/kg	2.20	mg/kg
Test Pit 3	TROV	Arsenic	39.2	mg/kg	20.00	mg/kg
Test Pit 3	TRUP	Arsenic	90.9	mg/kg	20.00	mg/kg
Test Pit 4	REOV	Arsenic	26.5	mg/kg	20.00	mg/kg
Test Pit 4	REOV	Thallium	2.72	mg/kg	2.00	mg/kg
Test Pit 4	REUP	Thallium	2.06	mg/kg	2.00	mg/kg
Test Pit 4	REUP	Beryllium	2.18	mg/kg	2.00	mg/kg
Test Pit 4	REUP	Arsenic	50.5	mg/kg	20.00	mg/kg
Test Pit 4	SUOV	Thallium	4.48	mg/kg	2.00	mg/kg
Test Pit 4	SUOV	Arsenic	100.	mg/kg	20.00	mg/kg
Test Pit 4	SUOV	Beryllium	3.15	mg/kg	2.00	mg/kg
Test Pit 4	TROV	Beryllium	2.43	mg/kg	2.00	mg/kg

Table E-1b: Chemical Exceedances (NDJEP Non-Residential Soil Reuse Criteria)

Engineering Test Pit Sampling

Maywood Interim Storage Site, Maywood

Area	*Zone*	*Chemical*	*Chemical Concentration*	*Units*	*Soil Screening Level Industrial*	*Units*
Test Pit 4	TROV	Thallium	4.31	mg/kg	2.00	mg/kg
Test Pit 4	TROV	Arsenic	110.	mg/kg	20.00	mg/kg
Test Pit 5	0A03	Benzene	380	mg/kg	13.00	mg/kg
Test Pit 5	0A03	Toluene	73000	mg/kg	1,000.00	mg/kg
Test Pit 5	UPER	Copper	889.	mg/kg	600.00	mg/kg

Table E-1: Soil Chemical Data - SVOC Analyses
Engineering Test Pit Sampling
Maywood Interim Storage Site, Maywood NJ

Result Qualifier Codes

U - Analyzed for but not detected
J - Compound detected, value is estimated
UJ - Compound not detected, quantitation limit is estimat
B - Analyte in blank as well as sample
E - Exceeds calibration curve range
D - Identified at secondary dilution factor

SW Sample ID:	*MISS-00140*	*Test Pit 1*		*SW Sample ID:*	*MISS-0015X*	*Test Pit 1*		*SW Sample ID:*	*MISS-00160*	*Test Pit 1*	
Sample Type:	*Subsurface Soil*	*SUOV*		*Sample Type:*	*Subsurface Soil*	*SUUP*		*Sample Type:*	*Subsurface Soil*	*SULO*	
Sample Date:	*08/20/1999*			*Sample Date:*	*08/20/1999*			*Sample Date:*	*08/20/1999*		
Analysis Name	***Result***	***Unit***	***Exceedance***	***Analysis Name***	***Result***	***Unit***	***Exceedance***	***Analysis Name***	***Result***	***Unit***	***Exceedance***
1,2,4-Trichlorobenzene	540 U	UG/KG		1,2,4-Trichlorobenzene	580 U	UG/KG		1,2,4-Trichlorobenzene	120 U	UG/KG	
1,2-Dichlorobenzene	540 U	UG/KG		1,2-Dichlorobenzene	580 U	UG/KG		1,2-Dichlorobenzene	120 U	UG/KG	
1,3-Dichlorobenzene	540 U	UG/KG		1,3-Dichlorobenzene	580 U	UG/KG		1,3-Dichlorobenzene	120 U	UG/KG	
1,4-Dichlorobenzene	540 U	UG/KG		1,4-Dichlorobenzene	580 U	UG/KG		1,4-Dichlorobenzene	120 U	UG/KG	
2,2'-Oxybis(1-Chloropropane)	540 U	UG/KG		2,2'-Oxybis(1-Chloropropane)	580 U	UG/KG		2,2'-Oxybis(1-Chloropropane)	120 U	UG/KG	
2,4,5-Trichlorophenol	9200 U	UG/KG		2,4,5-Trichlorophenol	9900 U	UG/KG		2,4,5-Trichlorophenol	2000 U	UG/KG	
2,4,6-Trichlorophenol	1800 U	UG/KG		2,4,6-Trichlorophenol	1900 U	UG/KG		2,4,6-Trichlorophenol	380 U	UG/KG	
2,4-Dichlorophenol	1800 U	UG/KG		2,4-Dichlorophenol	1900 U	UG/KG		2,4-Dichlorophenol	380 U	UG/KG	
2,4-Dimethylphenol	1800 U	UG/KG		2,4-Dimethylphenol	1900 U	UG/KG		2,4-Dimethylphenol	380 U	UG/KG	
2,4-Dinitrophenol	9200 U	UG/KG		2,4-Dinitrophenol	9900 U	UG/KG		2,4-Dinitrophenol	2000 U	UG/KG	
2,4-Dinitrotoluene	540 U	UG/KG		2,4-Dinitrotoluene	580 U	UG/KG		2,4-Dinitrotoluene	120 U	UG/KG	
2,6-Dinitrotoluene	540 U	UG/KG		2,6-Dinitrotoluene	580 U	UG/KG		2,6-Dinitrotoluene	120 U	UG/KG	
2-Chloronaphthalene	540 U	UG/KG		2-Chloronaphthalene	580 U	UG/KG		2-Chloronaphthalene	120 U	UG/KG	
2-Chlorophenol	1800 U	UG/KG		2-Chlorophenol	1900 U	UG/KG		2-Chlorophenol	380 U	UG/KG	
2-Methylnaphthalene	540 U	UG/KG		2-Methylnaphthalene	580 U	UG/KG		2-Methylnaphthalene	120 U	UG/KG	
2-Methylphenol	1800 U	UG/KG		2-Methylphenol	1900 U	UG/KG		2-Methylphenol	380 U	UG/KG	
2-Nitroaniline	9200 U	UG/KG		2-Nitroaniline	9900 U	UG/KG		2-Nitroaniline	2000 U	UG/KG	
2-Nitrophenol	1800 U	UG/KG		2-Nitrophenol	1900 U	UG/KG		2-Nitrophenol	380 U	UG/KG	
3,3'-Dichlorobenzidine	540 U	UG/KG		3,3'-Dichlorobenzidine	580 U	UG/KG		3,3'-Dichlorobenzidine	120 U	UG/KG	
3-Nitroaniline	9200 U	UG/KG		3-Nitroaniline	9900 U	UG/KG		3-Nitroaniline	2000 U	UG/KG	
4,6-Dinitro-2-Methylphenol	9200 U	UG/KG		4,6-Dinitro-2-Methylphenol	9900 U	UG/KG		4,6-Dinitro-2-Methylphenol	2000 U	UG/KG	
4-Bromophenyl-Phenylether	540 U	UG/KG		4-Bromophenyl-Phenylether	580 U	UG/KG		4-Bromophenyl-Phenylether	120 U	UG/KG	
4-Chloro-3-Methylphenol	540 U	UG/KG		4-Chloro-3-Methylphenol	580 U	UG/KG		4-Chloro-3-Methylphenol	120 U	UG/KG	
4-Chloroaniline	540 U	UG/KG		4-Chloroaniline	580 U	UG/KG		4-Chloroaniline	120 U	UG/KG	
4-Chlorophenyl-Phenyl Ether	540 U	UG/KG		4-Chlorophenyl-Phenyl Ether	580 U	UG/KG		4-Chlorophenyl-Phenyl Ether	120 U	UG/KG	
4-Methylphenol	450 J	UG/KG		4-Methylphenol	300 J	UG/KG		4-Methylphenol	380 U	UG/KG	
4-Nitroaniline	9200 U	UG/KG		4-Nitroaniline	9900 U	UG/KG		4-Nitroaniline	2000 U	UG/KG	
4-Nitrophenol	9200 U	UG/KG		4-Nitrophenol	9900 U	UG/KG		4-Nitrophenol	2000 U	UG/KG	
Acenaphthene	200 J	UG/KG		Acenaphthene	580 U	UG/KG		Acenaphthene	120 U	UG/KG	
Acenaphthylene	540 U	UG/KG		Acenaphthylene	580 U	UG/KG		Acenaphthylene	120 U	UG/KG	
Anthracene	510 J	UG/KG		Anthracene	580 U	UG/KG		Anthracene	120 U	UG/KG	
Benzo(a)anthracene	1100	UG/KG		Benzo(a)anthracene	580 U	UG/KG		Benzo(a)anthracene	120 U	UG/KG	
Benzo(a)pyrene	740	UG/KG	Yes	Benzo(a)pyrene	580 U	UG/KG		Benzo(a)pyrene	120 U	UG/KG	
Benzo(b)fluoranthene	1000	UG/KG		Benzo(b)fluoranthene	580 U	UG/KG		Benzo(b)fluoranthene	120 U	UG/KG	
Benzo(g,h,i)perylene	540 U	UG/KG		Benzo(g,h,i)perylene	580 U	UG/KG		Benzo(g,h,i)perylene	120 U	UG/KG	
Benzo(k)fluoranthene	400 J	UG/KG		Benzo(k)fluoranthene	580 U	UG/KG		Benzo(k)fluoranthene	120 U	UG/KG	
Bis(2-chloroethoxy) methane	540 U	UG/KG		Bis(2-chloroethoxy) methane	580 U	UG/KG		Bis(2-chloroethoxy) methane	120 U	UG/KG	
Bis(2-chloroethyl) ether	540 U	UG/KG		Bis(2-chloroethyl) ether	580 U	UG/KG		Bis(2-chloroethyl) ether	120 U	UG/KG	
Bis(2-ethylhexyl)phthalate	540 U	UG/KG		Bis(2-ethylhexyl)phthalate	580 U	UG/KG		Bis(2-ethylhexyl)phthalate	120 U	UG/KG	
Butyl benzyl phthalate	540 U	UG/KG		Butyl benzyl phthalate	580 U	UG/KG		Butyl benzyl phthalate	120 U	UG/KG	
Carbazole	210 J	UG/KG		Carbazole	580 U	UG/KG		Carbazole	120 U	UG/KG	
Chrysene	1200	UG/KG		Chrysene	580 U	UG/KG		Chrysene	120 U	UG/KG	
Di-N-Butylphthalate	540 U	UG/KG		Di-N-Butylphthalate	580 U	UG/KG		Di-N-Butylphthalate	120 U	UG/KG	
Di-N-Octylphthalate	540 U	UG/KG		Di-N-Octylphthalate	580 U	UG/KG		Di-N-Octylphthalate	120 U	UG/KG	
Dibenzo(a,h)anthracene	540 U	UG/KG		Dibenzo(a,h)anthracene	580 U	UG/KG		Dibenzo(a,h)anthracene	120 U	UG/KG	
Dibenzofuran	540 U	UG/KG		Dibenzofuran	580 U	UG/KG		Dibenzofuran	120 U	UG/KG	
Diethylphthalate	540 U	UG/KG		Diethylphthalate	580 U	UG/KG		Diethylphthalate	120 U	UG/KG	
Dimethylphthalate	540 U	UG/KG		Dimethylphthalate	580 U	UG/KG		Dimethylphthalate	120 U	UG/KG	
Fluoranthene	2200	UG/KG		Fluoranthene	200 J	UG/KG		Fluoranthene	120 U	UG/KG	
Fluorene	250 J	UG/KG		Fluorene	580 U	UG/KG		Fluorene	120 U	UG/KG	
Hexachlorobenzene	540 U	UG/KG		Hexachlorobenzene	580 U	UG/KG		Hexachlorobenzene	120 U	UG/KG	
Hexachlorobutadiene	540 U	UG/KG		Hexachlorobutadiene	580 U	UG/KG		Hexachlorobutadiene	120 U	UG/KG	
Hexachlorocyclopentadiene	540 U	UG/KG		Hexachlorocyclopentadiene	580 U	UG/KG		Hexachlorocyclopentadiene	120 U	UG/KG	
Hexachloroethane	540 U	UG/KG		Hexachloroethane	580 U	UG/KG		Hexachloroethane	120 U	UG/KG	
Indeno(1,2,3-cd)pyrene	350 J	UG/KG		Indeno(1,2,3-cd)pyrene	580 U	UG/KG		Indeno(1,2,3-cd)pyrene	120 U	UG/KG	
Isophorone	540 U	UG/KG		Isophorone	580 U	UG/KG		Isophorone	120 U	UG/KG	
N-nitroso-di-n-propylamine	540 U	UG/KG		N-nitroso-di-n-propylamine	580 U	UG/KG		N-nitroso-di-n-propylamine	120 U	UG/KG	
N-nitroso-diphenylamine	540 U	UG/KG		N-nitroso-diphenylamine	580 U	UG/KG		N-nitroso-diphenylamine	120 U	UG/KG	
Naphthalene	540 U	UG/KG		Naphthalene	580 U	UG/KG		Naphthalene	120 U	UG/KG	
Nitrobenzene	540 U	UG/KG		Nitrobenzene	580 U	UG/KG		Nitrobenzene	120 U	UG/KG	
Pentachlorophenol	9200 U	UG/KG		Pentachlorophenol	9900 U	UG/KG		Pentachlorophenol	2000 U	UG/KG	
Phenanthrene	2100	UG/KG		Phenanthrene	580 U	UG/KG		Phenanthrene	120 U	UG/KG	
Phenol	1800 U	UG/KG		Phenol	1900 U	UG/KG		Phenol	380 U	UG/KG	
Pyrene	2000	UG/KG		Pyrene	190 J	UG/KG		Pyrene	120 U	UG/KG	

Table E-1: Soil Chemical Data - SVOC Analyses
Engineering Test Pit Sampling
Maywood Interim Storage Site, Maywood NJ

Result Qualifier Codes

U - Analyzed for but not detected
J - Compound detected, value is estimated
UJ - Compound not detected, quantitation limit is estimat
B - Analyte in blank as well as sample
E - Exceeds calibration curve range
D - Identified at secondary diluation factor

SW Sample ID: MISS-00170 — Test Pit 1
Sample Type: Subsurface Soil — TROV
Sample Date: 08/20/1999

Analysis Name	Result	Unit	Exceedance
1,2,4-Trichlorobenzene	110 U	UG/KG	
1,2-Dichlorobenzene	110 U	UG/KG	
1,3-Dichlorobenzene	110 U	UG/KG	
1,4-Dichlorobenzene	110 U	UG/KG	
2,2'-Oxybis(1-Chloropropane)	110 U	UG/KG	
2,4,5-Trichlorophenol	1900 U	UG/KG	
2,4,6-Trichlorophenol	360 U	UG/KG	
2,4-Dichlorophenol	360 U	UG/KG	
2,4-Dimethylphenol	360 U	UG/KG	
2,4-Dinitrophenol	1900 U	UG/KG	
2,4-Dinitrotoluene	110 U	UG/KG	
2,6-Dinitrotoluene	110 U	UG/KG	
2-Chloronaphthalene	110 U	UG/KG	
2-Chlorophenol	360 U	UG/KG	
2-Methylnaphthalene	110 U	UG/KG	
2-Methylphenol	360 U	UG/KG	
2-Nitroaniline	1900 U	UG/KG	
2-Nitrophenol	360 U	UG/KG	
3,3'-Dichlorobenzidine	110 U	UG/KG	
3-Nitroaniline	1900 U	UG/KG	
4,6-Dinitro-2-Methylphenol	1900 U	UG/KG	
4-Bromophenyl-Phenylether	110 U	UG/KG	
4-Chloro-3-Methylphenol	110 U	UG/KG	
4-Chloroaniline	110 U	UG/KG	
4-Chlorophenyl-Phenyl Ether	110 U	UG/KG	
4-Methylphenol	310 J	UG/KG	
4-Nitroaniline	1900 U	UG/KG	
4-Nitrophenol	1900 U	UG/KG	
Acenaphthene	54 J	UG/KG	
Acenaphthylene	51 J	UG/KG	
Anthracene	160	UG/KG	
Benzo(a)anthracene	560	UG/KG	
Benzo(a)pyrene	480	UG/KG	
Benzo(b)fluoranthene	790	UG/KG	
Benzo(g,h,i)perylene	110 U	UG/KG	
Benzo(k)fluoranthene	210	UG/KG	
Bis(2-chloroethoxy) methane	110 U	UG/KG	
Bis(2-chloroethyl) ether	110 U	UG/KG	
Bis(2-ethylhexyl)phthalate	90 J	UG/KG	
Butyl benzyl phthalate	110 U	UG/KG	
Carbazole	65 J	UG/KG	
Chrysene	690	UG/KG	
Di-N-Butylphthalate	110 U	UG/KG	
Di-N-Octylphthalate	110 U	UG/KG	
Dibenzo(a,h)anthracene	67 J	UG/KG	
Dibenzofuran	110 U	UG/KG	
Diethylphthalate	110 U	UG/KG	
Dimethylphthalate	110 U	UG/KG	
Fluoranthene	1100	UG/KG	
Fluorene	73 J	UG/KG	
Hexachlorobenzene	110 U	UG/KG	
Hexachlorobutadiene	110 U	UG/KG	
Hexachlorocyclopentadiene	110 U	UG/KG	
Hexachloroethane	110 U	UG/KG	
Indeno(1,2,3-cd)pyrene	200	UG/KG	
Isophorone	110 U	UG/KG	
N-nitroso-di-n-propylamine	110 U	UG/KG	
N-nitroso-diphenylamine	190	UG/KG	
Naphthalene	110 U	UG/KG	
Nitrobenzene	110 U	UG/KG	
Pentachlorophenol	1900 U	UG/KG	
Phenanthrene	670	UG/KG	
Phenol	360 U	UG/KG	
Pyrene	1100	UG/KG	

SW Sample ID: MISS-00180 — Test Pit 1
Sample Type: Subsurface Soil — TRUP
Sample Date: 08/20/1999

Analysis Name	Result	Unit	Exceedance
1,2,4-Trichlorobenzene	140 U	UG/KG	
1,2-Dichlorobenzene	140 U	UG/KG	
1,3-Dichlorobenzene	140 U	UG/KG	
1,4-Dichlorobenzene	140 U	UG/KG	
2,2'-Oxybis(1-Chloropropane)	140 U	UG/KG	
2,4,5-Trichlorophenol	2300 U	UG/KG	
2,4,6-Trichlorophenol	440 U	UG/KG	
2,4-Dichlorophenol	440 U	UG/KG	
2,4-Dimethylphenol	440 U	UG/KG	
2,4-Dinitrophenol	2300 U	UG/KG	
2,4-Dinitrotoluene	140 U	UG/KG	
2,6-Dinitrotoluene	140 U	UG/KG	
2-Chloronaphthalene	140 U	UG/KG	
2-Chlorophenol	440 U	UG/KG	
2-Methylnaphthalene	140 U	UG/KG	
2-Methylphenol	440 U	UG/KG	
2-Nitroaniline	2300 U	UG/KG	
2-Nitrophenol	440 U	UG/KG	
3,3'-Dichlorobenzidine	140 U	UG/KG	
3-Nitroaniline	2300 U	UG/KG	
4,6-Dinitro-2-Methylphenol	2300 U	UG/KG	
4-Bromophenyl-Phenylether	140 U	UG/KG	
4-Chloro-3-Methylphenol	140 U	UG/KG	
4-Chloroaniline	140 U	UG/KG	
4-Chlorophenyl-Phenyl Ether	140 U	UG/KG	
4-Methylphenol	440 U	UG/KG	
4-Nitroaniline	2300 U	UG/KG	
4-Nitrophenol	2300 U	UG/KG	
Acenaphthene	140 U	UG/KG	
Acenaphthylene	140 U	UG/KG	
Anthracene	140 U	UG/KG	
Benzo(a)anthracene	140 U	UG/KG	
Benzo(a)pyrene	140 U	UG/KG	
Benzo(b)fluoranthene	57 J	UG/KG	
Benzo(g,h,i)perylene	140 U	UG/KG	
Benzo(k)fluoranthene	140 U	UG/KG	
Bis(2-chloroethoxy) methane	140 U	UG/KG	
Bis(2-chloroethyl) ether	140 U	UG/KG	
Bis(2-ethylhexyl)phthalate	74 J	UG/KG	
Butyl benzyl phthalate	140 U	UG/KG	
Carbazole	140 U	UG/KG	
Chrysene	140 U	UG/KG	
Di-N-Butylphthalate	140 U	UG/KG	
Di-N-Octylphthalate	140 U	UG/KG	
Dibenzo(a,h)anthracene	140 U	UG/KG	
Dibenzofuran	140 U	UG/KG	
Diethylphthalate	140 U	UG/KG	
Dimethylphthalate	140 U	UG/KG	
Fluoranthene	60 J	UG/KG	
Fluorene	140 U	UG/KG	
Hexachlorobenzene	140 U	UG/KG	
Hexachlorobutadiene	140 U	UG/KG	
Hexachlorocyclopentadiene	140 U	UG/KG	
Hexachloroethane	140 U	UG/KG	
Indeno(1,2,3-cd)pyrene	140 U	UG/KG	
Isophorone	140 U	UG/KG	
N-nitroso-di-n-propylamine	140 U	UG/KG	
N-nitroso-diphenylamine	140 U	UG/KG	
Naphthalene	140 U	UG/KG	
Nitrobenzene	140 U	UG/KG	
Pentachlorophenol	2300 U	UG/KG	
Phenanthrene	140 U	UG/KG	
Phenol	440 U	UG/KG	
Pyrene	70 J	UG/KG	

SW Sample ID: MISS-00190 — Test Pit 1
Sample Type: Subsurface Soil — TRLO
Sample Date: 08/20/1999

Analysis Name	Result	Unit	Exceedance
1,2,4-Trichlorobenzene	110 U	UG/KG	
1,2-Dichlorobenzene	110 U	UG/KG	
1,3-Dichlorobenzene	110 U	UG/KG	
1,4-Dichlorobenzene	110 U	UG/KG	
2,2'-Oxybis(1-Chloropropane)	110 U	UG/KG	
2,4,5-Trichlorophenol	1900 U	UG/KG	
2,4,6-Trichlorophenol	380 U	UG/KG	
2,4-Dichlorophenol	380 U	UG/KG	
2,4-Dimethylphenol	380 U	UG/KG	
2,4-Dinitrophenol	1900 U	UG/KG	
2,4-Dinitrotoluene	110 U	UG/KG	
2,6-Dinitrotoluene	110 U	UG/KG	
2-Chloronaphthalene	110 U	UG/KG	
2-Chlorophenol	380 U	UG/KG	
2-Methylnaphthalene	110 U	UG/KG	
2-Methylphenol	380 U	UG/KG	
2-Nitroaniline	1900 U	UG/KG	
2-Nitrophenol	380 U	UG/KG	
3,3'-Dichlorobenzidine	110 U	UG/KG	
3-Nitroaniline	1900 U	UG/KG	
4,6-Dinitro-2-Methylphenol	1900 U	UG/KG	
4-Bromophenyl-Phenylether	110 U	UG/KG	
4-Chloro-3-Methylphenol	110 U	UG/KG	
4-Chloroaniline	110 U	UG/KG	
4-Chlorophenyl-Phenyl Ether	110 U	UG/KG	
4-Methylphenol	380 U	UG/KG	
4-Nitroaniline	1900 U	UG/KG	
4-Nitrophenol	1900 U	UG/KG	
Acenaphthene	110 U	UG/KG	
Acenaphthylene	110 U	UG/KG	
Anthracene	110 U	UG/KG	
Benzo(a)anthracene	110 U	UG/KG	
Benzo(a)pyrene	110 U	UG/KG	
Benzo(b)fluoranthene	110 U	UG/KG	
Benzo(g,h,i)perylene	110 U	UG/KG	
Benzo(k)fluoranthene	110 U	UG/KG	
Bis(2-chloroethoxy) methane	110 U	UG/KG	
Bis(2-chloroethyl) ether	110 U	UG/KG	
Bis(2-ethylhexyl)phthalate	110 U	UG/KG	
Butyl benzyl phthalate	110 U	UG/KG	
Carbazole	110 U	UG/KG	
Chrysene	110 U	UG/KG	
Di-N-Butylphthalate	110 U	UG/KG	
Di-N-Octylphthalate	110 U	UG/KG	
Dibenzo(a,h)anthracene	110 U	UG/KG	
Dibenzofuran	110 U	UG/KG	
Diethylphthalate	110 U	UG/KG	
Dimethylphthalate	110 U	UG/KG	
Fluoranthene	110 U	UG/KG	
Fluorene	110 U	UG/KG	
Hexachlorobenzene	110 U	UG/KG	
Hexachlorobutadiene	110 U	UG/KG	
Hexachlorocyclopentadiene	110 U	UG/KG	
Hexachloroethane	110 U	UG/KG	
Indeno(1,2,3-cd)pyrene	110 U	UG/KG	
Isophorone	110 U	UG/KG	
N-nitroso-di-n-propylamine	110 U	UG/KG	
N-nitroso-diphenylamine	110 U	UG/KG	
Naphthalene	110 U	UG/KG	
Nitrobenzene	110 U	UG/KG	
Pentachlorophenol	1900 U	UG/KG	
Phenanthrene	110 U	UG/KG	
Phenol	380 U	UG/KG	
Pyrene	110 U	UG/KG	

Table E-1: Soil Chemical Data - SVOC Analyses
Engineering Test Pit Sampling
Maywood Interim Storage Site, Maywood NJ

Result Qualifier Codes

U - Analyzed for but not detected
J - Compound detected, value is estimated
UJ - Compound not detected, quantitation limit is estimat
B - Analyte in blank as well as sample
E - Exceeds calibration curve range
D - Identified at secondary diluation factor

SW Sample ID:	MISS-00200	Test Pit 1		SW Sample ID:	MISS-00210	Test Pit 1		SW Sample ID:	MISS-00220	Test Pit 1	
Sample Type:	Subsurface Soil	REOV		Sample Type:	Subsurface Soil	REUP		Sample Type:	Subsurface Soil	RELO	
Sample Date:	08/20/1999			Sample Date:	08/20/1999			Sample Date:	08/20/1999		
Analysis Name	**Result**	**Unit**	**Exceedance**	**Analysis Name**	**Result**	**Unit**	**Exceedance**	**Analysis Name**	**Result**	**Unit**	**Exceedance**
1,2,4-Trichlorobenzene	190 U	UG/KG		1,2,4-Trichlorobenzene	160 U	UG/KG		1,2,4-Trichlorobenzene	120 U	UG/KG	
1,2-Dichlorobenzene	190 U	UG/KG		1,2-Dichlorobenzene	160 U	UG/KG		1,2-Dichlorobenzene	120 U	UG/KG	
1,3-Dichlorobenzene	190 U	UG/KG		1,3-Dichlorobenzene	160 U	UG/KG		1,3-Dichlorobenzene	120 U	UG/KG	
1,4-Dichlorobenzene	190 U	UG/KG		1,4-Dichlorobenzene	160 U	UG/KG		1,4-Dichlorobenzene	120 U	UG/KG	
2,2'-Oxybis(1-Chloropropane)	190 U	UG/KG		2,2'-Oxybis(1-Chloropropane)	160 U	UG/KG		2,2'-Oxybis(1-Chloropropane)	120 U	UG/KG	
2,4,5-Trichlorophenol	3200 U	UG/KG		2,4,5-Trichlorophenol	2600 U	UG/KG		2,4,5-Trichlorophenol	2000 U	UG/KG	
2,4,6-Trichlorophenol	620 U	UG/KG		2,4,6-Trichlorophenol	510 U	UG/KG		2,4,6-Trichlorophenol	380 U	UG/KG	
2,4-Dichlorophenol	620 U	UG/KG		2,4-Dichlorophenol	510 U	UG/KG		2,4-Dichlorophenol	380 U	UG/KG	
2,4-Dimethylphenol	620 U	UG/KG		2,4-Dimethylphenol	510 U	UG/KG		2,4-Dimethylphenol	380 U	UG/KG	
2,4-Dinitrophenol	3200 U	UG/KG		2,4-Dinitrophenol	2600 U	UG/KG		2,4-Dinitrophenol	2000 U	UG/KG	
2,4-Dinitrotoluene	190 U	UG/KG		2,4-Dinitrotoluene	160 U	UG/KG		2,4-Dinitrotoluene	120 U	UG/KG	
2,6-Dinitrotoluene	190 U	UG/KG		2,6-Dinitrotoluene	160 U	UG/KG		2,6-Dinitrotoluene	120 U	UG/KG	
2-Chloronaphthalene	190 U	UG/KG		2-Chloronaphthalene	160 U	UG/KG		2-Chloronaphthalene	120 U	UG/KG	
2-Chlorophenol	620 U	UG/KG		2-Chlorophenol	510 U	UG/KG		2-Chlorophenol	380 U	UG/KG	
2-Methylnaphthalene	190 U	UG/KG		2-Methylnaphthalene	160 U	UG/KG		2-Methylnaphthalene	120 U	UG/KG	
2-Methylphenol	620 U	UG/KG		2-Methylphenol	510 U	UG/KG		2-Methylphenol	380 U	UG/KG	
2-Nitroaniline	3200 U	UG/KG		2-Nitroaniline	2600 U	UG/KG		2-Nitroaniline	2000 U	UG/KG	
2-Nitrophenol	620 U	UG/KG		2-Nitrophenol	510 U	UG/KG		2-Nitrophenol	380 U	UG/KG	
3,3'-Dichlorobenzidine	190 U	UG/KG		3,3'-Dichlorobenzidine	160 U	UG/KG		3,3'-Dichlorobenzidine	120 U	UG/KG	
3-Nitroaniline	3200 U	UG/KG		3-Nitroaniline	2600 U	UG/KG		3-Nitroaniline	2000 U	UG/KG	
4,6-Dinitro-2-Methylphenol	3200 U	UG/KG		4,6-Dinitro-2-Methylphenol	2600 U	UG/KG		4,6-Dinitro-2-Methylphenol	2000 U	UG/KG	
4-Bromophenyl-Phenylether	190 U	UG/KG		4-Bromophenyl-Phenylether	160 U	UG/KG		4-Bromophenyl-Phenylether	120 U	UG/KG	
4-Chloro-3-Methylphenol	190 U	UG/KG		4-Chloro-3-Methylphenol	160 U	UG/KG		4-Chloro-3-Methylphenol	120 U	UG/KG	
4-Chloroaniline	190 U	UG/KG		4-Chloroaniline	160 U	UG/KG		4-Chloroaniline	120 U	UG/KG	
4-Chlorophenyl-Phenyl Ether	190 U	UG/KG		4-Chlorophenyl-Phenyl Ether	160 U	UG/KG		4-Chlorophenyl-Phenyl Ether	120 U	UG/KG	
4-Methylphenol	320 J	UG/KG		4-Methylphenol	57 J	UG/KG		4-Methylphenol	380 U	UG/KG	
4-Nitroaniline	3200 U	UG/KG		4-Nitroaniline	2600 U	UG/KG		4-Nitroaniline	2000 U	UG/KG	
4-Nitrophenol	3200 U	UG/KG		4-Nitrophenol	2600 U	UG/KG		4-Nitrophenol	2000 U	UG/KG	
Acenaphthene	190 U	UG/KG		Acenaphthene	160 U	UG/KG		Acenaphthene	120 U	UG/KG	
Acenaphthylene	190 U	UG/KG		Acenaphthylene	160 U	UG/KG		Acenaphthylene	120 U	UG/KG	
Anthracene	79 J	UG/KG		Anthracene	160 U	UG/KG		Anthracene	120 U	UG/KG	
Benzo(a)anthracene	190 U	UG/KG		Benzo(a)anthracene	220	UG/KG		Benzo(a)anthracene	120 U	UG/KG	
Benzo(a)pyrene	320	UG/KG		Benzo(a)pyrene	210	UG/KG		Benzo(a)pyrene	120 U	UG/KG	
Benzo(b)fluoranthene	490	UG/KG		Benzo(b)fluoranthene	330	UG/KG		Benzo(b)fluoranthene	120 U	UG/KG	
Benzo(g,h,i)perylene	190 U	UG/KG		Benzo(g,h,i)perylene	160 U	UG/KG		Benzo(g,h,i)perylene	120 U	UG/KG	
Benzo(k)fluoranthene	140 J	UG/KG		Benzo(k)fluoranthene	130 J	UG/KG		Benzo(k)fluoranthene	120 U	UG/KG	
Bis(2-chloroethoxy) methane	190 U	UG/KG		Bis(2-chloroethoxy) methane	160 U	UG/KG		Bis(2-chloroethoxy) methane	120 U	UG/KG	
Bis(2-chloroethyl) ether	190 U	UG/KG		Bis(2-chloroethyl) ether	160 U	UG/KG		Bis(2-chloroethyl) ether	120 U	UG/KG	
Bis(2-ethylhexyl)phthalate	81 J	UG/KG		Bis(2-ethylhexyl)phthalate	160 U	UG/KG		Bis(2-ethylhexyl)phthalate	120 U	UG/KG	
Butyl benzyl phthalate	190 U	UG/KG		Butyl benzyl phthalate	160 U	UG/KG		Butyl benzyl phthalate	120 U	UG/KG	
Carbazole	190 U	UG/KG		Carbazole	64 J	UG/KG		Carbazole	120 U	UG/KG	
Chrysene	470	UG/KG		Chrysene	360	UG/KG		Chrysene	120 U	UG/KG	
Di-N-Butylphthalate	190 U	UG/KG		Di-N-Butylphthalate	160 U	UG/KG		Di-N-Butylphthalate	120 U	UG/KG	
Di-N-Octylphthalate	190 U	UG/KG		Di-N-Octylphthalate	160 U	UG/KG		Di-N-Octylphthalate	120 U	UG/KG	
Dibenzo(a,h)anthracene	190 U	UG/KG		Dibenzo(a,h)anthracene	160 U	UG/KG		Dibenzo(a,h)anthracene	120 U	UG/KG	
Dibenzofuran	190 U	UG/KG		Dibenzofuran	160 U	UG/KG		Dibenzofuran	120 U	UG/KG	
Diethylphthalate	190 U	UG/KG		Diethylphthalate	160 U	UG/KG		Diethylphthalate	120 U	UG/KG	
Dimethylphthalate	190 U	UG/KG		Dimethylphthalate	160 U	UG/KG		Dimethylphthalate	120 U	UG/KG	
Fluoranthene	710	UG/KG		Fluoranthene	700	UG/KG		Fluoranthene	120 U	UG/KG	
Fluorene	190 U	UG/KG		Fluorene	160 U	UG/KG		Fluorene	120 U	UG/KG	
Hexachlorobenzene	190 U	UG/KG		Hexachlorobenzene	160 U	UG/KG		Hexachlorobenzene	120 U	UG/KG	
Hexachlorobutadiene	190 U	UG/KG		Hexachlorobutadiene	160 U	UG/KG		Hexachlorobutadiene	120 U	UG/KG	
Hexachlorocyclopentadiene	190 U	UG/KG		Hexachlorocyclopentadiene	160 U	UG/KG		Hexachlorocyclopentadiene	120 U	UG/KG	
Hexachloroethane	190 U	UG/KG		Hexachloroethane	160 U	UG/KG		Hexachloroethane	120 U	UG/KG	
Indeno(1,2,3-cd)pyrene	160 J	UG/KG		Indeno(1,2,3-cd)pyrene	98 J	UG/KG		Indeno(1,2,3-cd)pyrene	120 U	UG/KG	
Isophorone	190 U	UG/KG		Isophorone	160 U	UG/KG		Isophorone	120 U	UG/KG	
N-nitroso-di-n-propylamine	190 U	UG/KG		N-nitroso-di-n-propylamine	160 U	UG/KG		N-nitroso-di-n-propylamine	120 U	UG/KG	
N-nitroso-diphenylamine	190 U	UG/KG		N-nitroso-diphenylamine	160 U	UG/KG		N-nitroso-diphenylamine	120 U	UG/KG	
Naphthalene	190 U	UG/KG		Naphthalene	160 U	UG/KG		Naphthalene	120 U	UG/KG	
Nitrobenzene	190 U	UG/KG		Nitrobenzene	160 U	UG/KG		Nitrobenzene	120 U	UG/KG	
Pentachlorophenol	3200 U	UG/KG		Pentachlorophenol	2600 U	UG/KG		Pentachlorophenol	2000 U	UG/KG	
Phenanthrene	380	UG/KG		Phenanthrene	520	UG/KG		Phenanthrene	120 U	UG/KG	
Phenol	620 U	UG/KG		Phenol	510 U	UG/KG		Phenol	380 U	UG/KG	
Pyrene	720	UG/KG		Pyrene	600	UG/KG		Pyrene	120 U	UG/KG	

Table E-1: Soil Chemical Data - SVOC Analyses
Engineering Test Pit Sampling
Maywood Interim Storage Site, Maywood NJ

Result Qualifier Codes

U - Analyzed for but not detected
J - Compound detected, value is estimated
UJ - Compound not detected, quantitation limit is estimat
B - Analyte in blank as well as sample
E - Exceeds calibration curve range
D - Identified at secondary diluation factor

SW Sample ID: MISS-00230 — *Test Pit 1* **REUP**
Sample Type: Subsurface Soil
Sample Date: 08/20/1999

Analysis Name	Result	Unit	Exceedance
1,2,4-Trichlorobenzene	150 U	UG/KG	
1,2-Dichlorobenzene	150 U	UG/KG	
1,3-Dichlorobenzene	150 U	UG/KG	
1,4-Dichlorobenzene	150 U	UG/KG	
2,2'-Oxybis(1-Chloropropane)	150 U	UG/KG	
2,4,5-Trichlorophenol	2600 U	UG/KG	
2,4,6-Trichlorophenol	510 U	UG/KG	
2,4-Dichlorophenol	510 U	UG/KG	
2,4-Dimethylphenol	510 U	UG/KG	
2,4-Dinitrophenol	2600 U	UG/KG	
2,4-Dinitrotoluene	150 U	UG/KG	
2,6-Dinitrotoluene	150 U	UG/KG	
2-Chloronaphthalene	150 U	UG/KG	
2-Chlorophenol	510 U	UG/KG	
2-Methylnaphthalene	150 U	UG/KG	
2-Methylphenol	510 U	UG/KG	
2-Nitroaniline	2600 U	UG/KG	
2-Nitrophenol	510 U	UG/KG	
3,3'-Dichlorobenzidine	150 U	UG/KG	
3-Nitroaniline	2600 U	UG/KG	
4,6-Dinitro-2-Methylphenol	2600 U	UG/KG	
4-Bromophenyl-Phenylether	150 U	UG/KG	
4-Chloro-3-Methylphenol	150 U	UG/KG	
4-Chloroaniline	150 U	UG/KG	
4-Chlorophenyl-Phenyl Ether	150 U	UG/KG	
4-Methylphenol	110 J	UG/KG	
4-Nitroaniline	2600 U	UG/KG	
4-Nitrophenol	2600 U	UG/KG	
Acenaphthene	150 U	UG/KG	
Acenaphthylene	150 U	UG/KG	
Anthracene	150 U	UG/KG	
Benzo(a)anthracene	160	UG/KG	
Benzo(a)pyrene	140 J	UG/KG	
Benzo(b)fluoranthene	220	UG/KG	
Benzo(g,h,i)perylene	150 U	UG/KG	
Benzo(k)fluoranthene	79 J	UG/KG	
Bis(2-chloroethoxy) methane	150 U	UG/KG	
Bis(2-chloroethyl) ether	150 U	UG/KG	
Bis(2-ethylhexyl)phthalate	54 J	UG/KG	
Butyl benzyl phthalate	150 U	UG/KG	
Carbazole	150 U	UG/KG	
Chrysene	240	UG/KG	
Di-N-Butylphthalate	150 U	UG/KG	
Di-N-Octylphthalate	150 U	UG/KG	
Dibenzo(a,h)anthracene	150 U	UG/KG	
Dibenzofuran	150 U	UG/KG	
Diethylphthalate	150 U	UG/KG	
Dimethylphthalate	150 U	UG/KG	
Fluoranthene	390	UG/KG	
Fluorene	150 U	UG/KG	
Hexachlorobenzene	150 U	UG/KG	
Hexachlorobutadiene	150 U	UG/KG	
Hexachlorocyclopentadiene	150 U	UG/KG	
Hexachloroethane	150 U	UG/KG	
Indeno(1,2,3-cd)pyrene	81 J	UG/KG	
Isophorone	150 U	UG/KG	
N-nitroso-di-n-propylamine	150 U	UG/KG	
N-nitroso-diphenylamine	150 U	UG/KG	
Naphthalene	150 U	UG/KG	
Nitrobenzene	150 U	UG/KG	
Pentachlorophenol	2600 U	UG/KG	
Phenanthrene	260	UG/KG	
Phenol	510 U	UG/KG	
Pyrene	340	UG/KG	

SW Sample ID: MISS-00330 — *Test Pit 2* **SUOV**
Sample Type: Subsurface Soil
Sample Date: 08/25/1999

Analysis Name	Result	Unit	Exceedance
1,2,4-Trichlorobenzene	130 U	UG/KG	
1,2-Dichlorobenzene	130 U	UG/KG	
1,3-Dichlorobenzene	130 U	UG/KG	
1,4-Dichlorobenzene	130 U	UG/KG	
2,2'-Oxybis(1-Chloropropane)	130 U	UG/KG	
2,4,5-Trichlorophenol	2200 U	UG/KG	
2,4,6-Trichlorophenol	430 U	UG/KG	
2,4-Dichlorophenol	430 U	UG/KG	
2,4-Dimethylphenol	63 J	UG/KG	
2,4-Dinitrophenol	2200 U	UG/KG	
2,4-Dinitrotoluene	130 U	UG/KG	
2,6-Dinitrotoluene	130 U	UG/KG	
2-Chloronaphthalene	130 U	UG/KG	
2-Chlorophenol	430 U	UG/KG	
2-Methylnaphthalene	360	UG/KG	
2-Methylphenol	430 U	UG/KG	
2-Nitroaniline	2200 U	UG/KG	
2-Nitrophenol	430 U	UG/KG	
3,3'-Dichlorobenzidine	130 U	UG/KG	
3-Nitroaniline	2200 U	UG/KG	
4,6-Dinitro-2-Methylphenol	2200 U	UG/KG	
4-Bromophenyl-Phenylether	130 U	UG/KG	
4-Chloro-3-Methylphenol	130 U	UG/KG	
4-Chloroaniline	130 U	UG/KG	
4-Chlorophenyl-Phenyl Ether	130 U	UG/KG	
4-Methylphenol	98 J	UG/KG	
4-Nitroaniline	2200 U	UG/KG	
4-Nitrophenol	2200 U	UG/KG	
Acenaphthene	360	UG/KG	
Acenaphthylene	51 J	UG/KG	
Anthracene	770	UG/KG	
Benzo(a)anthracene	1300	UG/KG	
Benzo(a)pyrene	920	UG/KG	Yes
Benzo(b)fluoranthene	1400	UG/KG	
Benzo(g,h,i)perylene	250	UG/KG	
Benzo(k)fluoranthene	340	UG/KG	
Bis(2-chloroethoxy) methane	130 U	UG/KG	
Bis(2-chloroethyl) ether	1400	UG/KG	
Bis(2-ethylhexyl)phthalate	52 J	UG/KG	
Butyl benzyl phthalate	130 U	UG/KG	
Carbazole	460	UG/KG	
Chrysene	1400	UG/KG	
Di-N-Butylphthalate	130 U	UG/KG	
Di-N-Octylphthalate	130 U	UG/KG	
Dibenzo(a,h)anthracene	130	UG/KG	
Dibenzofuran	380	UG/KG	
Diethylphthalate	130 U	UG/KG	
Dimethylphthalate	130 U	UG/KG	
Fluoranthene	2500	UG/KG	
Fluorene	400	UG/KG	
Hexachlorobenzene	130 U	UG/KG	
Hexachlorobutadiene	130 U	UG/KG	
Hexachlorocyclopentadiene	130 U	UG/KG	
Hexachloroethane	130 U	UG/KG	
Indeno(1,2,3-cd)pyrene	320	UG/KG	
Isophorone	130 U	UG/KG	
N-nitroso-di-n-propylamine	130 U	UG/KG	
N-nitroso-diphenylamine	56 J	UG/KG	
Naphthalene	690	UG/KG	
Nitrobenzene	130 U	UG/KG	
Pentachlorophenol	2200 U	UG/KG	
Phenanthrene	2700	UG/KG	
Phenol	430 U	UG/KG	
Pyrene	2400	UG/KG	

SW Sample ID: MISS-00340 — *Test Pit 2* **SUUP**
Sample Type: Subsurface Soil
Sample Date: 08/25/1999

Analysis Name	Result	Unit	Exceedance
1,2,4-Trichlorobenzene	260 U	UG/KG	
1,2-Dichlorobenzene	260 U	UG/KG	
1,3-Dichlorobenzene	260 U	UG/KG	
1,4-Dichlorobenzene	260 U	UG/KG	
2,2'-Oxybis(1-Chloropropane)	260 U	UG/KG	
2,4,5-Trichlorophenol	4400 U	UG/KG	
2,4,6-Trichlorophenol	850 U	UG/KG	
2,4-Dichlorophenol	850 U	UG/KG	
2,4-Dimethylphenol	850 U	UG/KG	
2,4-Dinitrophenol	4400 U	UG/KG	
2,4-Dinitrotoluene	260 U	UG/KG	
2,6-Dinitrotoluene	260 U	UG/KG	
2-Chloronaphthalene	260 U	UG/KG	
2-Chlorophenol	850 U	UG/KG	
2-Methylnaphthalene	260 U	UG/KG	
2-Methylphenol	850 U	UG/KG	
2-Nitroaniline	4400 U	UG/KG	
2-Nitrophenol	850 U	UG/KG	
3,3'-Dichlorobenzidine	260 U	UG/KG	
3-Nitroaniline	4400 U	UG/KG	
4,6-Dinitro-2-Methylphenol	4400 U	UG/KG	
4-Bromophenyl-Phenylether	260 U	UG/KG	
4-Chloro-3-Methylphenol	260 U	UG/KG	
4-Chloroaniline	260 U	UG/KG	
4-Chlorophenyl-Phenyl Ether	260 U	UG/KG	
4-Methylphenol	850 U	UG/KG	
4-Nitroaniline	4400 U	UG/KG	
4-Nitrophenol	4400 U	UG/KG	
Acenaphthene	260 U	UG/KG	
Acenaphthylene	260 U	UG/KG	
Anthracene	260 U	UG/KG	
Benzo(a)anthracene	130 J	UG/KG	
Benzo(a)pyrene	120 J	UG/KG	
Benzo(b)fluoranthene	260 U	UG/KG	
Benzo(g,h,i)perylene	260 U	UG/KG	
Benzo(k)fluoranthene	260 U	UG/KG	
Bis(2-chloroethoxy) methane	260 U	UG/KG	
Bis(2-chloroethyl) ether	7400	UG/KG	Yes
Bis(2-ethylhexyl)phthalate	260 U	UG/KG	
Butyl benzyl phthalate	260 U	UG/KG	
Carbazole	260 U	UG/KG	
Chrysene	170 J	UG/KG	
Di-N-Butylphthalate	260 U	UG/KG	
Di-N-Octylphthalate	260 U	UG/KG	
Dibenzo(a,h)anthracene	260 U	UG/KG	
Dibenzofuran	260 U	UG/KG	
Diethylphthalate	260 U	UG/KG	
Dimethylphthalate	260 U	UG/KG	
Fluoranthene	240 J	UG/KG	
Fluorene	260 U	UG/KG	
Hexachlorobenzene	260 U	UG/KG	
Hexachlorobutadiene	260 U	UG/KG	
Hexachlorocyclopentadiene	260 U	UG/KG	
Hexachloroethane	260 U	UG/KG	
Indeno(1,2,3-cd)pyrene	260 U	UG/KG	
Isophorone	260 U	UG/KG	
N-nitroso-di-n-propylamine	260 U	UG/KG	
N-nitroso-diphenylamine	360	UG/KG	
Naphthalene	260 U	UG/KG	
Nitrobenzene	260 U	UG/KG	
Pentachlorophenol	4400 U	UG/KG	
Phenanthrene	120 J	UG/KG	
Phenol	850 U	UG/KG	
Pyrene	260	UG/KG	

Table E-1: Soil Chemical Data - SVOC Analyses
Engineering Test Pit Sampling
Maywood Interim Storage Site, Maywood NJ

Result Qualifier Codes

U - Analyzed for but not detected
J - Compound detected, value is estimated
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B - Analyte in blank as well as sample
E - Exceeds calibration curve range
D - Identified at secondary dilution factor

	SW Sample ID: MISS-00350, Test Pit 2, Sample Type: Subsurface Soil, SULO, Sample Date: 08/25/1999			SW Sample ID: MISS-00360, Test Pit 2, Sample Type: Subsurface Soil, TROV, Sample Date: 08/25/1999			SW Sample ID: MISS-003[illegible], Test Pit 2, Sample Type: Subsurface Soil, TRUP, Sample Date: 08/25/1999		
Analysis Name	**Result**	**Unit**	**Exceedance**	**Result**	**Unit**	**Exceedance**	**Result**	**Unit**	**Exceedance**
1,2,4-Trichlorobenzene	120 U	UG/KG		130 U	UG/KG		1200 U	UG/KG	
1,2-Dichlorobenzene	120 U	UG/KG		130 U	UG/KG		1200 U	UG/KG	
1,3-Dichlorobenzene	120 U	UG/KG		130 U	UG/KG		1200 U	UG/KG	
1,4-Dichlorobenzene	120 U	UG/KG		130 U	UG/KG		1200 U	UG/KG	
2,2'-Oxybis(1-Chloropropane)	120 U	UG/KG		130 U	UG/KG		1200 U	UG/KG	
2,4,5-Trichlorophenol	2100 U	UG/KG		2200 U	UG/KG		21000 U	UG/KG	
2,4,6-Trichlorophenol	400 U	UG/KG		420 U	UG/KG		4100 U	UG/KG	
2,4-Dichlorophenol	400 U	UG/KG		420 U	UG/KG		4100 U	UG/KG	
2,4-Dimethylphenol	400 U	UG/KG		420 U	UG/KG		4100 U	UG/KG	
2,4-Dinitrophenol	2100 U	UG/KG		2200 U	UG/KG		21000 U	UG/KG	
2,4-Dinitrotoluene	120 U	UG/KG		130 U	UG/KG		1200 U	UG/KG	
2,6-Dinitrotoluene	120 U	UG/KG		130 U	UG/KG		1200 U	UG/KG	
2-Chloronaphthalene	120 U	UG/KG		130 U	UG/KG		1200 U	UG/KG	
2-Chlorophenol	400 U	UG/KG		420 U	UG/KG		4100 U	UG/KG	
2-Methylnaphthalene	120 U	UG/KG		130 U	UG/KG		1200 U	UG/KG	
2-Methylphenol	400 U	UG/KG		420 U	UG/KG		4100 U	UG/KG	
2-Nitroaniline	2100 U	UG/KG		2200 U	UG/KG		21000 U	UG/KG	
2-Nitrophenol	400 U	UG/KG		420 U	UG/KG		4100 U	UG/KG	
3,3'-Dichlorobenzidine	120 U	UG/KG		130 U	UG/KG		1200 U	UG/KG	
3-Nitroaniline	2100 U	UG/KG		2200 U	UG/KG		21000 U	UG/KG	
4,6-Dinitro-2-Methylphenol	2100 U	UG/KG		2200 U	UG/KG		21000 U	UG/KG	
4-Bromophenyl-Phenylether	120 U	UG/KG		130 U	UG/KG		1200 U	UG/KG	
4-Chloro-3-Methylphenol	120 U	UG/KG		130 U	UG/KG		1200 U	UG/KG	
4-Chloroaniline	120 U	UG/KG		130 U	UG/KG		1200 U	UG/KG	
4-Chlorophenyl-Phenyl Ether	120 U	UG/KG		130 U	UG/KG		1200 U	UG/KG	
4-Methylphenol	400 U	UG/KG		420 U	UG/KG		4100 U	UG/KG	
4-Nitroaniline	2100 U	UG/KG		2200 U	UG/KG		21000 U	UG/KG	
4-Nitrophenol	2100 U	UG/KG		2200 U	UG/KG		21000 U	UG/KG	
Acenaphthene	120 U	UG/KG		130 U	UG/KG		1200 U	UG/KG	
Acenaphthylene	120 U	UG/KG		130 U	UG/KG		1200 U	UG/KG	
Anthracene	120 U	UG/KG		130 U	UG/KG		1200 U	UG/KG	
Benzo(a)anthracene	120 U	UG/KG		170	UG/KG		460 J	UG/KG	
Benzo(a)pyrene	120 U	UG/KG		160	UG/KG		1200 U	UG/KG	
Benzo(b)fluoranthene	120 U	UG/KG		230	UG/KG		1200 U	UG/KG	
Benzo(g,h,i)perylene	120 U	UG/KG		130 U	UG/KG		1200 U	UG/KG	
Benzo(k)fluoranthene	120 U	UG/KG		82 J	UG/KG		1200 U	UG/KG	
Bis(2-chloroethoxy) methane	120 U	UG/KG		130 U	UG/KG		1200 U	UG/KG	
Bis(2-chloroethyl) ether	120 U	UG/KG		2000	UG/KG		48000	UG/KG	Yes
Bis(2-ethylhexyl)phthalate	120 U	UG/KG		76 J	UG/KG		1200 U	UG/KG	
Butyl benzyl phthalate	120 U	UG/KG		130 U	UG/KG		1200 U	UG/KG	
Carbazole	120 U	UG/KG		130 U	UG/KG		1200 U	UG/KG	
Chrysene	120 U	UG/KG		230	UG/KG		480 J	UG/KG	
Di-N-Butylphthalate	120 U	UG/KG		130 U	UG/KG		1200 U	UG/KG	
Di-N-Octylphthalate	120 U	UG/KG		130 U	UG/KG		1200 U	UG/KG	
Dibenzo(a,h)anthracene	120 U	UG/KG		130 U	UG/KG		1200 U	UG/KG	
Dibenzofuran	120 U	UG/KG		130 U	UG/KG		1200 U	UG/KG	
Diethylphthalate	120 U	UG/KG		130 U	UG/KG		1200 U	UG/KG	
Dimethylphthalate	120 U	UG/KG		130 U	UG/KG		1200 U	UG/KG	
Fluoranthene	120 U	UG/KG		290	UG/KG		750 J	UG/KG	
Fluorene	120 U	UG/KG		130 U	UG/KG		1200 U	UG/KG	
Hexachlorobenzene	120 U	UG/KG		130 U	UG/KG		1200 U	UG/KG	
Hexachlorobutadiene	120 U	UG/KG		130 U	UG/KG		1200 U	UG/KG	
Hexachlorocyclopentadiene	120 U	UG/KG		130 U	UG/KG		1200 U	UG/KG	
Hexachloroethane	120 U	UG/KG		130 U	UG/KG		1200 U	UG/KG	
Indeno(1,2,3-cd)pyrene	120 U	UG/KG		71 J	UG/KG		1200 U	UG/KG	
Isophorone	120 U	UG/KG		130 U	UG/KG		1200 U	UG/KG	
N-nitroso-di-n-propylamine	120 U	UG/KG		130 U	UG/KG		1200 U	UG/KG	
N-nitroso-diphenylamine	120 U	UG/KG		64 J	UG/KG		890 J	UG/KG	
Naphthalene	120 U	UG/KG		130 U	UG/KG		1200 U	UG/KG	
Nitrobenzene	120 U	UG/KG		130 U	UG/KG		1200 U	UG/KG	
Pentachlorophenol	2100 U	UG/KG		2200 U	UG/KG		21000 U	UG/KG	
Phenanthrene	120 U	UG/KG		140	UG/KG		1200 U	UG/KG	
Phenol	400 U	UG/KG		420 U	UG/KG		4100 U	UG/KG	
Pyrene	120 U	UG/KG		320	UG/KG		720 J	UG/KG	

Table E-1: Soil Chemical Data - SVOC Analyses
Engineering Test Pit Sampling
Maywood Interim Storage Site, Maywood NJ

Result Qualifier Codes

U - Analyzed for but not detected
J - Compound detected, value is estimated
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B - Analyte in blank as well as sample
E - Exceeds calibration curve range
D - Identified at secondary dilution factor

	MISS-00380			MISS-00390			MISS-00400		
SW Sample ID:	MISS-00380	Test Pit 2		MISS-00390	Test Pit 2		MISS-00400	Test Pit 2	
Sample Type:	Subsurface Soil	TRLO		Subsurface Soil	REOV		Subsurface Soil	REUP	
Sample Date:	08/25/1999			08/25/1999			08/25/1999		
Analysis Name	**Result**	**Unit**	**Exceedance**	**Result**	**Unit**	**Exceedance**	**Result**	**Unit**	**Exceedance**
1,2,4-Trichlorobenzene	120 U	UG/KG		230 U	UG/KG		150 U	UG/KG	
1,2-Dichlorobenzene	120 U	UG/KG		230 U	UG/KG		150 U	UG/KG	
1,3-Dichlorobenzene	120 U	UG/KG		230 U	UG/KG		150 U	UG/KG	
1,4-Dichlorobenzene	120 U	UG/KG		230 U	UG/KG		150 U	UG/KG	
2,2'-Oxybis(1-Chloropropane)	120 U	UG/KG		230 U	UG/KG		150 U	UG/KG	
2,4,5-Trichlorophenol	2000 U	UG/KG		3900 U	UG/KG		2500 U	UG/KG	
2,4,6-Trichlorophenol	390 U	UG/KG		760 U	UG/KG		480 U	UG/KG	
2,4-Dichlorophenol	390 U	UG/KG		760 U	UG/KG		480 U	UG/KG	
2,4-Dimethylphenol	390 U	UG/KG		760 U	UG/KG		480 U	UG/KG	
2,4-Dinitrophenol	2000 U	UG/KG		3900 U	UG/KG		2500 U	UG/KG	
2,4-Dinitrotoluene	120 U	UG/KG		230 U	UG/KG		150 U	UG/KG	
2,6-Dinitrotoluene	120 U	UG/KG		230 U	UG/KG		150 U	UG/KG	
2-Chloronaphthalene	120 U	UG/KG		230 U	UG/KG		150 U	UG/KG	
2-Chlorophenol	390 U	UG/KG		760 U	UG/KG		480 U	UG/KG	
2-Methylnaphthalene	120 U	UG/KG		230 U	UG/KG		150 U	UG/KG	
2-Methylphenol	390 U	UG/KG		760 U	UG/KG		480 U	UG/KG	
2-Nitroaniline	2000 U	UG/KG		3900 U	UG/KG		2500 U	UG/KG	
2-Nitrophenol	390 U	UG/KG		760 U	UG/KG		480 U	UG/KG	
3,3'-Dichlorobenzidine	120 U	UG/KG		230 U	UG/KG		150 U	UG/KG	
3-Nitroaniline	2000 U	UG/KG		3900 U	UG/KG		2500 U	UG/KG	
4,6-Dinitro-2-Methylphenol	2000 U	UG/KG		3900 U	UG/KG		2500 U	UG/KG	
4-Bromophenyl-Phenylether	120 U	UG/KG		230 U	UG/KG		150 U	UG/KG	
4-Chloro-3-Methylphenol	120 U	UG/KG		230 U	UG/KG		150 U	UG/KG	
4-Chloroaniline	120 U	UG/KG		230 U	UG/KG		150 U	UG/KG	
4-Chlorophenyl-Phenyl Ether	120 U	UG/KG		230 U	UG/KG		150 U	UG/KG	
4-Methylphenol	390 U	UG/KG		760 U	UG/KG		480 U	UG/KG	
4-Nitroaniline	2000 U	UG/KG		3900 U	UG/KG		2500 U	UG/KG	
4-Nitrophenol	2000 U	UG/KG		3900 U	UG/KG		2500 U	UG/KG	
Acenaphthene	120 U	UG/KG		230 U	UG/KG		150 U	UG/KG	
Acenaphthylene	120 U	UG/KG		230 U	UG/KG		150 U	UG/KG	
Anthracene	120 U	UG/KG		230 U	UG/KG		150 U	UG/KG	
Benzo(a)anthracene	120 U	UG/KG		230 U	UG/KG		150 U	UG/KG	
Benzo(a)pyrene	120 U	UG/KG		230 U	UG/KG		110 J	UG/KG	
Benzo(b)fluoranthene	120 U	UG/KG		230 U	UG/KG		150 U	UG/KG	
Benzo(g,h,i)perylene	120 U	UG/KG		230 U	UG/KG		150 U	UG/KG	
Benzo(k)fluoranthene	120 U	UG/KG		230 U	UG/KG		150 U	UG/KG	
Bis(2-chloroethoxy) methane	120 U	UG/KG		230 U	UG/KG		150 U	UG/KG	
Bis(2-chloroethyl) ether	120 U	UG/KG		5200	UG/KG	Yes	5400	UG/KG	Yes
Bis(2-ethylhexyl)phthalate	120 U	UG/KG		230 U	UG/KG		150 U	UG/KG	
Butyl benzyl phthalate	120 U	UG/KG		230 U	UG/KG		150 U	UG/KG	
Carbazole	120 U	UG/KG		230 U	UG/KG		150 U	UG/KG	
Chrysene	120 U	UG/KG		82 J	UG/KG		170	UG/KG	
Di-N-Butylphthalate	120 U	UG/KG		230 U	UG/KG		150 U	UG/KG	
Di-N-Octylphthalate	120 U	UG/KG		230 U	UG/KG		150 U	UG/KG	
Dibenzo(a,h)anthracene	120 U	UG/KG		230 U	UG/KG		150 U	UG/KG	
Dibenzofuran	120 U	UG/KG		230 U	UG/KG		150 U	UG/KG	
Diethylphthalate	120 U	UG/KG		230 U	UG/KG		150 U	UG/KG	
Dimethylphthalate	120 U	UG/KG		230 U	UG/KG		150 U	UG/KG	
Fluoranthene	120 U	UG/KG		88 J	UG/KG		220	UG/KG	
Fluorene	120 U	UG/KG		230 U	UG/KG		150 U	UG/KG	
Hexachlorobenzene	120 U	UG/KG		230 U	UG/KG		150 U	UG/KG	
Hexachlorobutadiene	120 U	UG/KG		230 U	UG/KG		150 U	UG/KG	
Hexachlorocyclopentadiene	120 U	UG/KG		230 U	UG/KG		150 U	UG/KG	
Hexachloroethane	120 U	UG/KG		230 U	UG/KG		150 U	UG/KG	
Indeno(1,2,3-cd)pyrene	120 U	UG/KG		230 U	UG/KG		150 U	UG/KG	
Isophorone	120 U	UG/KG		230 U	UG/KG		150 U	UG/KG	
N-nitroso-di-n-propylamine	120 U	UG/KG		230 U	UG/KG		150 U	UG/KG	
N-nitroso-diphenylamine	120 U	UG/KG		280	UG/KG		170	UG/KG	
Naphthalene	120 U	UG/KG		230 U	UG/KG		150 U	UG/KG	
Nitrobenzene	120 U	UG/KG		230 U	UG/KG		150 U	UG/KG	
Pentachlorophenol	2000 U	UG/KG		3900 U	UG/KG		2500 U	UG/KG	
Phenanthrene	120 U	UG/KG		230 U	UG/KG		110 J	UG/KG	
Phenol	390 U	UG/KG		760 U	UG/KG		480 U	UG/KG	
Pyrene	120 U	UG/KG		100 J	UG/KG		210	UG/KG	

Table E-1: Soil Chemical Data - SVOC Analyses
Engineering Test Pit Sampling
Maywood Interim Storage Site, Maywood NJ

Result Qualifier Codes

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- UJ - Compound not detected, quantitation limit is estimat
- B - Analyte in blank as well as sample
- E - Exceeds calibration curve range
- D - Identified at secondary dilution factor

SW Sample ID:	MISS-00410		Test Pit 2	SW Sample ID:	MISS-00430		Test Pit 2	SW Sample ID:	MISS-00520		Test Pit 3
Sample Type:	Subsurface Soil		RELO	Sample Type:	Subsurface Soil		REUP	Sample Type:	Subsurface Soil		SUOV
Sample Date:	08/25/1999			Sample Date:	08/25/1999			Sample Date:	08/31/1999		
Analysis Name	**Result**	**Unit**	**Exceedance**	**Analysis Name**	**Result**	**Unit**	**Exceedance**	**Analysis Name**	**Result**	**Unit**	**Exceedance**
1,2,4-Trichlorobenzene	120 U	UG/KG		1,2,4-Trichlorobenzene	140 U	UG/KG		1,2,4-Trichlorobenzene	140 U	UG/KG	
1,2-Dichlorobenzene	120 U	UG/KG		1,2-Dichlorobenzene	140 U	UG/KG		1,2-Dichlorobenzene	140 U	UG/KG	
1,3-Dichlorobenzene	120 U	UG/KG		1,3-Dichlorobenzene	140 U	UG/KG		1,3-Dichlorobenzene	140 U	UG/KG	
1,4-Dichlorobenzene	120 U	UG/KG		1,4-Dichlorobenzene	140 U	UG/KG		1,4-Dichlorobenzene	140 U	UG/KG	
2,2'-Oxybis(1-Chloropropane)	120 U	UG/KG		2,2'-Oxybis(1-Chloropropane)	140 U	UG/KG		2,2'-Oxybis(1-Chloropropane)	140 U	UG/KG	
2,4,5-Trichlorophenol	2100 U	UG/KG		2,4,5-Trichlorophenol	2300 U	UG/KG		2,4,5-Trichlorophenol	2400 U	UG/KG	
2,4,6-Trichlorophenol	410 U	UG/KG		2,4,6-Trichlorophenol	450 U	UG/KG		2,4,6-Trichlorophenol	470 U	UG/KG	
2,4-Dichlorophenol	410 U	UG/KG		2,4-Dichlorophenol	450 U	UG/KG		2,4-Dichlorophenol	470 U	UG/KG	
2,4-Dimethylphenol	410 U	UG/KG		2,4-Dimethylphenol	450 U	UG/KG		2,4-Dimethylphenol	470 U	UG/KG	
2,4-Dinitrophenol	2100 U	UG/KG		2,4-Dinitrophenol	2300 U	UG/KG		2,4-Dinitrophenol	2400 U	UG/KG	
2,4-Dinitrotoluene	120 U	UG/KG		2,4-Dinitrotoluene	140 U	UG/KG		2,4-Dinitrotoluene	140 U	UG/KG	
2,6-Dinitrotoluene	120 U	UG/KG		2,6-Dinitrotoluene	140 U	UG/KG		2,6-Dinitrotoluene	140 U	UG/KG	
2-Chloronaphthalene	120 U	UG/KG		2-Chloronaphthalene	140 U	UG/KG		2-Chloronaphthalene	140 U	UG/KG	
2-Chlorophenol	410 U	UG/KG		2-Chlorophenol	450 U	UG/KG		2-Chlorophenol	470 U	UG/KG	
2-Methylnaphthalene	120 U	UG/KG		2-Methylnaphthalene	140 U	UG/KG		2-Methylnaphthalene	140 U	UG/KG	
2-Methylphenol	410 U	UG/KG		2-Methylphenol	450 U	UG/KG		2-Methylphenol	49 J	UG/KG	
2-Nitroaniline	2100 U	UG/KG		2-Nitroaniline	2300 U	UG/KG		2-Nitroaniline	2400 U	UG/KG	
2-Nitrophenol	410 U	UG/KG		2-Nitrophenol	450 U	UG/KG		2-Nitrophenol	470 U	UG/KG	
3,3'-Dichlorobenzidine	120 U	UG/KG		3,3'-Dichlorobenzidine	140 U	UG/KG		3,3'-Dichlorobenzidine	140 U	UG/KG	
3-Nitroaniline	2100 U	UG/KG		3-Nitroaniline	2300 U	UG/KG		3-Nitroaniline	2400 U	UG/KG	
4,6-Dinitro-2-Methylphenol	2100 U	UG/KG		4,6-Dinitro-2-Methylphenol	2300 U	UG/KG		4,6-Dinitro-2-Methylphenol	2400 U	UG/KG	
4-Bromophenyl-Phenylether	120 U	UG/KG		4-Bromophenyl-Phenylether	140 U	UG/KG		4-Bromophenyl-Phenylether	140 U	UG/KG	
4-Chloro-3-Methylphenol	120 U	UG/KG		4-Chloro-3-Methylphenol	140 U	UG/KG		4-Chloro-3-Methylphenol	140 U	UG/KG	
4-Chloroaniline	120 U	UG/KG		4-Chloroaniline	140 U	UG/KG		4-Chloroaniline	140 U	UG/KG	
4-Chlorophenyl-Phenyl Ether	120 U	UG/KG		4-Chlorophenyl-Phenyl Ether	140 U	UG/KG		4-Chlorophenyl-Phenyl Ether	140 U	UG/KG	
4-Methylphenol	410 U	UG/KG		4-Methylphenol	450 U	UG/KG		4-Methylphenol	470 U	UG/KG	
4-Nitroaniline	2100 U	UG/KG		4-Nitroaniline	2300 U	UG/KG		4-Nitroaniline	2400 U	UG/KG	
4-Nitrophenol	2100 U	UG/KG		4-Nitrophenol	2300 U	UG/KG		4-Nitrophenol	2400 U	UG/KG	
Acenaphthene	120 U	UG/KG		Acenaphthene	140 U	UG/KG		Acenaphthene	140 U	UG/KG	
Acenaphthylene	120 U	UG/KG		Acenaphthylene	140 U	UG/KG		Acenaphthylene	140 U	UG/KG	
Anthracene	120 U	UG/KG		Anthracene	73 J	UG/KG		Anthracene	140 U	UG/KG	
Benzo(a)anthracene	120 U	UG/KG		Benzo(a)anthracene	460	UG/KG		Benzo(a)anthracene	140 U	UG/KG	
Benzo(a)pyrene	120 U	UG/KG		Benzo(a)pyrene	360	UG/KG		Benzo(a)pyrene	140 U	UG/KG	
Benzo(b)fluoranthene	120 U	UG/KG		Benzo(b)fluoranthene	610	UG/KG		Benzo(b)fluoranthene	140 U	UG/KG	
Benzo(g,h,i)perylene	120 U	UG/KG		Benzo(g,h,i)perylene	140 U	UG/KG		Benzo(g,h,i)perylene	140 U	UG/KG	
Benzo(k)fluoranthene	120 U	UG/KG		Benzo(k)fluoranthene	280	UG/KG		Benzo(k)fluoranthene	140 U	UG/KG	
Bis(2-chloroethoxy) methane	120 U	UG/KG		Bis(2-chloroethoxy) methane	140 U	UG/KG		Bis(2-chloroethoxy) methane	140 U	UG/KG	
Bis(2-chloroethyl) ether	150	UG/KG		Bis(2-chloroethyl) ether	5000	UG/KG	Yes	Bis(2-chloroethyl) ether	140 U	UG/KG	
Bis(2-ethylhexyl)phthalate	120 U	UG/KG		Bis(2-ethylhexyl)phthalate	140 U	UG/KG		Bis(2-ethylhexyl)phthalate	140 U	UG/KG	
Butyl benzyl phthalate	120 U	UG/KG		Butyl benzyl phthalate	140 U	UG/KG		Butyl benzyl phthalate	140 U	UG/KG	
Carbazole	120 U	UG/KG		Carbazole	72 J	UG/KG		Carbazole	140 U	UG/KG	
Chrysene	120 U	UG/KG		Chrysene	540	UG/KG		Chrysene	140 U	UG/KG	
Di-N-Butylphthalate	120 U	UG/KG		Di-N-Butylphthalate	140 U	UG/KG		Di-N-Butylphthalate	140 U	UG/KG	
Di-N-Octylphthalate	120 U	UG/KG		Di-N-Octylphthalate	140 U	UG/KG		Di-N-Octylphthalate	140 U	UG/KG	
Dibenzo(a,h)anthracene	120 U	UG/KG		Dibenzo(a,h)anthracene	56 J	UG/KG		Dibenzo(a,h)anthracene	140 U	UG/KG	
Dibenzofuran	120 U	UG/KG		Dibenzofuran	140 U	UG/KG		Dibenzofuran	140 U	UG/KG	
Diethylphthalate	120 U	UG/KG		Diethylphthalate	140 U	UG/KG		Diethylphthalate	140 U	UG/KG	
Dimethylphthalate	120 U	UG/KG		Dimethylphthalate	140 U	UG/KG		Dimethylphthalate	140 U	UG/KG	
Fluoranthene	120 U	UG/KG		Fluoranthene	700	UG/KG		Fluoranthene	140 U	UG/KG	
Fluorene	120 U	UG/KG		Fluorene	140 U	UG/KG		Fluorene	140 U	UG/KG	
Hexachlorobenzene	120 U	UG/KG		Hexachlorobenzene	140 U	UG/KG		Hexachlorobenzene	140 U	UG/KG	
Hexachlorobutadiene	120 U	UG/KG		Hexachlorobutadiene	140 U	UG/KG		Hexachlorobutadiene	140 U	UG/KG	
Hexachlorocyclopentadiene	120 U	UG/KG		Hexachlorocyclopentadiene	140 U	UG/KG		Hexachlorocyclopentadiene	140 U	UG/KG	
Hexachloroethane	120 U	UG/KG		Hexachloroethane	140 U	UG/KG		Hexachloroethane	140 U	UG/KG	
Indeno(1,2,3-cd)pyrene	120 U	UG/KG		Indeno(1,2,3-cd)pyrene	150	UG/KG		Indeno(1,2,3-cd)pyrene	140 U	UG/KG	
Isophorone	120 U	UG/KG		Isophorone	140 U	UG/KG		Isophorone	140 U	UG/KG	
N-nitroso-di-n-propylamine	120 U	UG/KG		N-nitroso-di-n-propylamine	140 U	UG/KG		N-nitroso-di-n-propylamine	140 U	UG/KG	
N-nitroso-diphenylamine	120 U	UG/KG		N-nitroso-diphenylamine	150	UG/KG		N-nitroso-diphenylamine	140 U	UG/KG	
Naphthalene	120 U	UG/KG		Naphthalene	140 U	UG/KG		Naphthalene	140 U	UG/KG	
Nitrobenzene	120 U	UG/KG		Nitrobenzene	140 U	UG/KG		Nitrobenzene	140 U	UG/KG	
Pentachlorophenol	2100 U	UG/KG		Pentachlorophenol	2300 U	UG/KG		Pentachlorophenol	2400 U	UG/KG	
Phenanthrene	120 U	UG/KG		Phenanthrene	360	UG/KG		Phenanthrene	82 J	UG/KG	
Phenol	410 U	UG/KG		Phenol	450 U	UG/KG		Phenol	470 U	UG/KG	
Pyrene	120 U	UG/KG		Pyrene	710	UG/KG		Pyrene	140 U	UG/KG	

Table E-1: Soil Chemical Data - SVOC Analyses
Engineering Test Pit Sampling
Maywood Interim Storage Site, Maywood NJ

Result Qualifier Codes

U - Analyzed for but not detected
J - Compound detected, value is estimated
UJ - Compound not detected, quantitation limit is estimat
B - Analyte in blank as well as sample
E - Exceeds calibration curve range
D - Identified at secondary dilution factor

SW Sample ID: MISS-0053X *Test Pit 3*
Sample Type: Subsurface Soil *SUUP*
Sample Date: 08/31/1999

Analysis Name	Result	Unit	Exceedance
1,2,4-Trichlorobenzene	130 U	UG/KG	
1,2-Dichlorobenzene	130 U	UG/KG	
1,3-Dichlorobenzene	130 U	UG/KG	
1,4-Dichlorobenzene	130 U	UG/KG	
2,2'-Oxybis(1-Chloropropane)	130 U	UG/KG	
2,4,5-Trichlorophenol	2200 U	UG/KG	
2,4,6-Trichlorophenol	420 U	UG/KG	
2,4-Dichlorophenol	420 U	UG/KG	
2,4-Dimethylphenol	420 U	UG/KG	
2,4-Dinitrophenol	2200 U	UG/KG	
2,4-Dinitrotoluene	130 U	UG/KG	
2,6-Dinitrotoluene	130 U	UG/KG	
2-Chloronaphthalene	130 U	UG/KG	
2-Chlorophenol	420 U	UG/KG	
2-Methylnaphthalene	130 U	UG/KG	
2-Methylphenol	420 U	UG/KG	
2-Nitroaniline	2200 U	UG/KG	
2-Nitrophenol	420 U	UG/KG	
3,3'-Dichlorobenzidine	130 U	UG/KG	
3-Nitroaniline	2200 U	UG/KG	
4,6-Dinitro-2-Methylphenol	2200 U	UG/KG	
4-Bromophenyl-Phenylether	130 U	UG/KG	
4-Chloro-3-Methylphenol	130 U	UG/KG	
4-Chloroaniline	130 U	UG/KG	
4-Chlorophenyl-Phenyl Ether	130 U	UG/KG	
4-Methylphenol	420 U	UG/KG	
4-Nitroaniline	2200 U	UG/KG	
4-Nitrophenol	2200 U	UG/KG	
Acenaphthene	130 U	UG/KG	
Acenaphthylene	130 U	UG/KG	
Anthracene	130 U	UG/KG	
Benzo(a)anthracene	130 U	UG/KG	
Benzo(a)pyrene	130 U	UG/KG	
Benzo(b)fluoranthene	130 U	UG/KG	
Benzo(g,h,i)perylene	130 U	UG/KG	
Benzo(k)fluoranthene	130 U	UG/KG	
Bis(2-chloroethoxy) methane	130 U	UG/KG	
Bis(2-chloroethyl) ether	360	UG/KG	
Bis(2-ethylhexyl)phthalate	130 U	UG/KG	
Butyl benzyl phthalate	130 U	UG/KG	
Carbazole	130 U	UG/KG	
Chrysene	52 J	UG/KG	
Di-N-Butylphthalate	130 U	UG/KG	
Di-N-Octylphthalate	130 U	UG/KG	
Dibenzo(a,h)anthracene	130 U	UG/KG	
Dibenzofuran	130 U	UG/KG	
Diethylphthalate	130 U	UG/KG	
Dimethylphthalate	130 U	UG/KG	
Fluoranthene	59 J	UG/KG	
Fluorene	130 U	UG/KG	
Hexachlorobenzene	130 U	UG/KG	
Hexachlorobutadiene	130 U	UG/KG	
Hexachlorocyclopentadiene	130 U	UG/KG	
Hexachloroethane	130 U	UG/KG	
Indeno(1,2,3-cd)pyrene	130 U	UG/KG	
Isophorone	130 U	UG/KG	
N-nitroso-di-n-propylamine	130 U	UG/KG	
N-nitroso-diphenylamine	130 U	UG/KG	
Naphthalene	130 U	UG/KG	
Nitrobenzene	130 U	UG/KG	
Pentachlorophenol	2200 U	UG/KG	
Phenanthrene	57 J	UG/KG	
Phenol	420 U	UG/KG	
Pyrene	74 J	UG/KG	

SW Sample ID: MISS-00540 *Test Pit 3*
Sample Type: Subsurface Soil *SULO*
Sample Date: 08/31/1999

Analysis Name	Result	Unit	Exceedance
1,2,4-Trichlorobenzene	120 U	UG/KG	
1,2-Dichlorobenzene	120 U	UG/KG	
1,3-Dichlorobenzene	120 U	UG/KG	
1,4-Dichlorobenzene	120 U	UG/KG	
2,2'-Oxybis(1-Chloropropane)	120 U	UG/KG	
2,4,5-Trichlorophenol	2000 U	UG/KG	
2,4,6-Trichlorophenol	400 U	UG/KG	
2,4-Dichlorophenol	400 U	UG/KG	
2,4-Dimethylphenol	400 U	UG/KG	
2,4-Dinitrophenol	2000 U	UG/KG	
2,4-Dinitrotoluene	120 U	UG/KG	
2,6-Dinitrotoluene	120 U	UG/KG	
2-Chloronaphthalene	120 U	UG/KG	
2-Chlorophenol	400 U	UG/KG	
2-Methylnaphthalene	120 U	UG/KG	
2-Methylphenol	400 U	UG/KG	
2-Nitroaniline	2000 U	UG/KG	
2-Nitrophenol	400 U	UG/KG	
3,3'-Dichlorobenzidine	120 U	UG/KG	
3-Nitroaniline	2000 U	UG/KG	
4,6-Dinitro-2-Methylphenol	2000 U	UG/KG	
4-Bromophenyl-Phenylether	120 U	UG/KG	
4-Chloro-3-Methylphenol	120 U	UG/KG	
4-Chloroaniline	120 U	UG/KG	
4-Chlorophenyl-Phenyl Ether	120 U	UG/KG	
4-Methylphenol	400 U	UG/KG	
4-Nitroaniline	2000 U	UG/KG	
4-Nitrophenol	2000 U	UG/KG	
Acenaphthene	120 U	UG/KG	
Acenaphthylene	120 U	UG/KG	
Anthracene	120 U	UG/KG	
Benzo(a)anthracene	120 U	UG/KG	
Benzo(a)pyrene	120 U	UG/KG	
Benzo(b)fluoranthene	120 U	UG/KG	
Benzo(g,h,i)perylene	120 U	UG/KG	
Benzo(k)fluoranthene	120 U	UG/KG	
Bis(2-chloroethoxy) methane	120 U	UG/KG	
Bis(2-chloroethyl) ether	120 U	UG/KG	
Bis(2-ethylhexyl)phthalate	120 U	UG/KG	
Butyl benzyl phthalate	120 U	UG/KG	
Carbazole	120 U	UG/KG	
Chrysene	120 U	UG/KG	
Di-N-Butylphthalate	120 U	UG/KG	
Di-N-Octylphthalate	120 U	UG/KG	
Dibenzo(a,h)anthracene	120 U	UG/KG	
Dibenzofuran	120 U	UG/KG	
Diethylphthalate	120 U	UG/KG	
Dimethylphthalate	120 U	UG/KG	
Fluoranthene	120 U	UG/KG	
Fluorene	120 U	UG/KG	
Hexachlorobenzene	120 U	UG/KG	
Hexachlorobutadiene	120 U	UG/KG	
Hexachlorocyclopentadiene	120 U	UG/KG	
Hexachloroethane	120 U	UG/KG	
Indeno(1,2,3-cd)pyrene	120 U	UG/KG	
Isophorone	120 U	UG/KG	
N-nitroso-di-n-propylamine	120 U	UG/KG	
N-nitroso-diphenylamine	120 U	UG/KG	
Naphthalene	120 U	UG/KG	
Nitrobenzene	120 U	UG/KG	
Pentachlorophenol	2000 U	UG/KG	
Phenanthrene	120 U	UG/KG	
Phenol	400 U	UG/KG	
Pyrene	120 U	UG/KG	

SW Sample ID: MISS-00550 *Test Pit 3*
Sample Type: Subsurface Soil *TROV*
Sample Date: 08/31/1999

Analysis Name	Result	Unit	Exceedance
1,2,4-Trichlorobenzene	140 U	UG/KG	
1,2-Dichlorobenzene	140 U	UG/KG	
1,3-Dichlorobenzene	140 U	UG/KG	
1,4-Dichlorobenzene	140 U	UG/KG	
2,2'-Oxybis(1-Chloropropane)	140 U	UG/KG	
2,4,5-Trichlorophenol	2300 U	UG/KG	
2,4,6-Trichlorophenol	440 U	UG/KG	
2,4-Dichlorophenol	440 U	UG/KG	
2,4-Dimethylphenol	440 U	UG/KG	
2,4-Dinitrophenol	2300 U	UG/KG	
2,4-Dinitrotoluene	140 U	UG/KG	
2,6-Dinitrotoluene	140 U	UG/KG	
2-Chloronaphthalene	140 U	UG/KG	
2-Chlorophenol	440 U	UG/KG	
2-Methylnaphthalene	140 U	UG/KG	
2-Methylphenol	91 J	UG/KG	
2-Nitroaniline	2300 U	UG/KG	
2-Nitrophenol	440 U	UG/KG	
3,3'-Dichlorobenzidine	140 U	UG/KG	
3-Nitroaniline	2300 U	UG/KG	
4,6-Dinitro-2-Methylphenol	2300 U	UG/KG	
4-Bromophenyl-Phenylether	140 U	UG/KG	
4-Chloro-3-Methylphenol	140 U	UG/KG	
4-Chloroaniline	140 U	UG/KG	
4-Chlorophenyl-Phenyl Ether	140 U	UG/KG	
4-Methylphenol	440 U	UG/KG	
4-Nitroaniline	2300 U	UG/KG	
4-Nitrophenol	2300 U	UG/KG	
Acenaphthene	140 U	UG/KG	
Acenaphthylene	140 U	UG/KG	
Anthracene	140 U	UG/KG	
Benzo(a)anthracene	61 J	UG/KG	
Benzo(a)pyrene	140 U	UG/KG	
Benzo(b)fluoranthene	77 J	UG/KG	
Benzo(g,h,i)perylene	140 U	UG/KG	
Benzo(k)fluoranthene	140 U	UG/KG	
Bis(2-chloroethoxy) methane	140 U	UG/KG	
Bis(2-chloroethyl) ether	140 U	UG/KG	
Bis(2-ethylhexyl)phthalate	140 U	UG/KG	
Butyl benzyl phthalate	140 U	UG/KG	
Carbazole	140 U	UG/KG	
Chrysene	110 J	UG/KG	
Di-N-Butylphthalate	140 U	UG/KG	
Di-N-Octylphthalate	140 U	UG/KG	
Dibenzo(a,h)anthracene	140 U	UG/KG	
Dibenzofuran	140 U	UG/KG	
Diethylphthalate	140 U	UG/KG	
Dimethylphthalate	140 U	UG/KG	
Fluoranthene	85 J	UG/KG	
Fluorene	140 U	UG/KG	
Hexachlorobenzene	140 U	UG/KG	
Hexachlorobutadiene	140 U	UG/KG	
Hexachlorocyclopentadiene	140 U	UG/KG	
Hexachloroethane	140 U	UG/KG	
Indeno(1,2,3-cd)pyrene	140 U	UG/KG	
Isophorone	140 U	UG/KG	
N-nitroso-di-n-propylamine	140 U	UG/KG	
N-nitroso-diphenylamine	140 U	UG/KG	
Naphthalene	140 U	UG/KG	
Nitrobenzene	140 U	UG/KG	
Pentachlorophenol	2300 U	UG/KG	
Phenanthrene	170	UG/KG	
Phenol	440 U	UG/KG	
Pyrene	110 J	UG/KG	

Table E-1: Soil Chemical Data - SVOC Analyses
Engineering Test Pit Sampling
Maywood Interim Storage Site, Maywood NJ

Result Qualifier Codes

U - Analyzed for but not detected
J - Compound detected, value is estimated
UJ - Compound not detected, quantitation limit is estimat
B - Analyte in blank as well as sample
E - Exceeds calibration curve range
D - Identified at secondary diluation factor

SW Sample ID: MISS-00560 **Test Pit 3**
Sample Type: Subsurface Soil **TRUP**
Sample Date: 08/31/1999

Analysis Name	Result	Unit	Exceedance
1,2,4-Trichlorobenzene	150 U	UG/KG	
1,2-Dichlorobenzene	150 U	UG/KG	
1,3-Dichlorobenzene	150 U	UG/KG	
1,4-Dichlorobenzene	150 U	UG/KG	
2,2'-Oxybis(1-Chloropropane)	150 U	UG/KG	
2,4,5-Trichlorophenol	2500 U	UG/KG	
2,4,6-Trichlorophenol	480 U	UG/KG	
2,4-Dichlorophenol	480 U	UG/KG	
2,4-Dimethylphenol	480 U	UG/KG	
2,4-Dinitrophenol	2500 U	UG/KG	
2,4-Dinitrotoluene	150 U	UG/KG	
2,6-Dinitrotoluene	150 U	UG/KG	
2-Chloronaphthalene	150 U	UG/KG	
2-Chlorophenol	480 U	UG/KG	
2-Methylnaphthalene	150 U	UG/KG	
2-Methylphenol	480 U	UG/KG	
2-Nitroaniline	2500 U	UG/KG	
2-Nitrophenol	480 U	UG/KG	
3,3'-Dichlorobenzidine	150 U	UG/KG	
3-Nitroaniline	2500 U	UG/KG	
4,6-Dinitro-2-Methylphenol	2500 U	UG/KG	
4-Bromophenyl-Phenylether	150 U	UG/KG	
4-Chloro-3-Methylphenol	150 U	UG/KG	
4-Chloroaniline	150 U	UG/KG	
4-Chlorophenyl-Phenyl Ether	150 U	UG/KG	
4-Methylphenol	480 U	UG/KG	
4-Nitroaniline	2500 U	UG/KG	
4-Nitrophenol	2500 U	UG/KG	
Acenaphthene	150 U	UG/KG	
Acenaphthylene	150 U	UG/KG	
Anthracene	150 U	UG/KG	
Benzo(a)anthracene	65 J	UG/KG	
Benzo(a)pyrene	55 J	UG/KG	
Benzo(b)fluoranthene	77 J	UG/KG	
Benzo(g,h,i)perylene	150 U	UG/KG	
Benzo(k)fluoranthene	150 U	UG/KG	
Bis(2-chloroethoxy) methane	150 U	UG/KG	
Bis(2-chloroethyl) ether	150 U	UG/KG	
Bis(2-ethylhexyl)phthalate	150 U	UG/KG	
Butyl benzyl phthalate	150 U	UG/KG	
Carbazole	150 U	UG/KG	
Chrysene	100 J	UG/KG	
Di-N-Butylphthalate	150 U	UG/KG	
Di-N-Octylphthalate	150 U	UG/KG	
Dibenzo(a,h)anthracene	150 U	UG/KG	
Dibenzofuran	150 U	UG/KG	
Diethylphthalate	150 U	UG/KG	
Dimethylphthalate	150 U	UG/KG	
Fluoranthene	100 J	UG/KG	
Fluorene	150 U	UG/KG	
Hexachlorobenzene	150 U	UG/KG	
Hexachlorobutadiene	150 U	UG/KG	
Hexachlorocyclopentadiene	150 U	UG/KG	
Hexachloroethane	150 U	UG/KG	
Indeno(1,2,3-cd)pyrene	150 U	UG/KG	
Isophorone	150 U	UG/KG	
N-nitroso-di-n-propylamine	150 U	UG/KG	
N-nitroso-diphenylamine	150 U	UG/KG	
Naphthalene	150 U	UG/KG	
Nitrobenzene	150 U	UG/KG	
Pentachlorophenol	2500 U	UG/KG	
Phenanthrene	81 J	UG/KG	
Phenol	480 U	UG/KG	
Pyrene	130 J	UG/KG	

SW Sample ID: MISS-00570 **Test Pit 3**
Sample Type: Subsurface Soil **TRLO**
Sample Date: 08/31/1999

Analysis Name	Result	Unit	Exceedance
1,2,4-Trichlorobenzene	120 U	UG/KG	
1,2-Dichlorobenzene	120 U	UG/KG	
1,3-Dichlorobenzene	120 U	UG/KG	
1,4-Dichlorobenzene	120 U	UG/KG	
2,2'-Oxybis(1-Chloropropane)	120 U	UG/KG	
2,4,5-Trichlorophenol	2000 U	UG/KG	
2,4,6-Trichlorophenol	380 U	UG/KG	
2,4-Dichlorophenol	380 U	UG/KG	
2,4-Dimethylphenol	380 U	UG/KG	
2,4-Dinitrophenol	2000 U	UG/KG	
2,4-Dinitrotoluene	120 U	UG/KG	
2,6-Dinitrotoluene	120 U	UG/KG	
2-Chloronaphthalene	120 U	UG/KG	
2-Chlorophenol	380 U	UG/KG	
2-Methylnaphthalene	120 U	UG/KG	
2-Methylphenol	380 U	UG/KG	
2-Nitroaniline	2000 U	UG/KG	
2-Nitrophenol	380 U	UG/KG	
3,3'-Dichlorobenzidine	120 U	UG/KG	
3-Nitroaniline	2000 U	UG/KG	
4,6-Dinitro-2-Methylphenol	2000 U	UG/KG	
4-Bromophenyl-Phenylether	120 U	UG/KG	
4-Chloro-3-Methylphenol	120 U	UG/KG	
4-Chloroaniline	120 U	UG/KG	
4-Chlorophenyl-Phenyl Ether	120 U	UG/KG	
4-Methylphenol	380 U	UG/KG	
4-Nitroaniline	2000 U	UG/KG	
4-Nitrophenol	2000 U	UG/KG	
Acenaphthene	120 U	UG/KG	
Acenaphthylene	120 U	UG/KG	
Anthracene	120 U	UG/KG	
Benzo(a)anthracene	120 U	UG/KG	
Benzo(a)pyrene	120 U	UG/KG	
Benzo(b)fluoranthene	120 U	UG/KG	
Benzo(g,h,i)perylene	120 U	UG/KG	
Benzo(k)fluoranthene	120 U	UG/KG	
Bis(2-chloroethoxy) methane	120 U	UG/KG	
Bis(2-chloroethyl) ether	120 U	UG/KG	
Bis(2-ethylhexyl)phthalate	120 U	UG/KG	
Butyl benzyl phthalate	120 U	UG/KG	
Carbazole	120 U	UG/KG	
Chrysene	120 U	UG/KG	
Di-N-Butylphthalate	120 U	UG/KG	
Di-N-Octylphthalate	120 U	UG/KG	
Dibenzo(a,h)anthracene	120 U	UG/KG	
Dibenzofuran	120 U	UG/KG	
Diethylphthalate	120 U	UG/KG	
Dimethylphthalate	120 U	UG/KG	
Fluoranthene	120 U	UG/KG	
Fluorene	120 U	UG/KG	
Hexachlorobenzene	120 U	UG/KG	
Hexachlorobutadiene	120 U	UG/KG	
Hexachlorocyclopentadiene	120 U	UG/KG	
Hexachloroethane	120 U	UG/KG	
Indeno(1,2,3-cd)pyrene	120 U	UG/KG	
Isophorone	120 U	UG/KG	
N-nitroso-di-n-propylamine	120 U	UG/KG	
N-nitroso-diphenylamine	120 U	UG/KG	
Naphthalene	120 U	UG/KG	
Nitrobenzene	120 U	UG/KG	
Pentachlorophenol	2000 U	UG/KG	
Phenanthrene	120 U	UG/KG	
Phenol	380 U	UG/KG	
Pyrene	120 U	UG/KG	

SW Sample ID: MISS-00580 **Test Pit 3**
Sample Type: Subsurface Soil **REOV**
Sample Date: 08/31/1999

Analysis Name	Result	Unit	Exceedance
1,2,4-Trichlorobenzene	230 U	UG/KG	
1,2-Dichlorobenzene	230 U	UG/KG	
1,3-Dichlorobenzene	230 U	UG/KG	
1,4-Dichlorobenzene	230 U	UG/KG	
2,2'-Oxybis(1-Chloropropane)	230 U	UG/KG	
2,4,5-Trichlorophenol	3900 U	UG/KG	
2,4,6-Trichlorophenol	750 U	UG/KG	
2,4-Dichlorophenol	750 U	UG/KG	
2,4-Dimethylphenol	750 U	UG/KG	
2,4-Dinitrophenol	3900 U	UG/KG	
2,4-Dinitrotoluene	230 U	UG/KG	
2,6-Dinitrotoluene	230 U	UG/KG	
2-Chloronaphthalene	230 U	UG/KG	
2-Chlorophenol	750 U	UG/KG	
2-Methylnaphthalene	230 U	UG/KG	
2-Methylphenol	750 U	UG/KG	
2-Nitroaniline	3900 U	UG/KG	
2-Nitrophenol	750 U	UG/KG	
3,3'-Dichlorobenzidine	230 U	UG/KG	
3-Nitroaniline	3900 U	UG/KG	
4,6-Dinitro-2-Methylphenol	3900 U	UG/KG	
4-Bromophenyl-Phenylether	230 U	UG/KG	
4-Chloro-3-Methylphenol	230 U	UG/KG	
4-Chloroaniline	230 U	UG/KG	
4-Chlorophenyl-Phenyl Ether	230 U	UG/KG	
4-Methylphenol	750 U	UG/KG	
4-Nitroaniline	3900 U	UG/KG	
4-Nitrophenol	3900 U	UG/KG	
Acenaphthene	230 U	UG/KG	
Acenaphthylene	230 U	UG/KG	
Anthracene	230 U	UG/KG	
Benzo(a)anthracene	230 U	UG/KG	
Benzo(a)pyrene	230 U	UG/KG	
Benzo(b)fluoranthene	230 U	UG/KG	
Benzo(g,h,i)perylene	230 U	UG/KG	
Benzo(k)fluoranthene	230 U	UG/KG	
Bis(2-chloroethoxy) methane	230 U	UG/KG	
Bis(2-chloroethyl) ether	230 U	UG/KG	
Bis(2-ethylhexyl)phthalate	230 U	UG/KG	
Butyl benzyl phthalate	230 U	UG/KG	
Carbazole	230 U	UG/KG	
Chrysene	230 U	UG/KG	
Di-N-Butylphthalate	230 U	UG/KG	
Di-N-Octylphthalate	230 U	UG/KG	
Dibenzo(a,h)anthracene	230 U	UG/KG	
Dibenzofuran	230 U	UG/KG	
Diethylphthalate	230 U	UG/KG	
Dimethylphthalate	230 U	UG/KG	
Fluoranthene	230 U	UG/KG	
Fluorene	230 U	UG/KG	
Hexachlorobenzene	230 U	UG/KG	
Hexachlorobutadiene	230 U	UG/KG	
Hexachlorocyclopentadiene	230 U	UG/KG	
Hexachloroethane	230 U	UG/KG	
Indeno(1,2,3-cd)pyrene	230 U	UG/KG	
Isophorone	230 U	UG/KG	
N-nitroso-di-n-propylamine	230 U	UG/KG	
N-nitroso-diphenylamine	230 U	UG/KG	
Naphthalene	230 U	UG/KG	
Nitrobenzene	230 U	UG/KG	
Pentachlorophenol	3900 U	UG/KG	
Phenanthrene	230 U	UG/KG	
Phenol	750 U	UG/KG	
Pyrene	230 U	UG/KG	

Table E-1: Soil Chemical Data - SVOC Analyses
Engineering Test Pit Sampling
Maywood Interim Storage Site, Maywood NJ

Result Qualifier Codes

U - Analyzed for but not detected
J - Compound detected, value is estimated
UJ - Compound not detected, quantitation limit is estimat
B - Analyte in blank as well as sample
E - Exceeds calibration curve range
D - Identified at secondary diluation factor

SW Sample ID: MISS-00590   *Test Pit 3*
Sample Type: Subsurface Soil   *REUP*
Sample Date: 08/31/1999

Analysis Name	Result	Unit	Exceedance
1,2,4-Trichlorobenzene	200 U	UG/KG	
1,2-Dichlorobenzene	200 U	UG/KG	
1,3-Dichlorobenzene	200 U	UG/KG	
1,4-Dichlorobenzene	200 U	UG/KG	
2,2'-Oxybis(1-Chloropropane)	200 U	UG/KG	
2,4,5-Trichlorophenol	3300 U	UG/KG	
2,4,6-Trichlorophenol	650 U	UG/KG	
2,4-Dichlorophenol	650 U	UG/KG	
2,4-Dimethylphenol	650 U	UG/KG	
2,4-Dinitrophenol	3300 U	UG/KG	
2,4-Dinitrotoluene	200 U	UG/KG	
2,6-Dinitrotoluene	200 U	UG/KG	
2-Chloronaphthalene	200 U	UG/KG	
2-Chlorophenol	650 U	UG/KG	
2-Methylnaphthalene	200 U	UG/KG	
2-Methylphenol	650 U	UG/KG	
2-Nitroaniline	3300 U	UG/KG	
2-Nitrophenol	650 U	UG/KG	
3,3'-Dichlorobenzidine	200 U	UG/KG	
3-Nitroaniline	3300 U	UG/KG	
4,6-Dinitro-2-Methylphenol	3300 U	UG/KG	
4-Bromophenyl-Phenylether	200 U	UG/KG	
4-Chloro-3-Methylphenol	200 U	UG/KG	
4-Chloroaniline	200 U	UG/KG	
4-Chlorophenyl-Phenyl Ether	200 U	UG/KG	
4-Methylphenol	650 U	UG/KG	
4-Nitroaniline	3300 U	UG/KG	
4-Nitrophenol	3300 U	UG/KG	
Acenaphthene	200 U	UG/KG	
Acenaphthylene	200 U	UG/KG	
Anthracene	200 U	UG/KG	
Benzo(a)anthracene	200 U	UG/KG	
Benzo(a)pyrene	200 U	UG/KG	
Benzo(b)fluoranthene	200 U	UG/KG	
Benzo(g,h,i)perylene	200 U	UG/KG	
Benzo(k)fluoranthene	200 U	UG/KG	
Bis(2-chloroethoxy) methane	200 U	UG/KG	
Bis(2-chloroethyl) ether	200 U	UG/KG	
Bis(2-ethylhexyl)phthalate	200 U	UG/KG	
Butyl benzyl phthalate	200 U	UG/KG	
Carbazole	200 U	UG/KG	
Chrysene	200 U	UG/KG	
Di-N-Butylphthalate	200 U	UG/KG	
Di-N-Octylphthalate	200 U	UG/KG	
Dibenzo(a,h)anthracene	200 U	UG/KG	
Dibenzofuran	200 U	UG/KG	
Diethylphthalate	200 U	UG/KG	
Dimethylphthalate	200 U	UG/KG	
Fluoranthene	200 U	UG/KG	
Fluorene	200 U	UG/KG	
Hexachlorobenzene	200 U	UG/KG	
Hexachlorobutadiene	200 U	UG/KG	
Hexachlorocyclopentadiene	200 U	UG/KG	
Hexachloroethane	200 U	UG/KG	
Indeno(1,2,3-cd)pyrene	200 U	UG/KG	
Isophorone	200 U	UG/KG	
N-nitroso-di-n-propylamine	200 U	UG/KG	
N-nitroso-diphenylamine	200 U	UG/KG	
Naphthalene	200 U	UG/KG	
Nitrobenzene	200 U	UG/KG	
Pentachlorophenol	3300 U	UG/KG	
Phenanthrene	220	UG/KG	
Phenol	650 U	UG/KG	
Pyrene	80 J	UG/KG	

SW Sample ID: MISS-00600   *Test Pit 3*
Sample Type: Subsurface Soil   *RELO*
Sample Date: 08/31/1999

Analysis Name	Result	Unit	Exceedance
1,2,4-Trichlorobenzene	120 U	UG/KG	
1,2-Dichlorobenzene	120 U	UG/KG	
1,3-Dichlorobenzene	120 U	UG/KG	
1,4-Dichlorobenzene	120 U	UG/KG	
2,2'-Oxybis(1-Chloropropane)	120 U	UG/KG	
2,4,5-Trichlorophenol	2000 U	UG/KG	
2,4,6-Trichlorophenol	380 U	UG/KG	
2,4-Dichlorophenol	380 U	UG/KG	
2,4-Dimethylphenol	380 U	UG/KG	
2,4-Dinitrophenol	2000 U	UG/KG	
2,4-Dinitrotoluene	120 U	UG/KG	
2,6-Dinitrotoluene	120 U	UG/KG	
2-Chloronaphthalene	120 U	UG/KG	
2-Chlorophenol	380 U	UG/KG	
2-Methylnaphthalene	120 U	UG/KG	
2-Methylphenol	380 U	UG/KG	
2-Nitroaniline	2000 U	UG/KG	
2-Nitrophenol	380 U	UG/KG	
3,3'-Dichlorobenzidine	120 U	UG/KG	
3-Nitroaniline	2000 U	UG/KG	
4,6-Dinitro-2-Methylphenol	2000 U	UG/KG	
4-Bromophenyl-Phenylether	120 U	UG/KG	
4-Chloro-3-Methylphenol	120 U	UG/KG	
4-Chloroaniline	120 U	UG/KG	
4-Chlorophenyl-Phenyl Ether	120 U	UG/KG	
4-Methylphenol	380 U	UG/KG	
4-Nitroaniline	2000 U	UG/KG	
4-Nitrophenol	2000 U	UG/KG	
Acenaphthene	120 U	UG/KG	
Acenaphthylene	120 U	UG/KG	
Anthracene	120 U	UG/KG	
Benzo(a)anthracene	120 U	UG/KG	
Benzo(a)pyrene	120 U	UG/KG	
Benzo(b)fluoranthene	120 U	UG/KG	
Benzo(g,h,i)perylene	120 U	UG/KG	
Benzo(k)fluoranthene	120 U	UG/KG	
Bis(2-chloroethoxy) methane	120 U	UG/KG	
Bis(2-chloroethyl) ether	120 U	UG/KG	
Bis(2-ethylhexyl)phthalate	120 U	UG/KG	
Butyl benzyl phthalate	120 U	UG/KG	
Carbazole	120 U	UG/KG	
Chrysene	120 U	UG/KG	
Di-N-Butylphthalate	120 U	UG/KG	
Di-N-Octylphthalate	120 U	UG/KG	
Dibenzo(a,h)anthracene	120 U	UG/KG	
Dibenzofuran	120 U	UG/KG	
Diethylphthalate	120 U	UG/KG	
Dimethylphthalate	120 U	UG/KG	
Fluoranthene	120 U	UG/KG	
Fluorene	120 U	UG/KG	
Hexachlorobenzene	120 U	UG/KG	
Hexachlorobutadiene	120 U	UG/KG	
Hexachlorocyclopentadiene	120 U	UG/KG	
Hexachloroethane	120 U	UG/KG	
Indeno(1,2,3-cd)pyrene	120 U	UG/KG	
Isophorone	120 U	UG/KG	
N-nitroso-di-n-propylamine	120 U	UG/KG	
N-nitroso-diphenylamine	120 U	UG/KG	
Naphthalene	120 U	UG/KG	
Nitrobenzene	120 U	UG/KG	
Pentachlorophenol	2000 U	UG/KG	
Phenanthrene	120 U	UG/KG	
Phenol	380 U	UG/KG	
Pyrene	120 U	UG/KG	

SW Sample ID: MISS-00610   *Test Pit 3*
Sample Type: Subsurface Soil   *REUP*
Sample Date: 08/31/1999

Analysis Name	Result	Unit	Exceedance
1,2,4-Trichlorobenzene	200 U	UG/KG	
1,2-Dichlorobenzene	200 U	UG/KG	
1,3-Dichlorobenzene	200 U	UG/KG	
1,4-Dichlorobenzene	200 U	UG/KG	
2,2'-Oxybis(1-Chloropropane)	200 U	UG/KG	
2,4,5-Trichlorophenol	3300 U	UG/KG	
2,4,6-Trichlorophenol	650 U	UG/KG	
2,4-Dichlorophenol	650 U	UG/KG	
2,4-Dimethylphenol	650 U	UG/KG	
2,4-Dinitrophenol	3300 U	UG/KG	
2,4-Dinitrotoluene	200 U	UG/KG	
2,6-Dinitrotoluene	200 U	UG/KG	
2-Chloronaphthalene	200 U	UG/KG	
2-Chlorophenol	650 U	UG/KG	
2-Methylnaphthalene	200 U	UG/KG	
2-Methylphenol	650 U	UG/KG	
2-Nitroaniline	3300 U	UG/KG	
2-Nitrophenol	650 U	UG/KG	
3,3'-Dichlorobenzidine	200 U	UG/KG	
3-Nitroaniline	3300 U	UG/KG	
4,6-Dinitro-2-Methylphenol	3300 U	UG/KG	
4-Bromophenyl-Phenylether	200 U	UG/KG	
4-Chloro-3-Methylphenol	200 U	UG/KG	
4-Chloroaniline	200 U	UG/KG	
4-Chlorophenyl-Phenyl Ether	200 U	UG/KG	
4-Methylphenol	650 U	UG/KG	
4-Nitroaniline	3300 U	UG/KG	
4-Nitrophenol	3300 U	UG/KG	
Acenaphthene	200 U	UG/KG	
Acenaphthylene	200 U	UG/KG	
Anthracene	200 U	UG/KG	
Benzo(a)anthracene	200 U	UG/KG	
Benzo(a)pyrene	200 U	UG/KG	
Benzo(b)fluoranthene	200 U	UG/KG	
Benzo(g,h,i)perylene	200 U	UG/KG	
Benzo(k)fluoranthene	200 U	UG/KG	
Bis(2-chloroethoxy) methane	200 U	UG/KG	
Bis(2-chloroethyl) ether	200 U	UG/KG	
Bis(2-ethylhexyl)phthalate	200 U	UG/KG	
Butyl benzyl phthalate	200 U	UG/KG	
Carbazole	200 U	UG/KG	
Chrysene	200 U	UG/KG	
Di-N-Butylphthalate	200 U	UG/KG	
Di-N-Octylphthalate	200 U	UG/KG	
Dibenzo(a,h)anthracene	200 U	UG/KG	
Dibenzofuran	200 U	UG/KG	
Diethylphthalate	200 U	UG/KG	
Dimethylphthalate	200 U	UG/KG	
Fluoranthene	200 U	UG/KG	
Fluorene	200 U	UG/KG	
Hexachlorobenzene	200 U	UG/KG	
Hexachlorobutadiene	200 U	UG/KG	
Hexachlorocyclopentadiene	200 U	UG/KG	
Hexachloroethane	200 U	UG/KG	
Indeno(1,2,3-cd)pyrene	200 U	UG/KG	
Isophorone	200 U	UG/KG	
N-nitroso-di-n-propylamine	200 U	UG/KG	
N-nitroso-diphenylamine	200 U	UG/KG	
Naphthalene	200 U	UG/KG	
Nitrobenzene	200 U	UG/KG	
Pentachlorophenol	3300 U	UG/KG	
Phenanthrene	200 U	UG/KG	
Phenol	650 U	UG/KG	
Pyrene	200 U	UG/KG	

Table E-1: Soil Chemical Data - SVOC Analyses
Engineering Test Pit Sampling
Maywood Interim Storage Site, Maywood NJ

Result Qualifier Codes

- U - Analyzed for but not detected
- J - Compound detected, value is estimated
- UJ - Compound not detected, quantitation limit is estimat
- B - Analyte in blank as well as sample
- E - Exceeds calibration curve range
- D - Identified at secondary dilution factor

	MISS-00710			MISS-00720			MISS-00730		
SW Sample ID:	MISS-00710	Test Pit 4	SUOV	MISS-00720	Test Pit 4	SUUP	MISS-00730	Test Pit 4	SULO
Sample Type:	Subsurface Soil			Subsurface Soil			Subsurface Soil		
Sample Date:	09/01/1999			09/01/1999			09/01/1999		
Analysis Name	**Result**	**Unit**	**Exceedance**	**Result**	**Unit**	**Exceedance**	**Result**	**Unit**	**Exceedance**
1,2,4-Trichlorobenzene	180 U	UG/KG		120 U	UG/KG		110 U	UG/KG	
1,2-Dichlorobenzene	180 U	UG/KG		120 U	UG/KG		110 U	UG/KG	
1,3-Dichlorobenzene	180 U	UG/KG		120 U	UG/KG		110 U	UG/KG	
1,4-Dichlorobenzene	180 U	UG/KG		120 U	UG/KG		110 U	UG/KG	
2,2'-Oxybis(1-Chloropropane)	180 U	UG/KG		120 U	UG/KG		110 U	UG/KG	
2,4,5-Trichlorophenol	3100 U	UG/KG		2000 U	UG/KG		1800 U	UG/KG	
2,4,6-Trichlorophenol	610 U	UG/KG		390 U	UG/KG		350 U	UG/KG	
2,4-Dichlorophenol	610 U	UG/KG		390 U	UG/KG		350 U	UG/KG	
2,4-Dimethylphenol	610 U	UG/KG		390 U	UG/KG		350 U	UG/KG	
2,4-Dinitrophenol	3100 U	UG/KG		2000 U	UG/KG		1800 U	UG/KG	
2,4-Dinitrotoluene	180 U	UG/KG		120 U	UG/KG		110 U	UG/KG	
2,6-Dinitrotoluene	180 U	UG/KG		120 U	UG/KG		110 U	UG/KG	
2-Chloronaphthalene	180 U	UG/KG		120 U	UG/KG		110 U	UG/KG	
2-Chlorophenol	610 U	UG/KG		390 U	UG/KG		350 U	UG/KG	
2-Methylnaphthalene	180 U	UG/KG		120 U	UG/KG		110 U	UG/KG	
2-Methylphenol	610 U	UG/KG		390 U	UG/KG		350 U	UG/KG	
2-Nitroaniline	3100 U	UG/KG		2000 U	UG/KG		1800 U	UG/KG	
2-Nitrophenol	610 U	UG/KG		390 U	UG/KG		350 U	UG/KG	
3,3'-Dichlorobenzidine	180 U	UG/KG		120 U	UG/KG		110 U	UG/KG	
3-Nitroaniline	3100 U	UG/KG		2000 U	UG/KG		1800 U	UG/KG	
4,6-Dinitro-2-Methylphenol	3100 U	UG/KG		2000 U	UG/KG		1800 U	UG/KG	
4-Bromophenyl-Phenylether	180 U	UG/KG		120 U	UG/KG		110 U	UG/KG	
4-Chloro-3-Methylphenol	180 U	UG/KG		120 U	UG/KG		110 U	UG/KG	
4-Chloroaniline	180 U	UG/KG		120 U	UG/KG		110 U	UG/KG	
4-Chlorophenyl-Phenyl Ether	180 U	UG/KG		120 U	UG/KG		110 U	UG/KG	
4-Methylphenol	610 U	UG/KG		390 U	UG/KG		350 U	UG/KG	
4-Nitroaniline	3100 U	UG/KG		2000 U	UG/KG		1800 U	UG/KG	
4-Nitrophenol	3100 U	UG/KG		2000 U	UG/KG		1800 U	UG/KG	
Acenaphthene	180 U	UG/KG		120 U	UG/KG		110 U	UG/KG	
Acenaphthylene	180 U	UG/KG		120 U	UG/KG		110 U	UG/KG	
Anthracene	180 U	UG/KG		120 U	UG/KG		110 U	UG/KG	
Benzo(a)anthracene	110 J	UG/KG		57 J	UG/KG		110 U	UG/KG	
Benzo(a)pyrene	100 J	UG/KG		43 J	UG/KG		110 U	UG/KG	
Benzo(b)fluoranthene	160 J	UG/KG		120 U	UG/KG		110 U	UG/KG	
Benzo(g,h,i)perylene	68 J	UG/KG		120 U	UG/KG		110 U	UG/KG	
Benzo(k)fluoranthene	65 J	UG/KG		120 U	UG/KG		110 U	UG/KG	
Bis(2-chloroethoxy) methane	180 U	UG/KG		120 U	UG/KG		110 U	UG/KG	
Bis(2-chloroethyl) ether	180 U	UG/KG		120 U	UG/KG		110 U	UG/KG	
Bis(2-ethylhexyl)phthalate	62 JB	UG/KG		120 U	UG/KG		43 JB	UG/KG	
Butyl benzyl phthalate	180 U	UG/KG		120 U	UG/KG		110 U	UG/KG	
Carbazole	180 U	UG/KG		120 U	UG/KG		110 U	UG/KG	
Chrysene	180	UG/KG		110 J	UG/KG		110 U	UG/KG	
Di-N-Butylphthalate	180 U	UG/KG		120 U	UG/KG		110 U	UG/KG	
Di-N-Octylphthalate	180 U	UG/KG		120 U	UG/KG		110 U	UG/KG	
Dibenzo(a,h)anthracene	180 U	UG/KG		120 U	UG/KG		110 U	UG/KG	
Dibenzofuran	180 U	UG/KG		120 U	UG/KG		110 U	UG/KG	
Diethylphthalate	180 U	UG/KG		120 U	UG/KG		110 U	UG/KG	
Dimethylphthalate	180 U	UG/KG		120 U	UG/KG		110 U	UG/KG	
Fluoranthene	170 J	UG/KG		76 J	UG/KG		110 U	UG/KG	
Fluorene	180 U	UG/KG		120 U	UG/KG		110 U	UG/KG	
Hexachlorobenzene	180 U	UG/KG		120 U	UG/KG		110 U	UG/KG	
Hexachlorobutadiene	180 U	UG/KG		120 U	UG/KG		110 U	UG/KG	
Hexachlorocyclopentadiene	180 U	UG/KG		120 U	UG/KG		110 U	UG/KG	
Hexachloroethane	180 U	UG/KG		120 U	UG/KG		110 U	UG/KG	
Indeno(1,2,3-cd)pyrene	77 J	UG/KG		120 U	UG/KG		110 U	UG/KG	
Isophorone	180 U	UG/KG		120 U	UG/KG		110 U	UG/KG	
N-nitroso-di-n-propylamine	180 U	UG/KG		120 U	UG/KG		110 U	UG/KG	
N-nitroso-diphenylamine	180 U	UG/KG		120 U	UG/KG		110 U	UG/KG	
Naphthalene	180 U	UG/KG		120 U	UG/KG		60 J	UG/KG	
Nitrobenzene	180 U	UG/KG		120 U	UG/KG		110 U	UG/KG	
Pentachlorophenol	3100 U	UG/KG		2000 U	UG/KG		1800 U	UG/KG	
Phenanthrene	110 J	UG/KG		62 J	UG/KG		38 J	UG/KG	
Phenol	610 U	UG/KG		530	UG/KG		350 U	UG/KG	
Pyrene	230	UG/KG		95 J	UG/KG		110 U	UG/KG	

Table E-1: Soil Chemical Data - SVOC Analyses
Engineering Test Pit Sampling
Maywood Interim Storage Site, Maywood NJ

Result Qualifier Codes

U - Analyzed for but not detected
J - Compound detected, value is estimated
UJ - Compound not detected, quantitation limit is estimat
B - Analyte in blank as well as sample
E - Exceeds calibration curve range
D - Identified at secondary diluation factor

	SW Sample ID: MISS-00740, Sample Type: Subsurface Soil, Sample Date: 09/01/1999, Test Pit 4 TROV			SW Sample ID: MISS-00750, Sample Type: Subsurface Soil, Sample Date: 09/01/1999, Test Pit 4 TRUP			SW Sample ID: MISS-00760, Sample Type: Subsurface Soil, Sample Date: 09/01/1999, Test Pit 4 TRLO		
Analysis Name	Result	Unit	Exceedance	Result	Unit	Exceedance	Result	Unit	Exceedance
1,2,4-Trichlorobenzene	170 U	UG/KG		110 U	UG/KG		110 U	UG/KG	
1,2-Dichlorobenzene	170 U	UG/KG		110 U	UG/KG		110 U	UG/KG	
1,3-Dichlorobenzene	170 U	UG/KG		110 U	UG/KG		110 U	UG/KG	
1,4-Dichlorobenzene	170 U	UG/KG		110 U	UG/KG		110 U	UG/KG	
2,2'-Oxybis(1-Chloropropane)	170 U	UG/KG		110 U	UG/KG		110 U	UG/KG	
2,4,5-Trichlorophenol	2900 U	UG/KG		1900 U	UG/KG		1900 U	UG/KG	
2,4,6-Trichlorophenol	560 U	UG/KG		380 U	UG/KG		370 U	UG/KG	
2,4-Dichlorophenol	560 U	UG/KG		380 U	UG/KG		370 U	UG/KG	
2,4-Dimethylphenol	560 U	UG/KG		380 U	UG/KG		370 U	UG/KG	
2,4-Dinitrophenol	2900 U	UG/KG		1900 U	UG/KG		1900 U	UG/KG	
2,4-Dinitrotoluene	170 U	UG/KG		110 U	UG/KG		110 U	UG/KG	
2,6-Dinitrotoluene	170 U	UG/KG		110 U	UG/KG		110 U	UG/KG	
2-Chloronaphthalene	170 U	UG/KG		110 U	UG/KG		110 U	UG/KG	
2-Chlorophenol	560 U	UG/KG		380 U	UG/KG		370 U	UG/KG	
2-Methylnaphthalene	170 U	UG/KG		110 U	UG/KG		110 U	UG/KG	
2-Methylphenol	560 U	UG/KG		380 U	UG/KG		370 U	UG/KG	
2-Nitroaniline	2900 U	UG/KG		1900 U	UG/KG		1900 U	UG/KG	
2-Nitrophenol	560 U	UG/KG		380 U	UG/KG		370 U	UG/KG	
3,3'-Dichlorobenzidine	170 U	UG/KG		110 U	UG/KG		110 U	UG/KG	
3-Nitroaniline	2900 U	UG/KG		1900 U	UG/KG		1900 U	UG/KG	
4,6-Dinitro-2-Methylphenol	2900 U	UG/KG		1900 U	UG/KG		1900 U	UG/KG	
4-Bromophenyl-Phenylether	170 U	UG/KG		110 U	UG/KG		110 U	UG/KG	
4-Chloro-3-Methylphenol	170 U	UG/KG		110 U	UG/KG		110 U	UG/KG	
4-Chloroaniline	170 U	UG/KG		110 U	UG/KG		110 U	UG/KG	
4-Chlorophenyl-Phenyl Ether	170 U	UG/KG		110 U	UG/KG		110 U	UG/KG	
4-Methylphenol	560 U	UG/KG		380 U	UG/KG		370 U	UG/KG	
4-Nitroaniline	2900 U	UG/KG		1900 U	UG/KG		1900 U	UG/KG	
4-Nitrophenol	2900 U	UG/KG		1900 U	UG/KG		1900 U	UG/KG	
Acenaphthene	170 U	UG/KG		110 U	UG/KG		110 U	UG/KG	
Acenaphthylene	82 J	UG/KG		110 U	UG/KG		110 U	UG/KG	
Anthracene	59 J	UG/KG		110 U	UG/KG		110 U	UG/KG	
Benzo(a)anthracene	310	UG/KG		110 U	UG/KG		110 U	UG/KG	
Benzo(a)pyrene	250	UG/KG		110 U	UG/KG		110 U	UG/KG	
Benzo(b)fluoranthene	410	UG/KG		110 U	UG/KG		110 U	UG/KG	
Benzo(g,h,i)perylene	180	UG/KG		110 U	UG/KG		110 U	UG/KG	
Benzo(k)fluoranthene	110 J	UG/KG		110 U	UG/KG		110 U	UG/KG	
Bis(2-chloroethoxy) methane	170 U	UG/KG		110 U	UG/KG		110 U	UG/KG	
Bis(2-chloroethyl) ether	170 U	UG/KG		110 U	UG/KG		110 U	UG/KG	
Bis(2-ethylhexyl)phthalate	76 JB	UG/KG		89 JB	UG/KG		110 U	UG/KG	
Butyl benzyl phthalate	170 U	UG/KG		110 U	UG/KG		110 U	UG/KG	
Carbazole	170 U	UG/KG		110 U	UG/KG		110 U	UG/KG	
Chrysene	520	UG/KG		110 U	UG/KG		110 U	UG/KG	
Di-N-Butylphthalate	170 U	UG/KG		110 U	UG/KG		110 U	UG/KG	
Di-N-Octylphthalate	170 U	UG/KG		110 U	UG/KG		110 U	UG/KG	
Dibenzo(a,h)anthracene	61 J	UG/KG		110 U	UG/KG		110 U	UG/KG	
Dibenzofuran	170 U	UG/KG		110 U	UG/KG		110 U	UG/KG	
Diethylphthalate	170 U	UG/KG		110 U	UG/KG		110 U	UG/KG	
Dimethylphthalate	170 U	UG/KG		110 U	UG/KG		110 U	UG/KG	
Fluoranthene	560	UG/KG		110 U	UG/KG		110 U	UG/KG	
Fluorene	170 U	UG/KG		110 U	UG/KG		110 U	UG/KG	
Hexachlorobenzene	170 U	UG/KG		110 U	UG/KG		110 U	UG/KG	
Hexachlorobutadiene	170 U	UG/KG		110 U	UG/KG		110 U	UG/KG	
Hexachlorocyclopentadiene	170 U	UG/KG		110 U	UG/KG		110 U	UG/KG	
Hexachloroethane	170 U	UG/KG		110 U	UG/KG		110 U	UG/KG	
Indeno(1,2,3-cd)pyrene	190	UG/KG		110 U	UG/KG		110 U	UG/KG	
Isophorone	170 U	UG/KG		110 U	UG/KG		110 U	UG/KG	
N-nitroso-di-n-propylamine	170 U	UG/KG		110 U	UG/KG		110 U	UG/KG	
N-nitroso-diphenylamine	170 U	UG/KG		110 U	UG/KG		110 U	UG/KG	
Naphthalene	170 U	UG/KG		110 U	UG/KG		110 U	UG/KG	
Nitrobenzene	170 U	UG/KG		110 U	UG/KG		110 U	UG/KG	
Pentachlorophenol	2900 U	UG/KG		1900 U	UG/KG		1900 U	UG/KG	
Phenanthrene	340	UG/KG		110 U	UG/KG		110 U	UG/KG	
Phenol	560 U	UG/KG		380 U	UG/KG		39 J	UG/KG	
Pyrene	700	UG/KG		110 U	UG/KG		110 U	UG/KG	

Table E-1: Soil Chemical Data - SVOC Analyses
Engineering Test Pit Sampling
Maywood Interim Storage Site, Maywood NJ

Result Qualifier Codes

U - Analyzed for but not detected
J - Compound detected, value is estimated
UJ - Compound not detected, quantitation limit is estimat
B - Analyte in blank as well as sample
E - Exceeds calibration curve range
D - Identified at secondary dilution factor

SW Sample ID:	MISS-00770	Test Pit 4		SW Sample ID:	MISS-0078X	Test Pit 4		SW Sample ID:	MISS-00790	Test Pit 4	
Sample Type:	Subsurface Soil	REOV		Sample Type:	Subsurface Soil	REUP		Sample Type:	Subsurface Soil	RELO	
Sample Date:	09/01/1999			Sample Date:	09/01/1999			Sample Date:	09/01/1999		
Analysis Name	**Result**	**Unit**	**Exceedance**	**Analysis Name**	**Result**	**Unit**	**Exceedance**	**Analysis Name**	**Result**	**Unit**	**Exceedance**
1,2,4-Trichlorobenzene	150 U	UG/KG		1,2,4-Trichlorobenzene	180 U	UG/KG		1,2,4-Trichlorobenzene	130 U	UG/KG	
1,2-Dichlorobenzene	150 U	UG/KG		1,2-Dichlorobenzene	180 U	UG/KG		1,2-Dichlorobenzene	130 U	UG/KG	
1,3-Dichlorobenzene	150 U	UG/KG		1,3-Dichlorobenzene	180 U	UG/KG		1,3-Dichlorobenzene	130 U	UG/KG	
1,4-Dichlorobenzene	150 U	UG/KG		1,4-Dichlorobenzene	180 U	UG/KG		1,4-Dichlorobenzene	130 U	UG/KG	
2,2'-Oxybis(1-Chloropropane)	150 U	UG/KG		2,2'-Oxybis(1-Chloropropane)	180 U	UG/KG		2,2'-Oxybis(1-Chloropropane)	130 U	UG/KG	
2,4,5-Trichlorophenol	2500 U	UG/KG		2,4,5-Trichlorophenol	3000 U	UG/KG		2,4,5-Trichlorophenol	2200 U	UG/KG	
2,4,6-Trichlorophenol	490 U	UG/KG		2,4,6-Trichlorophenol	580 U	UG/KG		2,4,6-Trichlorophenol	420 U	UG/KG	
2,4-Dichlorophenol	490 U	UG/KG		2,4-Dichlorophenol	580 U	UG/KG		2,4-Dichlorophenol	420 U	UG/KG	
2,4-Dimethylphenol	490 U	UG/KG		2,4-Dimethylphenol	580 U	UG/KG		2,4-Dimethylphenol	420 U	UG/KG	
2,4-Dinitrophenol	2500 U	UG/KG		2,4-Dinitrophenol	3000 U	UG/KG		2,4-Dinitrophenol	2200 U	UG/KG	
2,4-Dinitrotoluene	150 U	UG/KG		2,4-Dinitrotoluene	180 U	UG/KG		2,4-Dinitrotoluene	130 U	UG/KG	
2,6-Dinitrotoluene	150 U	UG/KG		2,6-Dinitrotoluene	180 U	UG/KG		2,6-Dinitrotoluene	130 U	UG/KG	
2-Chloronaphthalene	150 U	UG/KG		2-Chloronaphthalene	180 U	UG/KG		2-Chloronaphthalene	130 U	UG/KG	
2-Chlorophenol	490 U	UG/KG		2-Chlorophenol	580 U	UG/KG		2-Chlorophenol	420 U	UG/KG	
2-Methylnaphthalene	150 U	UG/KG		2-Methylnaphthalene	180 U	UG/KG		2-Methylnaphthalene	130 U	UG/KG	
2-Methylphenol	490 U	UG/KG		2-Methylphenol	580 U	UG/KG		2-Methylphenol	420 U	UG/KG	
2-Nitroaniline	2500 U	UG/KG		2-Nitroaniline	3000 U	UG/KG		2-Nitroaniline	2200 U	UG/KG	
2-Nitrophenol	490 U	UG/KG		2-Nitrophenol	580 U	UG/KG		2-Nitrophenol	420 U	UG/KG	
3,3'-Dichlorobenzidine	150 U	UG/KG		3,3'-Dichlorobenzidine	180 U	UG/KG		3,3'-Dichlorobenzidine	130 U	UG/KG	
3-Nitroaniline	2500 U	UG/KG		3-Nitroaniline	3000 U	UG/KG		3-Nitroaniline	2200 U	UG/KG	
4,6-Dinitro-2-Methylphenol	2500 U	UG/KG		4,6-Dinitro-2-Methylphenol	3000 U	UG/KG		4,6-Dinitro-2-Methylphenol	2200 U	UG/KG	
4-Bromophenyl-Phenylether	150 U	UG/KG		4-Bromophenyl-Phenylether	180 U	UG/KG		4-Bromophenyl-Phenylether	130 U	UG/KG	
4-Chloro-3-Methylphenol	150 U	UG/KG		4-Chloro-3-Methylphenol	180 U	UG/KG		4-Chloro-3-Methylphenol	130 U	UG/KG	
4-Chloroaniline	150 U	UG/KG		4-Chloroaniline	180 U	UG/KG		4-Chloroaniline	130 U	UG/KG	
4-Chlorophenyl-Phenyl Ether	150 U	UG/KG		4-Chlorophenyl-Phenyl Ether	180 U	UG/KG		4-Chlorophenyl-Phenyl Ether	130 U	UG/KG	
4-Methylphenol	490 U	UG/KG		4-Methylphenol	580 U	UG/KG		4-Methylphenol	420 U	UG/KG	
4-Nitroaniline	2500 U	UG/KG		4-Nitroaniline	3000 U	UG/KG		4-Nitroaniline	2200 U	UG/KG	
4-Nitrophenol	2500 U	UG/KG		4-Nitrophenol	3000 U	UG/KG		4-Nitrophenol	2200 U	UG/KG	
Acenaphthene	150 U	UG/KG		Acenaphthene	180 U	UG/KG		Acenaphthene	130 U	UG/KG	
Acenaphthylene	61 J	UG/KG		Acenaphthylene	180 U	UG/KG		Acenaphthylene	130 U	UG/KG	
Anthracene	50 J	UG/KG		Anthracene	180 U	UG/KG		Anthracene	130 U	UG/KG	
Benzo(a)anthracene	200	UG/KG		Benzo(a)anthracene	96 J	UG/KG		Benzo(a)anthracene	130 U	UG/KG	
Benzo(a)pyrene	180	UG/KG		Benzo(a)pyrene	80 J	UG/KG		Benzo(a)pyrene	130 U	UG/KG	
Benzo(b)fluoranthene	340	UG/KG		Benzo(b)fluoranthene	180 U	UG/KG		Benzo(b)fluoranthene	130 U	UG/KG	
Benzo(g,h,i)perylene	110 J	UG/KG		Benzo(g,h,i)perylene	180 U	UG/KG		Benzo(g,h,i)perylene	130 U	UG/KG	
Benzo(k)fluoranthene	87 J	UG/KG		Benzo(k)fluoranthene	180 U	UG/KG		Benzo(k)fluoranthene	130 U	UG/KG	
Bis(2-chloroethoxy) methane	150 U	UG/KG		Bis(2-chloroethoxy) methane	180 U	UG/KG		Bis(2-chloroethoxy) methane	130 U	UG/KG	
Bis(2-chloroethyl) ether	150 U	UG/KG		Bis(2-chloroethyl) ether	180 U	UG/KG		Bis(2-chloroethyl) ether	130 U	UG/KG	
Bis(2-ethylhexyl)phthalate	210 B	UG/KG		Bis(2-ethylhexyl)phthalate	180 U	UG/KG		Bis(2-ethylhexyl)phthalate	200 B	UG/KG	
Butyl benzyl phthalate	150 U	UG/KG		Butyl benzyl phthalate	180 U	UG/KG		Butyl benzyl phthalate	130 U	UG/KG	
Carbazole	150 U	UG/KG		Carbazole	180 U	UG/KG		Carbazole	130 U	UG/KG	
Chrysene	400	UG/KG		Chrysene	160 J	UG/KG		Chrysene	130 U	UG/KG	
Di-N-Butylphthalate	150 U	UG/KG		Di-N-Butylphthalate	180 U	UG/KG		Di-N-Butylphthalate	130 U	UG/KG	
Di-N-Octylphthalate	150 U	UG/KG		Di-N-Octylphthalate	180 U	UG/KG		Di-N-Octylphthalate	130 U	UG/KG	
Dibenzo(a,h)anthracene	59 J	UG/KG		Dibenzo(a,h)anthracene	180 U	UG/KG		Dibenzo(a,h)anthracene	130 U	UG/KG	
Dibenzofuran	150 U	UG/KG		Dibenzofuran	180 U	UG/KG		Dibenzofuran	130 U	UG/KG	
Diethylphthalate	150 U	UG/KG		Diethylphthalate	180 U	UG/KG		Diethylphthalate	130 U	UG/KG	
Dimethylphthalate	150 U	UG/KG		Dimethylphthalate	180 U	UG/KG		Dimethylphthalate	130 U	UG/KG	
Fluoranthene	210	UG/KG		Fluoranthene	140 J	UG/KG		Fluoranthene	130 U	UG/KG	
Fluorene	150 U	UG/KG		Fluorene	180 U	UG/KG		Fluorene	130 U	UG/KG	
Hexachlorobenzene	150 U	UG/KG		Hexachlorobenzene	180 U	UG/KG		Hexachlorobenzene	130 U	UG/KG	
Hexachlorobutadiene	150 U	UG/KG		Hexachlorobutadiene	180 U	UG/KG		Hexachlorobutadiene	130 U	UG/KG	
Hexachlorocyclopentadiene	150 U	UG/KG		Hexachlorocyclopentadiene	180 U	UG/KG		Hexachlorocyclopentadiene	130 U	UG/KG	
Hexachloroethane	150 U	UG/KG		Hexachloroethane	180 U	UG/KG		Hexachloroethane	130 U	UG/KG	
Indeno(1,2,3-cd)pyrene	140 J	UG/KG		Indeno(1,2,3-cd)pyrene	180 U	UG/KG		Indeno(1,2,3-cd)pyrene	130 U	UG/KG	
Isophorone	150 U	UG/KG		Isophorone	180 U	UG/KG		Isophorone	130 U	UG/KG	
N-nitroso-di-n-propylamine	150 U	UG/KG		N-nitroso-di-n-propylamine	180 U	UG/KG		N-nitroso-di-n-propylamine	130 U	UG/KG	
N-nitroso-diphenylamine	150 U	UG/KG		N-nitroso-diphenylamine	180 U	UG/KG		N-nitroso-diphenylamine	130 U	UG/KG	
Naphthalene	150 U	UG/KG		Naphthalene	180 U	UG/KG		Naphthalene	130 U	UG/KG	
Nitrobenzene	150 U	UG/KG		Nitrobenzene	180 U	UG/KG		Nitrobenzene	130 U	UG/KG	
Pentachlorophenol	2500 U	UG/KG		Pentachlorophenol	3000 U	UG/KG		Pentachlorophenol	2200 U	UG/KG	
Phenanthrene	130 J	UG/KG		Phenanthrene	84 J	UG/KG		Phenanthrene	130 U	UG/KG	
Phenol	490 U	UG/KG		Phenol	260 J	UG/KG		Phenol	420 U	UG/KG	
Pyrene	370	UG/KG		Pyrene	190	UG/KG		Pyrene	130 U	UG/KG	

Table E-1: Soil Chemical Data - SVOC Analyses
Engineering Test Pit Sampling
Maywood Interim Storage Site, Maywood NJ

Result Qualifier Codes

- U - Analyzed for but not detected
- J - Compound detected, value is estimated
- UJ - Compound not detected, quantitation limit is estimat
- B - Analyte in blank as well as sample
- E - Exceeds calibration curve range
- D - Identified at secondary diluation factor

SW Sample ID: MISS-00800 — *Test Pit 4*
Sample Type: Subsurface Soil — *RELO*
Sample Date: 09/01/1999

Analysis Name	Result	Unit	Exceedance
1,2,4-Trichlorobenzene	120 U	UG/KG	
1,2-Dichlorobenzene	120 U	UG/KG	
1,3-Dichlorobenzene	120 U	UG/KG	
1,4-Dichlorobenzene	120 U	UG/KG	
2,2'-Oxybis(1-Chloropropane)	120 U	UG/KG	
2,4,5-Trichlorophenol	2100 U	UG/KG	
2,4,6-Trichlorophenol	400 U	UG/KG	
2,4-Dichlorophenol	400 U	UG/KG	
2,4-Dimethylphenol	400 U	UG/KG	
2,4-Dinitrophenol	2100 U	UG/KG	
2,4-Dinitrotoluene	120 U	UG/KG	
2,6-Dinitrotoluene	120 U	UG/KG	
2-Chloronaphthalene	120 U	UG/KG	
2-Chlorophenol	400 U	UG/KG	
2-Methylnaphthalene	120 U	UG/KG	
2-Methylphenol	400 U	UG/KG	
2-Nitroaniline	2100 U	UG/KG	
2-Nitrophenol	400 U	UG/KG	
3,3'-Dichlorobenzidine	120 U	UG/KG	
3-Nitroaniline	2100 U	UG/KG	
4,6-Dinitro-2-Methylphenol	2100 U	UG/KG	
4-Bromophenyl-Phenylether	120 U	UG/KG	
4-Chloro-3-Methylphenol	120 U	UG/KG	
4-Chloroaniline	120 U	UG/KG	
4-Chlorophenyl-Phenyl Ether	120 U	UG/KG	
4-Methylphenol	400 U	UG/KG	
4-Nitroaniline	2100 U	UG/KG	
4-Nitrophenol	2100 U	UG/KG	
Acenaphthene	120 U	UG/KG	
Acenaphthylene	120 U	UG/KG	
Anthracene	120 U	UG/KG	
Benzo(a)anthracene	120 U	UG/KG	
Benzo(a)pyrene	120 U	UG/KG	
Benzo(b)fluoranthene	120 U	UG/KG	
Benzo(g,h,i)perylene	120 U	UG/KG	
Benzo(k)fluoranthene	120 U	UG/KG	
Bis(2-chloroethoxy) methane	120 U	UG/KG	
Bis(2-chloroethyl) ether	120 U	UG/KG	
Bis(2-ethylhexyl)phthalate	150 B	UG/KG	
Butyl benzyl phthalate	120 U	UG/KG	
Carbazole	120 U	UG/KG	
Chrysene	120 U	UG/KG	
Di-N-Butylphthalate	120 U	UG/KG	
Di-N-Octylphthalate	120 U	UG/KG	
Dibenzo(a,h)anthracene	120 U	UG/KG	
Dibenzofuran	120 U	UG/KG	
Diethylphthalate	120 U	UG/KG	
Dimethylphthalate	120 U	UG/KG	
Fluoranthene	120 U	UG/KG	
Fluorene	120 U	UG/KG	
Hexachlorobenzene	120 U	UG/KG	
Hexachlorobutadiene	120 U	UG/KG	
Hexachlorocyclopentadiene	120 U	UG/KG	
Hexachloroethane	120 U	UG/KG	
Indeno(1,2,3-cd)pyrene	120 U	UG/KG	
Isophorone	120 U	UG/KG	
N-nitroso-di-n-propylamine	120 U	UG/KG	
N-nitroso-diphenylamine	120 U	UG/KG	
Naphthalene	120 U	UG/KG	
Nitrobenzene	120 U	UG/KG	
Pentachlorophenol	2100 U	UG/KG	
Phenanthrene	120 U	UG/KG	
Phenol	400 U	UG/KG	
Pyrene	120 U	UG/KG	

SW Sample ID: MISS-00900 — *Test Pit 5*
Sample Type: Subsurface Soil — *OVER*
Sample Date: 08/18/1999

Analysis Name	Result	Unit	Exceedance
1,2,4-Trichlorobenzene	440 U	UG/KG	
1,2-Dichlorobenzene	440 U	UG/KG	
1,3-Dichlorobenzene	440 U	UG/KG	
1,4-Dichlorobenzene	440 U	UG/KG	
2,2'-Oxybis(1-Chloropropane)	440 U	UG/KG	
2,4,5-Trichlorophenol	7500 U	UG/KG	
2,4,6-Trichlorophenol	1500 U	UG/KG	
2,4-Dichlorophenol	1500 U	UG/KG	
2,4-Dimethylphenol	1500 U	UG/KG	
2,4-Dinitrophenol	7500 U	UG/KG	
2,4-Dinitrotoluene	440 U	UG/KG	
2,6-Dinitrotoluene	440 U	UG/KG	
2-Chloronaphthalene	440 U	UG/KG	
2-Chlorophenol	1500 U	UG/KG	
2-Methylnaphthalene	440 U	UG/KG	
2-Methylphenol	1500 U	UG/KG	
2-Nitroaniline	7500 U	UG/KG	
2-Nitrophenol	1500 U	UG/KG	
3,3'-Dichlorobenzidine	440 U	UG/KG	
3-Nitroaniline	7500 U	UG/KG	
4,6-Dinitro-2-Methylphenol	7500 U	UG/KG	
4-Bromophenyl-Phenylether	440 U	UG/KG	
4-Chloro-3-Methylphenol	440 U	UG/KG	
4-Chloroaniline	440 U	UG/KG	
4-Chlorophenyl-Phenyl Ether	440 U	UG/KG	
4-Methylphenol	1500 U	UG/KG	
4-Nitroaniline	7500 U	UG/KG	
4-Nitrophenol	7500 U	UG/KG	
Acenaphthene	440 U	UG/KG	
Acenaphthylene	440 U	UG/KG	
Anthracene	440 U	UG/KG	
Benzo(a)anthracene	440 U	UG/KG	
Benzo(a)pyrene	230 J	UG/KG	
Benzo(b)fluoranthene	440 U	UG/KG	
Benzo(g,h,i)perylene	440 U	UG/KG	
Benzo(k)fluoranthene	440 U	UG/KG	
Bis(2-chloroethoxy) methane	440 U	UG/KG	
Bis(2-chloroethyl) ether	440 U	UG/KG	
Bis(2-ethylhexyl)phthalate	440 U	UG/KG	
Butyl benzyl phthalate	440 U	UG/KG	
Carbazole	440 U	UG/KG	
Chrysene	320 J	UG/KG	
Di-N-Butylphthalate	440 U	UG/KG	
Di-N-Octylphthalate	440 U	UG/KG	
Dibenzo(a,h)anthracene	440 U	UG/KG	
Dibenzofuran	440 U	UG/KG	
Diethylphthalate	440 U	UG/KG	
Dimethylphthalate	440 U	UG/KG	
Fluoranthene	400 J	UG/KG	
Fluorene	440 U	UG/KG	
Hexachlorobenzene	440 U	UG/KG	
Hexachlorobutadiene	440 U	UG/KG	
Hexachlorocyclopentadiene	440 U	UG/KG	
Hexachloroethane	440 U	UG/KG	
Indeno(1,2,3-cd)pyrene	440 U	UG/KG	
Isophorone	440 U	UG/KG	
N-nitroso-di-n-propylamine	440 U	UG/KG	
N-nitroso-diphenylamine	300 J	UG/KG	
Naphthalene	440 U	UG/KG	
Nitrobenzene	440 U	UG/KG	
Pentachlorophenol	7500 U	UG/KG	
Phenanthrene	210 J	UG/KG	
Phenol	1500 U	UG/KG	
Pyrene	390 J	UG/KG	

SW Sample ID: MISS-00910 — *Test Pit 5*
Sample Type: Subsurface Soil — *UPER*
Sample Date: 08/18/1999

Analysis Name	Result	Unit	Exceedance
1,2,4-Trichlorobenzene	150 U	UG/KG	
1,2-Dichlorobenzene	150 U	UG/KG	
1,3-Dichlorobenzene	150 U	UG/KG	
1,4-Dichlorobenzene	150 U	UG/KG	
2,2'-Oxybis(1-Chloropropane)	150 U	UG/KG	
2,4,5-Trichlorophenol	2600 U	UG/KG	
2,4,6-Trichlorophenol	500 U	UG/KG	
2,4-Dichlorophenol	500 U	UG/KG	
2,4-Dimethylphenol	500 U	UG/KG	
2,4-Dinitrophenol	2600 U	UG/KG	
2,4-Dinitrotoluene	150 U	UG/KG	
2,6-Dinitrotoluene	150 U	UG/KG	
2-Chloronaphthalene	150 U	UG/KG	
2-Chlorophenol	500 U	UG/KG	
2-Methylnaphthalene	150 U	UG/KG	
2-Methylphenol	110 J	UG/KG	
2-Nitroaniline	2600 U	UG/KG	
2-Nitrophenol	500 U	UG/KG	
3,3'-Dichlorobenzidine	150 U	UG/KG	
3-Nitroaniline	2600 U	UG/KG	
4,6-Dinitro-2-Methylphenol	2600 U	UG/KG	
4-Bromophenyl-Phenylether	150 U	UG/KG	
4-Chloro-3-Methylphenol	150 U	UG/KG	
4-Chloroaniline	150 U	UG/KG	
4-Chlorophenyl-Phenyl Ether	150 U	UG/KG	
4-Methylphenol	250 J	UG/KG	
4-Nitroaniline	2600 U	UG/KG	
4-Nitrophenol	57 J	UG/KG	
Acenaphthene	150 U	UG/KG	
Acenaphthylene	150 U	UG/KG	
Anthracene	150 U	UG/KG	
Benzo(a)anthracene	150 U	UG/KG	
Benzo(a)pyrene	150 U	UG/KG	
Benzo(b)fluoranthene	99 J	UG/KG	
Benzo(g,h,i)perylene	150 U	UG/KG	
Benzo(k)fluoranthene	150 U	UG/KG	
Bis(2-chloroethoxy) methane	150 U	UG/KG	
Bis(2-chloroethyl) ether	150 U	UG/KG	
Bis(2-ethylhexyl)phthalate	150 U	UG/KG	
Butyl benzyl phthalate	150 U	UG/KG	
Carbazole	150 U	UG/KG	
Chrysene	120 J	UG/KG	
Di-N-Butylphthalate	150 U	UG/KG	
Di-N-Octylphthalate	150 U	UG/KG	
Dibenzo(a,h)anthracene	150 U	UG/KG	
Dibenzofuran	150 U	UG/KG	
Diethylphthalate	150 U	UG/KG	
Dimethylphthalate	150 U	UG/KG	
Fluoranthene	190	UG/KG	
Fluorene	150 U	UG/KG	
Hexachlorobenzene	150 U	UG/KG	
Hexachlorobutadiene	150 U	UG/KG	
Hexachlorocyclopentadiene	150 U	UG/KG	
Hexachloroethane	150 U	UG/KG	
Indeno(1,2,3-cd)pyrene	150 U	UG/KG	
Isophorone	150 U	UG/KG	
N-nitroso-di-n-propylamine	150 U	UG/KG	
N-nitroso-diphenylamine	82 J	UG/KG	
Naphthalene	150 U	UG/KG	
Nitrobenzene	150 U	UG/KG	
Pentachlorophenol	2600 U	UG/KG	
Phenanthrene	170	UG/KG	
Phenol	500 U	UG/KG	
Pyrene	210	UG/KG	

Table E-1: Soil Chemical Data - SVOC Analyses
Engineering Test Pit Sampling
Maywood Interim Storage Site, Maywood NJ

Result Qualifier Codes

U - Analyzed for but not detected
J - Compound detected, value is estimated
UJ - Compound not detected, quantitation limit is estimat
B - Analyte in blank as well as sample
E - Exceeds calibration curve range
D - Identified at secondary diluation factor

SW Sample ID:	MISS-0092X	Test Pit 5		SW Sample ID:	MISS-00930	Test Pit 5	
Sample Type:	Subsurface Soil	LWER		Sample Type:	Subsurface Soil	UPER	
Sample Date:	08/18/1999			Sample Date:	08/18/1999		
Analysis Name	**Result**	**Unit**	**Exceedance**	**Analysis Name**	**Result**	**Unit**	**Exceedance**
1,2,4-Trichlorobenzene	120 U	UG/KG		1,2,4-Trichlorobenzene	180 U	UG/KG	
1,2-Dichlorobenzene	120 U	UG/KG		1,2-Dichlorobenzene	180 U	UG/KG	
1,3-Dichlorobenzene	120 U	UG/KG		1,3-Dichlorobenzene	180 U	UG/KG	
1,4-Dichlorobenzene	120 U	UG/KG		1,4-Dichlorobenzene	180 U	UG/KG	
2,2'-Oxybis(1-Chloropropane)	120 U	UG/KG		2,2'-Oxybis(1-Chloropropane)	180 U	UG/KG	
2,4,5-Trichlorophenol	2000 U	UG/KG		2,4,5-Trichlorophenol	3000 U	UG/KG	
2,4,6-Trichlorophenol	400 U	UG/KG		2,4,6-Trichlorophenol	590 U	UG/KG	
2,4-Dichlorophenol	400 U	UG/KG		2,4-Dichlorophenol	590 U	UG/KG	
2,4-Dimethylphenol	400 U	UG/KG		2,4-Dimethylphenol	590 U	UG/KG	
2,4-Dinitrophenol	2000 U	UG/KG		2,4-Dinitrophenol	3000 U	UG/KG	
2,4-Dinitrotoluene	120 U	UG/KG		2,4-Dinitrotoluene	180 U	UG/KG	
2,6-Dinitrotoluene	120 U	UG/KG		2,6-Dinitrotoluene	180 U	UG/KG	
2-Chloronaphthalene	120 U	UG/KG		2-Chloronaphthalene	180 U	UG/KG	
2-Chlorophenol	400 U	UG/KG		2-Chlorophenol	590 U	UG/KG	
2-Methylnaphthalene	120 U	UG/KG		2-Methylnaphthalene	180 U	UG/KG	
2-Methylphenol	400 U	UG/KG		2-Methylphenol	150 J	UG/KG	
2-Nitroaniline	2000 U	UG/KG		2-Nitroaniline	3000 U	UG/KG	
2-Nitrophenol	400 U	UG/KG		2-Nitrophenol	590 U	UG/KG	
3,3'-Dichlorobenzidine	120 U	UG/KG		3,3'-Dichlorobenzidine	180 U	UG/KG	
3-Nitroaniline	2000 U	UG/KG		3-Nitroaniline	3000 U	UG/KG	
4,6-Dinitro-2-Methylphenol	2000 U	UG/KG		4,6-Dinitro-2-Methylphenol	3000 U	UG/KG	
4-Bromophenyl-Phenylether	120 U	UG/KG		4-Bromophenyl-Phenylether	180 U	UG/KG	
4-Chloro-3-Methylphenol	120 U	UG/KG		4-Chloro-3-Methylphenol	180 U	UG/KG	
4-Chloroaniline	120 U	UG/KG		4-Chloroaniline	180 U	UG/KG	
4-Chlorophenyl-Phenyl Ether	120 U	UG/KG		4-Chlorophenyl-Phenyl Ether	180 U	UG/KG	
4-Methylphenol	400 U	UG/KG		4-Methylphenol	200 J	UG/KG	
4-Nitroaniline	2000 U	UG/KG		4-Nitroaniline	3000 U	UG/KG	
4-Nitrophenol	2000 U	UG/KG		4-Nitrophenol	3000 U	UG/KG	
Acenaphthene	120 U	UG/KG		Acenaphthene	180 U	UG/KG	
Acenaphthylene	120 U	UG/KG		Acenaphthylene	180 U	UG/KG	
Anthracene	120 U	UG/KG		Anthracene	180 U	UG/KG	
Benzo(a)anthracene	120 U	UG/KG		Benzo(a)anthracene	180 U	UG/KG	
Benzo(a)pyrene	120 U	UG/KG		Benzo(a)pyrene	180 U	UG/KG	
Benzo(b)fluoranthene	120 U	UG/KG		Benzo(b)fluoranthene	62 J	UG/KG	
Benzo(g,h,i)perylene	120 U	UG/KG		Benzo(g,h,i)perylene	180 U	UG/KG	
Benzo(k)fluoranthene	120 U	UG/KG		Benzo(k)fluoranthene	180 U	UG/KG	
Bis(2-chloroethoxy) methane	120 U	UG/KG		Bis(2-chloroethoxy) methane	180 U	UG/KG	
Bis(2-chloroethyl) ether	120 U	UG/KG		Bis(2-chloroethyl) ether	180 U	UG/KG	
Bis(2-ethylhexyl)phthalate	120 U	UG/KG		Bis(2-ethylhexyl)phthalate	180 U	UG/KG	
Butyl benzyl phthalate	120 U	UG/KG		Butyl benzyl phthalate	180 U	UG/KG	
Carbazole	120 U	UG/KG		Carbazole	180 U	UG/KG	
Chrysene	120 U	UG/KG		Chrysene	180 U	UG/KG	
Di-N-Butylphthalate	120 U	UG/KG		Di-N-Butylphthalate	180 U	UG/KG	
Di-N-Octylphthalate	120 U	UG/KG		Di-N-Octylphthalate	180 U	UG/KG	
Dibenzo(a,h)anthracene	120 U	UG/KG		Dibenzo(a,h)anthracene	180 U	UG/KG	
Dibenzofuran	120 U	UG/KG		Dibenzofuran	180 U	UG/KG	
Diethylphthalate	120 U	UG/KG		Diethylphthalate	180 U	UG/KG	
Dimethylphthalate	120 U	UG/KG		Dimethylphthalate	180 U	UG/KG	
Fluoranthene	120 U	UG/KG		Fluoranthene	85 J	UG/KG	
Fluorene	120 U	UG/KG		Fluorene	180 U	UG/KG	
Hexachlorobenzene	120 U	UG/KG		Hexachlorobenzene	180 U	UG/KG	
Hexachlorobutadiene	120 U	UG/KG		Hexachlorobutadiene	180 U	UG/KG	
Hexachlorocyclopentadiene	120 U	UG/KG		Hexachlorocyclopentadiene	180 U	UG/KG	
Hexachloroethane	120 U	UG/KG		Hexachloroethane	180 U	UG/KG	
Indeno(1,2,3-cd)pyrene	120 U	UG/KG		Indeno(1,2,3-cd)pyrene	180 U	UG/KG	
Isophorone	120 U	UG/KG		Isophorone	180 U	UG/KG	
N-nitroso-di-n-propylamine	120 U	UG/KG		N-nitroso-di-n-propylamine	180 U	UG/KG	
N-nitroso-diphenylamine	120 U	UG/KG		N-nitroso-diphenylamine	80 J	UG/KG	
Naphthalene	120 U	UG/KG		Naphthalene	180 U	UG/KG	
Nitrobenzene	120 U	UG/KG		Nitrobenzene	180 U	UG/KG	
Pentachlorophenol	2000 U	UG/KG		Pentachlorophenol	3000 U	UG/KG	
Phenanthrene	120 U	UG/KG		Phenanthrene	76 J	UG/KG	
Phenol	400 U	UG/KG		Phenol	590 U	UG/KG	
Pyrene	120 U	UG/KG		Pyrene	100 J	UG/KG	

Table E-2: Soil Chemical Data - VOC Analyses
Engineering Test Pit Sampling
Maywood Interim Storage Site, Maywood NJ

Result Qualifier Codes

U - Analyzed for but not detected
J - Compound detected, value is estimated
UJ - Compound not detected, quantitation limit is estimat
B - Analyte in blank as well as sample
E - Exceeds calibration curve range
D - Identified at secondary diluation factor

SW Sample ID: MISS-0014V Test Pit 1
Sample Type: Subsurface Soil SUOV
Sample Date: 08/19/1999

Analysis Name	Result		Unit	Exceedance
1,1,1-Trichloroethane	560	U	UG/KG	
1,1,2,2-Tetrachloroethane	560	U	UG/KG	
1,1,2-Trichloroethane	560	U	UG/KG	
1,1-Dichloroethane	560	U	UG/KG	
1,1-Dichloroethene	560	U	UG/KG	
1,2-Dichloroethane	560	U	UG/KG	
1,2-Dichloropropane	560	U	UG/KG	
2-Butanone	1100	U	UG/KG	
2-Hexanone	1100	U	UG/KG	
4-Methyl-2-Pentanone	1100	U	UG/KG	
Acetone	1100	U	UG/KG	
Benzene	560	U	UG/KG	
Bromodichloromethane	560	U	UG/KG	
Bromoform	560	U	UG/KG	
Bromomethane	1100	U	UG/KG	
Carbon Disulfide	560	U	UG/KG	
Carbon Tetrachloride	560	U	UG/KG	
Chlorobenzene	560	U	UG/KG	
Chloroethane	1100	U	UG/KG	
Chloroform	560	U	UG/KG	
Chloromethane	1100	U	UG/KG	
Cis-1,2-Dichloroethene	560	U	UG/KG	
cis-1,3-Dichloropropene	560	U	UG/KG	
Ethylbenzene	560	U	UG/KG	
m-Xylenes (Total)	560	U	UG/KG	
Methylene Chloride	560	U	UG/KG	
Styrene	560	U	UG/KG	
Tetrachloroethene	560	U	UG/KG	
Toluene	3000		UG/KG	
Trans-1,2-Dichloroethene	560	U	UG/KG	
Trans-1,3-Dichloropropene	560	U	UG/KG	
Vinyl Chloride	1100	U	UG/KG	

SW Sample ID: MISS-0015V Test Pit 1
Sample Type: Subsurface Soil SUUP
Sample Date: 08/19/1999

Analysis Name	Result		Unit	Exceedance
1,1,1-Trichloroethane	600	U	UG/KG	
1,1,2,2-Tetrachloroethane	600	U	UG/KG	
1,1,2-Trichloroethane	600	U	UG/KG	
1,1-Dichloroethane	600	U	UG/KG	
1,1-Dichloroethene	600	U	UG/KG	
1,2-Dichloroethane	600	U	UG/KG	
1,2-Dichloropropane	600	U	UG/KG	
2-Butanone	1200	U	UG/KG	
2-Hexanone	1200	U	UG/KG	
4-Methyl-2-Pentanone	1200	U	UG/KG	
Acetone	1200	U	UG/KG	
Benzene	600	U	UG/KG	
Bromodichloromethane	600	U	UG/KG	
Bromoform	600	U	UG/KG	
Bromomethane	1200	U	UG/KG	
Carbon Disulfide	600	U	UG/KG	
Carbon Tetrachloride	600	U	UG/KG	
Chlorobenzene	600	U	UG/KG	
Chloroethane	1200	U	UG/KG	
Chloroform	600	U	UG/KG	
Chloromethane	1200	U	UG/KG	
Cis-1,2-Dichloroethene	600	U	UG/KG	
cis-1,3-Dichloropropene	600	U	UG/KG	
Ethylbenzene	600	U	UG/KG	
m-Xylenes (Total)	600	U	UG/KG	
Methylene Chloride	600	U	UG/KG	
Styrene	600	U	UG/KG	
Tetrachloroethene	600	U	UG/KG	
Toluene	600	U	UG/KG	
Trans-1,2-Dichloroethene	600	U	UG/KG	
Trans-1,3-Dichloropropene	600	U	UG/KG	
Vinyl Chloride	1200	U	UG/KG	

SW Sample ID: MISS-0016V Test Pit 1
Sample Type: Subsurface Soil SULO
Sample Date: 08/19/1999

Analysis Name	Result		Unit	Exceedance
1,1,1-Trichloroethane	480	U	UG/KG	
1,1,2,2-Tetrachloroethane	480	U	UG/KG	
1,1,2-Trichloroethane	480	U	UG/KG	
1,1-Dichloroethane	480	U	UG/KG	
1,1-Dichloroethene	480	U	UG/KG	
1,2-Dichloroethane	480	U	UG/KG	
1,2-Dichloropropane	480	U	UG/KG	
2-Butanone	930	U	UG/KG	
2-Hexanone	930	U	UG/KG	
4-Methyl-2-Pentanone	930	U	UG/KG	
Acetone	930	U	UG/KG	
Benzene	480	U	UG/KG	
Bromodichloromethane	480	U	UG/KG	
Bromoform	480	U	UG/KG	
Bromomethane	930	U	UG/KG	
Carbon Disulfide	480	U	UG/KG	
Carbon Tetrachloride	480	U	UG/KG	
Chlorobenzene	480	U	UG/KG	
Chloroethane	930	U	UG/KG	
Chloroform	480	U	UG/KG	
Chloromethane	930	U	UG/KG	
Cis-1,2-Dichloroethene	480	U	UG/KG	
cis-1,3-Dichloropropene	480	U	UG/KG	
Ethylbenzene	480	U	UG/KG	
m-Xylenes (Total)	480	U	UG/KG	
Methylene Chloride	480	U	UG/KG	
Styrene	480	U	UG/KG	
Tetrachloroethene	480	U	UG/KG	
Toluene	480	U	UG/KG	
Trans-1,2-Dichloroethene	480	U	UG/KG	
Trans-1,3-Dichloropropene	480	U	UG/KG	
Vinyl Chloride	930	U	UG/KG	

Note : Exceedance criteria based on NJDEP Non-residential soil cleanup criteria.

Table E-2: Soil Chemical Data - VOC Analyses
Engineering Test Pit Sampling
Maywood Interim Storage Site, Maywood NJ

Result Qualifier Codes

U - Analyzed for but not detected
J - Compound detected, value is estimated
UJ - Compound not detected, quantitation limit is estimat
B - Analyte in blank as well as sample
E - Exceeds calibration curve range
D - Identified at secondary dilution factor

SW Sample ID: MISS-0017V *Test Pit 1*
Sample Type: Subsurface Soil **TROV**
Sample Date: 08/19/1999

Analysis Name	Result	Unit	Exceedance
1,1,1-Trichloroethane	580 U	UG/KG	
1,1,2,2-Tetrachloroethane	580 U	UG/KG	
1,1,2-Trichloroethane	580 U	UG/KG	
1,1-Dichloroethane	580 U	UG/KG	
1,1-Dichloroethene	580 U	UG/KG	
1,2-Dichloroethane	580 U	UG/KG	
1,2-Dichloropropane	580 U	UG/KG	
2-Butanone	1100 U	UG/KG	
2-Hexanone	1100 U	UG/KG	
4-Methyl-2-Pentanone	1100 U	UG/KG	
Acetone	430 J	UG/KG	
Benzene	580 U	UG/KG	
Bromodichloromethane	580 U	UG/KG	
Bromoform	580 U	UG/KG	
Bromomethane	1100 U	UG/KG	
Carbon Disulfide	580 U	UG/KG	
Carbon Tetrachloride	580 U	UG/KG	
Chlorobenzene	580 U	UG/KG	
Chloroethane	1100 U	UG/KG	
Chloroform	580 U	UG/KG	
Chloromethane	1100 U	UG/KG	
Cis-1,2-Dichloroethene	580 U	UG/KG	
cis-1,3-Dichloropropene	580 U	UG/KG	
Ethylbenzene	580 U	UG/KG	
m-Xylenes (Total)	580 U	UG/KG	
Methylene Chloride	580 U	UG/KG	
Styrene	580 U	UG/KG	
Tetrachloroethene	580 U	UG/KG	
Toluene	2500	UG/KG	
Trans-1,2-Dichloroethene	580 U	UG/KG	
Trans-1,3-Dichloropropene	580 U	UG/KG	
Vinyl Chloride	1100 U	UG/KG	

SW Sample ID: MISS-0018V *Test Pit 1*
Sample Type: Subsurface Soil **TRUP**
Sample Date: 08/19/1999

Analysis Name	Result	Unit	Exceedance
1,1,1-Trichloroethane	1200 U	UG/KG	
1,1,2,2-Tetrachloroethane	1200 U	UG/KG	
1,1,2-Trichloroethane	1200 U	UG/KG	
1,1-Dichloroethane	1200 U	UG/KG	
1,1-Dichloroethene	1200 U	UG/KG	
1,2-Dichloroethane	1200 U	UG/KG	
1,2-Dichloropropane	1200 U	UG/KG	
2-Butanone	2400 U	UG/KG	
2-Hexanone	2400 U	UG/KG	
4-Methyl-2-Pentanone	2400 U	UG/KG	
Acetone	2400 U	UG/KG	
Benzene	1200 U	UG/KG	
Bromodichloromethane	1200 U	UG/KG	
Bromoform	1200 U	UG/KG	
Bromomethane	2400 U	UG/KG	
Carbon Disulfide	1200 U	UG/KG	
Carbon Tetrachloride	1200 U	UG/KG	
Chlorobenzene	1200 U	UG/KG	
Chloroethane	2400 U	UG/KG	
Chloroform	1200 U	UG/KG	
Chloromethane	2400 U	UG/KG	
Cis-1,2-Dichloroethene	1200 U	UG/KG	
cis-1,3-Dichloropropene	1200 U	UG/KG	
Ethylbenzene	1200 U	UG/KG	
m-Xylenes (Total)	1200 U	UG/KG	
Methylene Chloride	1200 U	UG/KG	
Styrene	1200 U	UG/KG	
Tetrachloroethene	1200 U	UG/KG	
Toluene	1200 U	UG/KG	
Trans-1,2-Dichloroethene	1200 U	UG/KG	
Trans-1,3-Dichloropropene	1200 U	UG/KG	
Vinyl Chloride	2400 U	UG/KG	

SW Sample ID: MISS-0019V *Test Pit 1*
Sample Type: Subsurface Soil **TRLO**
Sample Date: 08/19/1999

Analysis Name	Result	Unit	Exceedance
1,1,1-Trichloroethane	510 U	UG/KG	
1,1,2,2-Tetrachloroethane	510 U	UG/KG	
1,1,2-Trichloroethane	510 U	UG/KG	
1,1-Dichloroethane	510 U	UG/KG	
1,1-Dichloroethene	510 U	UG/KG	
1,2-Dichloroethane	510 U	UG/KG	
1,2-Dichloropropane	510 U	UG/KG	
2-Butanone	980 U	UG/KG	
2-Hexanone	980 U	UG/KG	
4-Methyl-2-Pentanone	980 U	UG/KG	
Acetone	980 U	UG/KG	
Benzene	510 U	UG/KG	
Bromodichloromethane	510 U	UG/KG	
Bromoform	510 U	UG/KG	
Bromomethane	980 U	UG/KG	
Carbon Disulfide	510 U	UG/KG	
Carbon Tetrachloride	510 U	UG/KG	
Chlorobenzene	510 U	UG/KG	
Chloroethane	980 U	UG/KG	
Chloroform	510 U	UG/KG	
Chloromethane	980 U	UG/KG	
Cis-1,2-Dichloroethene	510 U	UG/KG	
cis-1,3-Dichloropropene	510 U	UG/KG	
Ethylbenzene	510 U	UG/KG	
m-Xylenes (Total)	510 U	UG/KG	
Methylene Chloride	510 U	UG/KG	
Styrene	510 U	UG/KG	
Tetrachloroethene	510 U	UG/KG	
Toluene	510 U	UG/KG	
Trans-1,2-Dichloroethene	510 U	UG/KG	
Trans-1,3-Dichloropropene	510 U	UG/KG	
Vinyl Chloride	980 U	UG/KG	

Note : Exceedance criteria based on NJDEP Non-residential soil cleanup criteria.

Table E-2: Soil Chemical Data - VOC Analyses
Engineering Test Pit Sampling
Maywood Interim Storage Site, Maywood NJ

Result Qualifier Codes

U - Analyzed for but not detected
J - Compound detected, value is estimated
UJ - Compound not detected, quantitation limit is estimat
B - Analyte in blank as well as sample
E - Exceeds calibration curve range
D - Identified at secondary dilution factor

SW Sample ID:	MISS-0020V	Test Pit 1		SW Sample ID:	MISS-0021V	Test Pit 1		SW Sample ID:	MISS-0022V	Test Pit 1	
Sample Type:	Subsurface Soil	REOV		Sample Type:	Subsurface Soil	REUP		Sample Type:	Subsurface Soil	RELO	
Sample Date:	08/19/1999			Sample Date:	08/19/1999			Sample Date:	08/19/1999		
Analysis Name	**Result**	**Unit**	**Exceedance**	**Analysis Name**	**Result**	**Unit**	**Exceedance**	**Analysis Name**	**Result**	**Unit**	**Exceedance**
1,1,1-Trichloroethane	530 U	UG/KG		1,1,1-Trichloroethane	1000 U	UG/KG		1,1,1-Trichloroethane	530 U	UG/KG	
1,1,2,2-Tetrachloroethane	530 U	UG/KG		1,1,2,2-Tetrachloroethane	1000 U	UG/KG		1,1,2,2-Tetrachloroethane	530 U	UG/KG	
1,1,2-Trichloroethane	530 U	UG/KG		1,1,2-Trichloroethane	1000 U	UG/KG		1,1,2-Trichloroethane	530 U	UG/KG	
1,1-Dichloroethane	530 U	UG/KG		1,1-Dichloroethane	1000 U	UG/KG		1,1-Dichloroethane	530 U	UG/KG	
1,1-Dichloroethene	530 U	UG/KG		1,1-Dichloroethene	1000 U	UG/KG		1,1-Dichloroethene	530 U	UG/KG	
1,2-Dichloroethane	530 U	UG/KG		1,2-Dichloroethane	1000 U	UG/KG		1,2-Dichloroethane	530 U	UG/KG	
1,2-Dichloropropane	530 U	UG/KG		1,2-Dichloropropane	1000 U	UG/KG		1,2-Dichloropropane	530 U	UG/KG	
2-Butanone	1000 U	UG/KG		2-Butanone	2000 U	UG/KG		2-Butanone	1000 U	UG/KG	
2-Hexanone	1000 U	UG/KG		2-Hexanone	2000 U	UG/KG		2-Hexanone	1000 U	UG/KG	
4-Methyl-2-Pentanone	1000 U	UG/KG		4-Methyl-2-Pentanone	2000 U	UG/KG		4-Methyl-2-Pentanone	1000 U	UG/KG	
Acetone	1000 U	UG/KG		Acetone	2000 U	UG/KG		Acetone	1000 U	UG/KG	
Benzene	530 U	UG/KG		Benzene	1000 U	UG/KG		Benzene	530 U	UG/KG	
Bromodichloromethane	530 U	UG/KG		Bromodichloromethane	1000 U	UG/KG		Bromodichloromethane	530 U	UG/KG	
Bromoform	530 U	UG/KG		Bromoform	1000 U	UG/KG		Bromoform	530 U	UG/KG	
Bromomethane	1000 U	UG/KG		Bromomethane	2000 U	UG/KG		Bromomethane	1000 U	UG/KG	
Carbon Disulfide	530 U	UG/KG		Carbon Disulfide	1000 U	UG/KG		Carbon Disulfide	530 U	UG/KG	
Carbon Tetrachloride	530 U	UG/KG		Carbon Tetrachloride	1000 U	UG/KG		Carbon Tetrachloride	530 U	UG/KG	
Chlorobenzene	530 U	UG/KG		Chlorobenzene	1000 U	UG/KG		Chlorobenzene	530 U	UG/KG	
Chloroethane	1000 U	UG/KG		Chloroethane	2000 U	UG/KG		Chloroethane	1000 U	UG/KG	
Chloroform	530 U	UG/KG		Chloroform	1000 U	UG/KG		Chloroform	530 U	UG/KG	
Chloromethane	1000 U	UG/KG		Chloromethane	2000 U	UG/KG		Chloromethane	1000 U	UG/KG	
Cis-1,2-Dichloroethene	530 U	UG/KG		Cis-1,2-Dichloroethene	1000 U	UG/KG		Cis-1,2-Dichloroethene	530 U	UG/KG	
cis-1,3-Dichloropropene	530 U	UG/KG		cis-1,3-Dichloropropene	1000 U	UG/KG		cis-1,3-Dichloropropene	530 U	UG/KG	
Ethylbenzene	530 U	UG/KG		Ethylbenzene	1000 U	UG/KG		Ethylbenzene	530 U	UG/KG	
m-Xylenes (Total)	530 U	UG/KG		m-Xylenes (Total)	1000 U	UG/KG		m-Xylenes (Total)	530 U	UG/KG	
Methylene Chloride	530 U	UG/KG		Methylene Chloride	1000 U	UG/KG		Methylene Chloride	530 U	UG/KG	
Styrene	530 U	UG/KG		Styrene	1000 U	UG/KG		Styrene	530 U	UG/KG	
Tetrachloroethene	530 U	UG/KG		Tetrachloroethene	1000 U	UG/KG		Tetrachloroethene	530 U	UG/KG	
Toluene	530 U	UG/KG		Toluene	1000 U	UG/KG		Toluene	530 U	UG/KG	
Trans-1,2-Dichloroethene	530 U	UG/KG		Trans-1,2-Dichloroethene	1000 U	UG/KG		Trans-1,2-Dichloroethene	530 U	UG/KG	
Trans-1,3-Dichloropropene	530 U	UG/KG		Trans-1,3-Dichloropropene	1000 U	UG/KG		Trans-1,3-Dichloropropene	530 U	UG/KG	
Vinyl Chloride	1000 U	UG/KG		Vinyl Chloride	2000 U	UG/KG		Vinyl Chloride	1000 U	UG/KG	

Note : Exceedance criteria based on NJDEP Non-residential soil cleanup criteria.

Table E-2: Soil Chemical Data - VOC Analyses
Engineering Test Pit Sampling
Maywood Interim Storage Site, Maywood NJ

Result Qualifier Codes

U - Analyzed for but not detected
J - Compound detected, value is estimated
UJ - Compound not detected, quantitation limit is estimat
B - Analyte in blank as well as sample
E - Exceeds calibration curve range
D - Identified at secondary dilution factor

SW Sample ID:	*MISS-0023V*		*Test Pit 1*	*SW Sample ID:*	*MISS-0033V*		*Test Pit 2*	*SW Sample ID:*	*MISS-0034V*		*Test Pit 2*
Sample Type:	*Subsurface Soil*		*REUP*	*Sample Type:*	*Subsurface Soil*		*SUOV*	*Sample Type:*	*Subsurface Soil*		*SUUP*
Sample Date:	*08/19/1999*			*Sample Date:*	*08/24/1999*			*Sample Date:*	*08/24/1999*		
Analysis Name	***Result***	***Unit***	***Exceedance***	***Analysis Name***	***Result***	***Unit***	***Exceedance***	***Analysis Name***	***Result***	***Unit***	***Exceedance***
1,1,1-Trichloroethane	1000 U	UG/KG		1,1,1-Trichloroethane	710 U	UG/KG		1,1,1-Trichloroethane	860 U	UG/KG	
1,1,2,2-Tetrachloroethane	1000 U	UG/KG		1,1,2,2-Tetrachloroethane	710 U	UG/KG		1,1,2,2-Tetrachloroethane	860 U	UG/KG	
1,1,2-Trichloroethane	1000 U	UG/KG		1,1,2-Trichloroethane	710 U	UG/KG		1,1,2-Trichloroethane	860 U	UG/KG	
1,1-Dichloroethane	1000 U	UG/KG		1,1-Dichloroethane	710 U	UG/KG		1,1-Dichloroethane	860 U	UG/KG	
1,1-Dichloroethene	1000 U	UG/KG		1,1-Dichloroethene	710 U	UG/KG		1,1-Dichloroethene	860 U	UG/KG	
1,2-Dichloroethane	1000 U	UG/KG		1,2-Dichloroethane	710 U	UG/KG		1,2-Dichloroethane	860 U	UG/KG	
1,2-Dichloropropane	1000 U	UG/KG		1,2-Dichloropropane	710 U	UG/KG		1,2-Dichloropropane	860 U	UG/KG	
2-Butanone	2000 U	UG/KG		2-Butanone	1400 U	UG/KG		2-Butanone	1600 U	UG/KG	
2-Hexanone	2000 U	UG/KG		2-Hexanone	1400 U	UG/KG		2-Hexanone	1600 U	UG/KG	
4-Methyl-2-Pentanone	2000 U	UG/KG		4-Methyl-2-Pentanone	1400 U	UG/KG		4-Methyl-2-Pentanone	1600 U	UG/KG	
Acetone	2000 U	UG/KG		Acetone	1400 U	UG/KG		Acetone	1600 U	UG/KG	
Benzene	1000 U	UG/KG		Benzene	710 U	UG/KG		Benzene	860 U	UG/KG	
Bromodichloromethane	1000 U	UG/KG		Bromodichloromethane	710 U	UG/KG		Bromodichloromethane	860 U	UG/KG	
Bromoform	1000 U	UG/KG		Bromoform	710 U	UG/KG		Bromoform	860 U	UG/KG	
Bromomethane	2000 U	UG/KG		Bromomethane	1400 U	UG/KG		Bromomethane	1600 U	UG/KG	
Carbon Disulfide	1000 U	UG/KG		Carbon Disulfide	710 U	UG/KG		Carbon Disulfide	860 U	UG/KG	
Carbon Tetrachloride	1000 U	UG/KG		Carbon Tetrachloride	710 U	UG/KG		Carbon Tetrachloride	860 U	UG/KG	
Chlorobenzene	1000 U	UG/KG		Chlorobenzene	710 U	UG/KG		Chlorobenzene	860 U	UG/KG	
Chloroethane	2000 U	UG/KG		Chloroethane	1400 U	UG/KG		Chloroethane	1600 U	UG/KG	
Chloroform	1000 U	UG/KG		Chloroform	710 U	UG/KG		Chloroform	860 U	UG/KG	
Chloromethane	2000 U	UG/KG		Chloromethane	1400 U	UG/KG		Chloromethane	1600 U	UG/KG	
Cis-1,2-Dichloroethene	1000 U	UG/KG		Cis-1,2-Dichloroethene	710 U	UG/KG		Cis-1,2-Dichloroethene	860 U	UG/KG	
cis-1,3-Dichloropropene	1000 U	UG/KG		cis-1,3-Dichloropropene	710 U	UG/KG		cis-1,3-Dichloropropene	860 U	UG/KG	
Ethylbenzene	1000 U	UG/KG		Ethylbenzene	710 U	UG/KG		Ethylbenzene	860 U	UG/KG	
m-Xylenes (Total)	1000 U	UG/KG		m-Xylenes (Total)	710 U	UG/KG		m-Xylenes (Total)	860 U	UG/KG	
Methylene Chloride	1000 U	UG/KG		Methylene Chloride	710 U	UG/KG		Methylene Chloride	860 U	UG/KG	
Styrene	1000 U	UG/KG		Styrene	710 U	UG/KG		Styrene	860 U	UG/KG	
Tetrachloroethene	1000 U	UG/KG		Tetrachloroethene	710 U	UG/KG		Tetrachloroethene	860 U	UG/KG	
Toluene	1000 U	UG/KG		Toluene	710 U	UG/KG		Toluene	860 U	UG/KG	
Trans-1,2-Dichloroethene	1000 U	UG/KG		Trans-1,2-Dichloroethene	710 U	UG/KG		Trans-1,2-Dichloroethene	860 U	UG/KG	
Trans-1,3-Dichloropropene	1000 U	UG/KG		Trans-1,3-Dichloropropene	710 U	UG/KG		Trans-1,3-Dichloropropene	860 U	UG/KG	
Vinyl Chloride	2000 U	UG/KG		Vinyl Chloride	1400 U	UG/KG		Vinyl Chloride	1600 U	UG/KG	

Note : Exceedance criteria based on NJDEP Non-residential soil cleanup criteria.

Table E-2: Soil Chemical Data - VOC Analyses
Engineering Test Pit Sampling
Maywood Interim Storage Site, Maywood NJ

Result Qualifier Codes

U - Analyzed for but not detected
J - Compound detected, value is estimated
UJ - Compound not detected, quantitation limit is estimat
B - Analyte in blank as well as sample
E - Exceeds calibration curve range
D - Identified at secondary diluation factor

SW Sample ID: MISS-0035V *Test Pit 2*
Sample Type: Subsurface Soil *SULO*
Sample Date: 08/24/1999

Analysis Name	Result	Unit	Exceedance
1,1,1-Trichloroethane	710 U	UG/KG	
1,1,2,2-Tetrachloroethane	710 U	UG/KG	
1,1,2-Trichloroethane	710 U	UG/KG	
1,1-Dichloroethane	710 U	UG/KG	
1,1-Dichloroethene	710 U	UG/KG	
1,2-Dichloroethane	710 U	UG/KG	
1,2-Dichloropropane	710 U	UG/KG	
2-Butanone	1400 U	UG/KG	
2-Hexanone	1400 U	UG/KG	
4-Methyl-2-Pentanone	1400 U	UG/KG	
Acetone	1400 U	UG/KG	
Benzene	710 U	UG/KG	
Bromodichloromethane	710 U	UG/KG	
Bromoform	710 U	UG/KG	
Bromomethane	1400 U	UG/KG	
Carbon Disulfide	710 U	UG/KG	
Carbon Tetrachloride	710 U	UG/KG	
Chlorobenzene	710 U	UG/KG	
Chloroethane	1400 U	UG/KG	
Chloroform	710 U	UG/KG	
Chloromethane	1400 U	UG/KG	
Cis-1,2-Dichloroethene	710 U	UG/KG	
cis-1,3-Dichloropropene	710 U	UG/KG	
Ethylbenzene	710 U	UG/KG	
m-Xylenes (Total)	710 U	UG/KG	
Methylene Chloride	710 U	UG/KG	
Styrene	710 U	UG/KG	
Tetrachloroethene	710 U	UG/KG	
Toluene	710 U	UG/KG	
Trans-1,2-Dichloroethene	710 U	UG/KG	
Trans-1,3-Dichloropropene	710 U	UG/KG	
Vinyl Chloride	1400 U	UG/KG	

SW Sample ID: MISS-0036V *Test Pit 2*
Sample Type: Subsurface Soil *TROV*
Sample Date: 08/24/1999

Analysis Name	Result	Unit	Exceedance
1,1,1-Trichloroethane	710 U	UG/KG	
1,1,2,2-Tetrachloroethane	710 U	UG/KG	
1,1,2-Trichloroethane	710 U	UG/KG	
1,1-Dichloroethane	710 U	UG/KG	
1,1-Dichloroethene	710 U	UG/KG	
1,2-Dichloroethane	710 U	UG/KG	
1,2-Dichloropropane	710 U	UG/KG	
2-Butanone	1400 U	UG/KG	
2-Hexanone	1400 U	UG/KG	
4-Methyl-2-Pentanone	1400 U	UG/KG	
Acetone	1400 U	UG/KG	
Benzene	710 U	UG/KG	
Bromodichloromethane	710 U	UG/KG	
Bromoform	710 U	UG/KG	
Bromomethane	1400 U	UG/KG	
Carbon Disulfide	710 U	UG/KG	
Carbon Tetrachloride	710 U	UG/KG	
Chlorobenzene	710 U	UG/KG	
Chloroethane	1400 U	UG/KG	
Chloroform	710 U	UG/KG	
Chloromethane	1400 U	UG/KG	
Cis-1,2-Dichloroethene	710 U	UG/KG	
cis-1,3-Dichloropropene	710 U	UG/KG	
Ethylbenzene	710 U	UG/KG	
m-Xylenes (Total)	710 U	UG/KG	
Methylene Chloride	710 U	UG/KG	
Styrene	710 U	UG/KG	
Tetrachloroethene	710 U	UG/KG	
Toluene	710 U	UG/KG	
Trans-1,2-Dichloroethene	710 U	UG/KG	
Trans-1,3-Dichloropropene	710 U	UG/KG	
Vinyl Chloride	1400 U	UG/KG	

SW Sample ID: MISS-0037V *Test Pit 2*
Sample Type: Subsurface Soil *TRUP*
Sample Date: 08/24/1999

Analysis Name	Result	Unit	Exceedance
1,1,1-Trichloroethane	840 U	UG/KG	
1,1,2,2-Tetrachloroethane	840 U	UG/KG	
1,1,2-Trichloroethane	840 U	UG/KG	
1,1-Dichloroethane	840 U	UG/KG	
1,1-Dichloroethene	840 U	UG/KG	
1,2-Dichloroethane	840 U	UG/KG	
1,2-Dichloropropane	840 U	UG/KG	
2-Butanone	1600 U	UG/KG	
2-Hexanone	1600 U	UG/KG	
4-Methyl-2-Pentanone	1600 U	UG/KG	
Acetone	1600 U	UG/KG	
Benzene	840 U	UG/KG	
Bromodichloromethane	840 U	UG/KG	
Bromoform	840 U	UG/KG	
Bromomethane	1600 U	UG/KG	
Carbon Disulfide	840 U	UG/KG	
Carbon Tetrachloride	840 U	UG/KG	
Chlorobenzene	840 U	UG/KG	
Chloroethane	1600 U	UG/KG	
Chloroform	840 U	UG/KG	
Chloromethane	1600 U	UG/KG	
Cis-1,2-Dichloroethene	840 U	UG/KG	
cis-1,3-Dichloropropene	840 U	UG/KG	
Ethylbenzene	840 U	UG/KG	
m-Xylenes (Total)	840 U	UG/KG	
Methylene Chloride	840 U	UG/KG	
Styrene	840 U	UG/KG	
Tetrachloroethene	840 U	UG/KG	
Toluene	840 U	UG/KG	
Trans-1,2-Dichloroethene	840 U	UG/KG	
Trans-1,3-Dichloropropene	840 U	UG/KG	
Vinyl Chloride	1600 U	UG/KG	

Note : Exceedance criteria based on NJDEP Non-residential soil cleanup criteria.

Table E-2: Soil Chemical Data - VOC Analyses
Engineering Test Pit Sampling
Maywood Interim Storage Site, Maywood NJ

Result Qualifier Codes

U - Analyzed for but not detected
J - Compound detected, value is estimated
UJ - Compound not detected, quantitation limit is estimat
B - Analyte in blank as well as sample
E - Exceeds calibration curve range
D - Identified at secondary diluation factor

	MISS-0038V			MISS-0039V			MISS-0040V		
SW Sample ID:	MISS-0038V Test Pit 2			MISS-0039V Test Pit 2			MISS-0040V Test Pit 2		
Sample Type:	Subsurface Soil TRLO			Subsurface Soil REOV			Subsurface Soil REUP		
Sample Date:	08/24/1999			08/24/1999			08/24/1999		
Analysis Name	*Result*	*Unit*	*Exceedance*	*Result*	*Unit*	*Exceedance*	*Result*	*Unit*	*Exceedance*
1,1,1-Trichloroethane	600 U	UG/KG		1100 U	UG/KG		1000 U	UG/KG	
1,1,2,2-Tetrachloroethane	600 U	UG/KG		1100 U	UG/KG		1000 U	UG/KG	
1,1,2-Trichloroethane	600 U	UG/KG		1100 U	UG/KG		1000 U	UG/KG	
1,1-Dichloroethane	600 U	UG/KG		1100 U	UG/KG		1000 U	UG/KG	
1,1-Dichloroethene	600 U	UG/KG		1100 U	UG/KG		1000 U	UG/KG	
1,2-Dichloroethane	600 U	UG/KG		1100 U	UG/KG		1000 U	UG/KG	
1,2-Dichloropropane	600 U	UG/KG		1100 U	UG/KG		1000 U	UG/KG	
2-Butanone	1200 U	UG/KG		2100 U	UG/KG		2000 U	UG/KG	
2-Hexanone	1200 U	UG/KG		2100 U	UG/KG		2000 U	UG/KG	
4-Methyl-2-Pentanone	1200 U	UG/KG		2100 U	UG/KG		2000 U	UG/KG	
Acetone	1200 U	UG/KG		2100 U	UG/KG		2000 U	UG/KG	
Benzene	600 U	UG/KG		1100 U	UG/KG		1000 U	UG/KG	
Bromodichloromethane	600 U	UG/KG		1100 U	UG/KG		1000 U	UG/KG	
Bromoform	600 U	UG/KG		1100 U	UG/KG		1000 U	UG/KG	
Bromomethane	1200 U	UG/KG		2100 U	UG/KG		2000 U	UG/KG	
Carbon Disulfide	600 U	UG/KG		1100 U	UG/KG		1000 U	UG/KG	
Carbon Tetrachloride	600 U	UG/KG		1100 U	UG/KG		1000 U	UG/KG	
Chlorobenzene	600 U	UG/KG		1100 U	UG/KG		1000 U	UG/KG	
Chloroethane	1200 U	UG/KG		2100 U	UG/KG		2000 U	UG/KG	
Chloroform	600 U	UG/KG		1100 U	UG/KG		1000 U	UG/KG	
Chloromethane	1200 U	UG/KG		2100 U	UG/KG		2000 U	UG/KG	
Cis-1,2-Dichloroethene	600 U	UG/KG		1100 U	UG/KG		1000 U	UG/KG	
cis-1,3-Dichloropropene	600 U	UG/KG		1100 U	UG/KG		1000 U	UG/KG	
Ethylbenzene	600 U	UG/KG		1100 U	UG/KG		1000 U	UG/KG	
m-Xylenes (Total)	600 U	UG/KG		1100 U	UG/KG		1000 U	UG/KG	
Methylene Chloride	600 U	UG/KG		1100 U	UG/KG		1000 U	UG/KG	
Styrene	600 U	UG/KG		1100 U	UG/KG		1000 U	UG/KG	
Tetrachloroethene	600 U	UG/KG		1100 U	UG/KG		1000 U	UG/KG	
Toluene	600 U	UG/KG		1100 U	UG/KG		1000 U	UG/KG	
Trans-1,2-Dichloroethene	600 U	UG/KG		1100 U	UG/KG		1000 U	UG/KG	
Trans-1,3-Dichloropropene	600 U	UG/KG		1100 U	UG/KG		1000 U	UG/KG	
Vinyl Chloride	1200 U	UG/KG		2100 U	UG/KG		2000 U	UG/KG	

Note : Exceedance criteria based on NJDEP Non-residential soil cleanup criteria.

Result Qualifier Codes

U - Analyzed for but not detected
J - Compound detected, value is estimated
UJ - Compound not detected, quantitation limit is estimat
B - Analyte in blank as well as sample
E - Exceeds calibration curve range
D - Identified at secondary diluation factor

SW Sample ID:	MISS-0041V	Test Pit 2		SW Sample ID:	MISS-0043V	Test Pit 2		SW Sample ID:	MISS-0052V	Test Pit 3	
Sample Type:	Subsurface Soil	RELO		Sample Type:	Subsurface Soil	RELO		Sample Type:	Subsurface Soil	SUOV	
Sample Date:	08/24/1999			Sample Date:	08/24/1999			Sample Date:	08/30/1999		
Analysis Name	**Result**	**Unit**	**Exceedance**	**Analysis Name**	**Result**	**Unit**	**Exceedance**	**Analysis Name**	**Result**	**Unit**	**Exceedance**
1,1,1-Trichloroethane	580 U	UG/KG		1,1,1-Trichloroethane	700 U	UG/KG		1,1,1-Trichloroethane	870 U	UG/KG	
1,1,2,2-Tetrachloroethane	580 U	UG/KG		1,1,2,2-Tetrachloroethane	700 U	UG/KG		1,1,2,2-Tetrachloroethane	870 U	UG/KG	
1,1,2-Trichloroethane	580 U	UG/KG		1,1,2-Trichloroethane	700 U	UG/KG		1,1,2-Trichloroethane	870 U	UG/KG	
1,1-Dichloroethane	580 U	UG/KG		1,1-Dichloroethane	700 U	UG/KG		1,1-Dichloroethane	870 U	UG/KG	
1,1-Dichloroethene	580 U	UG/KG		1,1-Dichloroethene	700 U	UG/KG		1,1-Dichloroethene	870 U	UG/KG	
1,2-Dichloroethane	580 U	UG/KG		1,2-Dichloroethane	700 U	UG/KG		1,2-Dichloroethane	870 U	UG/KG	
1,2-Dichloropropane	580 U	UG/KG		1,2-Dichloropropane	700 U	UG/KG		1,2-Dichloropropane	870 U	UG/KG	
2-Butanone	1100 U	UG/KG		2-Butanone	1400 U	UG/KG		2-Butanone	1700 U	UG/KG	
2-Hexanone	1100 U	UG/KG		2-Hexanone	1400 U	UG/KG		2-Hexanone	1700 U	UG/KG	
4-Methyl-2-Pentanone	1100 U	UG/KG		4-Methyl-2-Pentanone	1400 U	UG/KG		4-Methyl-2-Pentanone	1700 U	UG/KG	
Acetone	1100 U	UG/KG		Acetone	1400 U	UG/KG		Acetone	1700 U	UG/KG	
Benzene	580 U	UG/KG		Benzene	700 U	UG/KG		Benzene	870 U	UG/KG	
Bromodichloromethane	580 U	UG/KG		Bromodichloromethane	700 U	UG/KG		Bromodichloromethane	870 U	UG/KG	
Bromoform	580 U	UG/KG		Bromoform	700 U	UG/KG		Bromoform	870 U	UG/KG	
Bromomethane	1100 U	UG/KG		Bromomethane	1400 U	UG/KG		Bromomethane	1700 U	UG/KG	
Carbon Disulfide	580 U	UG/KG		Carbon Disulfide	700 U	UG/KG		Carbon Disulfide	870 U	UG/KG	
Carbon Tetrachloride	580 U	UG/KG		Carbon Tetrachloride	700 U	UG/KG		Carbon Tetrachloride	870 U	UG/KG	
Chlorobenzene	580 U	UG/KG		Chlorobenzene	700 U	UG/KG		Chlorobenzene	870 U	UG/KG	
Chloroethane	1100 U	UG/KG		Chloroethane	1400 U	UG/KG		Chloroethane	1700 U	UG/KG	
Chloroform	580 U	UG/KG		Chloroform	700 U	UG/KG		Chloroform	870 U	UG/KG	
Chloromethane	1100 U	UG/KG		Chloromethane	1400 U	UG/KG		Chloromethane	1700 U	UG/KG	
Cis-1,2-Dichloroethene	580 U	UG/KG		Cis-1,2-Dichloroethene	700 U	UG/KG		Cis-1,2-Dichloroethene	870 U	UG/KG	
cis-1,3-Dichloropropene	580 U	UG/KG		cis-1,3-Dichloropropene	700 U	UG/KG		cis-1,3-Dichloropropene	870 U	UG/KG	
Ethylbenzene	580 U	UG/KG		Ethylbenzene	700 U	UG/KG		Ethylbenzene	870 U	UG/KG	
m-Xylenes (Total)	580 U	UG/KG		m-Xylenes (Total)	700 U	UG/KG		m-Xylenes (Total)	870 U	UG/KG	
Methylene Chloride	580 U	UG/KG		Methylene Chloride	700 U	UG/KG		Methylene Chloride	680 JB	UG/KG	
Styrene	580 U	UG/KG		Styrene	700 U	UG/KG		Styrene	870 U	UG/KG	
Tetrachloroethene	580 U	UG/KG		Tetrachloroethene	700 U	UG/KG		Tetrachloroethene	870 U	UG/KG	
Toluene	580 U	UG/KG		Toluene	700 U	UG/KG		Toluene	870 U	UG/KG	
Trans-1,2-Dichloroethene	580 U	UG/KG		Trans-1,2-Dichloroethene	700 U	UG/KG		Trans-1,2-Dichloroethene	870 U	UG/KG	
Trans-1,3-Dichloropropene	580 U	UG/KG		Trans-1,3-Dichloropropene	700 U	UG/KG		Trans-1,3-Dichloropropene	870 U	UG/KG	
Vinyl Chloride	1100 U	UG/KG		Vinyl Chloride	1400 U	UG/KG		Vinyl Chloride	1700 U	UG/KG	

Note : Exceedance criteria based on NJDEP Non-residential soil cleanup criteria.

Table E-2: Soil Chemical Data - VOC Analyses
Engineering Test Pit Sampling
Maywood Interim Storage Site, Maywood NJ

Result Qualifier Codes

U - Analyzed for but not detected
J - Compound detected, value is estimated
UJ - Compound not detected, quantitation limit is estimat
B - Analyte in blank as well as sample
E - Exceeds calibration curve range
D - Identified at secondary dilution factor

SW Sample ID:	MISS-0053V	Test Pit 3		SW Sample ID:	MISS-0054V	Test Pit 3		SW Sample ID:	MISS-0055V	Test Pit 3	
Sample Type:	Subsurface Soil	SUUP		Sample Type:	Subsurface Soil	SULO		Sample Type:	Subsurface Soil	TROV	
Sample Date:	08/30/1999			Sample Date:	08/30/1999			Sample Date:	08/30/1999		
Analysis Name	**Result**	**Unit**	**Exceedance**	**Analysis Name**	**Result**	**Unit**	**Exceedance**	**Analysis Name**	**Result**	**Unit**	**Exceedance**
1,1,1-Trichloroethane	1000 U	UG/KG		1,1,1-Trichloroethane	620 U	UG/KG		1,1,1-Trichloroethane	1000 U	UG/KG	
1,1,2,2-Tetrachloroethane	1000 U	UG/KG		1,1,2,2-Tetrachloroethane	620 U	UG/KG		1,1,2,2-Tetrachloroethane	1000 U	UG/KG	
1,1,2-Trichloroethane	1000 U	UG/KG		1,1,2-Trichloroethane	620 U	UG/KG		1,1,2-Trichloroethane	1000 U	UG/KG	
1,1-Dichloroethane	1000 U	UG/KG		1,1-Dichloroethane	620 U	UG/KG		1,1-Dichloroethane	1000 U	UG/KG	
1,1-Dichloroethene	1000 U	UG/KG		1,1-Dichloroethene	620 U	UG/KG		1,1-Dichloroethene	1000 U	UG/KG	
1,2-Dichloroethane	1000 U	UG/KG		1,2-Dichloroethane	620 U	UG/KG		1,2-Dichloroethane	1000 U	UG/KG	
1,2-Dichloropropane	1000 U	UG/KG		1,2-Dichloropropane	620 U	UG/KG		1,2-Dichloropropane	1000 U	UG/KG	
2-Butanone	1900 U	UG/KG		2-Butanone	1200 U	UG/KG		2-Butanone	2000 U	UG/KG	
2-Hexanone	1900 U	UG/KG		2-Hexanone	1200 U	UG/KG		2-Hexanone	2000 U	UG/KG	
4-Methyl-2-Pentanone	1900 U	UG/KG		4-Methyl-2-Pentanone	1200 U	UG/KG		4-Methyl-2-Pentanone	2000 U	UG/KG	
Acetone	1900 U	UG/KG		Acetone	1200 U	UG/KG		Acetone	2000 U	UG/KG	
Benzene	4300	UG/KG		Benzene	620 U	UG/KG		Benzene	1000 U	UG/KG	
Bromodichloromethane	1000 U	UG/KG		Bromodichloromethane	620 U	UG/KG		Bromodichloromethane	1000 U	UG/KG	
Bromoform	1000 U	UG/KG		Bromoform	620 U	UG/KG		Bromoform	1000 U	UG/KG	
Bromomethane	1900 U	UG/KG		Bromomethane	1200 U	UG/KG		Bromomethane	2000 U	UG/KG	
Carbon Disulfide	1000 U	UG/KG		Carbon Disulfide	620 U	UG/KG		Carbon Disulfide	1000 U	UG/KG	
Carbon Tetrachloride	1000 U	UG/KG		Carbon Tetrachloride	620 U	UG/KG		Carbon Tetrachloride	1000 U	UG/KG	
Chlorobenzene	1000 U	UG/KG		Chlorobenzene	620 U	UG/KG		Chlorobenzene	1000 U	UG/KG	
Chloroethane	1900 U	UG/KG		Chloroethane	1200 U	UG/KG		Chloroethane	2000 U	UG/KG	
Chloroform	1000 U	UG/KG		Chloroform	620 U	UG/KG		Chloroform	1000 U	UG/KG	
Chloromethane	1900 U	UG/KG		Chloromethane	1200 U	UG/KG		Chloromethane	2000 U	UG/KG	
Cis-1,2-Dichloroethene	1000 U	UG/KG		Cis-1,2-Dichloroethene	620 U	UG/KG		Cis-1,2-Dichloroethene	1000 U	UG/KG	
cis-1,3-Dichloropropene	1000 U	UG/KG		cis-1,3-Dichloropropene	620 U	UG/KG		cis-1,3-Dichloropropene	1000 U	UG/KG	
Ethylbenzene	1000 U	UG/KG		Ethylbenzene	620 U	UG/KG		Ethylbenzene	1000 U	UG/KG	
m-Xylenes (Total)	790 J	UG/KG		m-Xylenes (Total)	620 U	UG/KG		m-Xylenes (Total)	1000 U	UG/KG	
Methylene Chloride	940 JB	UG/KG		Methylene Chloride	620 U	UG/KG		Methylene Chloride	1000 U	UG/KG	
Styrene	1000 U	UG/KG		Styrene	620 U	UG/KG		Styrene	1000 U	UG/KG	
Tetrachloroethene	1000 U	UG/KG		Tetrachloroethene	620 U	UG/KG		Tetrachloroethene	1000 U	UG/KG	
Toluene	97000	UG/KG		Toluene	620 U	UG/KG		Toluene	1000 U	UG/KG	
Trans-1,2-Dichloroethene	1000 U	UG/KG		Trans-1,2-Dichloroethene	620 U	UG/KG		Trans-1,2-Dichloroethene	1000 U	UG/KG	
Trans-1,3-Dichloropropene	1000 U	UG/KG		Trans-1,3-Dichloropropene	620 U	UG/KG		Trans-1,3-Dichloropropene	1000 U	UG/KG	
Vinyl Chloride	1900 U	UG/KG		Vinyl Chloride	1200 U	UG/KG		Vinyl Chloride	2000 U	UG/KG	

Note : Exceedance criteria based on NJDEP Non-residential soil cleanup criteria.

Table E-2: Soil Chemical Data - VOC Analyses
Engineering Test Pit Sampling
Maywood Interim Storage Site, Maywood NJ

Result Qualifier Codes

U - Analyzed for but not detected
J - Compound detected, value is estimated
UJ - Compound not detected, quantitation limit is estimat
B - Analyte in blank as well as sample
E - Exceeds calibration curve range
D - Identified at secondary dilution factor

SW Sample ID: *MISS-0056V* *Test Pit 3*
Sample Type: *Subsurface Soil* *TRUP*
Sample Date: *08/30/1999*

Analysis Name	Result	Unit	Exceedance
1,1,1-Trichloroethane	1300 U	UG/KG	
1,1,2,2-Tetrachloroethane	1300 U	UG/KG	
1,1,2-Trichloroethane	1300 U	UG/KG	
1,1-Dichloroethane	1300 U	UG/KG	
1,1-Dichloroethene	1300 U	UG/KG	
1,2-Dichloroethane	1300 U	UG/KG	
1,2-Dichloropropane	1300 U	UG/KG	
2-Butanone	2600 U	UG/KG	
2-Hexanone	2600 U	UG/KG	
4-Methyl-2-Pentanone	2600 U	UG/KG	
Acetone	2600 U	UG/KG	
Benzene	1300 U	UG/KG	
Bromodichloromethane	1300 U	UG/KG	
Bromoform	1300 U	UG/KG	
Bromomethane	2600 U	UG/KG	
Carbon Disulfide	1300 U	UG/KG	
Carbon Tetrachloride	1300 U	UG/KG	
Chlorobenzene	1300 U	UG/KG	
Chloroethane	2600 U	UG/KG	
Chloroform	1300 U	UG/KG	
Chloromethane	2600 U	UG/KG	
Cis-1,2-Dichloroethene	1300 U	UG/KG	
cis-1,3-Dichloropropene	1300 U	UG/KG	
Ethylbenzene	1300 U	UG/KG	
m-Xylenes (Total)	1300 U	UG/KG	
Methylene Chloride	1300 U	UG/KG	
Styrene	1300 U	UG/KG	
Tetrachloroethene	1300 U	UG/KG	
Toluene	1300 U	UG/KG	
Trans-1,2-Dichloroethene	1300 U	UG/KG	
Trans-1,3-Dichloropropene	1300 U	UG/KG	
Vinyl Chloride	2600 U	UG/KG	

SW Sample ID: *MISS-0057V* *Test Pit 3*
Sample Type: *Subsurface Soil* *TRLO*
Sample Date: *08/30/1999*

Analysis Name	Result	Unit	Exceedance
1,1,1-Trichloroethane	550 U	UG/KG	
1,1,2,2-Tetrachloroethane	550 U	UG/KG	
1,1,2-Trichloroethane	550 U	UG/KG	
1,1-Dichloroethane	550 U	UG/KG	
1,1-Dichloroethene	550 U	UG/KG	
1,2-Dichloroethane	550 U	UG/KG	
1,2-Dichloropropane	550 U	UG/KG	
2-Butanone	1100 U	UG/KG	
2-Hexanone	1100 U	UG/KG	
4-Methyl-2-Pentanone	1100 U	UG/KG	
Acetone	1100 U	UG/KG	
Benzene	550 U	UG/KG	
Bromodichloromethane	550 U	UG/KG	
Bromoform	550 U	UG/KG	
Bromomethane	1100 U	UG/KG	
Carbon Disulfide	3300	UG/KG	
Carbon Tetrachloride	550 U	UG/KG	
Chlorobenzene	550 U	UG/KG	
Chloroethane	1100 U	UG/KG	
Chloroform	550 U	UG/KG	
Chloromethane	1100 U	UG/KG	
Cis-1,2-Dichloroethene	550 U	UG/KG	
cis-1,3-Dichloropropene	550 U	UG/KG	
Ethylbenzene	550 U	UG/KG	
m-Xylenes (Total)	550 U	UG/KG	
Methylene Chloride	550 U	UG/KG	
Styrene	550 U	UG/KG	
Tetrachloroethene	550 U	UG/KG	
Toluene	550 U	UG/KG	
Trans-1,2-Dichloroethene	550 U	UG/KG	
Trans-1,3-Dichloropropene	550 U	UG/KG	
Vinyl Chloride	1100 U	UG/KG	

SW Sample ID: *MISS-0058V* *Test Pit 3*
Sample Type: *Subsurface Soil* *REOV*
Sample Date: *08/30/1999*

Analysis Name	Result	Unit	Exceedance
1,1,1-Trichloroethane	1200 U	UG/KG	
1,1,2,2-Tetrachloroethane	1200 U	UG/KG	
1,1,2-Trichloroethane	1200 U	UG/KG	
1,1-Dichloroethane	1200 U	UG/KG	
1,1-Dichloroethene	1200 U	UG/KG	
1,2-Dichloroethane	1200 U	UG/KG	
1,2-Dichloropropane	1200 U	UG/KG	
2-Butanone	2300 U	UG/KG	
2-Hexanone	2300 U	UG/KG	
4-Methyl-2-Pentanone	2300 U	UG/KG	
Acetone	2300 U	UG/KG	
Benzene	1200 U	UG/KG	
Bromodichloromethane	1200 U	UG/KG	
Bromoform	1200 U	UG/KG	
Bromomethane	2300 U	UG/KG	
Carbon Disulfide	1200 U	UG/KG	
Carbon Tetrachloride	1200 U	UG/KG	
Chlorobenzene	1200 U	UG/KG	
Chloroethane	2300 U	UG/KG	
Chloroform	1200 U	UG/KG	
Chloromethane	2300 U	UG/KG	
Cis-1,2-Dichloroethene	1200 U	UG/KG	
cis-1,3-Dichloropropene	1200 U	UG/KG	
Ethylbenzene	1200 U	UG/KG	
m-Xylenes (Total)	1200 U	UG/KG	
Methylene Chloride	1200 U	UG/KG	
Styrene	1200 U	UG/KG	
Tetrachloroethene	1200 U	UG/KG	
Toluene	1200 U	UG/KG	
Trans-1,2-Dichloroethene	1200 U	UG/KG	
Trans-1,3-Dichloropropene	1200 U	UG/KG	
Vinyl Chloride	2300 U	UG/KG	

Note : Exceedance criteria based on NJDEP Non-residential soil cleanup criteria.

Table E-2: Soil Chemical Data - VOC Analyses
Engineering Test Pit Sampling
Maywood Interim Storage Site, Maywood NJ

Result Qualifier Codes

U - Analyzed for but not detected
J - Compound detected, value is estimated
UJ - Compound not detected, quantitation limit is estimat
B - Analyte in blank as well as sample
E - Exceeds calibration curve range
D - Identified at secondary diluation factor

SW Sample ID:	MISS-0059V	Test Pit 3	SW Sample ID:	MISS-0060V	Test Pit 3	SW Sample ID:	MISS-0061V	Test Pit 3
Sample Type:	Subsurface Soil	REUP	Sample Type:	Subsurface Soil	RELO	Sample Type:	Subsurface Soil	REUP
Sample Date:	08/30/1999		Sample Date:	08/30/1999		Sample Date:	08/30/1999	

Analysis Name	Result	Unit	Exceedance	Analysis Name	Result	Unit	Exceedance	Analysis Name	Result	Unit	Exceedance
1,1,1-Trichloroethane	1100 U	UG/KG		1,1,1-Trichloroethane	920 U	UG/KG		1,1,1-Trichloroethane	1300 U	UG/KG	
1,1,2,2-Tetrachloroethane	1100 U	UG/KG		1,1,2,2-Tetrachloroethane	920 U	UG/KG		1,1,2,2-Tetrachloroethane	1300 U	UG/KG	
1,1,2-Trichloroethane	1100 U	UG/KG		1,1,2-Trichloroethane	920 U	UG/KG		1,1,2-Trichloroethane	1300 U	UG/KG	
1,1-Dichloroethane	1100 U	UG/KG		1,1-Dichloroethane	920 U	UG/KG		1,1-Dichloroethane	1300 U	UG/KG	
1,1-Dichloroethene	1100 U	UG/KG		1,1-Dichloroethene	920 U	UG/KG		1,1-Dichloroethene	1300 U	UG/KG	
1,2-Dichloroethane	1100 U	UG/KG		1,2-Dichloroethane	920 U	UG/KG		1,2-Dichloroethane	1300 U	UG/KG	
1,2-Dichloropropane	1100 U	UG/KG		1,2-Dichloropropane	920 U	UG/KG		1,2-Dichloropropane	1300 U	UG/KG	
2-Butanone	2100 U	UG/KG		2-Butanone	1800 U	UG/KG		2-Butanone	2400 U	UG/KG	
2-Hexanone	2100 U	UG/KG		2-Hexanone	1800 U	UG/KG		2-Hexanone	2400 U	UG/KG	
4-Methyl-2-Pentanone	2100 U	UG/KG		4-Methyl-2-Pentanone	1800 U	UG/KG		4-Methyl-2-Pentanone	2400 U	UG/KG	
Acetone	2100 U	UG/KG		Acetone	1800 U	UG/KG		Acetone	2400 U	UG/KG	
Benzene	1100 U	UG/KG		Benzene	920 U	UG/KG		Benzene	1300 U	UG/KG	
Bromodichloromethane	1100 U	UG/KG		Bromodichloromethane	920 U	UG/KG		Bromodichloromethane	1300 U	UG/KG	
Bromoform	1100 U	UG/KG		Bromoform	920 U	UG/KG		Bromoform	1300 U	UG/KG	
Bromomethane	2100 U	UG/KG		Bromomethane	1800 U	UG/KG		Bromomethane	2400 U	UG/KG	
Carbon Disulfide	1100 U	UG/KG		Carbon Disulfide	920 U	UG/KG		Carbon Disulfide	1300 U	UG/KG	
Carbon Tetrachloride	1100 U	UG/KG		Carbon Tetrachloride	920 U	UG/KG		Carbon Tetrachloride	1300 U	UG/KG	
Chlorobenzene	1100 U	UG/KG		Chlorobenzene	920 U	UG/KG		Chlorobenzene	1300 U	UG/KG	
Chloroethane	2100 U	UG/KG		Chloroethane	1800 U	UG/KG		Chloroethane	2400 U	UG/KG	
Chloroform	1100 U	UG/KG		Chloroform	920 U	UG/KG		Chloroform	1300 U	UG/KG	
Chloromethane	2100 U	UG/KG		Chloromethane	1800 U	UG/KG		Chloromethane	2400 U	UG/KG	
Cis-1,2-Dichloroethene	1100 U	UG/KG		Cis-1,2-Dichloroethene	920 U	UG/KG		Cis-1,2-Dichloroethene	1300 U	UG/KG	
cis-1,3-Dichloropropene	1100 U	UG/KG		cis-1,3-Dichloropropene	920 U	UG/KG		cis-1,3-Dichloropropene	1300 U	UG/KG	
Ethylbenzene	1100 U	UG/KG		Ethylbenzene	920 U	UG/KG		Ethylbenzene	1300 U	UG/KG	
m-Xylenes (Total)	1100 U	UG/KG		m-Xylenes (Total)	920 U	UG/KG		m-Xylenes (Total)	1300 U	UG/KG	
Methylene Chloride	1100 U	UG/KG		Methylene Chloride	920 U	UG/KG		Methylene Chloride	1300 U	UG/KG	
Styrene	1100 U	UG/KG		Styrene	920 U	UG/KG		Styrene	1300 U	UG/KG	
Tetrachloroethene	1100 U	UG/KG		Tetrachloroethene	920 U	UG/KG		Tetrachloroethene	1300 U	UG/KG	
Toluene	1100 U	UG/KG		Toluene	920 U	UG/KG		Toluene	1300 U	UG/KG	
Trans-1,2-Dichloroethene	1100 U	UG/KG		Trans-1,2-Dichloroethene	920 U	UG/KG		Trans-1,2-Dichloroethene	1300 U	UG/KG	
Trans-1,3-Dichloropropene	1100 U	UG/KG		Trans-1,3-Dichloropropene	920 U	UG/KG		Trans-1,3-Dichloropropene	1300 U	UG/KG	
Vinyl Chloride	2100 U	UG/KG		Vinyl Chloride	1800 U	UG/KG		Vinyl Chloride	2400 U	UG/KG	

Note : Exceedance criteria based on NJDEP Non-residential soil cleanup criteria.

Table E-2: Soil Chemical Data - VOC Analyses
Engineering Test Pit Sampling
Maywood Interim Storage Site, Maywood NJ

Result Qualifier Codes

U - Analyzed for but not detected
J - Compound detected, value is estimated
UJ - Compound not detected, quantitation limit is estimat
B - Analyte in blank as well as sample
E - Exceeds calibration curve range
D - Identified at secondary dilution factor

SW Sample ID: MISS-0071V — *Test Pit 4*
Sample Type: Subsurface Soil — *SUOV*
Sample Date: 08/31/1999

Analysis Name	Result	Unit	Exceedance
1,1,1-Trichloroethane	1200 U	UG/KG	
1,1,2,2-Tetrachloroethane	1200 U	UG/KG	
1,1,2-Trichloroethane	1200 U	UG/KG	
1,1-Dichloroethane	1200 U	UG/KG	
1,1-Dichloroethene	1200 U	UG/KG	
1,2-Dichloroethane	1200 U	UG/KG	
1,2-Dichloropropane	1200 U	UG/KG	
2-Butanone	2400 U	UG/KG	
2-Hexanone	2400 U	UG/KG	
4-Methyl-2-Pentanone	2400 U	UG/KG	
Acetone	2400 U	UG/KG	
Benzene	850 J	UG/KG	
Bromodichloromethane	1200 U	UG/KG	
Bromoform	1200 U	UG/KG	
Bromomethane	2400 U	UG/KG	
Carbon Disulfide	1200 U	UG/KG	
Carbon Tetrachloride	1200 U	UG/KG	
Chlorobenzene	1200 U	UG/KG	
Chloroethane	2400 U	UG/KG	
Chloroform	1200 U	UG/KG	
Chloromethane	2400 U	UG/KG	
Cis-1,2-Dichloroethene	1200 U	UG/KG	
cis-1,3-Dichloropropene	1200 U	UG/KG	
Ethylbenzene	1200 U	UG/KG	
m-Xylenes (Total)	1200 U	UG/KG	
Methylene Chloride	940 J	UG/KG	
Styrene	1200 U	UG/KG	
Tetrachloroethene	1200 U	UG/KG	
Toluene	860 J	UG/KG	
Trans-1,2-Dichloroethene	1200 U	UG/KG	
Trans-1,3-Dichloropropene	1200 U	UG/KG	
Vinyl Chloride	2400 U	UG/KG	

SW Sample ID: MISS-0072V — *Test Pit 4*
Sample Type: Subsurface Soil — *SUUP*
Sample Date: 08/31/1999

Analysis Name	Result	Unit	Exceedance
1,1,1-Trichloroethane	870 U	UG/KG	
1,1,2,2-Tetrachloroethane	870 U	UG/KG	
1,1,2-Trichloroethane	870 U	UG/KG	
1,1-Dichloroethane	870 U	UG/KG	
1,1-Dichloroethene	870 U	UG/KG	
1,2-Dichloroethane	870 U	UG/KG	
1,2-Dichloropropane	870 U	UG/KG	
2-Butanone	1700 U	UG/KG	
2-Hexanone	1700 U	UG/KG	
4-Methyl-2-Pentanone	1700 U	UG/KG	
Acetone	1700 U	UG/KG	
Benzene	3600	UG/KG	
Bromodichloromethane	870 U	UG/KG	
Bromoform	870 U	UG/KG	
Bromomethane	1700 U	UG/KG	
Carbon Disulfide	870 U	UG/KG	
Carbon Tetrachloride	870 U	UG/KG	
Chlorobenzene	870 U	UG/KG	
Chloroethane	1700 U	UG/KG	
Chloroform	870 U	UG/KG	
Chloromethane	1700 U	UG/KG	
Cis-1,2-Dichloroethene	870 U	UG/KG	
cis-1,3-Dichloropropene	870 U	UG/KG	
Ethylbenzene	870 U	UG/KG	
m-Xylenes (Total)	870 U	UG/KG	
Methylene Chloride	580 J	UG/KG	
Styrene	870 U	UG/KG	
Tetrachloroethene	870 U	UG/KG	
Toluene	7500	UG/KG	
Trans-1,2-Dichloroethene	870 U	UG/KG	
Trans-1,3-Dichloropropene	870 U	UG/KG	
Vinyl Chloride	1700 U	UG/KG	

SW Sample ID: MISS-0073V — *Test Pit 4*
Sample Type: Subsurface Soil — *SULO*
Sample Date: 08/31/1999

Analysis Name	Result	Unit	Exceedance
1,1,1-Trichloroethane	590 U	UG/KG	
1,1,2,2-Tetrachloroethane	590 U	UG/KG	
1,1,2-Trichloroethane	590 U	UG/KG	
1,1-Dichloroethane	590 U	UG/KG	
1,1-Dichloroethene	590 U	UG/KG	
1,2-Dichloroethane	590 U	UG/KG	
1,2-Dichloropropane	590 U	UG/KG	
2-Butanone	1200 U	UG/KG	
2-Hexanone	1200 U	UG/KG	
4-Methyl-2-Pentanone	1200 U	UG/KG	
Acetone	1200 U	UG/KG	
Benzene	590 U	UG/KG	
Bromodichloromethane	590 U	UG/KG	
Bromoform	590 U	UG/KG	
Bromomethane	1200 U	UG/KG	
Carbon Disulfide	590 U	UG/KG	
Carbon Tetrachloride	590 U	UG/KG	
Chlorobenzene	590 U	UG/KG	
Chloroethane	1200 U	UG/KG	
Chloroform	590 U	UG/KG	
Chloromethane	1200 U	UG/KG	
Cis-1,2-Dichloroethene	590 U	UG/KG	
cis-1,3-Dichloropropene	590 U	UG/KG	
Ethylbenzene	590 U	UG/KG	
m-Xylenes (Total)	590 U	UG/KG	
Methylene Chloride	590 U	UG/KG	
Styrene	590 U	UG/KG	
Tetrachloroethene	590 U	UG/KG	
Toluene	590 U	UG/KG	
Trans-1,2-Dichloroethene	590 U	UG/KG	
Trans-1,3-Dichloropropene	590 U	UG/KG	
Vinyl Chloride	1200 U	UG/KG	

Note : Exceedance criteria based on NJDEP Non-residential soil cleanup criteria.

Table E-2: Soil Chemical Data - VOC Analyses
Engineering Test Pit Sampling
Maywood Interim Storage Site, Maywood NJ

Result Qualifier Codes

U - Analyzed for but not detected
J - Compound detected, value is estimated
UJ - Compound not detected, quantitation limit is estimat
B - Analyte in blank as well as sample
E - Exceeds calibration curve range
D - Identified at secondary dilution factor

SW Sample ID: MISS-0074V *Test Pit 4*
Sample Type: Subsurface Soil *TROV*
Sample Date: 08/31/1999

Analysis Name	Result	Unit	Exceedance
1,1,1-Trichloroethane	990 U	UG/KG	
1,1,2,2-Tetrachloroethane	990 U	UG/KG	
1,1,2-Trichloroethane	990 U	UG/KG	
1,1-Dichloroethane	990 U	UG/KG	
1,1-Dichloroethene	990 U	UG/KG	
1,2-Dichloroethane	990 U	UG/KG	
1,2-Dichloropropane	990 U	UG/KG	
2-Butanone	1900 U	UG/KG	
2-Hexanone	1900 U	UG/KG	
4-Methyl-2-Pentanone	1900 U	UG/KG	
Acetone	1900 U	UG/KG	
Benzene	990 U	UG/KG	
Bromodichloromethane	990 U	UG/KG	
Bromoform	990 U	UG/KG	
Bromomethane	1900 U	UG/KG	
Carbon Disulfide	990 U	UG/KG	
Carbon Tetrachloride	990 U	UG/KG	
Chlorobenzene	990 U	UG/KG	
Chloroethane	1900 U	UG/KG	
Chloroform	990 U	UG/KG	
Chloromethane	1900 U	UG/KG	
Cis-1,2-Dichloroethene	990 U	UG/KG	
cis-1,3-Dichloropropene	990 U	UG/KG	
Ethylbenzene	990 U	UG/KG	
m-Xylenes (Total)	990 U	UG/KG	
Methylene Chloride	870 J	UG/KG	
Styrene	990 U	UG/KG	
Tetrachloroethene	990 U	UG/KG	
Toluene	990 U	UG/KG	
Trans-1,2-Dichloroethene	990 U	UG/KG	
Trans-1,3-Dichloropropene	990 U	UG/KG	
Vinyl Chloride	1900 U	UG/KG	

SW Sample ID: MISS-0075V *Test Pit 4*
Sample Type: Subsurface Soil *TRUP*
Sample Date: 08/31/1999

Analysis Name	Result	Unit	Exceedance
1,1,1-Trichloroethane	760 U	UG/KG	
1,1,2,2-Tetrachloroethane	760 U	UG/KG	
1,1,2-Trichloroethane	760 U	UG/KG	
1,1-Dichloroethane	760 U	UG/KG	
1,1-Dichloroethene	760 U	UG/KG	
1,2-Dichloroethane	760 U	UG/KG	
1,2-Dichloropropane	760 U	UG/KG	
2-Butanone	1500 U	UG/KG	
2-Hexanone	1500 U	UG/KG	
4-Methyl-2-Pentanone	1500 U	UG/KG	
Acetone	1500 U	UG/KG	
Benzene	760 U	UG/KG	
Bromodichloromethane	760 U	UG/KG	
Bromoform	760 U	UG/KG	
Bromomethane	1500 U	UG/KG	
Carbon Disulfide	760 U	UG/KG	
Carbon Tetrachloride	760 U	UG/KG	
Chlorobenzene	760 U	UG/KG	
Chloroethane	1500 U	UG/KG	
Chloroform	760 U	UG/KG	
Chloromethane	1500 U	UG/KG	
Cis-1,2-Dichloroethene	760 U	UG/KG	
cis-1,3-Dichloropropene	760 U	UG/KG	
Ethylbenzene	760 U	UG/KG	
m-Xylenes (Total)	760 U	UG/KG	
Methylene Chloride	600 J	UG/KG	
Styrene	760 U	UG/KG	
Tetrachloroethene	760 U	UG/KG	
Toluene	760 U	UG/KG	
Trans-1,2-Dichloroethene	760 U	UG/KG	
Trans-1,3-Dichloropropene	760 U	UG/KG	
Vinyl Chloride	1500 U	UG/KG	

SW Sample ID: MISS-0076V *Test Pit 4*
Sample Type: Subsurface Soil *TRLO*
Sample Date: 08/31/1999

Analysis Name	Result	Unit	Exceedance
1,1,1-Trichloroethane	700 U	UG/KG	
1,1,2,2-Tetrachloroethane	700 U	UG/KG	
1,1,2-Trichloroethane	700 U	UG/KG	
1,1-Dichloroethane	700 U	UG/KG	
1,1-Dichloroethene	700 U	UG/KG	
1,2-Dichloroethane	700 U	UG/KG	
1,2-Dichloropropane	700 U	UG/KG	
2-Butanone	1400 U	UG/KG	
2-Hexanone	1400 U	UG/KG	
4-Methyl-2-Pentanone	1400 U	UG/KG	
Acetone	1400 U	UG/KG	
Benzene	730	UG/KG	
Bromodichloromethane	700 U	UG/KG	
Bromoform	700 U	UG/KG	
Bromomethane	1400 U	UG/KG	
Carbon Disulfide	700 U	UG/KG	
Carbon Tetrachloride	700 U	UG/KG	
Chlorobenzene	700 U	UG/KG	
Chloroethane	1400 U	UG/KG	
Chloroform	700 U	UG/KG	
Chloromethane	1400 U	UG/KG	
Cis-1,2-Dichloroethene	700 U	UG/KG	
cis-1,3-Dichloropropene	700 U	UG/KG	
Ethylbenzene	700 U	UG/KG	
m-Xylenes (Total)	700 U	UG/KG	
Methylene Chloride	580 J	UG/KG	
Styrene	700 U	UG/KG	
Tetrachloroethene	700 U	UG/KG	
Toluene	800	UG/KG	
Trans-1,2-Dichloroethene	700 U	UG/KG	
Trans-1,3-Dichloropropene	700 U	UG/KG	
Vinyl Chloride	1400 U	UG/KG	

Note : Exceedance criteria based on NJDEP Non-residential soil cleanup criteria.

Table E-2: Soil Chemical Data - VOC Analyses
Engineering Test Pit Sampling
Maywood Interim Storage Site, Maywood NJ

Result Qualifier Codes

U - Analyzed for but not detected
J - Compound detected, value is estimated
UJ - Compound not detected, quantitation limit is estimat
B - Analyte in blank as well as sample
E - Exceeds calibration curve range
D - Identified at secondary dilution factor

SW Sample ID: *MISS-0077V* *Test Pit 4*
Sample Type: *Subsurface Soil* *REOV*
Sample Date: *08/31/1999*

Analysis Name	Result	Unit	Exceedance
1,1,1-Trichloroethane	1000 U	UG/KG	
1,1,2,2-Tetrachloroethane	1000 U	UG/KG	
1,1,2-Trichloroethane	1000 U	UG/KG	
1,1-Dichloroethane	1000 U	UG/KG	
1,1-Dichloroethene	1000 U	UG/KG	
1,2-Dichloroethane	1000 U	UG/KG	
1,2-Dichloropropane	1000 U	UG/KG	
2-Butanone	1900 U	UG/KG	
2-Hexanone	1900 U	UG/KG	
4-Methyl-2-Pentanone	1900 U	UG/KG	
Acetone	1900 U	UG/KG	
Benzene	1000 U	UG/KG	
Bromodichloromethane	1000 U	UG/KG	
Bromoform	1000 U	UG/KG	
Bromomethane	1900 U	UG/KG	
Carbon Disulfide	1000 U	UG/KG	
Carbon Tetrachloride	1000 U	UG/KG	
Chlorobenzene	1000 U	UG/KG	
Chloroethane	1900 U	UG/KG	
Chloroform	1000 U	UG/KG	
Chloromethane	1900 U	UG/KG	
Cis-1,2-Dichloroethene	1000 U	UG/KG	
cis-1,3-Dichloropropene	1000 U	UG/KG	
Ethylbenzene	1000 U	UG/KG	
m-Xylenes (Total)	1000 U	UG/KG	
Methylene Chloride	870 J	UG/KG	
Styrene	1000 U	UG/KG	
Tetrachloroethene	1000 U	UG/KG	
Toluene	1000 U	UG/KG	
Trans-1,2-Dichloroethene	1000 U	UG/KG	
Trans-1,3-Dichloropropene	1000 U	UG/KG	
Vinyl Chloride	1900 U	UG/KG	

SW Sample ID: *MISS-0078V* *Test Pit 4*
Sample Type: *Subsurface Soil* *REUP*
Sample Date: *08/31/1999*

Analysis Name	Result	Unit	Exceedance
1,1,1-Trichloroethane	1200 U	UG/KG	
1,1,2,2-Tetrachloroethane	1200 U	UG/KG	
1,1,2-Trichloroethane	1200 U	UG/KG	
1,1-Dichloroethane	1200 U	UG/KG	
1,1-Dichloroethene	1200 U	UG/KG	
1,2-Dichloroethane	1200 U	UG/KG	
1,2-Dichloropropane	1200 U	UG/KG	
2-Butanone	2300 U	UG/KG	
2-Hexanone	2300 U	UG/KG	
4-Methyl-2-Pentanone	2300 U	UG/KG	
Acetone	2300 U	UG/KG	
Benzene	1200 U	UG/KG	
Bromodichloromethane	1200 U	UG/KG	
Bromoform	1200 U	UG/KG	
Bromomethane	2300 U	UG/KG	
Carbon Disulfide	1200 U	UG/KG	
Carbon Tetrachloride	1200 U	UG/KG	
Chlorobenzene	1200 U	UG/KG	
Chloroethane	2300 U	UG/KG	
Chloroform	1200 U	UG/KG	
Chloromethane	2300 U	UG/KG	
Cis-1,2-Dichloroethene	1200 U	UG/KG	
cis-1,3-Dichloropropene	1200 U	UG/KG	
Ethylbenzene	1200 U	UG/KG	
m-Xylenes (Total)	1200 U	UG/KG	
Methylene Chloride	1100 J	UG/KG	
Styrene	1200 U	UG/KG	
Tetrachloroethene	1200 U	UG/KG	
Toluene	1200 U	UG/KG	
Trans-1,2-Dichloroethene	1200 U	UG/KG	
Trans-1,3-Dichloropropene	1200 U	UG/KG	
Vinyl Chloride	2300 U	UG/KG	

SW Sample ID: *MISS-0079V* *Test Pit 4*
Sample Type: *Subsurface Soil* *REUP*
Sample Date: *08/31/1999*

Analysis Name	Result	Unit	Exceedance
1,1,1-Trichloroethane	650 U	UG/KG	
1,1,2,2-Tetrachloroethane	650 U	UG/KG	
1,1,2-Trichloroethane	650 U	UG/KG	
1,1-Dichloroethane	650 U	UG/KG	
1,1-Dichloroethene	650 U	UG/KG	
1,2-Dichloroethane	650 U	UG/KG	
1,2-Dichloropropane	650 U	UG/KG	
2-Butanone	1300 U	UG/KG	
2-Hexanone	1300 U	UG/KG	
4-Methyl-2-Pentanone	1300 U	UG/KG	
Acetone	1300 U	UG/KG	
Benzene	650 U	UG/KG	
Bromodichloromethane	650 U	UG/KG	
Bromoform	650 U	UG/KG	
Bromomethane	1300 U	UG/KG	
Carbon Disulfide	650 U	UG/KG	
Carbon Tetrachloride	650 U	UG/KG	
Chlorobenzene	650 U	UG/KG	
Chloroethane	1300 U	UG/KG	
Chloroform	650 U	UG/KG	
Chloromethane	1300 U	UG/KG	
Cis-1,2-Dichloroethene	650 U	UG/KG	
cis-1,3-Dichloropropene	650 U	UG/KG	
Ethylbenzene	650 U	UG/KG	
m-Xylenes (Total)	650 U	UG/KG	
Methylene Chloride	600 J	UG/KG	
Styrene	650 U	UG/KG	
Tetrachloroethene	650 U	UG/KG	
Toluene	650 U	UG/KG	
Trans-1,2-Dichloroethene	650 U	UG/KG	
Trans-1,3-Dichloropropene	650 U	UG/KG	
Vinyl Chloride	1300 U	UG/KG	

Note : Exceedance criteria based on NJDEP Non-residential soil cleanup criteria.

Table E-2: Soil Chemical Data - VOC Analyses
Engineering Test Pit Sampling
Maywood Interim Storage Site, Maywood NJ

Result Qualifier Codes

U - Analyzed for but not detected
J - Compound detected, value is estimated
UJ - Compound not detected, quantitation limit is estimat
B - Analyte in blank as well as sample
E - Exceeds calibration curve range
D - Identified at secondary dilution factor

SW Sample ID: MISS-0080V *Test Pit 4*
Sample Type: Subsurface Soil *REUP*
Sample Date: 08/31/1999

Analysis Name	Result	Unit	Exceedance
1,1,1-Trichloroethane	970 U	UG/KG	
1,1,2,2-Tetrachloroethane	970 U	UG/KG	
1,1,2-Trichloroethane	970 U	UG/KG	
1,1-Dichloroethane	970 U	UG/KG	
1,1-Dichloroethene	970 U	UG/KG	
1,2-Dichloroethane	970 U	UG/KG	
1,2-Dichloropropane	970 U	UG/KG	
2-Butanone	1900 U	UG/KG	
2-Hexanone	1900 U	UG/KG	
4-Methyl-2-Pentanone	1900 U	UG/KG	
Acetone	1900 U	UG/KG	
Benzene	640 J	UG/KG	
Bromodichloromethane	970 U	UG/KG	
Bromoform	970 U	UG/KG	
Bromomethane	1900 U	UG/KG	
Carbon Disulfide	970 U	UG/KG	
Carbon Tetrachloride	970 U	UG/KG	
Chlorobenzene	970 U	UG/KG	
Chloroethane	1900 U	UG/KG	
Chloroform	970 U	UG/KG	
Chloromethane	1900 U	UG/KG	
Cis-1,2-Dichloroethene	970 U	UG/KG	
cis-1,3-Dichloropropene	970 U	UG/KG	
Ethylbenzene	970 U	UG/KG	
m-Xylenes (Total)	970 U	UG/KG	
Methylene Chloride	2400	UG/KG	
Styrene	970 U	UG/KG	
Tetrachloroethene	970 U	UG/KG	
Toluene	970 U	UG/KG	
Trans-1,2-Dichloroethene	970 U	UG/KG	
Trans-1,3-Dichloropropene	970 U	UG/KG	
Vinyl Chloride	1900 U	UG/KG	

SW Sample ID: MISS-0090V *Test Pit 5*
Sample Type: Subsurface Soil *OVER*
Sample Date: 08/17/1999

Analysis Name	Result	Unit	Exceedance
1,1,1-Trichloroethane	660 U	UG/KG	
1,1,2,2-Tetrachloroethane	660 U	UG/KG	
1,1,2-Trichloroethane	660 U	UG/KG	
1,1-Dichloroethane	660 U	UG/KG	
1,1-Dichloroethene	660 U	UG/KG	
1,2-Dichloroethane	660 U	UG/KG	
1,2-Dichloropropane	660 U	UG/KG	
2-Butanone	1300 U	UG/KG	
2-Hexanone	1300 U	UG/KG	
4-Methyl-2-Pentanone	1300 U	UG/KG	
Acetone	1300 U	UG/KG	
Benzene	660 U	UG/KG	
Bromodichloromethane	660 U	UG/KG	
Bromoform	660 U	UG/KG	
Bromomethane	1300 U	UG/KG	
Carbon Disulfide	660 U	UG/KG	
Carbon Tetrachloride	660 U	UG/KG	
Chlorobenzene	660 U	UG/KG	
Chloroethane	1300 U	UG/KG	
Chloroform	660 U	UG/KG	
Chloromethane	1300 U	UG/KG	
Cis-1,2-Dichloroethene	660 U	UG/KG	
cis-1,3-Dichloropropene	660 U	UG/KG	
Ethylbenzene	660 U	UG/KG	
m-Xylenes (Total)	660 U	UG/KG	
Methylene Chloride	440 J	UG/KG	
Styrene	660 U	UG/KG	
Tetrachloroethene	660 U	UG/KG	
Toluene	660 U	UG/KG	
Trans-1,2-Dichloroethene	660 U	UG/KG	
Trans-1,3-Dichloropropene	660 U	UG/KG	
Vinyl Chloride	1300 U	UG/KG	

SW Sample ID: MISS-0091V *Test Pit 5*
Sample Type: Subsurface Soil *UPER*
Sample Date: 08/17/1999

Analysis Name	Result	Unit	Exceedance
1,1,1-Trichloroethane	1400 U	UG/KG	
1,1,2,2-Tetrachloroethane	1400 U	UG/KG	
1,1,2-Trichloroethane	1400 U	UG/KG	
1,1-Dichloroethane	1400 U	UG/KG	
1,1-Dichloroethene	1400 U	UG/KG	
1,2-Dichloroethane	1400 U	UG/KG	
1,2-Dichloropropane	1400 U	UG/KG	
2-Butanone	2800 U	UG/KG	
2-Hexanone	2800 U	UG/KG	
4-Methyl-2-Pentanone	2800 U	UG/KG	
Acetone	2800 U	UG/KG	
Benzene	1400 U	UG/KG	
Bromodichloromethane	1400 U	UG/KG	
Bromoform	1400 U	UG/KG	
Bromomethane	2800 U	UG/KG	
Carbon Disulfide	1400 U	UG/KG	
Carbon Tetrachloride	1400 U	UG/KG	
Chlorobenzene	1400 U	UG/KG	
Chloroethane	2800 U	UG/KG	
Chloroform	1400 U	UG/KG	
Chloromethane	2800 U	UG/KG	
Cis-1,2-Dichloroethene	1400 U	UG/KG	
cis-1,3-Dichloropropene	1400 U	UG/KG	
Ethylbenzene	1400 U	UG/KG	
m-Xylenes (Total)	1400 U	UG/KG	
Methylene Chloride	1400 U	UG/KG	
Styrene	1400 U	UG/KG	
Tetrachloroethene	1400 U	UG/KG	
Toluene	1400 U	UG/KG	
Trans-1,2-Dichloroethene	1400 U	UG/KG	
Trans-1,3-Dichloropropene	1400 U	UG/KG	
Vinyl Chloride	2800 U	UG/KG	

Note : Exceedance criteria based on NJDEP Non-residential soil cleanup criteria.

Table E-2: Soil Chemical Data - VOC Analyses
Engineering Test Pit Sampling
Maywood Interim Storage Site, Maywood NJ

Result Qualifier Codes

U - Analyzed for but not detected
J - Compound detected, value is estimated
UJ - Compound not detected, quantitation limit is estimat
B - Analyte in blank as well as sample
E - Exceeds calibration curve range
D - Identified at secondary diluation factor

SW Sample ID: MISS-0092V *Test Pit 5*
Sample Type: Subsurface Soil *LWER*
Sample Date: 08/17/1999

Analysis Name	Result		Unit	Exceedance
1,1,1-Trichloroethane	610	U	UG/KG	
1,1,2,2-Tetrachloroethane	610	U	UG/KG	
1,1,2-Trichloroethane	610	U	UG/KG	
1,1-Dichloroethane	610	U	UG/KG	
1,1-Dichloroethene	610	U	UG/KG	
1,2-Dichloroethane	610	U	UG/KG	
1,2-Dichloropropane	610	U	UG/KG	
2-Butanone	1200	U	UG/KG	
2-Hexanone	1200	U	UG/KG	
4-Methyl-2-Pentanone	1200	U	UG/KG	
Acetone	1200	U	UG/KG	
Benzene	610	U	UG/KG	
Bromodichloromethane	610	U	UG/KG	
Bromoform	610	U	UG/KG	
Bromomethane	1200	U	UG/KG	
Carbon Disulfide	610	U	UG/KG	
Carbon Tetrachloride	610	U	UG/KG	
Chlorobenzene	610	U	UG/KG	
Chloroethane	1200	U	UG/KG	
Chloroform	610	U	UG/KG	
Chloromethane	1200	U	UG/KG	
Cis-1,2-Dichloroethene	610	U	UG/KG	
cis-1,3-Dichloropropene	610	U	UG/KG	
Ethylbenzene	610	U	UG/KG	
m-Xylenes (Total)	610	U	UG/KG	
Methylene Chloride	610	U	UG/KG	
Styrene	610	U	UG/KG	
Tetrachloroethene	610	U	UG/KG	
Toluene	610	U	UG/KG	
Trans-1,2-Dichloroethene	610	U	UG/KG	
Trans-1,3-Dichloropropene	610	U	UG/KG	
Vinyl Chloride	1200	U	UG/KG	

SW Sample ID: MISS-0093V *Test Pit 5*
Sample Type: Subsurface Soil *UPER*
Sample Date: 08/17/1999

Analysis Name	Result		Unit	Exceedance
1,1,1-Trichloroethane	2600	U	UG/KG	
1,1,2,2-Tetrachloroethane	2600	U	UG/KG	
1,1,2-Trichloroethane	2600	U	UG/KG	
1,1-Dichloroethane	2600	U	UG/KG	
1,1-Dichloroethene	2600	U	UG/KG	
1,2-Dichloroethane	2600	U	UG/KG	
1,2-Dichloropropane	2600	U	UG/KG	
2-Butanone	31000		UG/KG	
2-Hexanone	5000	U	UG/KG	
4-Methyl-2-Pentanone	5000	U	UG/KG	
Acetone	5000	U	UG/KG	
Benzene	2600	U	UG/KG	
Bromodichloromethane	2600	U	UG/KG	
Bromoform	2600	U	UG/KG	
Bromomethane	5000	U	UG/KG	
Carbon Disulfide	2600	U	UG/KG	
Carbon Tetrachloride	2600	U	UG/KG	
Chlorobenzene	2600	U	UG/KG	
Chloroethane	5000	U	UG/KG	
Chloroform	2600	U	UG/KG	
Chloromethane	5000	U	UG/KG	
Cis-1,2-Dichloroethene	2600	U	UG/KG	
cis-1,3-Dichloropropene	2600	U	UG/KG	
Ethylbenzene	2600	U	UG/KG	
m-Xylenes (Total)	2600	U	UG/KG	
Methylene Chloride	2600	U	UG/KG	
Styrene	2600	U	UG/KG	
Tetrachloroethene	2600	U	UG/KG	
Toluene	2600	U	UG/KG	
Trans-1,2-Dichloroethene	2600	U	UG/KG	
Trans-1,3-Dichloropropene	2600	U	UG/KG	
Vinyl Chloride	5000	U	UG/KG	

SW Sample ID: MISS-0152V *Test Pit 1*
Sample Type: Subsurface Soil *0D03*
Sample Date: 08/19/1999

Analysis Name	Result		Unit	Exceedance
1,1,1-Trichloroethane	920	U	UG/KG	
1,1,2,2-Tetrachloroethane	920	U	UG/KG	
1,1,2-Trichloroethane	920	U	UG/KG	
1,1-Dichloroethane	920	U	UG/KG	
1,1-Dichloroethene	920	U	UG/KG	
1,2-Dichloroethane	920	U	UG/KG	
1,2-Dichloropropane	920	U	UG/KG	
2-Butanone	1800	U	UG/KG	
2-Hexanone	1800	U	UG/KG	
4-Methyl-2-Pentanone	1800	U	UG/KG	
Acetone	1800	U	UG/KG	
Benzene	920	U	UG/KG	
Bromodichloromethane	920	U	UG/KG	
Bromoform	920	U	UG/KG	
Bromomethane	1800	U	UG/KG	
Carbon Disulfide	920	U	UG/KG	
Carbon Tetrachloride	920	U	UG/KG	
Chlorobenzene	920	U	UG/KG	
Chloroethane	1800	U	UG/KG	
Chloroform	920	U	UG/KG	
Chloromethane	1800	U	UG/KG	
Cis-1,2-Dichloroethene	920	U	UG/KG	
cis-1,3-Dichloropropene	920	U	UG/KG	
Ethylbenzene	920	U	UG/KG	
m-Xylenes (Total)	920	U	UG/KG	
Methylene Chloride	920	U	UG/KG	
Styrene	920	U	UG/KG	
Tetrachloroethene	920	U	UG/KG	
Toluene	920	U	UG/KG	
Trans-1,2-Dichloroethene	920	U	UG/KG	
Trans-1,3-Dichloropropene	920	U	UG/KG	
Vinyl Chloride	1800	U	UG/KG	

Note : Exceedance criteria based on NJDEP Non-residential soil cleanup criteria.

Table E-2: Soil Chemical Data - VOC Analyses
Engineering Test Pit Sampling
Maywood Interim Storage Site, Maywood NJ

Result Qualifier Codes

U - Analyzed for but not detected
J - Compound detected, value is estimated
UJ - Compound not detected, quantitation limit is estimat
B - Analyte in blank as well as sample
E - Exceeds calibration curve range
D - Identified at secondary dilution factor

SW Sample ID:	*MISS-0154V*	*Test Pit 2*		*SW Sample ID:*	*MISS-0156V*	*Test Pit 3*		*SW Sample ID:*	*MISS-0158V*	*Test Pit 4*	
Sample Type:	*Subsurface Soil*	*0C05*		*Sample Type:*	*Subsurface Soil*	*0D03*		*Sample Type:*	*Subsurface Soil*	*0E02*	
Sample Date:	*08/24/1999*			*Sample Date:*	*08/30/1999*			*Sample Date:*	*08/31/1999*		
Analysis Name	***Result***	***Unit***	***Exceedance***	***Analysis Name***	***Result***	***Unit***	***Exceedance***	***Analysis Name***	***Result***	***Unit***	***Exceedance***
1,1,1-Trichloroethane	1300 U	UG/KG		1,1,1-Trichloroethane	1600 U	UG/KG		1,1,1-Trichloroethane	1200 U	UG/KG	
1,1,2,2-Tetrachloroethane	1300 U	UG/KG		1,1,2,2-Tetrachloroethane	1600 U	UG/KG		1,1,2,2-Tetrachloroethane	1200 U	UG/KG	
1,1,2-Trichloroethane	1300 U	UG/KG		1,1,2-Trichloroethane	1600 U	UG/KG		1,1,2-Trichloroethane	1200 U	UG/KG	
1,1-Dichloroethane	1300 U	UG/KG		1,1-Dichloroethane	1600 U	UG/KG		1,1-Dichloroethane	1200 U	UG/KG	
1,1-Dichloroethene	1300 U	UG/KG		1,1-Dichloroethene	1600 U	UG/KG		1,1-Dichloroethene	1200 U	UG/KG	
1,2-Dichloroethane	1300 U	UG/KG		1,2-Dichloroethane	1600 U	UG/KG		1,2-Dichloroethane	1200 U	UG/KG	
1,2-Dichloropropane	1300 U	UG/KG		1,2-Dichloropropane	1600 U	UG/KG		1,2-Dichloropropane	1200 U	UG/KG	
2-Butanone	2500 U	UG/KG		2-Butanone	3200 U	UG/KG		2-Butanone	2300 U	UG/KG	
2-Hexanone	2500 U	UG/KG		2-Hexanone	3200 U	UG/KG		2-Hexanone	2300 U	UG/KG	
4-Methyl-2-Pentanone	2500 U	UG/KG		4-Methyl-2-Pentanone	3200 U	UG/KG		4-Methyl-2-Pentanone	2300 U	UG/KG	
Acetone	2500 U	UG/KG		Acetone	3200 U	UG/KG		Acetone	2300 U	UG/KG	
Benzene	1300 U	UG/KG		Benzene	1600 U	UG/KG		Benzene	1200 U	UG/KG	
Bromodichloromethane	1300 U	UG/KG		Bromodichloromethane	1600 U	UG/KG		Bromodichloromethane	1200 U	UG/KG	
Bromoform	1300 U	UG/KG		Bromoform	1600 U	UG/KG		Bromoform	1200 U	UG/KG	
Bromomethane	2500 U	UG/KG		Bromomethane	3200 U	UG/KG		Bromomethane	2300 U	UG/KG	
Carbon Disulfide	1300 U	UG/KG		Carbon Disulfide	1600 U	UG/KG		Carbon Disulfide	1200 U	UG/KG	
Carbon Tetrachloride	1300 U	UG/KG		Carbon Tetrachloride	1600 U	UG/KG		Carbon Tetrachloride	1200 U	UG/KG	
Chlorobenzene	1300 U	UG/KG		Chlorobenzene	1600 U	UG/KG		Chlorobenzene	1200 U	UG/KG	
Chloroethane	2500 U	UG/KG		Chloroethane	3200 U	UG/KG		Chloroethane	2300 U	UG/KG	
Chloroform	1300 U	UG/KG		Chloroform	1600 U	UG/KG		Chloroform	1200 U	UG/KG	
Chloromethane	2500 U	UG/KG		Chloromethane	3200 U	UG/KG		Chloromethane	2300 U	UG/KG	
Cis-1,2-Dichloroethene	1300 U	UG/KG		Cis-1,2-Dichloroethene	1600 U	UG/KG		Cis-1,2-Dichloroethene	1200 U	UG/KG	
cis-1,3-Dichloropropene	1300 U	UG/KG		cis-1,3-Dichloropropene	1600 U	UG/KG		cis-1,3-Dichloropropene	1200 U	UG/KG	
Ethylbenzene	1300 U	UG/KG		Ethylbenzene	1600 U	UG/KG		Ethylbenzene	1200 U	UG/KG	
m-Xylenes (Total)	1300 U	UG/KG		m-Xylenes (Total)	1600 U	UG/KG		m-Xylenes (Total)	1200 U	UG/KG	
Methylene Chloride	1300 U	UG/KG		Methylene Chloride	1600 U	UG/KG		Methylene Chloride	1200 U	UG/KG	
Styrene	1300 U	UG/KG		Styrene	1600 U	UG/KG		Styrene	1200 U	UG/KG	
Tetrachloroethene	1300 U	UG/KG		Tetrachloroethene	1600 U	UG/KG		Tetrachloroethene	1200 U	UG/KG	
Toluene	1300 U	UG/KG		Toluene	1600 U	UG/KG		Toluene	1200 U	UG/KG	
Trans-1,2-Dichloroethene	1300 U	UG/KG		Trans-1,2-Dichloroethene	1600 U	UG/KG		Trans-1,2-Dichloroethene	1200 U	UG/KG	
Trans-1,3-Dichloropropene	1300 U	UG/KG		Trans-1,3-Dichloropropene	1600 U	UG/KG		Trans-1,3-Dichloropropene	1200 U	UG/KG	
Vinyl Chloride	2500 U	UG/KG		Vinyl Chloride	3200 U	UG/KG		Vinyl Chloride	2300 U	UG/KG	

Note : Exceedance criteria based on NJDEP Non-residential soil cleanup criteria.

Result Qualifier Codes

U - Analyzed for but not detected
J - Compound detected, value is estimated
UJ - Compound not detected, quantitation limit is estimat
B - Analyte in blank as well as sample
E - Exceeds calibration curve range
D - Identified at secondary diluation factor

SW Sample ID: *MISS-0160V* *Test Pit 5*
Sample Type: *Subsurface Soil* *0A03*
Sample Date: *08/17/1999*

Analysis Name	Result		Unit	Exceedance
1,1,1-Trichloroethane	70000	U	UG/KG	
1,1,2,2-Tetrachloroethane	70000	U	UG/KG	
1,1,2-Trichloroethane	70000	U	UG/KG	
1,1-Dichloroethane	70000	U	UG/KG	
1,1-Dichloroethene	70000	U	UG/KG	
1,2-Dichloroethane	70000	U	UG/KG	
1,2-Dichloropropane	70000	U	UG/KG	
2-Butanone	140000	U	UG/KG	
2-Hexanone	140000	U	UG/KG	
4-Methyl-2-Pentanone	140000	U	UG/KG	
Acetone	140000	U	UG/KG	
Benzene	380000		UG/KG	Yes
Bromodichloromethane	70000	U	UG/KG	
Bromoform	70000	U	UG/KG	
Bromomethane	140000	U	UG/KG	
Carbon Disulfide	70000	U	UG/KG	
Carbon Tetrachloride	70000	U	UG/KG	
Chlorobenzene	70000	U	UG/KG	
Chloroethane	140000	U	UG/KG	
Chloroform	70000	U	UG/KG	
Chloromethane	140000	U	UG/KG	
Cis-1,2-Dichloroethene	70000	U	UG/KG	
cis-1,3-Dichloropropene	70000	U	UG/KG	
Ethylbenzene	70000	U	UG/KG	
m-Xylenes (Total)	70000	U	UG/KG	
Methylene Chloride	70000	U	UG/KG	
Styrene	70000	U	UG/KG	
Tetrachloroethene	70000	U	UG/KG	
Toluene	73000000	D	UG/KG	Yes
Trans-1,2-Dichloroethene	70000	U	UG/KG	
Trans-1,3-Dichloropropene	70000	U	UG/KG	
Vinyl Chloride	140000	U	UG/KG	

Note : Exceedance criteria based on NJDEP Non-residential soil cleanup criteria.

Table E-3: Soil Chemical Data - Metals Analyses
Engineering Test Pit Sampling
Maywood Interim Storage Site, Maywood NJ

Result Qualifier Codes

U - Analyzed for but not detected
J - Compound detected, value is estimated
UJ - Compound not detected, quantitation limit is estimat
B - Analyte in blank as well as sample
E - Exceeds calibration curve range
D - Identified at secondary dilution factor

SW Sample ID:	MISS-00140	Test Pit 1		SW Sample ID:	MISS-00170	Test Pit 1		SW Sample ID:	MISS-00200	Test Pit 1	
Sample Type:	Subsurface Soil	SUOV		Sample Type:	Subsurface Soil	TROV		Sample Type:	Subsurface Soil	REOV	
Sample Date:	08/20/1999			Sample Date:	08/20/1999			Sample Date:	08/20/1999		
Analysis Name	Result	Unit	Exceedance	Analysis Name	Result	Unit	Exceedance	Analysis Name	Result	Unit	Exceedance
Antimony	1.29	MG/KG		Antimony	.152 U	MG/KG		Antimony	1.32 B	MG/KG	
Arsenic	11.3	MG/KG		Arsenic	2.10	MG/KG		Arsenic	10.2	MG/KG	
Beryllium	0.251 B	MG/KG		Beryllium	.0238 U	MG/KG		Beryllium	1.08	MG/KG	
Cadmium	0.0554 B	MG/KG		Cadmium	0.0756 B	MG/KG		Cadmium	0.336 B	MG/KG	
Chromium	330.	MG/KG		Chromium	21.8	MG/KG		Chromium	320.	MG/KG	
Copper	33.9	MG/KG		Copper	6.88	MG/KG		Copper	117.	MG/KG	
Lead	79.3	MG/KG		Lead	10.8	MG/KG		Lead	84.5	MG/KG	
Mercury	0.435	MG/KG		Mercury	1.28	MG/KG		Mercury	2.67	MG/KG	
Nickel	10.2	MG/KG		Nickel	2.27	MG/KG		Nickel	45.8	MG/KG	
Selenium	.463 U	MG/KG		Selenium	.466 U	MG/KG		Selenium	.796 U	MG/KG	
Silver	.0732 U	MG/KG		Silver	.0737 U	MG/KG		Silver	.126 U	MG/KG	
Thallium	1.47	MG/KG		Thallium	0.722 B	MG/KG		Thallium	1.59 B	MG/KG	
Zinc	101	MG/KG		Zinc	16.8	MG/KG		Zinc	138.	MG/KG	

SW Sample ID:	MISS-0015X	Test Pit 1		SW Sample ID:	MISS-00180	Test Pit 1		SW Sample ID:	MISS-00210	Test Pit 1	
Sample Type:	Subsurface Soil	SUUP		Sample Type:	Subsurface Soil	TRUP		Sample Type:	Subsurface Soil	REUP	
Sample Date:	08/20/1999			Sample Date:	08/20/1999			Sample Date:	08/20/1999		
Analysis Name	Result	Unit	Exceedance	Analysis Name	Result	Unit	Exceedance	Analysis Name	Result	Unit	Exceedance
Antimony	0.416 B	MG/KG		Antimony	0.483 B	MG/KG		Antimony	.217 U	MG/KG	
Arsenic	4.65	MG/KG		Arsenic	4.38	MG/KG		Arsenic	35.4	MG/KG	Yes
Beryllium	0.355 B	MG/KG		Beryllium	0.857	MG/KG		Beryllium	1.33	MG/KG	
Cadmium	.0298 U	MG/KG		Cadmium	0.156 B	MG/KG		Cadmium	0.285 B	MG/KG	
Chromium	63.4	MG/KG		Chromium	57.2	MG/KG		Chromium	31.2	MG/KG	
Copper	40.2	MG/KG		Copper	46.1	MG/KG		Copper	115	MG/KG	
Lead	49.8	MG/KG		Lead	52.7	MG/KG		Lead	45.1	MG/KG	
Mercury	12.4	MG/KG		Mercury	9.01	MG/KG		Mercury	10.8	MG/KG	
Nickel	9.75	MG/KG		Nickel	12.6	MG/KG		Nickel	38.8	MG/KG	
Selenium	.494 U	MG/KG		Selenium	.573 U	MG/KG		Selenium	.664 U	MG/KG	
Silver	.0781 U	MG/KG		Silver	.0906 U	MG/KG		Silver	.105 U	MG/KG	
Thallium	0.556 B	MG/KG		Thallium	0.645 B	MG/KG		Thallium	0.666 B	MG/KG	
Zinc	79.4	MG/KG		Zinc	66.4	MG/KG		Zinc	124.	MG/KG	

SW Sample ID:	MISS-00160	Test Pit 1		SW Sample ID:	MISS-00190	Test Pit 1		SW Sample ID:	MISS-00220	Test Pit 1	
Sample Type:	Subsurface Soil	SULO		Sample Type:	Subsurface Soil	TRLO		Sample Type:	Subsurface Soil	RELO	
Sample Date:	08/20/1999			Sample Date:	08/20/1999			Sample Date:	08/20/1999		
Analysis Name	Result	Unit	Exceedance	Analysis Name	Result	Unit	Exceedance	Analysis Name	Result	Unit	Exceedance
Antimony	.164 U	MG/KG		Antimony	.16 U	MG/KG		Antimony	.161 U	MG/KG	
Arsenic	1.41	MG/KG		Arsenic	2.29	MG/KG		Arsenic	3.40	MG/KG	
Beryllium	0.215 B	MG/KG		Beryllium	0.331 B	MG/KG		Beryllium	0.251 B	MG/KG	
Cadmium	.0303 U	MG/KG		Cadmium	.0296 U	MG/KG		Cadmium	.0298 U	MG/KG	
Chromium	10.3	MG/KG		Chromium	8.38	MG/KG		Chromium	9.15	MG/KG	
Copper	5.43	MG/KG		Copper	6.65	MG/KG		Copper	4.51	MG/KG	
Lead	8.68	MG/KG		Lead	8.60	MG/KG		Lead	6.22	MG/KG	
Mercury	0.326	MG/KG		Mercury	1.03	MG/KG		Mercury	.0387 U	MG/KG	
Nickel	6.82	MG/KG		Nickel	8.49	MG/KG		Nickel	6.89	MG/KG	
Selenium	.502 U	MG/KG		Selenium	.491 U	MG/KG		Selenium	.495 U	MG/KG	
Silver	.0794 U	MG/KG		Silver	.0776 U	MG/KG		Silver	.0782 U	MG/KG	
Thallium	0.746 B	MG/KG		Thallium	0.829 B	MG/KG		Thallium	1.04 B	MG/KG	
Zinc	21.2	MG/KG		Zinc	36.5	MG/KG		Zinc	19.2	MG/KG	

Table E-3: Soil Chemical Data - Metals Analyses
Engineering Test Pit Sampling
Maywood Interim Storage Site, Maywood NJ

Result Qualifier Codes

U - Analyzed for but not detected
J - Compound detected, value is estimated
UJ - Compound not detected, quantitation limit is estimat
B - Analyte in blank as well as sample
E - Exceeds calibration curve range
D - Identified at secondary diluation factor

SW Sample ID: MISS-00230 — **Test Pit 1**
Sample Type: Subsurface Soil — **REUP**
Sample Date: 08/20/1999

Analysis Name	Result		Unit	Exceedance
Antimony	0.795	B	MG/KG	
Arsenic	37.3		MG/KG	Yes
Beryllium	1.08		MG/KG	
Cadmium	0.209	B	MG/KG	
Chromium	37.5		MG/KG	
Copper	95.1		MG/KG	
Lead	64.8		MG/KG	
Mercury	11.3		MG/KG	
Nickel	21.8		MG/KG	
Selenium	.655	U	MG/KG	
Silver	.104	U	MG/KG	
Thallium	0.855	B	MG/KG	
Zinc	119.		MG/KG	

SW Sample ID: MISS-00350 — **Test Pit 2**
Sample Type: Subsurface Soil — **SULO**
Sample Date: 08/25/1999

Analysis Name	Result		Unit	Exceedance
Antimony	.173	U	MG/KG	
Arsenic	2.44		MG/KG	
Beryllium	0.211	B	MG/KG	
Cadmium	0.207	B	MG/KG	
Chromium	15.6		MG/KG	
Copper	4.53		MG/KG	
Lead	11.0		MG/KG	
Mercury	.0416	U	MG/KG	
Nickel	8.35		MG/KG	
Selenium	.531	U	MG/KG	
Silver	.0839	U	MG/KG	
Thallium	0.901	B	MG/KG	
Zinc	67.0		MG/KG	

SW Sample ID: MISS-00380 — **Test Pit 2**
Sample Type: Subsurface Soil — **TRLO**
Sample Date: 08/25/1999

Analysis Name	Result		Unit	Exceedance
Antimony	.159	U	MG/KG	
Arsenic	1.39		MG/KG	
Beryllium	0.196	B	MG/KG	
Cadmium	0.0824	B	MG/KG	
Chromium	9.56		MG/KG	
Copper	5.43		MG/KG	
Lead	3.56		MG/KG	
Mercury	.0381	U	MG/KG	
Nickel	5.17		MG/KG	
Selenium	.487	U	MG/KG	
Silver	.077	U	MG/KG	
Thallium	0.780	B	MG/KG	
Zinc	26.1		MG/KG	

SW Sample ID: MISS-00330 — **Test Pit 2**
Sample Type: Subsurface Soil — **SUOV**
Sample Date: 08/25/1999

Analysis Name	Result		Unit	Exceedance
Antimony	1.36		MG/KG	
Arsenic	11.6		MG/KG	
Beryllium	0.411	B	MG/KG	
Cadmium	0.183	B	MG/KG	
Chromium	446.		MG/KG	
Copper	95.7		MG/KG	
Lead	60.3		MG/KG	
Mercury	0.733		MG/KG	
Nickel	10.8		MG/KG	
Selenium	.467	U	MG/KG	
Silver	.0738	U	MG/KG	
Thallium	1.28		MG/KG	
Zinc	74.0		MG/KG	

SW Sample ID: MISS-00360 — **Test Pit 2**
Sample Type: Subsurface Soil — **TROV**
Sample Date: 08/25/1999

Analysis Name	Result		Unit	Exceedance
Antimony	0.949	B	MG/KG	
Arsenic	11.9		MG/KG	
Beryllium	0.873		MG/KG	
Cadmium	0.351	B	MG/KG	
Chromium	362.		MG/KG	
Copper	83.3		MG/KG	
Lead	82.1		MG/KG	
Mercury	0.413		MG/KG	
Nickel	21.6		MG/KG	
Selenium	0.500	U	MG/KG	
Silver	.0791	U	MG/KG	
Thallium	0.631	B	MG/KG	
Zinc	87.2		MG/KG	

SW Sample ID: MISS-00390 — **Test Pit 2**
Sample Type: Subsurface Soil — **REOV**
Sample Date: 08/25/1999

Analysis Name	Result		Unit	Exceedance
Antimony	0.389	B	MG/KG	
Arsenic	12.2		MG/KG	
Beryllium	0.766		MG/KG	
Cadmium	0.353	B	MG/KG	
Chromium	124.		MG/KG	
Copper	91.7		MG/KG	
Lead	54.2		MG/KG	
Mercury	0.392		MG/KG	
Nickel	30.8		MG/KG	
Selenium	.597	U	MG/KG	
Silver	.0942	U	MG/KG	
Thallium	1.12	B	MG/KG	
Zinc	82.5		MG/KG	

SW Sample ID: MISS-00340 — **Test Pit 2**
Sample Type: Subsurface Soil — **SUUP**
Sample Date: 08/25/1999

Analysis Name	Result		Unit	Exceedance
Antimony	0.907	B	MG/KG	
Arsenic	11.2		MG/KG	
Beryllium	1.60		MG/KG	
Cadmium	0.310	B	MG/KG	
Chromium	243.		MG/KG	
Copper	115.		MG/KG	
Lead	130.		MG/KG	
Mercury	0.464		MG/KG	
Nickel	35.7		MG/KG	
Selenium	.462	U	MG/KG	
Silver	.0729	U	MG/KG	
Thallium	1.26		MG/KG	
Zinc	68.9		MG/KG	

SW Sample ID: MISS-0037X — **Test Pit 2**
Sample Type: Subsurface Soil — **TRUP**
Sample Date: 08/25/1999

Analysis Name	Result		Unit	Exceedance
Antimony	0.508	B	MG/KG	
Arsenic	24.3		MG/KG	Yes
Beryllium	0.184	B	MG/KG	
Cadmium	0.774		MG/KG	
Chromium	64.5		MG/KG	
Copper	962.		MG/KG	Yes
Lead	197.		MG/KG	
Mercury	1.24		MG/KG	
Nickel	24.9		MG/KG	
Selenium	.538	U	MG/KG	
Silver	.085	U	MG/KG	
Thallium	0.865	B	MG/KG	
Zinc	431.		MG/KG	

SW Sample ID: MISS-00400 — **Test Pit 2**
Sample Type: Subsurface Soil — **REUP**
Sample Date: 08/25/1999

Analysis Name	Result		Unit	Exceedance
Antimony	0.295	B	MG/KG	
Arsenic	13.8		MG/KG	
Beryllium	0.932		MG/KG	
Cadmium	0.329	B	MG/KG	
Chromium	24.4		MG/KG	
Copper	240.		MG/KG	
Lead	98.0		MG/KG	
Mercury	2.36		MG/KG	
Nickel	18.3		MG/KG	
Selenium	.56	U	MG/KG	
Silver	.0886	U	MG/KG	
Thallium	0.601	B	MG/KG	
Zinc	108.		MG/KG	

Table E-3: Soil Chemical Data - Metals Analyses
Engineering Test Pit Sampling
Maywood Interim Storage Site, Maywood NJ

Result Qualifier Codes

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J - Compound detected, value is estimated
UJ - Compound not detected, quantitation limit is estimat
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E - Exceeds calibration curve range
D - Identified at secondary dilution factor

SW Sample ID: MISS-00410 — **Test Pit 2**
Sample Type: Subsurface Soil — **RELO**
Sample Date: 08/25/1999

Analysis Name	Result	Unit	Exceedance
Antimony	.172 U	MG/KG	
Arsenic	1.08	MG/KG	
Beryllium	0.182 B	MG/KG	
Cadmium	0.0779 B	MG/KG	
Chromium	8.59	MG/KG	
Copper	4.50	MG/KG	
Lead	3.76	MG/KG	
Mercury	0.0418	MG/KG	
Nickel	4.87	MG/KG	
Selenium	.526 U	MG/KG	
Silver	.0832 U	MG/KG	
Thallium	0.574 B	MG/KG	
Zinc	21.8	MG/KG	

SW Sample ID: MISS-0053X — **Test Pit 3**
Sample Type: Subsurface Soil — **SUUP**
Sample Date: 08/31/1999

Analysis Name	Result	Unit	Exceedance
Antimony	0.288 B	MG/KG	
Arsenic	46.0	MG/KG	Yes
Beryllium	0.621	MG/KG	
Cadmium	0.128 B	MG/KG	
Chromium	113.	MG/KG	
Copper	125.	MG/KG	
Lead	80.7	MG/KG	
Mercury	0.477	MG/KG	
Nickel	17.6	MG/KG	
Selenium	2.75 U	MG/KG	
Silver	.434 U	MG/KG	
Thallium	1.22 B	MG/KG	
Zinc	60.7	MG/KG	

SW Sample ID: MISS-00560 — **Test Pit 3**
Sample Type: Subsurface Soil — **TRUP**
Sample Date: 08/31/1999

Analysis Name	Result	Unit	Exceedance
Antimony	2.34	MG/KG	
Arsenic	90.9	MG/KG	Yes
Beryllium	0.958	MG/KG	
Cadmium	0.210 B	MG/KG	
Chromium	862.	MG/KG	
Copper	255.	MG/KG	
Lead	124.	MG/KG	
Mercury	1.47	MG/KG	
Nickel	26.9	MG/KG	
Selenium	3.11 U	MG/KG	
Silver	.492 U	MG/KG	
Thallium	1.73	MG/KG	
Zinc	119.	MG/KG	

SW Sample ID: MISS-00430 — **Test Pit 2**
Sample Type: Subsurface Soil — **REUP**
Sample Date: 08/25/1999

Analysis Name	Result	Unit	Exceedance
Antimony	0.539 B	MG/KG	
Arsenic	19.2	MG/KG	
Beryllium	1.01	MG/KG	
Cadmium	0.409 B	MG/KG	
Chromium	20.7	MG/KG	
Copper	346.	MG/KG	
Lead	123.	MG/KG	
Mercury	3.25	MG/KG	
Nickel	19.2	MG/KG	
Selenium	.515 U	MG/KG	
Silver	.0814 U	MG/KG	
Thallium	0.891 B	MG/KG	
Zinc	103.	MG/KG	

SW Sample ID: MISS-00540 — **Test Pit 3**
Sample Type: Subsurface Soil — **SULO**
Sample Date: 08/31/1999

Analysis Name	Result	Unit	Exceedance
Antimony	.168 U	MG/KG	
Arsenic	.384 U	MG/KG	
Beryllium	0.210 B	MG/KG	
Cadmium	.031 U	MG/KG	
Chromium	6.33	MG/KG	
Copper	4.36	MG/KG	
Lead	2.09	MG/KG	
Mercury	.0402 U	MG/KG	
Nickel	4.98	MG/KG	
Selenium	.514 U	MG/KG	
Silver	.0812 U	MG/KG	
Thallium	0.435 B	MG/KG	
Zinc	17.4	MG/KG	

SW Sample ID: MISS-00570 — **Test Pit 3**
Sample Type: Subsurface Soil — **TRLO**
Sample Date: 08/31/1999

Analysis Name	Result	Unit	Exceedance
Antimony	.162 U	MG/KG	
Arsenic	0.576 B	MG/KG	
Beryllium	0.248 B	MG/KG	
Cadmium	.03 U	MG/KG	
Chromium	9.59	MG/KG	
Copper	5.16	MG/KG	
Lead	3.66	MG/KG	
Mercury	.0389 U	MG/KG	
Nickel	6.57	MG/KG	
Selenium	.497 U	MG/KG	
Silver	.0785 U	MG/KG	
Thallium	0.345 B	MG/KG	
Zinc	22.8	MG/KG	

SW Sample ID: MISS-00520 — **Test Pit 3**
Sample Type: Subsurface Soil — **SUOV**
Sample Date: 08/31/1999

Analysis Name	Result	Unit	Exceedance
Antimony	0.296 B	MG/KG	
Arsenic	68.3	MG/KG	Yes
Beryllium	0.624	MG/KG	
Cadmium	.0369 U	MG/KG	
Chromium	71.1	MG/KG	
Copper	43.5	MG/KG	
Lead	96.7	MG/KG	
Mercury	.0479 U	MG/KG	
Nickel	10.6	MG/KG	
Selenium	2.02	MG/KG	
Silver	.0967 U	MG/KG	
Thallium	0.717 B	MG/KG	
Zinc	55.7	MG/KG	

SW Sample ID: MISS-00550 — **Test Pit 3**
Sample Type: Subsurface Soil — **TROV**
Sample Date: 08/31/1999

Analysis Name	Result	Unit	Exceedance
Antimony	0.442 B	MG/KG	
Arsenic	39.2	MG/KG	Yes
Beryllium	0.642	MG/KG	
Cadmium	.0346 U	MG/KG	
Chromium	118.	MG/KG	
Copper	65.9	MG/KG	
Lead	97.0	MG/KG	
Mercury	0.186	MG/KG	
Nickel	11.6	MG/KG	
Selenium	.574 U	MG/KG	
Silver	.0907 U	MG/KG	
Thallium	1.03 B	MG/KG	
Zinc	37.2	MG/KG	

SW Sample ID: MISS-00580 — **Test Pit 3**
Sample Type: Subsurface Soil — **REOV**
Sample Date: 08/31/1999

Analysis Name	Result	Unit	Exceedance
Antimony	0.478 B	MG/KG	
Arsenic	5.64	MG/KG	
Beryllium	2.32	MG/KG	Yes
Cadmium	.0583 U	MG/KG	
Chromium	24.2	MG/KG	
Copper	66.4	MG/KG	
Lead	17.2	MG/KG	
Mercury	.0756 U	MG/KG	
Nickel	43.9	MG/KG	
Selenium	.966 U	MG/KG	
Silver	.153 U	MG/KG	
Thallium	.574 U	MG/KG	
Zinc	52.7	MG/KG	

Table E-3: Soil Chemical Data - Metals Analyses
Engineering Test Pit Sampling
Maywood Interim Storage Site, Maywood NJ

Result Qualifier Codes

U - Analyzed for but not detected
J - Compound detected, value is estimated
UJ - Compound not detected, quantitation limit is estimat
B - Analyte in blank as well as sample
E - Exceeds calibration curve range
D - Identified at secondary dilution factor

SW Sample ID: MISS-00590 — *Test Pit 3*
Sample Type: Subsurface Soil — *REUP*
Sample Date: 08/31/1999

Analysis Name	Result	Unit	Exceedance
Antimony	1.08 B	MG/KG	
Arsenic	16.0	MG/KG	
Beryllium	1.58	MG/KG	
Cadmium	0.0570 B	MG/KG	
Chromium	150.	MG/KG	
Copper	145.	MG/KG	
Lead	50.2	MG/KG	
Mercury	0.176	MG/KG	
Nickel	36.5	MG/KG	
Selenium	.837 U	MG/KG	
Silver	.132 U	MG/KG	
Thallium	.497 U	MG/KG	
Zinc	120.	MG/KG	

SW Sample ID: MISS-00710 — *Test Pit 4*
Sample Type: Subsurface Soil — *SUOV*
Sample Date: 09/01/1999

Analysis Name	Result	Unit	Exceedance
Antimony	1.54 B	MG/KG	
Arsenic	100.	MG/KG	Yes
Beryllium	3.15	MG/KG	Yes
Cadmium	0.104 B	MG/KG	
Chromium	720.	MG/KG	
Copper	462.	MG/KG	
Lead	249.	MG/KG	
Mercury	0.317	MG/KG	
Nickel	14.7	MG/KG	
Selenium	39.7 U	MG/KG	
Silver	6.28 U	MG/KG	
Thallium	4.48	MG/KG	Yes
Zinc	78.0	MG/KG	

SW Sample ID: MISS-00740 — *Test Pit 4*
Sample Type: Subsurface Soil — *TROV*
Sample Date: 09/01/1999

Analysis Name	Result	Unit	Exceedance
Antimony	3.98	MG/KG	
Arsenic	110.	MG/KG	Yes
Beryllium	2.43	MG/KG	Yes
Cadmium	0.180 B	MG/KG	
Chromium	1410	MG/KG	
Copper	111.	MG/KG	
Lead	187.	MG/KG	
Mercury	0.156	MG/KG	
Nickel	10.2	MG/KG	
Selenium	36.2 U	MG/KG	
Silver	5.72 U	MG/KG	
Thallium	4.31	MG/KG	Yes
Zinc	84.6	MG/KG	

SW Sample ID: MISS-00600 — *Test Pit 3*
Sample Type: Subsurface Soil — *RELO*
Sample Date: 08/31/1999

Analysis Name	Result	Unit	Exceedance
Antimony	.161 U	MG/KG	
Arsenic	0.993	MG/KG	
Beryllium	0.212 B	MG/KG	
Cadmium	.0298 U	MG/KG	
Chromium	32.5	MG/KG	
Copper	5.10	MG/KG	
Lead	4.85	MG/KG	
Mercury	0.107	MG/KG	
Nickel	5.85	MG/KG	
Selenium	.494 U	MG/KG	
Silver	.0781 U	MG/KG	
Thallium	0.356 B	MG/KG	
Zinc	28.3	MG/KG	

SW Sample ID: MISS-00720 — *Test Pit 4*
Sample Type: Subsurface Soil — *SUUP*
Sample Date: 09/01/1999

Analysis Name	Result	Unit	Exceedance
Antimony	.165 U	MG/KG	
Arsenic	14.1	MG/KG	
Beryllium	0.606	MG/KG	
Cadmium	.0305 U	MG/KG	
Chromium	103.	MG/KG	
Copper	102.	MG/KG	
Lead	33.0	MG/KG	
Mercury	0.854	MG/KG	
Nickel	7.52	MG/KG	
Selenium	2.53 U	MG/KG	
Silver	.0798 U	MG/KG	
Thallium	0.813 B	MG/KG	
Zinc	40.9	MG/KG	

SW Sample ID: MISS-00750 — *Test Pit 4*
Sample Type: Subsurface Soil — *TRUP*
Sample Date: 09/01/1999

Analysis Name	Result	Unit	Exceedance
Antimony	.158 U	MG/KG	
Arsenic	3.91	MG/KG	
Beryllium	0.304 B	MG/KG	
Cadmium	.0293 U	MG/KG	
Chromium	46.1	MG/KG	
Copper	55.0	MG/KG	
Lead	22.5	MG/KG	
Mercury	0.150	MG/KG	
Nickel	5.17	MG/KG	
Selenium	.485 U	MG/KG	
Silver	.0766 U	MG/KG	
Thallium	0.543 B	MG/KG	
Zinc	28.9	MG/KG	

SW Sample ID: MISS-00610 — *Test Pit 3*
Sample Type: Subsurface Soil — *REUP*
Sample Date: 08/31/1999

Analysis Name	Result	Unit	Exceedance
Antimony	0.790 B	MG/KG	
Arsenic	11.3	MG/KG	
Beryllium	1.40	MG/KG	
Cadmium	.05 U	MG/KG	
Chromium	86.0	MG/KG	
Copper	77.9	MG/KG	
Lead	27.2	MG/KG	
Mercury	0.171	MG/KG	
Nickel	31.3	MG/KG	
Selenium	.829 U	MG/KG	
Silver	.131 U	MG/KG	
Thallium	.492 U	MG/KG	
Zinc	92.0	MG/KG	

SW Sample ID: MISS-00730 — *Test Pit 4*
Sample Type: Subsurface Soil — *SULO*
Sample Date: 09/01/1999

Analysis Name	Result	Unit	Exceedance
Antimony	.15 U	MG/KG	
Arsenic	2.59	MG/KG	
Beryllium	0.207 B	MG/KG	
Cadmium	.0277 U	MG/KG	
Chromium	12.6	MG/KG	
Copper	5.99	MG/KG	
Lead	3.91	MG/KG	
Mercury	.036 U	MG/KG	
Nickel	5.42	MG/KG	
Selenium	.46 U	MG/KG	
Silver	.0726 U	MG/KG	
Thallium	0.355 B	MG/KG	
Zinc	16.4	MG/KG	

SW Sample ID: MISS-00760 — *Test Pit 4*
Sample Type: Subsurface Soil — *TRLO*
Sample Date: 09/01/1999

Analysis Name	Result	Unit	Exceedance
Antimony	.153 U	MG/KG	
Arsenic	2.95	MG/KG	
Beryllium	0.513	MG/KG	
Cadmium	.0284 U	MG/KG	
Chromium	15.4	MG/KG	
Copper	18.6	MG/KG	
Lead	7.52	MG/KG	
Mercury	0.0478	MG/KG	
Nickel	6.16	MG/KG	
Selenium	.47 U	MG/KG	
Silver	1.28	MG/KG	
Thallium	.279 U	MG/KG	
Zinc	14.4	MG/KG	

Table E-3: Soil Chemical Data - Metals Analyses
Engineering Test Pit Sampling
Maywood Interim Storage Site, Maywood NJ

Result Qualifier Codes

U - Analyzed for but not detected
J - Compound detected, value is estimated
UJ - Compound not detected, quantitation limit is estimat
B - Analyte in blank as well as sample
E - Exceeds calibration curve range
D - Identified at secondary diluation factor

SW Sample ID: MISS-00770 — **Test Pit 4** REOV
Sample Type: Subsurface Soil
Sample Date: 09/01/1999

Analysis Name	Result		Unit	Exceedance
Antimony	8.17		MG/KG	
Arsenic	26.5		MG/KG	Yes
Beryllium	1.01		MG/KG	
Cadmium	0.0942	B	MG/KG	
Chromium	2590		MG/KG	
Copper	358.		MG/KG	
Lead	78.0		MG/KG	
Mercury	0.134		MG/KG	
Nickel	9.38		MG/KG	
Selenium	6.37	U	MG/KG	
Silver	1.000	U	MG/KG	
Thallium	2.72		MG/KG	Yes
Zinc	75.2		MG/KG	

SW Sample ID: MISS-00800 — **Test Pit 4** RELO
Sample Type: Subsurface Soil
Sample Date: 09/01/1999

Analysis Name	Result		Unit	Exceedance
Antimony	.169	U	MG/KG	
Arsenic	9.60		MG/KG	
Beryllium	0.340	B	MG/KG	
Cadmium	.0313	U	MG/KG	
Chromium	48.4		MG/KG	
Copper	59.2		MG/KG	
Lead	29.6		MG/KG	
Mercury	.0406	U	MG/KG	
Nickel	3.06		MG/KG	
Selenium	2.59	U	MG/KG	
Silver	.41	U	MG/KG	
Thallium	0.681	B	MG/KG	
Zinc	14.7		MG/KG	

SW Sample ID: MISS-0092X — **Test Pit 5** LWER
Sample Type: Subsurface Soil
Sample Date: 08/18/1999

Analysis Name	Result		Unit	Exceedance
Antimony	.168	U	MG/KG	
Arsenic	0.834	B	MG/KG	
Beryllium	0.171	B	MG/KG	
Cadmium	.031	U	MG/KG	
Chromium	4.89		MG/KG	
Copper	2.90	B	MG/KG	
Lead	3.98		MG/KG	
Mercury	.0402	U	MG/KG	
Nickel	4.28		MG/KG	
Selenium	.514	U	MG/KG	
Silver	.0812	U	MG/KG	
Thallium	0.364	B	MG/KG	
Zinc	11.1		MG/KG	

SW Sample ID: MISS-0078X — **Test Pit 4** REUP
Sample Type: Subsurface Soil
Sample Date: 09/01/1999

Analysis Name	Result		Unit	Exceedance
Antimony	1.36	B	MG/KG	
Arsenic	50.5		MG/KG	Yes
Beryllium	2.18		MG/KG	Yes
Cadmium	0.0492	B	MG/KG	
Chromium	413.		MG/KG	
Copper	199.		MG/KG	
Lead	108.		MG/KG	
Mercury	0.120		MG/KG	
Nickel	12.6		MG/KG	
Selenium	7.49	U	MG/KG	
Silver	1.18	U	MG/KG	
Thallium	2.06		MG/KG	Yes
Zinc	46.4		MG/KG	

SW Sample ID: MISS-00900 — **Test Pit 5** OVER
Sample Type: Subsurface Soil
Sample Date: 08/18/1999

Analysis Name	Result		Unit	Exceedance
Antimony	0.535	B	MG/KG	
Arsenic	9.00		MG/KG	
Beryllium	0.321	B	MG/KG	
Cadmium	0.0409	B	MG/KG	
Chromium	342.		MG/KG	
Copper	363.		MG/KG	
Lead	89.9		MG/KG	
Mercury	0.796		MG/KG	
Nickel	16.4		MG/KG	
Selenium	.471	U	MG/KG	
Silver	.0744	U	MG/KG	
Thallium	1.44		MG/KG	
Zinc	119.		MG/KG	

SW Sample ID: MISS-00930 — **Test Pit 5** UPER
Sample Type: Subsurface Soil
Sample Date: 08/18/1999

Analysis Name	Result		Unit	Exceedance
Antimony	.248	U	MG/KG	
Arsenic	5.60		MG/KG	
Beryllium	0.314	B	MG/KG	
Cadmium	0.0891	B	MG/KG	
Chromium	6.00		MG/KG	
Copper	396.		MG/KG	
Lead	294.		MG/KG	
Mercury	0.915		MG/KG	
Nickel	18.6		MG/KG	
Selenium	.759	U	MG/KG	
Silver	.12	U	MG/KG	
Thallium	0.506	B	MG/KG	
Zinc	118.		MG/KG	

SW Sample ID: MISS-00790 — **Test Pit 4** RELO
Sample Type: Subsurface Soil
Sample Date: 09/01/1999

Analysis Name	Result		Unit	Exceedance
Antimony	0.377	B	MG/KG	
Arsenic	5.25		MG/KG	
Beryllium	0.343	B	MG/KG	
Cadmium	.0325	U	MG/KG	
Chromium	136.		MG/KG	
Copper	16.7		MG/KG	
Lead	26.7		MG/KG	
Mercury	.0421	U	MG/KG	
Nickel	4.15		MG/KG	
Selenium	.538	U	MG/KG	
Silver	.0851	U	MG/KG	
Thallium	0.933	B	MG/KG	
Zinc	29.5		MG/KG	

SW Sample ID: MISS-00910 — **Test Pit 5** UPER
Sample Type: Subsurface Soil
Sample Date: 08/18/1999

Analysis Name	Result		Unit	Exceedance
Antimony	0.326	B	MG/KG	
Arsenic	13.6		MG/KG	
Beryllium	0.312	B	MG/KG	
Cadmium	0.0409	B	MG/KG	
Chromium	6.56		MG/KG	
Copper	889.		MG/KG	Yes
Lead	216.		MG/KG	
Mercury	0.957		MG/KG	
Nickel	14.3		MG/KG	
Selenium	.645	U	MG/KG	
Silver	.102	U	MG/KG	
Thallium	1.44	B	MG/KG	
Zinc	113.		MG/KG	

Table E-4: Soil Chemical Data - Pesticide Analyses
Engineering Test Pit Sampling
Maywood Interim Storage Site, Maywood NJ

Result Qualifier Codes

U - Analyzed for but not detected
J - Compound detected, value is estimated
UJ - Compound not detected, quantitation limit is estimat
B - Analyte in blank as well as sample
E - Exceeds calibration curve range
D - Identified at secondary dilution factor

SW Sample ID: MISS-00140 — *Test Pit 1*
Sample Type: Subsurface Soil — *SUOV*
Sample Date: 08/20/1999

Analysis Name	Result		Unit	Exceedance
4,4'-DDD	3.6	U	UG/KG	
4,4'-DDE	5.2		UG/KG	
4,4'-DDT	3.4	J	UG/KG	
Aldrin	1.8	U	UG/KG	
Alpha-BHC	1.8	U	UG/KG	
Alpha-Chlordane	7.0		UG/KG	
Beta-BHC	1.8	U	UG/KG	
Delta-BHC	1.8	U	UG/KG	
Dieldrin	3.6	U	UG/KG	
Endosulfan I	1.8	U	UG/KG	
Endosulfan II	3.6	U	UG/KG	
Endosulfan Sulfate	3.6	U	UG/KG	
Endrin	3.6	U	UG/KG	
Endrin Aldehyde	3.6	U	UG/KG	
Endrin Ketone	3.6	U	UG/KG	
Gamma-BHC	1.8	U	UG/KG	
Gamma-Chlordane	8.0		UG/KG	
Heptachlor	1.8	U	UG/KG	
Heptachlor Epoxide	1.8	U	UG/KG	
Methoxychlor	18	U	UG/KG	
Toxaphene	72	U	UG/KG	

SW Sample ID: MISS-00160 — *Test Pit 1*
Sample Type: Subsurface Soil — *SULO*
Sample Date: 08/20/1999

Analysis Name	Result		Unit	Exceedance
4,4'-DDD	3.9	U	UG/KG	
4,4'-DDE	3.9	U	UG/KG	
4,4'-DDT	3.9	U	UG/KG	
Aldrin	2.0	U	UG/KG	
Alpha-BHC	2.0	U	UG/KG	
Alpha-Chlordane	2.0	U	UG/KG	
Beta-BHC	2.0	U	UG/KG	
Delta-BHC	2.0	U	UG/KG	
Dieldrin	3.9	U	UG/KG	
Endosulfan I	2.0	U	UG/KG	
Endosulfan II	3.9	U	UG/KG	
Endosulfan Sulfate	3.9	U	UG/KG	
Endrin	3.9	U	UG/KG	
Endrin Aldehyde	3.9	U	UG/KG	
Endrin Ketone	3.9	U	UG/KG	
Gamma-BHC	2.0	U	UG/KG	
Gamma-Chlordane	2.0	U	UG/KG	
Heptachlor	2.0	U	UG/KG	
Heptachlor Epoxide	2.0	U	UG/KG	
Methoxychlor	20	U	UG/KG	
Toxaphene	78	U	UG/KG	

SW Sample ID: MISS-00180 — *Test Pit 1*
Sample Type: Subsurface Soil — *TRUP*
Sample Date: 08/20/1999

Analysis Name	Result		Unit	Exceedance
4,4'-DDD	4.4	U	UG/KG	
4,4'-DDE	4.4	U	UG/KG	
4,4'-DDT	4.4	U	UG/KG	
Aldrin	2.2	U	UG/KG	
Alpha-BHC	2.2	U	UG/KG	
Alpha-Chlordane	2.2		UG/KG	
Beta-BHC	2.2	U	UG/KG	
Delta-BHC	2.2	U	UG/KG	
Dieldrin	4.4	U	UG/KG	
Endosulfan I	2.2	U	UG/KG	
Endosulfan II	4.4	U	UG/KG	
Endosulfan Sulfate	4.4	U	UG/KG	
Endrin	4.4	U	UG/KG	
Endrin Aldehyde	4.4	U	UG/KG	
Endrin Ketone	4.4	U	UG/KG	
Gamma-BHC	2.2	U	UG/KG	
Gamma-Chlordane	2.3		UG/KG	
Heptachlor	2.2	U	UG/KG	
Heptachlor Epoxide	2.2	U	UG/KG	
Methoxychlor	22	U	UG/KG	
Toxaphene	88	U	UG/KG	

SW Sample ID: MISS-0015X — *Test Pit 1*
Sample Type: Subsurface Soil — *SUUP*
Sample Date: 08/20/1999

Analysis Name	Result		Unit	Exceedance
4,4'-DDD	100		UG/KG	
4,4'-DDE	7.6	U	UG/KG	
4,4'-DDT	3.9	J	UG/KG	
Aldrin	3.8	U	UG/KG	
Alpha-BHC	3.8	U	UG/KG	
Alpha-Chlordane	3.8	U	UG/KG	
Beta-BHC	3.8	U	UG/KG	
Delta-BHC	3.8	U	UG/KG	
Dieldrin	7.6	U	UG/KG	
Endosulfan I	3.8	U	UG/KG	
Endosulfan II	7.6	U	UG/KG	
Endosulfan Sulfate	7.6	U	UG/KG	
Endrin	7.6	U	UG/KG	
Endrin Aldehyde	7.6	U	UG/KG	
Endrin Ketone	7.6	U	UG/KG	
Gamma-BHC	3.8	U	UG/KG	
Gamma-Chlordane	3.8	U	UG/KG	
Heptachlor	3.8	U	UG/KG	
Heptachlor Epoxide	3.8	U	UG/KG	
Methoxychlor	38	U	UG/KG	
Toxaphene	150	U	UG/KG	

SW Sample ID: MISS-00170 — *Test Pit 1*
Sample Type: Subsurface Soil — *TROV*
Sample Date: 08/20/1999

Analysis Name	Result		Unit	Exceedance
4,4'-DDD	3.6	U	UG/KG	
4,4'-DDE	4.1		UG/KG	
4,4'-DDT	5.2		UG/KG	
Aldrin	1.8	U	UG/KG	
Alpha-BHC	1.8	U	UG/KG	
Alpha-Chlordane	5.0		UG/KG	
Beta-BHC	3.1		UG/KG	
Delta-BHC	1.8	U	UG/KG	
Dieldrin	3.3	J	UG/KG	
Endosulfan I	1.8	U	UG/KG	
Endosulfan II	3.6	U	UG/KG	
Endosulfan Sulfate	3.6	U	UG/KG	
Endrin	3.6	U	UG/KG	
Endrin Aldehyde	3.6	U	UG/KG	
Endrin Ketone	3.6	U	UG/KG	
Gamma-BHC	1.8	U	UG/KG	
Gamma-Chlordane	6.0		UG/KG	
Heptachlor	1.8	U	UG/KG	
Heptachlor Epoxide	6.9		UG/KG	
Methoxychlor	18	U	UG/KG	
Toxaphene	72	U	UG/KG	

SW Sample ID: MISS-00190 — *Test Pit 1*
Sample Type: Subsurface Soil — *TRLO*
Sample Date: 08/20/1999

Analysis Name	Result		Unit	Exceedance
4,4'-DDD	5.5		UG/KG	
4,4'-DDE	3.8	U	UG/KG	
4,4'-DDT	3.8	U	UG/KG	
Aldrin	1.9	U	UG/KG	
Alpha-BHC	1.9	U	UG/KG	
Alpha-Chlordane	1.9	U	UG/KG	
Beta-BHC	1.9	U	UG/KG	
Delta-BHC	1.9	U	UG/KG	
Dieldrin	3.8	U	UG/KG	
Endosulfan I	1.9	U	UG/KG	
Endosulfan II	3.8	U	UG/KG	
Endosulfan Sulfate	3.8	U	UG/KG	
Endrin	3.8	U	UG/KG	
Endrin Aldehyde	3.8	U	UG/KG	
Endrin Ketone	3.8	U	UG/KG	
Gamma-BHC	1.9	U	UG/KG	
Gamma-Chlordane	1.9	U	UG/KG	
Heptachlor	1.9	U	UG/KG	
Heptachlor Epoxide	1.9	U	UG/KG	
Methoxychlor	19	U	UG/KG	
Toxaphene	77	U	UG/KG	

Table E-4: Soil Chemical Data - Pesticide Analyses
Engineering Test Pit Sampling
Maywood Interim Storage Site, Maywood NJ

Result Qualifier Codes

U - Analyzed for but not detected
J - Compound detected, value is estimated
UJ - Compound not detected, quantitation limit is estimat
B - Analyte in blank as well as sample
E - Exceeds calibration curve range
D - Identified at secondary dilution factor

SW Sample ID: MISS-00200 — *Test Pit 1* — REOV
Sample Type: Subsurface Soil
Sample Date: 08/20/1999

Analysis Name	Result		Unit	Exceedance
4,4'-DDD	6.1	U	UG/KG	
4,4'-DDE	6.1	U	UG/KG	
4,4'-DDT	12		UG/KG	
Aldrin	3.1	U	UG/KG	
Alpha-BHC	3.1	U	UG/KG	
Alpha-Chlordane	10		UG/KG	
Beta-BHC	3.1	U	UG/KG	
Delta-BHC	3.1	U	UG/KG	
Dieldrin	3.8	J	UG/KG	
Endosulfan I	3.1	U	UG/KG	
Endosulfan II	6.1	U	UG/KG	
Endosulfan Sulfate	6.1	U	UG/KG	
Endrin	6.1	U	UG/KG	
Endrin Aldehyde	6.1	U	UG/KG	
Endrin Ketone	6.1	U	UG/KG	
Gamma-BHC	3.1	U	UG/KG	
Gamma-Chlordane	13		UG/KG	
Heptachlor	3.1	U	UG/KG	
Heptachlor Epoxide	3.1	U	UG/KG	
Methoxychlor	31	U	UG/KG	
Toxaphene	120	U	UG/KG	

SW Sample ID: MISS-00220 — *Test Pit 1* — RELO
Sample Type: Subsurface Soil
Sample Date: 08/20/1999

Analysis Name	Result		Unit	Exceedance
4,4'-DDD	3.8	U	UG/KG	
4,4'-DDE	3.8	U	UG/KG	
4,4'-DDT	3.8	U	UG/KG	
Aldrin	1.9	U	UG/KG	
Alpha-BHC	1.9	U	UG/KG	
Alpha-Chlordane	1.9	U	UG/KG	
Beta-BHC	1.9	U	UG/KG	
Delta-BHC	1.9	U	UG/KG	
Dieldrin	3.8	U	UG/KG	
Endosulfan I	1.9	U	UG/KG	
Endosulfan II	3.8	U	UG/KG	
Endosulfan Sulfate	3.8	U	UG/KG	
Endrin	3.8	U	UG/KG	
Endrin Aldehyde	3.8	U	UG/KG	
Endrin Ketone	3.8	U	UG/KG	
Gamma-BHC	1.9	U	UG/KG	
Gamma-Chlordane	1.9	U	UG/KG	
Heptachlor	1.9	U	UG/KG	
Heptachlor Epoxide	1.9	U	UG/KG	
Methoxychlor	19	U	UG/KG	
Toxaphene	76	U	UG/KG	

SW Sample ID: MISS-00330 — *Test Pit 2* — SUOV
Sample Type: Subsurface Soil
Sample Date: 08/25/1999

Analysis Name	Result		Unit	Exceedance
4,4'-DDD	4.3	U	UG/KG	
4,4'-DDE	4.3	U	UG/KG	
4,4'-DDT	16		UG/KG	
Aldrin	2.2	U	UG/KG	
Alpha-BHC	2.2	U	UG/KG	
Alpha-Chlordane	7.6		UG/KG	
Beta-BHC	2.2	U	UG/KG	
Delta-BHC	2.2	U	UG/KG	
Dieldrin	6.0		UG/KG	
Endosulfan I	2.2	U	UG/KG	
Endosulfan II	4.3	U	UG/KG	
Endosulfan Sulfate	4.3	U	UG/KG	
Endrin	4.3	U	UG/KG	
Endrin Aldehyde	4.3	U	UG/KG	
Endrin Ketone	4.3	U	UG/KG	
Gamma-BHC	2.2	U	UG/KG	
Gamma-Chlordane	9.8		UG/KG	
Heptachlor	2.2	U	UG/KG	
Heptachlor Epoxide	3.8		UG/KG	
Methoxychlor	22	U	UG/KG	
Toxaphene	86	U	UG/KG	

SW Sample ID: MISS-00210 — *Test Pit 1* — REUP
Sample Type: Subsurface Soil
Sample Date: 08/20/1999

Analysis Name	Result		Unit	Exceedance
4,4'-DDD	5.2	U	UG/KG	
4,4'-DDE	5.2	U	UG/KG	
4,4'-DDT	5.2	U	UG/KG	
Aldrin	2.6	U	UG/KG	
Alpha-BHC	2.6	U	UG/KG	
Alpha-Chlordane	2.6		UG/KG	
Beta-BHC	2.6	U	UG/KG	
Delta-BHC	2.6	U	UG/KG	
Dieldrin	5.2	U	UG/KG	
Endosulfan I	1.8	J	UG/KG	
Endosulfan II	5.2	U	UG/KG	
Endosulfan Sulfate	5.2	U	UG/KG	
Endrin	5.2	U	UG/KG	
Endrin Aldehyde	5.2	U	UG/KG	
Endrin Ketone	5.2	U	UG/KG	
Gamma-BHC	2.6	U	UG/KG	
Gamma-Chlordane	2.6	U	UG/KG	
Heptachlor	2.6	U	UG/KG	
Heptachlor Epoxide	2.6	U	UG/KG	
Methoxychlor	26	U	UG/KG	
Toxaphene	100	U	UG/KG	

SW Sample ID: MISS-00230 — *Test Pit 1* — REUP
Sample Type: Subsurface Soil
Sample Date: 08/20/1999

Analysis Name	Result		Unit	Exceedance
4,4'-DDD	44		UG/KG	
4,4'-DDE	2.4	J	UG/KG	
4,4'-DDT	2.7	J	UG/KG	
Aldrin	2.5	U	UG/KG	
Alpha-BHC	2.5	U	UG/KG	
Alpha-Chlordane	2.7		UG/KG	
Beta-BHC	2.5	U	UG/KG	
Delta-BHC	2.5	U	UG/KG	
Dieldrin	5.1	U	UG/KG	
Endosulfan I	2.5	U	UG/KG	
Endosulfan II	5.1	U	UG/KG	
Endosulfan Sulfate	5.1	U	UG/KG	
Endrin	5.1	U	UG/KG	
Endrin Aldehyde	5.1	U	UG/KG	
Endrin Ketone	5.1	U	UG/KG	
Gamma-BHC	2.5	U	UG/KG	
Gamma-Chlordane	5.1		UG/KG	
Heptachlor	2.5	U	UG/KG	
Heptachlor Epoxide	2.5	U	UG/KG	
Methoxychlor	25	U	UG/KG	
Toxaphene	100	U	UG/KG	

SW Sample ID: MISS-00340 — *Test Pit 2* — SUUP
Sample Type: Subsurface Soil
Sample Date: 08/25/1999

Analysis Name	Result		Unit	Exceedance
4,4'-DDD	4.3	U	UG/KG	
4,4'-DDE	4.3	U	UG/KG	
4,4'-DDT	9.0		UG/KG	
Aldrin	2.2	U	UG/KG	
Alpha-BHC	2.2	U	UG/KG	
Alpha-Chlordane	3.7		UG/KG	
Beta-BHC	2.2	U	UG/KG	
Delta-BHC	2.2	U	UG/KG	
Dieldrin	4.3	U	UG/KG	
Endosulfan I	2.2	U	UG/KG	
Endosulfan II	4.3	U	UG/KG	
Endosulfan Sulfate	4.3	U	UG/KG	
Endrin	4.3	U	UG/KG	
Endrin Aldehyde	4.3	U	UG/KG	
Endrin Ketone	4.3	U	UG/KG	
Gamma-BHC	2.2	U	UG/KG	
Gamma-Chlordane	4.4		UG/KG	
Heptachlor	2.2	U	UG/KG	
Heptachlor Epoxide	2.2	U	UG/KG	
Methoxychlor	22	U	UG/KG	
Toxaphene	86	U	UG/KG	

Table E-4: Soil Chemical Data - Pesticide Analyses
Engineering Test Pit Sampling
Maywood Interim Storage Site, Maywood NJ

Result Qualifier Codes

U - Analyzed for but not detected
J - Compound detected, value is estimated
UJ - Compound not detected, quantitation limit is estimat
B - Analyte in blank as well as sample
E - Exceeds calibration curve range
D - Identified at secondary diluation factor

SW Sample ID: MISS-00350 — *Test Pit 2*
Sample Type: Subsurface Soil — *SULO*
Sample Date: 08/25/1999

Analysis Name	Result	Unit	Exceedance
4,4'-DDD	4.1 U	UG/KG	
4,4'-DDE	4.1 U	UG/KG	
4,4'-DDT	4.1 U	UG/KG	
Aldrin	2.0 U	UG/KG	
Alpha-BHC	2.0 U	UG/KG	
Alpha-Chlordane	2.0 U	UG/KG	
Beta-BHC	2.0 U	UG/KG	
Delta-BHC	2.0 U	UG/KG	
Dieldrin	4.1 U	UG/KG	
Endosulfan I	2.0 U	UG/KG	
Endosulfan II	4.1 U	UG/KG	
Endosulfan Sulfate	4.1 U	UG/KG	
Endrin	4.1 U	UG/KG	
Endrin Aldehyde	4.1 U	UG/KG	
Endrin Ketone	4.1 U	UG/KG	
Gamma-BHC	2.0 U	UG/KG	
Gamma-Chlordane	2.0 U	UG/KG	
Heptachlor	2.0 U	UG/KG	
Heptachlor Epoxide	2.0 U	UG/KG	
Methoxychlor	20 U	UG/KG	
Toxaphene	81 U	UG/KG	

SW Sample ID: MISS-0037X — *Test Pit 2*
Sample Type: Subsurface Soil — *TRUP*
Sample Date: 08/25/1999

Analysis Name	Result	Unit	Exceedance
4,4'-DDD	42 U	UG/KG	
4,4'-DDE	10 J	UG/KG	
4,4'-DDT	42 U	UG/KG	
Aldrin	21 U	UG/KG	
Alpha-BHC	21 U	UG/KG	
Alpha-Chlordane	21 U	UG/KG	
Beta-BHC	21 U	UG/KG	
Delta-BHC	21 U	UG/KG	
Dieldrin	38 J	UG/KG	
Endosulfan I	21 U	UG/KG	
Endosulfan II	42 U	UG/KG	
Endosulfan Sulfate	42 U	UG/KG	
Endrin	42 U	UG/KG	
Endrin Aldehyde	42 U	UG/KG	
Endrin Ketone	42 U	UG/KG	
Gamma-BHC	21 U	UG/KG	
Gamma-Chlordane	21 U	UG/KG	
Heptachlor	21 U	UG/KG	
Heptachlor Epoxide	21 U	UG/KG	
Methoxychlor	210 U	UG/KG	
Toxaphene	830 U	UG/KG	

SW Sample ID: MISS-00390 — *Test Pit 2*
Sample Type: Subsurface Soil — *REOV*
Sample Date: 08/25/1999

Analysis Name	Result	Unit	Exceedance
4,4'-DDD	3.8 U	UG/KG	
4,4'-DDE	3.8 U	UG/KG	
4,4'-DDT	3.8 U	UG/KG	
Aldrin	1.9 U	UG/KG	
Alpha-BHC	1.9 U	UG/KG	
Alpha-Chlordane	1.1 J	UG/KG	
Beta-BHC	1.9 U	UG/KG	
Delta-BHC	1.9 U	UG/KG	
Dieldrin	3.8 U	UG/KG	
Endosulfan I	1.9 U	UG/KG	
Endosulfan II	3.8 U	UG/KG	
Endosulfan Sulfate	3.8 U	UG/KG	
Endrin	3.8 U	UG/KG	
Endrin Aldehyde	3.8 U	UG/KG	
Endrin Ketone	3.8 U	UG/KG	
Gamma-BHC	1.9 U	UG/KG	
Gamma-Chlordane	1.4 J	UG/KG	
Heptachlor	1.9 U	UG/KG	
Heptachlor Epoxide	1.9 U	UG/KG	
Methoxychlor	19 U	UG/KG	
Toxaphene	77 U	UG/KG	

SW Sample ID: MISS-00360 — *Test Pit 2*
Sample Type: Subsurface Soil — *TROV*
Sample Date: 08/25/1999

Analysis Name	Result	Unit	Exceedance
4,4'-DDD	4.2 U	UG/KG	
4,4'-DDE	4.2 U	UG/KG	
4,4'-DDT	13	UG/KG	
Aldrin	2.1 U	UG/KG	
Alpha-BHC	2.1 U	UG/KG	
Alpha-Chlordane	9.4	UG/KG	
Beta-BHC	2.1 U	UG/KG	
Delta-BHC	2.1 U	UG/KG	
Dieldrin	3.7 J	UG/KG	
Endosulfan I	2.1 U	UG/KG	
Endosulfan II	4.2 U	UG/KG	
Endosulfan Sulfate	4.2 U	UG/KG	
Endrin	4.2 U	UG/KG	
Endrin Aldehyde	4.2 U	UG/KG	
Endrin Ketone	4.2 U	UG/KG	
Gamma-BHC	2.1 U	UG/KG	
Gamma-Chlordane	6.2	UG/KG	
Heptachlor	2.1 U	UG/KG	
Heptachlor Epoxide	2.1 U	UG/KG	
Methoxychlor	21 U	UG/KG	
Toxaphene	84 U	UG/KG	

SW Sample ID: MISS-00380 — *Test Pit 2*
Sample Type: Subsurface Soil — *TRLO*
Sample Date: 08/25/1999

Analysis Name	Result	Unit	Exceedance
4,4'-DDD	3.9 U	UG/KG	
4,4'-DDE	3.9 U	UG/KG	
4,4'-DDT	3.9 U	UG/KG	
Aldrin	1.9 U	UG/KG	
Alpha-BHC	1.9 U	UG/KG	
Alpha-Chlordane	1.9 U	UG/KG	
Beta-BHC	1.9 U	UG/KG	
Delta-BHC	1.9 U	UG/KG	
Dieldrin	3.9 U	UG/KG	
Endosulfan I	1.9 U	UG/KG	
Endosulfan II	3.9 U	UG/KG	
Endosulfan Sulfate	3.9 U	UG/KG	
Endrin	3.9 U	UG/KG	
Endrin Aldehyde	3.9 U	UG/KG	
Endrin Ketone	3.9 U	UG/KG	
Gamma-BHC	1.9 U	UG/KG	
Gamma-Chlordane	1.9 U	UG/KG	
Heptachlor	1.9 U	UG/KG	
Heptachlor Epoxide	1.9 U	UG/KG	
Methoxychlor	19 U	UG/KG	
Toxaphene	78 U	UG/KG	

SW Sample ID: MISS-00400 — *Test Pit 2*
Sample Type: Subsurface Soil — *REUP*
Sample Date: 08/25/1999

Analysis Name	Result	Unit	Exceedance
4,4'-DDD	4.9 U	UG/KG	
4,4'-DDE	4.9 U	UG/KG	
4,4'-DDT	4.9 U	UG/KG	
Aldrin	2.4 U	UG/KG	
Alpha-BHC	2.4 U	UG/KG	
Alpha-Chlordane	2.4 U	UG/KG	
Beta-BHC	2.4 U	UG/KG	
Delta-BHC	2.4 U	UG/KG	
Dieldrin	3.2 J	UG/KG	
Endosulfan I	2.4 U	UG/KG	
Endosulfan II	4.9 U	UG/KG	
Endosulfan Sulfate	4.9 U	UG/KG	
Endrin	4.9 U	UG/KG	
Endrin Aldehyde	4.9 U	UG/KG	
Endrin Ketone	4.9 U	UG/KG	
Gamma-BHC	2.4 U	UG/KG	
Gamma-Chlordane	2.4 U	UG/KG	
Heptachlor	2.4 U	UG/KG	
Heptachlor Epoxide	2.4 U	UG/KG	
Methoxychlor	24 U	UG/KG	
Toxaphene	98 U	UG/KG	

Table E-4: Soil Chemical Data - Pesticide Analyses
Engineering Test Pit Sampling
Maywood Interim Storage Site, Maywood NJ

Result Qualifier Codes

U - Analyzed for but not detected
J - Compound detected, value is estimated
UJ - Compound not detected, quantitation limit is estimat
B - Analyte in blank as well as sample
E - Exceeds calibration curve range
D - Identified at secondary dilution factor

SW Sample ID:	MISS-00410	Test Pit 2		SW Sample ID:	MISS-00520	Test Pit 3		SW Sample ID:	MISS-00540	Test Pit 3	
Sample Type:	Subsurface Soil	RELO		Sample Type:	Subsurface Soil	SUOV		Sample Type:	Subsurface Soil	SULO	
Sample Date:	08/25/1999			Sample Date:	08/31/1999			Sample Date:	08/31/1999		
Analysis Name	**Result**	**Unit**	**Exceedance**	**Analysis Name**	**Result**	**Unit**	**Exceedance**	**Analysis Name**	**Result**	**Unit**	**Exceedance**
4,4'-DDD	4.1 U	UG/KG		4,4'-DDD	24 U	MG/KG		4,4'-DDD	4.0 U	MG/KG	
4,4'-DDE	4.1 U	UG/KG		4,4'-DDE	24 U	MG/KG		4,4'-DDE	4.0 U	MG/KG	
4,4'-DDT	4.1 U	UG/KG		4,4'-DDT	24 U	MG/KG		4,4'-DDT	4.0 U	MG/KG	
Aldrin	2.0 U	UG/KG		Aldrin	12 U	MG/KG		Aldrin	2.0 U	MG/KG	
Alpha-BHC	2.0 U	UG/KG		Alpha-BHC	12 U	MG/KG		Alpha-BHC	2.0 U	MG/KG	
Alpha-Chlordane	2.0 U	UG/KG		Alpha-Chlordane	12 U	MG/KG		Alpha-Chlordane	2.0 U	MG/KG	
Beta-BHC	2.0 U	UG/KG		Beta-BHC	12 U	MG/KG		Beta-BHC	2.0 U	MG/KG	
Delta-BHC	2.0 U	UG/KG		Delta-BHC	12 U	MG/KG		Delta-BHC	2.0 U	MG/KG	
Dieldrin	4.1 U	UG/KG		Dieldrin	19 J	MG/KG	Yes	Dieldrin	4.0 U	MG/KG	
Endosulfan I	2.0 U	UG/KG		Endosulfan I	12 U	MG/KG		Endosulfan I	2.0 U	MG/KG	
Endosulfan II	4.1 U	UG/KG		Endosulfan II	24 U	MG/KG		Endosulfan II	4.0 U	MG/KG	
Endosulfan Sulfate	4.1 U	UG/KG		Endosulfan Sulfate	24 U	MG/KG		Endosulfan Sulfate	4.0 U	MG/KG	
Endrin	4.1 U	UG/KG		Endrin	13 J	MG/KG		Endrin	4.0 U	MG/KG	
Endrin Aldehyde	4.1 U	UG/KG		Endrin Aldehyde	24 U	MG/KG		Endrin Aldehyde	4.0 U	MG/KG	
Endrin Ketone	4.1 U	UG/KG		Endrin Ketone	24 U	MG/KG		Endrin Ketone	4.0 U	MG/KG	
Gamma-BHC	2.0 U	UG/KG		Gamma-BHC	51	MG/KG	Yes	Gamma-BHC	2.0 U	MG/KG	
Gamma-Chlordane	2.0 U	UG/KG		Gamma-Chlordane	12 U	MG/KG		Gamma-Chlordane	2.0 U	MG/KG	
Heptachlor	2.0 U	UG/KG		Heptachlor	12 U	MG/KG		Heptachlor	2.0 U	MG/KG	
Heptachlor Epoxide	2.0 U	UG/KG		Heptachlor Epoxide	12 U	MG/KG		Heptachlor Epoxide	2.0 U	MG/KG	
Methoxychlor	20 U	UG/KG		Methoxychlor	120 U	MG/KG		Methoxychlor	20 U	MG/KG	
Toxaphene	82 U	UG/KG		Toxaphene	480 U	MG/KG		Toxaphene	80 U	MG/KG	

SW Sample ID:	MISS-00430	Test Pit 2		SW Sample ID:	MISS-0053X	Test Pit 3		SW Sample ID:	MISS-00550	Test Pit 3	
Sample Type:	Subsurface Soil	REUP		Sample Type:	Subsurface Soil	SUUP		Sample Type:	Subsurface Soil	TROV	
Sample Date:	08/25/1999			Sample Date:	08/31/1999			Sample Date:	08/31/1999		
Analysis Name	**Result**	**Unit**	**Exceedance**	**Analysis Name**	**Result**	**Unit**	**Exceedance**	**Analysis Name**	**Result**	**Unit**	**Exceedance**
4,4'-DDD	9.1 U	UG/KG		4,4'-DDD	21 U	MG/KG		4,4'-DDD	22 U	MG/KG	
4,4'-DDE	9.1 U	UG/KG		4,4'-DDE	21 U	MG/KG		4,4'-DDE	22 U	MG/KG	
4,4'-DDT	9.1 U	UG/KG		4,4'-DDT	21 U	MG/KG		4,4'-DDT	22 U	MG/KG	
Aldrin	4.6 U	UG/KG		Aldrin	11 U	MG/KG		Aldrin	11 U	MG/KG	
Alpha-BHC	4.6 U	UG/KG		Alpha-BHC	11 U	MG/KG		Alpha-BHC	11 U	MG/KG	
Alpha-Chlordane	4.6 U	UG/KG		Alpha-Chlordane	11 U	MG/KG		Alpha-Chlordane	11 U	MG/KG	
Beta-BHC	4.6 U	UG/KG		Beta-BHC	11 U	MG/KG		Beta-BHC	11 U	MG/KG	
Delta-BHC	4.6 U	UG/KG		Delta-BHC	11 U	MG/KG		Delta-BHC	11 U	MG/KG	
Dieldrin	9.1 U	UG/KG		Dieldrin	21 U	MG/KG		Dieldrin	22 U	MG/KG	
Endosulfan I	4.6 U	UG/KG		Endosulfan I	8.5 J	MG/KG		Endosulfan I	11 U	MG/KG	
Endosulfan II	9.1 U	UG/KG		Endosulfan II	21 U	MG/KG		Endosulfan II	22 U	MG/KG	
Endosulfan Sulfate	9.1 U	UG/KG		Endosulfan Sulfate	21 U	MG/KG		Endosulfan Sulfate	22 U	MG/KG	
Endrin	9.1 U	UG/KG		Endrin	21 U	MG/KG		Endrin	22 U	MG/KG	
Endrin Aldehyde	9.1 U	UG/KG		Endrin Aldehyde	12 J	MG/KG		Endrin Aldehyde	22 U	MG/KG	
Endrin Ketone	9.1 U	UG/KG		Endrin Ketone	21 U	MG/KG		Endrin Ketone	22 U	MG/KG	
Gamma-BHC	4.6 U	UG/KG		Gamma-BHC	12	MG/KG	Yes	Gamma-BHC	11 U	MG/KG	
Gamma-Chlordane	4.6 U	UG/KG		Gamma-Chlordane	11 U	MG/KG		Gamma-Chlordane	11 U	MG/KG	
Heptachlor	4.6 U	UG/KG		Heptachlor	11 U	MG/KG		Heptachlor	11 U	MG/KG	
Heptachlor Epoxide	4.6 U	UG/KG		Heptachlor Epoxide	11 U	MG/KG		Heptachlor Epoxide	11 U	MG/KG	
Methoxychlor	46 U	UG/KG		Methoxychlor	110 U	MG/KG		Methoxychlor	110 U	MG/KG	
Toxaphene	180 U	UG/KG		Toxaphene	430 U	MG/KG		Toxaphene	450 U	MG/KG	

Table E-4: Soil Chemical Data - Pesticide Analyses
Engineering Test Pit Sampling
Maywood Interim Storage Site, Maywood NJ

Result Qualifier Codes

U - Analyzed for but not detected
J - Compound detected, value is estimated
UJ - Compound not detected, quantitation limit is estimat
B - Analyte in blank as well as sample
E - Exceeds calibration curve range
D - Identified at secondary diaution factor

SW Sample ID: MISS-00560 — Test Pit 3 TRUP
Sample Type: Subsurface Soil
Sample Date: 08/31/1999

Analysis Name	Result	Unit	Exceedance
4,4'-DDD	4.9 U	MG/KG	
4,4'-DDE	4.9 U	MG/KG	
4,4'-DDT	4.9 U	MG/KG	
Aldrin	2.4 U	MG/KG	
Alpha-BHC	2.4 U	MG/KG	
Alpha-Chlordane	2.4 U	MG/KG	
Beta-BHC	2.4 U	MG/KG	
Delta-BHC	2.4 U	MG/KG	
Dieldrin	4.9 U	MG/KG	
Endosulfan I	2.4 U	MG/KG	
Endosulfan II	4.9 U	MG/KG	
Endosulfan Sulfate	4.9 U	MG/KG	
Endrin	4.9 U	MG/KG	
Endrin Aldehyde	4.9 U	MG/KG	
Endrin Ketone	4.9 U	MG/KG	
Gamma-BHC	2.4 U	MG/KG	
Gamma-Chlordane	2.4 U	MG/KG	
Heptachlor	2.4 U	MG/KG	
Heptachlor Epoxide	2.4 U	MG/KG	
Methoxychlor	24 U	MG/KG	
Toxaphene	98 U	MG/KG	

SW Sample ID: MISS-00580 — Test Pit 3 REOV
Sample Type: Subsurface Soil
Sample Date: 08/31/1999

Analysis Name	Result	Unit	Exceedance
4,4'-DDD	7.6 U	MG/KG	
4,4'-DDE	7.6 U	MG/KG	
4,4'-DDT	7.6 U	MG/KG	
Aldrin	3.8 U	MG/KG	
Alpha-BHC	3.8 U	MG/KG	
Alpha-Chlordane	3.8 U	MG/KG	
Beta-BHC	3.8 U	MG/KG	
Delta-BHC	3.8 U	MG/KG	
Dieldrin	7.6 U	MG/KG	
Endosulfan I	3.8 U	MG/KG	
Endosulfan II	7.6 U	MG/KG	
Endosulfan Sulfate	7.6 U	MG/KG	
Endrin	7.6 U	MG/KG	
Endrin Aldehyde	7.6 U	MG/KG	
Endrin Ketone	7.6 U	MG/KG	
Gamma-BHC	3.8 U	MG/KG	
Gamma-Chlordane	3.8 U	MG/KG	
Heptachlor	3.8 U	MG/KG	
Heptachlor Epoxide	3.8 U	MG/KG	
Methoxychlor	38 U	MG/KG	
Toxaphene	150 U	MG/KG	

SW Sample ID: MISS-00600 — Test Pit 3 RELO
Sample Type: Subsurface Soil
Sample Date: 08/31/1999

Analysis Name	Result	Unit	Exceedance
4,4'-DDD	3.9 U	MG/KG	
4,4'-DDE	3.9 U	MG/KG	
4,4'-DDT	3.9 U	MG/KG	
Aldrin	1.9 U	MG/KG	
Alpha-BHC	1.9 U	MG/KG	
Alpha-Chlordane	1.9 U	MG/KG	
Beta-BHC	1.9 U	MG/KG	
Delta-BHC	1.9 U	MG/KG	
Dieldrin	3.9 U	MG/KG	
Endosulfan I	1.9 U	MG/KG	
Endosulfan II	3.9 U	MG/KG	
Endosulfan Sulfate	3.9 U	MG/KG	
Endrin	3.9 U	MG/KG	
Endrin Aldehyde	3.9 U	MG/KG	
Endrin Ketone	3.9 U	MG/KG	
Gamma-BHC	1.9 U	MG/KG	
Gamma-Chlordane	1.9 U	MG/KG	
Heptachlor	1.9 U	MG/KG	
Heptachlor Epoxide	1.9 U	MG/KG	
Methoxychlor	19 U	MG/KG	
Toxaphene	77 U	MG/KG	

SW Sample ID: MISS-00570 — Test Pit 3 TRLO
Sample Type: Subsurface Soil
Sample Date: 08/31/1999

Analysis Name	Result	Unit	Exceedance
4,4'-DDD	3.9 U	MG/KG	
4,4'-DDE	3.9 U	MG/KG	
4,4'-DDT	3.9 U	MG/KG	
Aldrin	1.9 U	MG/KG	
Alpha-BHC	1.9 U	MG/KG	
Alpha-Chlordane	1.9 U	MG/KG	
Beta-BHC	1.9 U	MG/KG	
Delta-BHC	1.9 U	MG/KG	
Dieldrin	3.9 U	MG/KG	
Endosulfan I	1.9 U	MG/KG	
Endosulfan II	3.9 U	MG/KG	
Endosulfan Sulfate	3.9 U	MG/KG	
Endrin	3.9 U	MG/KG	
Endrin Aldehyde	3.9 U	MG/KG	
Endrin Ketone	3.9 U	MG/KG	
Gamma-BHC	1.9 U	MG/KG	
Gamma-Chlordane	1.9 U	MG/KG	
Heptachlor	1.9 U	MG/KG	
Heptachlor Epoxide	1.9 U	MG/KG	
Methoxychlor	19 U	MG/KG	
Toxaphene	78 U	MG/KG	

SW Sample ID: MISS-00590 — Test Pit 3 REUP
Sample Type: Subsurface Soil
Sample Date: 08/31/1999

Analysis Name	Result	Unit	Exceedance
4,4'-DDD	6.5 U	MG/KG	
4,4'-DDE	6.5 U	MG/KG	
4,4'-DDT	6.5 U	MG/KG	
Aldrin	3.3 U	MG/KG	
Alpha-BHC	3.3 U	MG/KG	
Alpha-Chlordane	3.3 U	MG/KG	
Beta-BHC	3.3 U	MG/KG	
Delta-BHC	3.3 U	MG/KG	
Dieldrin	6.5 U	MG/KG	
Endosulfan I	3.3 U	MG/KG	
Endosulfan II	6.5 U	MG/KG	
Endosulfan Sulfate	6.5 U	MG/KG	
Endrin	6.5 U	MG/KG	
Endrin Aldehyde	6.5 U	MG/KG	
Endrin Ketone	6.5 U	MG/KG	
Gamma-BHC	3.3 U	MG/KG	
Gamma-Chlordane	3.3 U	MG/KG	
Heptachlor	3.3 U	MG/KG	
Heptachlor Epoxide	3.3 U	MG/KG	
Methoxychlor	33 U	MG/KG	
Toxaphene	130 U	MG/KG	

SW Sample ID: MISS-00610 — Test Pit 3 REUP
Sample Type: Subsurface Soil
Sample Date: 08/31/1999

Analysis Name	Result	Unit	Exceedance
4,4'-DDD	6.5 U	MG/KG	
4,4'-DDE	6.5 U	MG/KG	
4,4'-DDT	6.5 U	MG/KG	
Aldrin	3.3 U	MG/KG	
Alpha-BHC	3.3 U	MG/KG	
Alpha-Chlordane	3.3 U	MG/KG	
Beta-BHC	3.3 U	MG/KG	
Delta-BHC	3.3 U	MG/KG	
Dieldrin	6.5 U	MG/KG	
Endosulfan I	3.3 U	MG/KG	
Endosulfan II	6.5 U	MG/KG	
Endosulfan Sulfate	6.5 U	MG/KG	
Endrin	6.5 U	MG/KG	
Endrin Aldehyde	6.5 U	MG/KG	
Endrin Ketone	6.5 U	MG/KG	
Gamma-BHC	3.3 U	MG/KG	
Gamma-Chlordane	3.3 U	MG/KG	
Heptachlor	3.3 U	MG/KG	
Heptachlor Epoxide	3.3 U	MG/KG	
Methoxychlor	33 U	MG/KG	
Toxaphene	130 U	MG/KG	

Table E-4: Soil Chemical Data - Pesticide Analyses
Engineering Test Pit Sampling
Maywood Interim Storage Site, Maywood NJ

Result Qualifier Codes

U - Analyzed for but not detected
J - Compound detected, value is estimated
UJ - Compound not detected, quantitation limit is estimat
B - Analyte in blank as well as sample
E - Exceeds calibration curve range
D - Identified at secondary dilution factor

SW Sample ID: MISS-00710 — Test Pit 4 — SUOV
Sample Type: Subsurface Soil
Sample Date: 09/01/1999

Analysis Name	Result	Unit	Exceedance
4,4'-DDD	6.2 U	UG/KG	
4,4'-DDE	6.2 U	UG/KG	
4,4'-DDT	6.2 U	UG/KG	
Aldrin	3.1 U	UG/KG	
Alpha-BHC	3.1 U	UG/KG	
Alpha-Chlordane	3.1 U	UG/KG	
Beta-BHC	3.1 U	UG/KG	
Delta-BHC	3.1 U	UG/KG	
Dieldrin	6.2 U	UG/KG	
Endosulfan I	3.1 U	UG/KG	
Endosulfan II	6.2 U	UG/KG	
Endosulfan Sulfate	6.2 U	UG/KG	
Endrin	6.2 U	UG/KG	
Endrin Aldehyde	6.2 U	UG/KG	
Endrin Ketone	6.2 U	UG/KG	
Gamma-BHC	3.1 U	UG/KG	
Gamma-Chlordane	3.1 U	UG/KG	
Heptachlor	3.1 U	UG/KG	
Heptachlor Epoxide	3.1 U	UG/KG	
Methoxychlor	31 U	UG/KG	
Toxaphene	120 U	UG/KG	

SW Sample ID: MISS-00730 — Test Pit 4 — SULO
Sample Type: Subsurface Soil
Sample Date: 09/01/1999

Analysis Name	Result	Unit	Exceedance
4,4'-DDD	3.6 U	UG/KG	
4,4'-DDE	3.6 U	UG/KG	
4,4'-DDT	3.6 U	UG/KG	
Aldrin	1.8 U	UG/KG	
Alpha-BHC	1.8 U	UG/KG	
Alpha-Chlordane	1.8 U	UG/KG	
Beta-BHC	1.8 U	UG/KG	
Delta-BHC	1.8 U	UG/KG	
Dieldrin	3.6 U	UG/KG	
Endosulfan I	1.8 U	UG/KG	
Endosulfan II	3.6 U	UG/KG	
Endosulfan Sulfate	3.6 U	UG/KG	
Endrin	3.6 U	UG/KG	
Endrin Aldehyde	3.6 U	UG/KG	
Endrin Ketone	3.6 U	UG/KG	
Gamma-BHC	1.8 U	UG/KG	
Gamma-Chlordane	1.8 U	UG/KG	
Heptachlor	1.8 U	UG/KG	
Heptachlor Epoxide	1.8 U	UG/KG	
Methoxychlor	18 U	UG/KG	
Toxaphene	72 U	UG/KG	

SW Sample ID: MISS-00750 — Test Pit 4 — TRUP
Sample Type: Subsurface Soil
Sample Date: 09/01/1999

Analysis Name	Result	Unit	Exceedance
4,4'-DDD	3.8 U	UG/KG	
4,4'-DDE	3.8 U	UG/KG	
4,4'-DDT	3.8 U	UG/KG	
Aldrin	1.9 U	UG/KG	
Alpha-BHC	1.9 U	UG/KG	
Alpha-Chlordane	1.9 U	UG/KG	
Beta-BHC	1.9 U	UG/KG	
Delta-BHC	1.9 U	UG/KG	
Dieldrin	3.8 U	UG/KG	
Endosulfan I	1.9 U	UG/KG	
Endosulfan II	3.8 U	UG/KG	
Endosulfan Sulfate	3.8 U	UG/KG	
Endrin	3.8 U	UG/KG	
Endrin Aldehyde	3.8 U	UG/KG	
Endrin Ketone	3.8 U	UG/KG	
Gamma-BHC	1.9 U	UG/KG	
Gamma-Chlordane	1.9 U	UG/KG	
Heptachlor	1.9 U	UG/KG	
Heptachlor Epoxide	1.9 U	UG/KG	
Methoxychlor	19 U	UG/KG	
Toxaphene	76 U	UG/KG	

SW Sample ID: MISS-00720 — Test Pit 4 — SUUP
Sample Type: Subsurface Soil
Sample Date: 09/01/1999

Analysis Name	Result	Unit	Exceedance
4,4'-DDD	4.0 U	UG/KG	
4,4'-DDE	4.0 U	UG/KG	
4,4'-DDT	4.0 U	UG/KG	
Aldrin	2.0 U	UG/KG	
Alpha-BHC	2.0 U	UG/KG	
Alpha-Chlordane	2.0 U	UG/KG	
Beta-BHC	2.0 U	UG/KG	
Delta-BHC	2.0 U	UG/KG	
Dieldrin	4.0 U	UG/KG	
Endosulfan I	2.0 U	UG/KG	
Endosulfan II	4.0 U	UG/KG	
Endosulfan Sulfate	4.0 U	UG/KG	
Endrin	4.0 U	UG/KG	
Endrin Aldehyde	4.0 U	UG/KG	
Endrin Ketone	4.0 U	UG/KG	
Gamma-BHC	2.0 U	UG/KG	
Gamma-Chlordane	2.0 U	UG/KG	
Heptachlor	2.0 U	UG/KG	
Heptachlor Epoxide	2.0 U	UG/KG	
Methoxychlor	20 U	UG/KG	
Toxaphene	79 U	UG/KG	

SW Sample ID: MISS-00740 — Test Pit 4 — TROV
Sample Type: Subsurface Soil
Sample Date: 09/01/1999

Analysis Name	Result	Unit	Exceedance
4,4'-DDD	5.6 U	UG/KG	
4,4'-DDE	5.6 U	UG/KG	
4,4'-DDT	5.6 U	UG/KG	
Aldrin	2.8 U	UG/KG	
Alpha-BHC	2.8 U	UG/KG	
Alpha-Chlordane	2.8 U	UG/KG	
Beta-BHC	2.8 U	UG/KG	
Delta-BHC	2.8 U	UG/KG	
Dieldrin	5.6 U	UG/KG	
Endosulfan I	2.8 U	UG/KG	
Endosulfan II	5.6 U	UG/KG	
Endosulfan Sulfate	5.6 U	UG/KG	
Endrin	5.6 U	UG/KG	
Endrin Aldehyde	5.6 U	UG/KG	
Endrin Ketone	5.6 U	UG/KG	
Gamma-BHC	2.8 U	UG/KG	
Gamma-Chlordane	2.8 U	UG/KG	
Heptachlor	2.8 U	UG/KG	
Heptachlor Epoxide	2.8 U	UG/KG	
Methoxychlor	28 U	UG/KG	
Toxaphene	110 U	UG/KG	

SW Sample ID: MISS-00760 — Test Pit 4 — TRLO
Sample Type: Subsurface Soil
Sample Date: 09/01/1999

Analysis Name	Result	Unit	Exceedance
4,4'-DDD	3.7 U	UG/KG	
4,4'-DDE	3.7 U	UG/KG	
4,4'-DDT	3.7 U	UG/KG	
Aldrin	1.8 U	UG/KG	
Alpha-BHC	1.8 U	UG/KG	
Alpha-Chlordane	1.8 U	UG/KG	
Beta-BHC	1.8 U	UG/KG	
Delta-BHC	1.8 U	UG/KG	
Dieldrin	3.7 U	UG/KG	
Endosulfan I	1.8 U	UG/KG	
Endosulfan II	3.7 U	UG/KG	
Endosulfan Sulfate	3.7 U	UG/KG	
Endrin	3.7 U	UG/KG	
Endrin Aldehyde	3.7 U	UG/KG	
Endrin Ketone	3.7 U	UG/KG	
Gamma-BHC	1.8 U	UG/KG	
Gamma-Chlordane	1.8 U	UG/KG	
Heptachlor	1.8 U	UG/KG	
Heptachlor Epoxide	1.8 U	UG/KG	
Methoxychlor	18 U	UG/KG	
Toxaphene	74 U	UG/KG	

Table E-4: Soil Chemical Data - Pesticide Analyses
Engineering Test Pit Sampling
Maywood Interim Storage Site, Maywood NJ

Result Qualifier Codes

U - Analyzed for but not detected
J - Compound detected, value is estimated
UJ - Compound not detected, quantitation limit is estimat
B - Analyte in blank as well as sample
E - Exceeds calibration curve range
D - Identified at secondary diluation factor

SW Sample ID: MISS-00770 — *Test Pit 4*
Sample Type: Subsurface Soil — *REOV*
Sample Date: 09/01/1999

Analysis Name	Result	Unit	Exceedance
4,4'-DDD	5.0 U	UG/KG	
4,4'-DDE	5.0 U	UG/KG	
4,4'-DDT	5.0 U	UG/KG	
Aldrin	2.5 U	UG/KG	
Alpha-BHC	2.5 U	UG/KG	
Alpha-Chlordane	2.5 U	UG/KG	
Beta-BHC	2.5 U	UG/KG	
Delta-BHC	2.5 U	UG/KG	
Dieldrin	5.0 U	UG/KG	
Endosulfan I	2.5 U	UG/KG	
Endosulfan II	5.0 U	UG/KG	
Endosulfan Sulfate	5.0 U	UG/KG	
Endrin	5.0 U	UG/KG	
Endrin Aldehyde	5.0 U	UG/KG	
Endrin Ketone	5.0 U	UG/KG	
Gamma-BHC	2.5 U	UG/KG	
Gamma-Chlordane	2.5 U	UG/KG	
Heptachlor	2.5 U	UG/KG	
Heptachlor Epoxide	2.5 U	UG/KG	
Methoxychlor	25 U	UG/KG	
Toxaphene	100 U	UG/KG	

SW Sample ID: MISS-00790 — *Test Pit 4*
Sample Type: Subsurface Soil — *RELO*
Sample Date: 09/01/1999

Analysis Name	Result	Unit	Exceedance
4,4'-DDD	4.2 U	UG/KG	
4,4'-DDE	4.2 U	UG/KG	
4,4'-DDT	4.2 U	UG/KG	
Aldrin	2.1 U	UG/KG	
Alpha-BHC	2.1 U	UG/KG	
Alpha-Chlordane	2.1 U	UG/KG	
Beta-BHC	2.1 U	UG/KG	
Delta-BHC	2.1 U	UG/KG	
Dieldrin	4.2 U	UG/KG	
Endosulfan I	2.1 U	UG/KG	
Endosulfan II	4.2 U	UG/KG	
Endosulfan Sulfate	4.2 U	UG/KG	
Endrin	4.2 U	UG/KG	
Endrin Aldehyde	4.2 U	UG/KG	
Endrin Ketone	4.2 U	UG/KG	
Gamma-BHC	2.1 U	UG/KG	
Gamma-Chlordane	2.1 U	UG/KG	
Heptachlor	2.1 U	UG/KG	
Heptachlor Epoxide	2.1 U	UG/KG	
Methoxychlor	21 U	UG/KG	
Toxaphene	84 U	UG/KG	

SW Sample ID: MISS-00900 — *Test Pit 5*
Sample Type: Subsurface Soil — *OVER*
Sample Date: 08/18/1999

Analysis Name	Result	Unit	Exceedance
4,4'-DDD	3.6 U	UG/KG	
4,4'-DDE	3.6 U	UG/KG	
4,4'-DDT	3.6 U	UG/KG	
Aldrin	1.8 U	UG/KG	
Alpha-BHC	1.8 U	UG/KG	
Alpha-Chlordane	2.9	UG/KG	
Beta-BHC	1.8 U	UG/KG	
Delta-BHC	2.6	UG/KG	
Dieldrin	3.6 U	UG/KG	
Endosulfan I	1.8 U	UG/KG	
Endosulfan II	3.6 U	UG/KG	
Endosulfan Sulfate	3.6 U	UG/KG	
Endrin	3.6 U	UG/KG	
Endrin Aldehyde	5.1	UG/KG	
Endrin Ketone	3.6 U	UG/KG	
Gamma-BHC	1.8 U	UG/KG	
Gamma-Chlordane	1.6 J	UG/KG	
Heptachlor	1.8 U	UG/KG	
Heptachlor Epoxide	1.8 U	UG/KG	
Methoxychlor	18 U	UG/KG	
Toxaphene	73 U	UG/KG	

SW Sample ID: MISS-0078X — *Test Pit 4*
Sample Type: Subsurface Soil — *REUP*
Sample Date: 09/01/1999

Analysis Name	Result	Unit	Exceedance
4,4'-DDD	5.8 U	UG/KG	
4,4'-DDE	5.8 U	UG/KG	
4,4'-DDT	5.8 U	UG/KG	
Aldrin	2.9 U	UG/KG	
Alpha-BHC	2.9 U	UG/KG	
Alpha-Chlordane	2.9 U	UG/KG	
Beta-BHC	2.9 U	UG/KG	
Delta-BHC	2.9 U	UG/KG	
Dieldrin	5.8 U	UG/KG	
Endosulfan I	2.9 U	UG/KG	
Endosulfan II	5.8 U	UG/KG	
Endosulfan Sulfate	5.8 U	UG/KG	
Endrin	5.8 U	UG/KG	
Endrin Aldehyde	5.8 U	UG/KG	
Endrin Ketone	5.8 U	UG/KG	
Gamma-BHC	2.9 U	UG/KG	
Gamma-Chlordane	2.9 U	UG/KG	
Heptachlor	2.9 U	UG/KG	
Heptachlor Epoxide	2.9 U	UG/KG	
Methoxychlor	29 U	UG/KG	
Toxaphene	120 U	UG/KG	

SW Sample ID: MISS-00800 — *Test Pit 4*
Sample Type: Subsurface Soil — *RELO*
Sample Date: 09/01/1999

Analysis Name	Result	Unit	Exceedance
4,4'-DDD	4.0 U	UG/KG	
4,4'-DDE	4.0 U	UG/KG	
4,4'-DDT	4.0 U	UG/KG	
Aldrin	2.0 U	UG/KG	
Alpha-BHC	2.0 U	UG/KG	
Alpha-Chlordane	2.0 U	UG/KG	
Beta-BHC	2.0 U	UG/KG	
Delta-BHC	2.0 U	UG/KG	
Dieldrin	4.0 U	UG/KG	
Endosulfan I	2.0 U	UG/KG	
Endosulfan II	4.0 U	UG/KG	
Endosulfan Sulfate	4.0 U	UG/KG	
Endrin	4.0 U	UG/KG	
Endrin Aldehyde	4.0 U	UG/KG	
Endrin Ketone	4.0 U	UG/KG	
Gamma-BHC	2.0 U	UG/KG	
Gamma-Chlordane	2.0 U	UG/KG	
Heptachlor	2.0 U	UG/KG	
Heptachlor Epoxide	2.0 U	UG/KG	
Methoxychlor	20 U	UG/KG	
Toxaphene	81 U	UG/KG	

SW Sample ID: MISS-00910 — *Test Pit 5*
Sample Type: Subsurface Soil — *UPER*
Sample Date: 08/18/1999

Analysis Name	Result	Unit	Exceedance
4,4'-DDD	5.0 U	UG/KG	
4,4'-DDE	5.0 U	UG/KG	
4,4'-DDT	5.0 U	UG/KG	
Aldrin	2.5 U	UG/KG	
Alpha-BHC	2.5 U	UG/KG	
Alpha-Chlordane	7.0	UG/KG	
Beta-BHC	2.5 U	UG/KG	
Delta-BHC	2.5 U	UG/KG	
Dieldrin	5.0 U	UG/KG	
Endosulfan I	2.5 U	UG/KG	
Endosulfan II	5.0 U	UG/KG	
Endosulfan Sulfate	5.0 U	UG/KG	
Endrin	5.0 U	UG/KG	
Endrin Aldehyde	5.0 U	UG/KG	
Endrin Ketone	5.0 U	UG/KG	
Gamma-BHC	2.5 U	UG/KG	
Gamma-Chlordane	2.5 U	UG/KG	
Heptachlor	2.5 U	UG/KG	
Heptachlor Epoxide	2.5 U	UG/KG	
Methoxychlor	25 U	UG/KG	
Toxaphene	100 U	UG/KG	

Table E-4: Soil Chemical Data - Pesticide Analyses
Engineering Test Pit Sampling
Maywood Interim Storage Site, Maywood NJ

Result Qualifier Codes

U - Analyzed for but not detected
J - Compound detected, value is estimated
UJ - Compound not detected, quantitation limit is estimat
B - Analyte in blank as well as sample
E - Exceeds calibration curve range
D - Identified at secondary diluation factor

SW Sample ID: *MISS-0092X* *Test Pit 5*
Sample Type: *Subsurface Soil* *LWER*
Sample Date: *08/18/1999*

Analysis Name	Result	Unit	Exceedance
4,4'-DDD	4.0 U	UG/KG	
4,4'-DDE	4.0 U	UG/KG	
4,4'-DDT	4.0 U	UG/KG	
Aldrin	2.0 U	UG/KG	
Alpha-BHC	2.0 U	UG/KG	
Alpha-Chlordane	2.0 U	UG/KG	
Beta-BHC	2.0 U	UG/KG	
Delta-BHC	2.0 U	UG/KG	
Dieldrin	4.0 U	UG/KG	
Endosulfan I	2.0 U	UG/KG	
Endosulfan II	4.0 U	UG/KG	
Endosulfan Sulfate	4.0 U	UG/KG	
Endrin	4.0 U	UG/KG	
Endrin Aldehyde	4.0 U	UG/KG	
Endrin Ketone	4.0 U	UG/KG	
Gamma-BHC	2.0 U	UG/KG	
Gamma-Chlordane	2.0 U	UG/KG	
Heptachlor	2.0 U	UG/KG	
Heptachlor Epoxide	2.0 U	UG/KG	
Methoxychlor	20 U	UG/KG	
Toxaphene	80 U	UG/KG	

SW Sample ID: *MISS-00930* *Test Pit 5*
Sample Type: *Subsurface Soil* *UPER*
Sample Date: *08/18/1999*

Analysis Name	Result	Unit	Exceedance
4,4'-DDD	6.0 U	UG/KG	
4,4'-DDE	6.0 U	UG/KG	
4,4'-DDT	6.0 U	UG/KG	
Aldrin	3.0 U	UG/KG	
Alpha-BHC	3.0 U	UG/KG	
Alpha-Chlordane	3.0 U	UG/KG	
Beta-BHC	3.0 U	UG/KG	
Delta-BHC	3.0 U	UG/KG	
Dieldrin	6.0 U	UG/KG	
Endosulfan I	3.0 U	UG/KG	
Endosulfan II	6.0 U	UG/KG	
Endosulfan Sulfate	6.0 U	UG/KG	
Endrin	6.0 U	UG/KG	
Endrin Aldehyde	6.0 U	UG/KG	
Endrin Ketone	6.0 U	UG/KG	
Gamma-BHC	3.0 U	UG/KG	
Gamma-Chlordane	3.0 U	UG/KG	
Heptachlor	3.0 U	UG/KG	
Heptachlor Epoxide	3.0 U	UG/KG	
Methoxychlor	30 U	UG/KG	
Toxaphene	120 U	UG/KG	

Table E-5: Soil Chemical Data - PCB Analyses
Engineering Test Pit Sampling
Maywood Interim Storage Site, Maywood NJ

Result Qualifier Codes

- U - Analyzed for but not detected
- J - Compound detected, value is estimated
- UJ - Compound not detected, quantitation limit is estimat
- B - Analyte in blank as well as sample
- E - Exceeds calibration curve range
- D - Identified at secondary dilution factor

SW Sample ID: MISS-00140 — *Test Pit 1*
Sample Type: Subsurface Soil — *SUOV*
Sample Date: 08/20/1999

Analysis Name	Result	Unit	Exceedance
Arochlor-1016	36 U	UG/KG	
Arochlor-1221	36 U	UG/KG	
Arochlor-1232	36 U	UG/KG	
Arochlor-1242	36 U	UG/KG	
Arochlor-1248	210	UG/KG	
Arochlor-1254	140	UG/KG	
Arochlor-1260	36 U	UG/KG	

SW Sample ID: MISS-00190 — *Test Pit 1*
Sample Type: Subsurface Soil — *TRLO*
Sample Date: 08/20/1999

Analysis Name	Result	Unit	Exceedance
Arochlor-1016	38 U	UG/KG	
Arochlor-1221	38 U	UG/KG	
Arochlor-1232	38 U	UG/KG	
Arochlor-1242	38 U	UG/KG	
Arochlor-1248	38 U	UG/KG	
Arochlor-1254	38 U	UG/KG	
Arochlor-1260	38 U	UG/KG	

SW Sample ID: MISS-00330 — *Test Pit 2*
Sample Type: Subsurface Soil — *SUOV*
Sample Date: 08/25/1999

Analysis Name	Result	Unit	Exceedance
Arochlor-1016	36 U	UG/KG	
Arochlor-1221	36 U	UG/KG	
Arochlor-1232	36 U	UG/KG	
Arochlor-1242	36 U	UG/KG	
Arochlor-1248	36 U	UG/KG	
Arochlor-1254	59	UG/KG	
Arochlor-1260	36 U	UG/KG	

SW Sample ID: MISS-0015X — *Test Pit 1*
Sample Type: Subsurface Soil — *SUUP*
Sample Date: 08/20/1999

Analysis Name	Result	Unit	Exceedance
Arochlor-1016	38 U	UG/KG	
Arochlor-1221	38 U	UG/KG	
Arochlor-1232	38 U	UG/KG	
Arochlor-1242	38 U	UG/KG	
Arochlor-1248	38 U	UG/KG	
Arochlor-1254	38 U	UG/KG	
Arochlor-1260	38 U	UG/KG	

SW Sample ID: MISS-00200 — *Test Pit 1*
Sample Type: Subsurface Soil — *REOV*
Sample Date: 08/20/1999

Analysis Name	Result	Unit	Exceedance
Arochlor-1016	62 U	UG/KG	
Arochlor-1221	62 U	UG/KG	
Arochlor-1232	62 U	UG/KG	
Arochlor-1242	62 U	UG/KG	
Arochlor-1248	62 U	UG/KG	
Arochlor-1254	300 P	UG/KG	
Arochlor-1260	62 U	UG/KG	

SW Sample ID: MISS-00340 — *Test Pit 2*
Sample Type: Subsurface Soil — *SUUP*
Sample Date: 08/25/1999

Analysis Name	Result	Unit	Exceedance
Arochlor-1016	36 U	UG/KG	
Arochlor-1221	36 U	UG/KG	
Arochlor-1232	36 U	UG/KG	
Arochlor-1242	36 U	UG/KG	
Arochlor-1248	36 U	UG/KG	
Arochlor-1254	32 J	UG/KG	
Arochlor-1260	36 U	UG/KG	

SW Sample ID: MISS-00160 — *Test Pit 1*
Sample Type: Subsurface Soil — *SULO*
Sample Date: 08/20/1999

Analysis Name	Result	Unit	Exceedance
Arochlor-1016	39 U	UG/KG	
Arochlor-1221	39 U	UG/KG	
Arochlor-1232	39 U	UG/KG	
Arochlor-1242	39 U	UG/KG	
Arochlor-1248	39 U	UG/KG	
Arochlor-1254	39 U	UG/KG	
Arochlor-1260	39 U	UG/KG	

SW Sample ID: MISS-00210 — *Test Pit 1*
Sample Type: Subsurface Soil — *REUP*
Sample Date: 08/20/1999

Analysis Name	Result	Unit	Exceedance
Arochlor-1016	52 U	UG/KG	
Arochlor-1221	52 U	UG/KG	
Arochlor-1232	52 U	UG/KG	
Arochlor-1242	52 U	UG/KG	
Arochlor-1248	52 U	UG/KG	
Arochlor-1254	52 U	UG/KG	
Arochlor-1260	52 U	UG/KG	

SW Sample ID: MISS-00350 — *Test Pit 2*
Sample Type: Subsurface Soil — *SULO*
Sample Date: 08/25/1999

Analysis Name	Result	Unit	Exceedance
Arochlor-1016	41 U	UG/KG	
Arochlor-1221	41 U	UG/KG	
Arochlor-1232	41 U	UG/KG	
Arochlor-1242	41 U	UG/KG	
Arochlor-1248	41 U	UG/KG	
Arochlor-1254	41 U	UG/KG	
Arochlor-1260	41 U	UG/KG	

SW Sample ID: MISS-00170 — *Test Pit 1*
Sample Type: Subsurface Soil — *TROV*
Sample Date: 08/20/1999

Analysis Name	Result	Unit	Exceedance
Arochlor-1016	36 U	UG/KG	
Arochlor-1221	36 U	UG/KG	
Arochlor-1232	36 U	UG/KG	
Arochlor-1242	36 U	UG/KG	
Arochlor-1248	36 U	UG/KG	
Arochlor-1254	270	UG/KG	
Arochlor-1260	36 U	UG/KG	

SW Sample ID: MISS-00220 — *Test Pit 1*
Sample Type: Subsurface Soil — *RELO*
Sample Date: 08/20/1999

Analysis Name	Result	Unit	Exceedance
Arochlor-1016	38 U	UG/KG	
Arochlor-1221	38 U	UG/KG	
Arochlor-1232	38 U	UG/KG	
Arochlor-1242	38 U	UG/KG	
Arochlor-1248	38 U	UG/KG	
Arochlor-1254	38 U	UG/KG	
Arochlor-1260	38 U	UG/KG	

SW Sample ID: MISS-00360 — *Test Pit 2*
Sample Type: Subsurface Soil — *TROV*
Sample Date: 08/25/1999

Analysis Name	Result	Unit	Exceedance
Arochlor-1016	39 U	UG/KG	
Arochlor-1221	39 U	UG/KG	
Arochlor-1232	39 U	UG/KG	
Arochlor-1242	39 U	UG/KG	
Arochlor-1248	39 U	UG/KG	
Arochlor-1254	62	UG/KG	
Arochlor-1260	39 U	UG/KG	

SW Sample ID: MISS-00180 — *Test Pit 1*
Sample Type: Subsurface Soil — *TRUP*
Sample Date: 08/20/1999

Analysis Name	Result	Unit	Exceedance
Arochlor-1016	44 U	UG/KG	
Arochlor-1221	44 U	UG/KG	
Arochlor-1232	44 U	UG/KG	
Arochlor-1242	44 U	UG/KG	
Arochlor-1248	44 U	UG/KG	
Arochlor-1254	44 U	UG/KG	
Arochlor-1260	44 U	UG/KG	

SW Sample ID: MISS-00230 — *Test Pit 1*
Sample Type: Subsurface Soil — *REUP*
Sample Date: 08/20/1999

Analysis Name	Result	Unit	Exceedance
Arochlor-1016	51 U	UG/KG	
Arochlor-1221	51 U	UG/KG	
Arochlor-1232	51 U	UG/KG	
Arochlor-1242	51 U	UG/KG	
Arochlor-1248	51 U	UG/KG	
Arochlor-1254	51 U	UG/KG	
Arochlor-1260	51 U	UG/KG	

SW Sample ID: MISS-0037X — *Test Pit 2*
Sample Type: Subsurface Soil — *TRUP*
Sample Date: 08/25/1999

Analysis Name	Result	Unit	Exceedance
Arochlor-1016	42 U	UG/KG	
Arochlor-1221	42 U	UG/KG	
Arochlor-1232	42 U	UG/KG	
Arochlor-1242	42 U	UG/KG	
Arochlor-1248	42 U	UG/KG	
Arochlor-1254	42 U	UG/KG	
Arochlor-1260	42 U	UG/KG	

Note : Exceedance criteria based on NJDEP Non-residential soil cleanup criteria.

Table E-5: Soil Chemical Data - PCB Analyses
Engineering Test Pit Sampling
Maywood Interim Storage Site, Maywood NJ

Result Qualifier Codes

U - Analyzed for but not detected
J - Compound detected, value is estimated
UJ - Compound not detected, quantitation limit is estimat
B - Analyte in blank as well as sample
E - Exceeds calibration curve range
D - Identified at secondary dilution factor

SW Sample ID: MISS-00380 **Test Pit 2**
Sample Type: Subsurface Soil **TRLO**
Sample Date: 08/25/1999

Analysis Name	Result	Unit	Exceedance
Arochlor-1016	38 U	UG/KG	
Arochlor-1221	38 U	UG/KG	
Arochlor-1232	38 U	UG/KG	
Arochlor-1242	38 U	UG/KG	
Arochlor-1248	38 U	UG/KG	
Arochlor-1254	38 U	UG/KG	
Arochlor-1260	38 U	UG/KG	

SW Sample ID: MISS-00390 **Test Pit 2**
Sample Type: Subsurface Soil **REOV**
Sample Date: 08/25/1999

Analysis Name	Result	Unit	Exceedance
Arochlor-1016	46 U	UG/KG	
Arochlor-1221	46 U	UG/KG	
Arochlor-1232	46 U	UG/KG	
Arochlor-1242	46 U	UG/KG	
Arochlor-1248	46 U	UG/KG	
Arochlor-1254	46 U	UG/KG	
Arochlor-1260	46 U	UG/KG	

SW Sample ID: MISS-00400 **Test Pit 2**
Sample Type: Subsurface Soil **REUP**
Sample Date: 08/25/1999

Analysis Name	Result	Unit	Exceedance
Arochlor-1016	43 U	UG/KG	
Arochlor-1221	43 U	UG/KG	
Arochlor-1232	43 U	UG/KG	
Arochlor-1242	43 U	UG/KG	
Arochlor-1248	43 U	UG/KG	
Arochlor-1254	43 U	UG/KG	
Arochlor-1260	43 U	UG/KG	

SW Sample ID: MISS-00410 **Test Pit 2**
Sample Type: Subsurface Soil **RELO**
Sample Date: 08/25/1999

Analysis Name	Result	Unit	Exceedance
Arochlor-1016	41 U	UG/KG	
Arochlor-1221	41 U	UG/KG	
Arochlor-1232	41 U	UG/KG	
Arochlor-1242	41 U	UG/KG	
Arochlor-1248	41 U	UG/KG	
Arochlor-1254	41 U	UG/KG	
Arochlor-1260	41 U	UG/KG	

SW Sample ID: MISS-00430 **Test Pit 2**
Sample Type: Subsurface Soil **REUP**
Sample Date: 08/25/1999

Analysis Name	Result	Unit	Exceedance
Arochlor-1016	40 U	UG/KG	
Arochlor-1221	40 U	UG/KG	
Arochlor-1232	40 U	UG/KG	
Arochlor-1242	40 U	UG/KG	
Arochlor-1248	40 U	UG/KG	
Arochlor-1254	40 U	UG/KG	
Arochlor-1260	40 U	UG/KG	

SW Sample ID: MISS-00520 **Test Pit 3**
Sample Type: Subsurface Soil **SUOV**
Sample Date: 08/31/1999

Analysis Name	Result	Unit	Exceedance
Arochlor-1016	47 U	UG/KG	
Arochlor-1221	47 U	UG/KG	
Arochlor-1232	47 U	UG/KG	
Arochlor-1242	47 U	UG/KG	
Arochlor-1248	47 U	UG/KG	
Arochlor-1254	47 U	UG/KG	
Arochlor-1260	47 U	UG/KG	

SW Sample ID: MISS-0053X **Test Pit 3**
Sample Type: Subsurface Soil **SUUP**
Sample Date: 08/31/1999

Analysis Name	Result	Unit	Exceedance
Arochlor-1016	43 U	UG/KG	
Arochlor-1221	43 U	UG/KG	
Arochlor-1232	43 U	UG/KG	
Arochlor-1242	43 U	UG/KG	
Arochlor-1248	43 U	UG/KG	
Arochlor-1254	43 U	UG/KG	
Arochlor-1260	43 U	UG/KG	

SW Sample ID: MISS-00540 **Test Pit 3**
Sample Type: Subsurface Soil **SULO**
Sample Date: 08/31/1999

Analysis Name	Result	Unit	Exceedance
Arochlor-1016	40 U	UG/KG	
Arochlor-1221	40 U	UG/KG	
Arochlor-1232	40 U	UG/KG	
Arochlor-1242	40 U	UG/KG	
Arochlor-1248	40 U	UG/KG	
Arochlor-1254	40 U	UG/KG	
Arochlor-1260	40 U	UG/KG	

SW Sample ID: MISS-00550 **Test Pit 3**
Sample Type: Subsurface Soil **TROV**
Sample Date: 08/31/1999

Analysis Name	Result	Unit	Exceedance
Arochlor-1016	45 U	UG/KG	
Arochlor-1221	45 U	UG/KG	
Arochlor-1232	45 U	UG/KG	
Arochlor-1242	45 U	UG/KG	
Arochlor-1248	45 U	UG/KG	
Arochlor-1254	45 U	UG/KG	
Arochlor-1260	45 U	UG/KG	

SW Sample ID: MISS-00560 **Test Pit 3**
Sample Type: Subsurface Soil **TRUP**
Sample Date: 08/31/1999

Analysis Name	Result	Unit	Exceedance
Arochlor-1016	48 U	UG/KG	
Arochlor-1221	48 U	UG/KG	
Arochlor-1232	48 U	UG/KG	
Arochlor-1242	48 U	UG/KG	
Arochlor-1248	48 U	UG/KG	
Arochlor-1254	48 U	UG/KG	
Arochlor-1260	48 U	UG/KG	

SW Sample ID: MISS-00570 **Test Pit 3**
Sample Type: Subsurface Soil **TRLO**
Sample Date: 08/31/1999

Analysis Name	Result	Unit	Exceedance
Arochlor-1016	39 U	UG/KG	
Arochlor-1221	39 U	UG/KG	
Arochlor-1232	39 U	UG/KG	
Arochlor-1242	39 U	UG/KG	
Arochlor-1248	39 U	UG/KG	
Arochlor-1254	39 U	UG/KG	
Arochlor-1260	39 U	UG/KG	

SW Sample ID: MISS-00580 **Test Pit 3**
Sample Type: Subsurface Soil **REOV**
Sample Date: 08/31/1999

Analysis Name	Result	Unit	Exceedance
Arochlor-1016	75 U	UG/KG	
Arochlor-1221	75 U	UG/KG	
Arochlor-1232	75 U	UG/KG	
Arochlor-1242	75 U	UG/KG	
Arochlor-1248	75 U	UG/KG	
Arochlor-1254	75 U	UG/KG	
Arochlor-1260	75 U	UG/KG	

SW Sample ID: MISS-00590 **Test Pit 3**
Sample Type: Subsurface Soil **REUP**
Sample Date: 08/31/1999

Analysis Name	Result	Unit	Exceedance
Arochlor-1016	65 U	UG/KG	
Arochlor-1221	65 U	UG/KG	
Arochlor-1232	65 U	UG/KG	
Arochlor-1242	65 U	UG/KG	
Arochlor-1248	65 U	UG/KG	
Arochlor-1254	65 U	UG/KG	
Arochlor-1260	65 U	UG/KG	

SW Sample ID: MISS-00600 **Test Pit 3**
Sample Type: Subsurface Soil **RELO**
Sample Date: 08/31/1999

Analysis Name	Result	Unit	Exceedance
Arochlor-1016	38 U	UG/KG	
Arochlor-1221	38 U	UG/KG	
Arochlor-1232	38 U	UG/KG	
Arochlor-1242	38 U	UG/KG	
Arochlor-1248	38 U	UG/KG	
Arochlor-1254	38 U	UG/KG	
Arochlor-1260	38 U	UG/KG	

SW Sample ID: MISS-00610 **Test Pit 3**
Sample Type: Subsurface Soil **REUP**
Sample Date: 08/31/1999

Analysis Name	Result	Unit	Exceedance
Arochlor-1016	64 U	UG/KG	
Arochlor-1221	64 U	UG/KG	
Arochlor-1232	64 U	UG/KG	
Arochlor-1242	64 U	UG/KG	
Arochlor-1248	64 U	UG/KG	
Arochlor-1254	64 U	UG/KG	
Arochlor-1260	64 U	UG/KG	

Note : Exceedance criteria based on NJDEP Non-residential soil cleanup criteria.

Table E-5: Soil Chemical Data - PCB Analyses
Engineering Test Pit Sampling
Maywood Interim Storage Site, Maywood NJ

Result Qualifier Codes

U - Analyzed for but not detected
J - Compound detected, value is estimated
UJ - Compound not detected, quantitation limit is estimat
B - Analyte in blank as well as sample
E - Exceeds calibration curve range
D - Identified at secondary dilution factor

SW Sample ID: MISS-00710 — *Test Pit 4*
Sample Type: Subsurface Soil — *SUOV*
Sample Date: 09/01/1999

Analysis Name	Result		Unit	Exceedance
Arochlor-1016	61	U	UG/KG	
Arochlor-1221	61	U	UG/KG	
Arochlor-1232	61	U	UG/KG	
Arochlor-1242	61	U	UG/KG	
Arochlor-1248	61	U	UG/KG	
Arochlor-1254	61	U	UG/KG	
Arochlor-1260	61	U	UG/KG	

SW Sample ID: MISS-00760 — *Test Pit 4*
Sample Type: Subsurface Soil — *TRLO*
Sample Date: 09/01/1999

Analysis Name	Result		Unit	Exceedance
Arochlor-1016	36	U	UG/KG	
Arochlor-1221	36	U	UG/KG	
Arochlor-1232	36	U	UG/KG	
Arochlor-1242	36	U	UG/KG	
Arochlor-1248	36	U	UG/KG	
Arochlor-1254	36	U	UG/KG	
Arochlor-1260	36	U	UG/KG	

SW Sample ID: MISS-00900 — *Test Pit 5*
Sample Type: Subsurface Soil — *OVER*
Sample Date: 08/18/1999

Analysis Name	Result		Unit	Exceedance
Arochlor-1016	37	U	UG/KG	
Arochlor-1221	37	U	UG/KG	
Arochlor-1232	37	U	UG/KG	
Arochlor-1242	37	U	UG/KG	
Arochlor-1248	37	U	UG/KG	
Arochlor-1254	62		UG/KG	
Arochlor-1260	37	U	UG/KG	

SW Sample ID: MISS-00720 — *Test Pit 4*
Sample Type: Subsurface Soil — *SUUP*
Sample Date: 09/01/1999

Analysis Name	Result		Unit	Exceedance
Arochlor-1016	39	U	UG/KG	
Arochlor-1221	39	U	UG/KG	
Arochlor-1232	39	U	UG/KG	
Arochlor-1242	39	U	UG/KG	
Arochlor-1248	39	U	UG/KG	
Arochlor-1254	39	U	UG/KG	
Arochlor-1260	39	U	UG/KG	

SW Sample ID: MISS-00770 — *Test Pit 4*
Sample Type: Subsurface Soil — *REOV*
Sample Date: 09/01/1999

Analysis Name	Result		Unit	Exceedance
Arochlor-1016	49	U	UG/KG	
Arochlor-1221	49	U	UG/KG	
Arochlor-1232	49	U	UG/KG	
Arochlor-1242	49	U	UG/KG	
Arochlor-1248	49	U	UG/KG	
Arochlor-1254	49	U	UG/KG	
Arochlor-1260	49	U	UG/KG	

SW Sample ID: MISS-00910 — *Test Pit 5*
Sample Type: Subsurface Soil — *UPER*
Sample Date: 08/18/1999

Analysis Name	Result		Unit	Exceedance
Arochlor-1016	50	U	UG/KG	
Arochlor-1221	50	U	UG/KG	
Arochlor-1232	50	U	UG/KG	
Arochlor-1242	50	U	UG/KG	
Arochlor-1248	50	U	UG/KG	
Arochlor-1254	50	U	UG/KG	
Arochlor-1260	50	U	UG/KG	

SW Sample ID: MISS-00730 — *Test Pit 4*
Sample Type: Subsurface Soil — *SULO*
Sample Date: 09/01/1999

Analysis Name	Result		Unit	Exceedance
Arochlor-1016	36	U	UG/KG	
Arochlor-1221	36	U	UG/KG	
Arochlor-1232	36	U	UG/KG	
Arochlor-1242	36	U	UG/KG	
Arochlor-1248	36	U	UG/KG	
Arochlor-1254	36	U	UG/KG	
Arochlor-1260	36	U	UG/KG	

SW Sample ID: MISS-0078X — *Test Pit 4*
Sample Type: Subsurface Soil — *REUP*
Sample Date: 09/01/1999

Analysis Name	Result		Unit	Exceedance
Arochlor-1016	58	U	UG/KG	
Arochlor-1221	58	U	UG/KG	
Arochlor-1232	58	U	UG/KG	
Arochlor-1242	58	U	UG/KG	
Arochlor-1248	58	U	UG/KG	
Arochlor-1254	58	U	UG/KG	
Arochlor-1260	58	U	UG/KG	

SW Sample ID: MISS-0092X — *Test Pit 5*
Sample Type: Subsurface Soil — *LWER*
Sample Date: 08/18/1999

Analysis Name	Result		Unit	Exceedance
Arochlor-1016	40	U	UG/KG	
Arochlor-1221	40	U	UG/KG	
Arochlor-1232	40	U	UG/KG	
Arochlor-1242	40	U	UG/KG	
Arochlor-1248	40	U	UG/KG	
Arochlor-1254	40	U	UG/KG	
Arochlor-1260	40	U	UG/KG	

SW Sample ID: MISS-00740 — *Test Pit 4*
Sample Type: Subsurface Soil — *TROV*
Sample Date: 09/01/1999

Analysis Name	Result		Unit	Exceedance
Arochlor-1016	56	U	UG/KG	
Arochlor-1221	56	U	UG/KG	
Arochlor-1232	56	U	UG/KG	
Arochlor-1242	56	U	UG/KG	
Arochlor-1248	56	U	UG/KG	
Arochlor-1254	56	U	UG/KG	
Arochlor-1260	56	U	UG/KG	

SW Sample ID: MISS-00790 — *Test Pit 4*
Sample Type: Subsurface Soil — *RELO*
Sample Date: 09/01/1999

Analysis Name	Result		Unit	Exceedance
Arochlor-1016	42	U	UG/KG	
Arochlor-1221	42	U	UG/KG	
Arochlor-1232	42	U	UG/KG	
Arochlor-1242	42	U	UG/KG	
Arochlor-1248	42	U	UG/KG	
Arochlor-1254	42	U	UG/KG	
Arochlor-1260	42	U	UG/KG	

SW Sample ID: MISS-00930 — *Test Pit 5*
Sample Type: Subsurface Soil — *UPER*
Sample Date: 08/18/1999

Analysis Name	Result		Unit	Exceedance
Arochlor-1016	58	U	UG/KG	
Arochlor-1221	58	U	UG/KG	
Arochlor-1232	58	U	UG/KG	
Arochlor-1242	58	U	UG/KG	
Arochlor-1248	58	U	UG/KG	
Arochlor-1254	58	U	UG/KG	
Arochlor-1260	58	U	UG/KG	

SW Sample ID: MISS-00750 — *Test Pit 4*
Sample Type: Subsurface Soil — *TRUP*
Sample Date: 09/01/1999

Analysis Name	Result		Unit	Exceedance
Arochlor-1016	37	U	UG/KG	
Arochlor-1221	37	U	UG/KG	
Arochlor-1232	37	U	UG/KG	
Arochlor-1242	37	U	UG/KG	
Arochlor-1248	37	U	UG/KG	
Arochlor-1254	37	U	UG/KG	
Arochlor-1260	37	U	UG/KG	

SW Sample ID: MISS-00800 — *Test Pit 4*
Sample Type: Subsurface Soil — *RELO*
Sample Date: 09/01/1999

Analysis Name	Result		Unit	Exceedance
Arochlor-1016	40	U	UG/KG	
Arochlor-1221	40	U	UG/KG	
Arochlor-1232	40	U	UG/KG	
Arochlor-1242	40	U	UG/KG	
Arochlor-1248	40	U	UG/KG	
Arochlor-1254	40	U	UG/KG	
Arochlor-1260	40	U	UG/KG	

Note : Exceedance criteria based on NJDEP Non-residential soil cleanup criteria.

Table E-6: Equipment Rinsate - SVOC Analyses
Engineering Test Pit Sampling
Maywood Interim Storage Site, Maywood NJ

Result Qualifier Codes

U - Analyzed for but not detected
J - Compound detected, value is estimated
UJ - Compound not detected, quantitation limit is estimat
B - Analyte in blank as well as sample
E - Exceeds calibration curve range
D - Identified at secondary diluation fa

SW Sample ID:	*MISS-00110*	***Rough Pits***	*SW Sample ID:*	*MISS-00120*	***Rough Pits***	*SW Sample ID:*	*MISS-00300*	***Test Pits***
Sample Type:	*Equipment Rinsate*		*Sample Type:*	*Equipment Rinsate*		*Sample Type:*	*Equipment Rinsate*	
Sample Date:	*08/10/1999*		*Sample Date:*	*08/16/1999*		*Sample Date:*	*08/19/1999*	
Analysis Name	***Result***	***Unit***	***Analysis Name***	***Result***	***Unit***	***Analysis Name***	***Result***	***Unit***
1,2,4-Trichlorobenzene	10 U	UG/L	1,2,4-Trichlorobenzene	10 U	UG/L	1,2,4-Trichlorobenzene	10 U	UG/L
1,2-Dichlorobenzene	10 U	UG/L	1,2-Dichlorobenzene	10 U	UG/L	1,2-Dichlorobenzene	10 U	UG/L
1,3-Dichlorobenzene	10 U	UG/L	1,3-Dichlorobenzene	10 U	UG/L	1,3-Dichlorobenzene	10 U	UG/L
1,4-Dichlorobenzene	10 U	UG/L	1,4-Dichlorobenzene	10 U	UG/L	1,4-Dichlorobenzene	10 U	UG/L
2,2'-Oxybis(1-Chloropropane)	10 U	UG/L	2,2'-Oxybis(1-Chloropropane)	10 U	UG/L	2,2'-Oxybis(1-Chloropropane)	10 U	UG/L
2,4,5-Trichlorophenol	50 U	UG/L	2,4,5-Trichlorophenol	50 U	UG/L	2,4,5-Trichlorophenol	50 U	UG/L
2,4,6-Trichlorophenol	10 U	UG/L	2,4,6-Trichlorophenol	10 U	UG/L	2,4,6-Trichlorophenol	10 U	UG/L
2,4-Dichlorophenol	10 U	UG/L	2,4-Dichlorophenol	10 U	UG/L	2,4-Dichlorophenol	10 U	UG/L
2,4-Dimethylphenol	10 U	UG/L	2,4-Dimethylphenol	10 U	UG/L	2,4-Dimethylphenol	10 U	UG/L
2,4-Dinitrophenol	50 U	UG/L	2,4-Dinitrophenol	50 U	UG/L	2,4-Dinitrophenol	50 U	UG/L
2,4-Dinitrotoluene	10 U	UG/L	2,4-Dinitrotoluene	10 U	UG/L	2,4-Dinitrotoluene	10 U	UG/L
2,6-Dinitrotoluene	10 U	UG/L	2,6-Dinitrotoluene	10 U	UG/L	2,6-Dinitrotoluene	10 U	UG/L
2-Chloronaphthalene	10 U	UG/L	2-Chloronaphthalene	10 U	UG/L	2-Chloronaphthalene	10 U	UG/L
2-Chlorophenol	10 U	UG/L	2-Chlorophenol	10 U	UG/L	2-Chlorophenol	10 U	UG/L
2-Methylnaphthalene	10 U	UG/L	2-Methylnaphthalene	10 U	UG/L	2-Methylnaphthalene	10 U	UG/L
2-Methylphenol	10 U	UG/L	2-Methylphenol	10 U	UG/L	2-Methylphenol	10 U	UG/L
2-Nitroaniline	50 U	UG/L	2-Nitroaniline	50 U	UG/L	2-Nitroaniline	50 U	UG/L
2-Nitrophenol	10 U	UG/L	2-Nitrophenol	10 U	UG/L	2-Nitrophenol	10 U	UG/L
3,3'-Dichlorobenzidine	10 U	UG/L	3,3'-Dichlorobenzidine	10 U	UG/L	3,3'-Dichlorobenzidine	10 U	UG/L
3-Nitroaniline	50 U	UG/L	3-Nitroaniline	50 U	UG/L	3-Nitroaniline	50 U	UG/L
4,6-Dinitro-2-Methylphenol	50 U	UG/L	4,6-Dinitro-2-Methylphenol	50 U	UG/L	4,6-Dinitro-2-Methylphenol	50 U	UG/L
4-Bromophenyl-Phenylether	10 U	UG/L	4-Bromophenyl-Phenylether	10 U	UG/L	4-Bromophenyl-Phenylether	10 U	UG/L
4-Chloro-3-Methylphenol	10 U	UG/L	4-Chloro-3-Methylphenol	10 U	UG/L	4-Chloro-3-Methylphenol	10 U	UG/L
4-Chloroaniline	10 U	UG/L	4-Chloroaniline	10 U	UG/L	4-Chloroaniline	10 U	UG/L
4-Chlorophenyl-Phenyl Ether	10 U	UG/L	4-Chlorophenyl-Phenyl Ether	10 U	UG/L	4-Chlorophenyl-Phenyl Ether	10 U	UG/L
4-Methylphenol	10 U	UG/L	4-Methylphenol	10 U	UG/L	4-Methylphenol	10 U	UG/L
4-Nitroaniline	50 U	UG/L	4-Nitroaniline	50 U	UG/L	4-Nitroaniline	50 U	UG/L
4-Nitrophenol	50 U	UG/L	4-Nitrophenol	50 U	UG/L	4-Nitrophenol	50 U	UG/L
Acenaphthene	10 U	UG/L	Acenaphthene	10 U	UG/L	Acenaphthene	10 U	UG/L
Acenaphthylene	10 U	UG/L	Acenaphthylene	10 U	UG/L	Acenaphthylene	10 U	UG/L
Anthracene	10 U	UG/L	Anthracene	10 U	UG/L	Anthracene	10 U	UG/L
Benzo(a)anthracene	10 U	UG/L	Benzo(a)anthracene	10 U	UG/L	Benzo(a)anthracene	10 U	UG/L
Benzo(a)pyrene	10 U	UG/L	Benzo(a)pyrene	10 U	UG/L	Benzo(a)pyrene	10 U	UG/L
Benzo(b)fluoranthene	10 U	UG/L	Benzo(b)fluoranthene	10 U	UG/L	Benzo(b)fluoranthene	10 U	UG/L
Benzo(g,h,i)perylene	10 U	UG/L	Benzo(g,h,i)perylene	10 U	UG/L	Benzo(g,h,i)perylene	10 U	UG/L
Benzo(k)fluoranthene	10 U	UG/L	Benzo(k)fluoranthene	10 U	UG/L	Benzo(k)fluoranthene	10 U	UG/L
Bis(2-chloroethoxy) methane	10 U	UG/L	Bis(2-chloroethoxy) methane	10 U	UG/L	Bis(2-chloroethoxy) methane	10 U	UG/L
Bis(2-chloroethyl) ether	10 U	UG/L	Bis(2-chloroethyl) ether	10 U	UG/L	Bis(2-chloroethyl) ether	10 U	UG/L
Bis(2-ethylhexyl)phthalate	10 U	UG/L	Bis(2-ethylhexyl)phthalate	10 U	UG/L	Bis(2-ethylhexyl)phthalate	10 U	UG/L
Butyl benzyl phthalate	10 U	UG/L	Butyl benzyl phthalate	10 U	UG/L	Butyl benzyl phthalate	10 U	UG/L
Carbazole	10 U	UG/L	Carbazole	10 U	UG/L	Carbazole	10 U	UG/L
Chrysene	10 U	UG/L	Chrysene	10 U	UG/L	Chrysene	10 U	UG/L
Di-N-Butylphthalate	10 U	UG/L	Di-N-Butylphthalate	10 U	UG/L	Di-N-Butylphthalate	10 U	UG/L
Di-N-Octylphthalate	10 U	UG/L	Di-N-Octylphthalate	10 U	UG/L	Di-N-Octylphthalate	10 U	UG/L
Dibenzo(a,h)anthracene	10 U	UG/L	Dibenzo(a,h)anthracene	10 U	UG/L	Dibenzo(a,h)anthracene	10 U	UG/L
Dibenzofuran	10 U	UG/L	Dibenzofuran	10 U	UG/L	Dibenzofuran	10 U	UG/L
Diethylphthalate	10 U	UG/L	Diethylphthalate	10 U	UG/L	Diethylphthalate	10 U	UG/L
Dimethylphthalate	10 U	UG/L	Dimethylphthalate	10 U	UG/L	Dimethylphthalate	10 U	UG/L
Fluoranthene	10 U	UG/L	Fluoranthene	10 U	UG/L	Fluoranthene	10 U	UG/L
Fluorene	10 U	UG/L	Fluorene	10 U	UG/L	Fluorene	10 U	UG/L
Hexachlorobenzene	10 U	UG/L	Hexachlorobenzene	10 U	UG/L	Hexachlorobenzene	10 U	UG/L
Hexachlorobutadiene	10 U	UG/L	Hexachlorobutadiene	10 U	UG/L	Hexachlorobutadiene	10 U	UG/L
Hexachlorocyclopentadiene	10 U	UG/L	Hexachlorocyclopentadiene	10 U	UG/L	Hexachlorocyclopentadiene	10 U	UG/L
Hexachloroethane	10 U	UG/L	Hexachloroethane	10 U	UG/L	Hexachloroethane	10 U	UG/L
Indeno(1,2,3-cd)pyrene	10 U	UG/L	Indeno(1,2,3-cd)pyrene	10 U	UG/L	Indeno(1,2,3-cd)pyrene	10 U	UG/L
Isophorone	10 U	UG/L	Isophorone	10 U	UG/L	Isophorone	10 U	UG/L
N-nitroso-di-n-propylamine	10 U	UG/L	N-nitroso-di-n-propylamine	10 U	UG/L	N-nitroso-di-n-propylamine	10 U	UG/L
N-nitroso-diphenylamine	10 U	UG/L	N-nitroso-diphenylamine	10 U	UG/L	N-nitroso-diphenylamine	10 U	UG/L
Naphthalene	10 U	UG/L	Naphthalene	10 U	UG/L	Naphthalene	10 U	UG/L
Nitrobenzene	10 U	UG/L	Nitrobenzene	10 U	UG/L	Nitrobenzene	10 U	UG/L
Pentachlorophenol	50 U	UG/L	Pentachlorophenol	50 U	UG/L	Pentachlorophenol	50 U	UG/L
Phenanthrene	10 U	UG/L	Phenanthrene	10 U	UG/L	Phenanthrene	10 U	UG/L
Phenol	10 U	UG/L	Phenol	10 U	UG/L	Phenol	10 U	UG/L
Pyrene	10 U	UG/L	Pyrene	10 U	UG/L	Pyrene	10 U	UG/L

Table E-6: Equipment Rinsate - SVOC Analyses
Engineering Test Pit Sampling
Maywood Interim Storage Site, Maywood NJ

Result Qualifier Codes

U - Analyzed for but not detected
J - Compound detected, value is estimated
UJ - Compound not detected, quantitation limit is estimat
B - Analyte in blank as well as sample
E - Exceeds calibration curve range
D - Identified at secondary diluation fa

SW Sample ID: MISS-00490	Test Pits		SW Sample ID: MISS-00670	Test Pits		SW Sample ID: MISS-00860	Test Pits	
Sample Type: Equipment Rinsate			Sample Type: Equipment Rinsate			Sample Type: Equipment Rinsate		
Sample Date: 08/25/1999			Sample Date: 08/31/1999			Sample Date: 09/01/1999		
Analysis Name	**Result**	**Unit**	**Analysis Name**	**Result**	**Unit**	**Analysis Name**	**Result**	**Unit**
1,2,4-Trichlorobenzene	11 U	UG/L	1,2,4-Trichlorobenzene	10 U	UG/L	1,2,4-Trichlorobenzene	10 U	UG/L
1,2-Dichlorobenzene	11 U	UG/L	1,2-Dichlorobenzene	10 U	UG/L	1,2-Dichlorobenzene	10 U	UG/L
1,3-Dichlorobenzene	11 U	UG/L	1,3-Dichlorobenzene	10 U	UG/L	1,3-Dichlorobenzene	10 U	UG/L
1,4-Dichlorobenzene	11 U	UG/L	1,4-Dichlorobenzene	10 U	UG/L	1,4-Dichlorobenzene	10 U	UG/L
2,2'-Oxybis(1-Chloropropane)	11 U	UG/L	2,2'-Oxybis(1-Chloropropane)	10 U	UG/L	2,2'-Oxybis(1-Chloropropane)	10 U	UG/L
2,4,5-Trichlorophenol	56 U	UG/L	2,4,5-Trichlorophenol	50 U	UG/L	2,4,5-Trichlorophenol	50 U	UG/L
2,4,6-Trichlorophenol	11 U	UG/L	2,4,6-Trichlorophenol	10 U	UG/L	2,4,6-Trichlorophenol	10 U	UG/L
2,4-Dichlorophenol	11 U	UG/L	2,4-Dichlorophenol	10 U	UG/L	2,4-Dichlorophenol	10 U	UG/L
2,4-Dimethylphenol	11 U	UG/L	2,4-Dimethylphenol	10 U	UG/L	2,4-Dimethylphenol	10 U	UG/L
2,4-Dinitrophenol	56 U	UG/L	2,4-Dinitrophenol	50 U	UG/L	2,4-Dinitrophenol	50 U	UG/L
2,4-Dinitrotoluene	11 U	UG/L	2,4-Dinitrotoluene	10 U	UG/L	2,4-Dinitrotoluene	10 U	UG/L
2,6-Dinitrotoluene	11 U	UG/L	2,6-Dinitrotoluene	10 U	UG/L	2,6-Dinitrotoluene	10 U	UG/L
2-Chloronaphthalene	11 U	UG/L	2-Chloronaphthalene	10 U	UG/L	2-Chloronaphthalene	10 U	UG/L
2-Chlorophenol	11 U	UG/L	2-Chlorophenol	10 U	UG/L	2-Chlorophenol	10 U	UG/L
2-Methylnaphthalene	11 U	UG/L	2-Methylnaphthalene	10 U	UG/L	2-Methylnaphthalene	10 U	UG/L
2-Methylphenol	11 U	UG/L	2-Methylphenol	10 U	UG/L	2-Methylphenol	10 U	UG/L
2-Nitroaniline	56 U	UG/L	2-Nitroaniline	50 U	UG/L	2-Nitroaniline	50 U	UG/L
2-Nitrophenol	11 U	UG/L	2-Nitrophenol	10 U	UG/L	2-Nitrophenol	10 U	UG/L
3,3'-Dichlorobenzidine	11 U	UG/L	3,3'-Dichlorobenzidine	10 U	UG/L	3,3'-Dichlorobenzidine	10 U	UG/L
3-Nitroaniline	56 U	UG/L	3-Nitroaniline	50 U	UG/L	3-Nitroaniline	50 U	UG/L
4,6-Dinitro-2-Methylphenol	56 U	UG/L	4,6-Dinitro-2-Methylphenol	50 U	UG/L	4,6-Dinitro-2-Methylphenol	50 U	UG/L
4-Bromophenyl-Phenylether	11 U	UG/L	4-Bromophenyl-Phenylether	10 U	UG/L	4-Bromophenyl-Phenylether	10 U	UG/L
4-Chloro-3-Methylphenol	11 U	UG/L	4-Chloro-3-Methylphenol	10 U	UG/L	4-Chloro-3-Methylphenol	10 U	UG/L
4-Chloroaniline	11 U	UG/L	4-Chloroaniline	10 U	UG/L	4-Chloroaniline	10 U	UG/L
4-Chlorophenyl-Phenyl Ether	11 U	UG/L	4-Chlorophenyl-Phenyl Ether	10 U	UG/L	4-Chlorophenyl-Phenyl Ether	10 U	UG/L
4-Methylphenol	11 U	UG/L	4-Methylphenol	10 U	UG/L	4-Methylphenol	10 U	UG/L
4-Nitroaniline	56 U	UG/L	4-Nitroaniline	50 U	UG/L	4-Nitroaniline	50 U	UG/L
4-Nitrophenol	56 U	UG/L	4-Nitrophenol	50 U	UG/L	4-Nitrophenol	50 U	UG/L
Acenaphthene	11 U	UG/L	Acenaphthene	10 U	UG/L	Acenaphthene	10 U	UG/L
Acenaphthylene	11 U	UG/L	Acenaphthylene	10 U	UG/L	Acenaphthylene	10 U	UG/L
Anthracene	11 U	UG/L	Anthracene	10 U	UG/L	Anthracene	10 U	UG/L
Benzo(a)anthracene	11 U	UG/L	Benzo(a)anthracene	10 U	UG/L	Benzo(a)anthracene	10 U	UG/L
Benzo(a)pyrene	11 U	UG/L	Benzo(a)pyrene	10 U	UG/L	Benzo(a)pyrene	10 U	UG/L
Benzo(b)fluoranthene	11 U	UG/L	Benzo(b)fluoranthene	10 U	UG/L	Benzo(b)fluoranthene	10 U	UG/L
Benzo(g,h,i)perylene	11 U	UG/L	Benzo(g,h,i)perylene	10 U	UG/L	Benzo(g,h,i)perylene	10 U	UG/L
Benzo(k)fluoranthene	11 U	UG/L	Benzo(k)fluoranthene	10 U	UG/L	Benzo(k)fluoranthene	10 U	UG/L
Bis(2-chloroethoxy) methane	11 U	UG/L	Bis(2-chloroethoxy) methane	10 U	UG/L	Bis(2-chloroethoxy) methane	10 U	UG/L
Bis(2-chloroethyl) ether	11 U	UG/L	Bis(2-chloroethyl) ether	10 U	UG/L	Bis(2-chloroethyl) ether	10 U	UG/L
Bis(2-ethylhexyl)phthalate	11 U	UG/L	Bis(2-ethylhexyl)phthalate	10 U	UG/L	Bis(2-ethylhexyl)phthalate	10 U	UG/L
Butyl benzyl phthalate	11 U	UG/L	Butyl benzyl phthalate	10 U	UG/L	Butyl benzyl phthalate	10 U	UG/L
Carbazole	11 U	UG/L	Carbazole	10 U	UG/L	Carbazole	10 U	UG/L
Chrysene	11 U	UG/L	Chrysene	10 U	UG/L	Chrysene	10 U	UG/L
Di-N-Butylphthalate	11 U	UG/L	Di-N-Butylphthalate	10 U	UG/L	Di-N-Butylphthalate	10 U	UG/L
Di-N-Octylphthalate	11 U	UG/L	Di-N-Octylphthalate	10 U	UG/L	Di-N-Octylphthalate	10 U	UG/L
Dibenzo(a,h)anthracene	11 U	UG/L	Dibenzo(a,h)anthracene	10 U	UG/L	Dibenzo(a,h)anthracene	10 U	UG/L
Dibenzofuran	11 U	UG/L	Dibenzofuran	10 U	UG/L	Dibenzofuran	10 U	UG/L
Diethylphthalate	11 U	UG/L	Diethylphthalate	10 U	UG/L	Diethylphthalate	10 U	UG/L
Dimethylphthalate	11 U	UG/L	Dimethylphthalate	10 U	UG/L	Dimethylphthalate	10 U	UG/L
Fluoranthene	11 U	UG/L	Fluoranthene	10 U	UG/L	Fluoranthene	10 U	UG/L
Fluorene	11 U	UG/L	Fluorene	10 U	UG/L	Fluorene	10 U	UG/L
Hexachlorobenzene	11 U	UG/L	Hexachlorobenzene	10 U	UG/L	Hexachlorobenzene	10 U	UG/L
Hexachlorobutadiene	11 U	UG/L	Hexachlorobutadiene	10 U	UG/L	Hexachlorobutadiene	10 U	UG/L
Hexachlorocyclopentadiene	11 U	UG/L	Hexachlorocyclopentadiene	10 U	UG/L	Hexachlorocyclopentadiene	10 U	UG/L
Hexachloroethane	11 U	UG/L	Hexachloroethane	10 U	UG/L	Hexachloroethane	10 U	UG/L
Indeno(1,2,3-cd)pyrene	11 U	UG/L	Indeno(1,2,3-cd)pyrene	10 U	UG/L	Indeno(1,2,3-cd)pyrene	10 U	UG/L
Isophorone	11 U	UG/L	Isophorone	10 U	UG/L	Isophorone	10 U	UG/L
N-nitroso-di-n-propylamine	11 U	UG/L	N-nitroso-di-n-propylamine	10 U	UG/L	N-nitroso-di-n-propylamine	10 U	UG/L
N-nitroso-diphenylamine	11 U	UG/L	N-nitroso-diphenylamine	10 U	UG/L	N-nitroso-diphenylamine	10 U	UG/L
Naphthalene	11 U	UG/L	Naphthalene	10 U	UG/L	Naphthalene	10 U	UG/L
Nitrobenzene	11 U	UG/L	Nitrobenzene	10 U	UG/L	Nitrobenzene	10 U	UG/L
Pentachlorophenol	56 U	UG/L	Pentachlorophenol	50 U	UG/L	Pentachlorophenol	50 U	UG/L
Phenanthrene	11 U	UG/L	Phenanthrene	10 U	UG/L	Phenanthrene	10 U	UG/L
Phenol	11 U	UG/L	Phenol	10 U	UG/L	Phenol	10 U	UG/L
Pyrene	11 U	UG/L	Pyrene	10 U	UG/L	Pyrene	10 U	UG/L

Table E-6: Equipment Rinsate - SVOC Analyses
Engineering Test Pit Sampling
Maywood Interim Storage Site, Maywood NJ

Result Qualifier Codes

U - Analyzed for but not detected
J - Compound detected, value is estimated
UJ - Compound not detected, quantitation limit is estimat
B - Analyte in blank as well as sample
E - Exceeds calibration curve range
D - Identified at secondary dilution fa

SW Sample ID: MISS-00990 **Test Pits**
Sample Type: Equipment Rinsate
Sample Date:

Analysis Name	Result		Unit
1,2,4-Trichlorobenzene	10	U	UG/L
1,2-Dichlorobenzene	10	U	UG/L
1,3-Dichlorobenzene	10	U	UG/L
1,4-Dichlorobenzene	10	U	UG/L
2,2'-Oxybis(1-Chloropropane)	10	U	UG/L
2,4,5-Trichlorophenol	50	U	UG/L
2,4,6-Trichlorophenol	10	U	UG/L
2,4-Dichlorophenol	10	U	UG/L
2,4-Dimethylphenol	10	U	UG/L
2,4-Dinitrophenol	50	U	UG/L
2,4-Dinitrotoluene	10	U	UG/L
2,6-Dinitrotoluene	10	U	UG/L
2-Chloronaphthalene	10	U	UG/L
2-Chlorophenol	10	U	UG/L
2-Methylnaphthalene	10	U	UG/L
2-Methylphenol	10	U	UG/L
2-Nitroaniline	50	U	UG/L
2-Nitrophenol	10	U	UG/L
3,3'-Dichlorobenzidine	10	U	UG/L
3-Nitroaniline	50	U	UG/L
4,6-Dinitro-2-Methylphenol	50	U	UG/L
4-Bromophenyl-Phenylether	10	U	UG/L
4-Chloro-3-Methylphenol	10	U	UG/L
4-Chloroaniline	10	U	UG/L
4-Chlorophenyl-Phenyl Ether	10	U	UG/L
4-Methylphenol	10	U	UG/L
4-Nitroaniline	50	U	UG/L
4-Nitrophenol	50	U	UG/L
Acenaphthene	10	U	UG/L
Acenaphthylene	10	U	UG/L
Anthracene	10	U	UG/L
Benzo(a)anthracene	10	U	UG/L
Benzo(a)pyrene	10	U	UG/L
Benzo(b)fluoranthene	10	U	UG/L
Benzo(g,h,i)perylene	10	U	UG/L
Benzo(k)fluoranthene	10	U	UG/L
Bis(2-chloroethoxy) methane	10	U	UG/L
Bis(2-chloroethyl) ether	10	U	UG/L
Bis(2-ethylhexyl)phthalate	1	J	UG/L
Butyl benzyl phthalate	10	U	UG/L
Carbazole	10	U	UG/L
Chrysene	10	U	UG/L
Di-N-Butylphthalate	10	U	UG/L
Di-N-Octylphthalate	10	U	UG/L
Dibenzo(a,h)anthracene	10	U	UG/L
Dibenzofuran	10	U	UG/L
Diethylphthalate	10	U	UG/L
Dimethylphthalate	10	U	UG/L
Fluoranthene	10	U	UG/L
Fluorene	10	U	UG/L
Hexachlorobenzene	10	U	UG/L
Hexachlorobutadiene	10	U	UG/L
Hexachlorocyclopentadiene	10	U	UG/L
Hexachloroethane	10	U	UG/L
Indeno(1,2,3-cd)pyrene	10	U	UG/L
Isophorone	10	U	UG/L
N-nitroso-di-n-propylamine	10	U	UG/L
N-nitroso-diphenylamine	10	U	UG/L
Naphthalene	10	U	UG/L
Nitrobenzene	10	U	UG/L
Pentachlorophenol	50	U	UG/L
Phenanthrene	10	U	UG/L
Phenol	10	U	UG/L
Pyrene	10	U	UG/L

Table E-7: QC Chemical Data - VOC Analyses
Engineering Test Pit Sampling
Maywood Interim Storage Site, Maywood NJ

Result Qualifier Codes

U - Analyzed for but not detected
J - Compound detected, value is estimated
UJ - Compound not detected, quantitation limit is estimat
B - Analyte in blank as well as sample
E - Exceeds calibration curve range
D - Identified at secondary dilution factor

SW Sample ID: MISS-00060 **Rough Pits**
Sample Type: Trip Blank
Sample Date: 08/10/1999

Analysis Name	Result	Unit
1,1,1-Trichloroethane	5 U	UG/L
1,1,2,2-Tetrachloroethane	5 U	UG/L
1,1,2-Trichloroethane	5 U	UG/L
1,1-Dichloroethane	5 U	UG/L
1,1-Dichloroethene	5 U	UG/L
1,2-Dichloroethane	5 U	UG/L
1,2-Dichloropropane	5 U	UG/L
2-Butanone	10 U	UG/L
2-Hexanone	10 U	UG/L
4-Methyl-2-Pentanone	10 U	UG/L
Acetone	10 U	UG/L
Benzene	5 U	UG/L
Bromodichloromethane	5 U	UG/L
Bromoform	5 U	UG/L
Bromomethane	10 U	UG/L
Carbon Disulfide	5 U	UG/L
Carbon Tetrachloride	5 U	UG/L
Chlorobenzene	5 U	UG/L
Chloroethane	10 U	UG/L
Chloroform	5 U	UG/L
Chloromethane	10 U	UG/L
Cis-1,2-Dichloroethene	5 U	UG/L
cis-1,3-Dichloropropene	5 U	UG/L
Ethylbenzene	5 U	UG/L
m-Xylenes (Total)	5 U	UG/L
Methylene Chloride	5 U	UG/L
Styrene	5 U	UG/L
Tetrachloroethene	5 U	UG/L
Toluene	5 U	UG/L
Trans-1,2-Dichloroethene	5 U	UG/L
Trans-1,3-Dichloropropene	5 U	UG/L
Trichloroethene	5 U	UG/L
Vinyl Chloride	10 U	UG/L

SW Sample ID: MISS-00080 **Rough Pits**
Sample Type: Trip Blank
Sample Date: 08/16/1999

Analysis Name	Result	Unit
1,1,1-Trichloroethane	5 U	UG/L
1,1,2,2-Tetrachloroethane	5 U	UG/L
1,1,2-Trichloroethane	5 U	UG/L
1,1-Dichloroethane	5 U	UG/L
1,1-Dichloroethene	5 U	UG/L
1,2-Dichloroethane	5 U	UG/L
1,2-Dichloropropane	5 U	UG/L
2-Butanone	10 U	UG/L
2-Hexanone	10 U	UG/L
4-Methyl-2-Pentanone	10 U	UG/L
Acetone	10 U	UG/L
Benzene	5 U	UG/L
Bromodichloromethane	5 U	UG/L
Bromoform	5 U	UG/L
Bromomethane	10 U	UG/L
Carbon Disulfide	5 U	UG/L
Carbon Tetrachloride	5 U	UG/L
Chlorobenzene	5 U	UG/L
Chloroethane	10 U	UG/L
Chloroform	5 U	UG/L
Chloromethane	10 U	UG/L
Cis-1,2-Dichloroethene	5 U	UG/L
cis-1,3-Dichloropropene	5 U	UG/L
Ethylbenzene	5 U	UG/L
m-Xylenes (Total)	5 U	UG/L
Methylene Chloride	5 U	UG/L
Styrene	5 U	UG/L
Tetrachloroethene	5 U	UG/L
Toluene	5 U	UG/L
Trans-1,2-Dichloroethene	5 U	UG/L
Trans-1,3-Dichloropropene	5 U	UG/L
Trichloroethene	5 U	UG/L
Vinyl Chloride	10 U	UG/L

SW Sample ID: MISS-00110 **Rough Pits**
Sample Type: Equipment Rinsate
Sample Date: 08/10/1999

Analysis Name	Result	Unit
1,1,1-Trichloroethane	5 U	UG/L
1,1,2,2-Tetrachloroethane	5 U	UG/L
1,1,2-Trichloroethane	5 U	UG/L
1,1-Dichloroethane	5 U	UG/L
1,1-Dichloroethene	5 U	UG/L
1,2-Dichloroethane	5 U	UG/L
1,2-Dichloropropane	5 U	UG/L
2-Butanone	10 U	UG/L
2-Hexanone	10 U	UG/L
4-Methyl-2-Pentanone	10 U	UG/L
Acetone	10 U	UG/L
Benzene	5 U	UG/L
Bromodichloromethane	5 U	UG/L
Bromoform	5 U	UG/L
Bromomethane	10 U	UG/L
Carbon Disulfide	5 U	UG/L
Carbon Tetrachloride	5 U	UG/L
Chlorobenzene	5 U	UG/L
Chloroethane	10 U	UG/L
Chloroform	5 U	UG/L
Chloromethane	10 U	UG/L
Cis-1,2-Dichloroethene	5 U	UG/L
cis-1,3-Dichloropropene	5 U	UG/L
Ethylbenzene	5 U	UG/L
m-Xylenes (Total)	5 U	UG/L
Methylene Chloride	5 U	UG/L
Styrene	5 U	UG/L
Tetrachloroethene	5 U	UG/L
Toluene	5 U	UG/L
Trans-1,2-Dichloroethene	5 U	UG/L
Trans-1,3-Dichloropropene	5 U	UG/L
Trichloroethene	5 U	UG/L
Vinyl Chloride	10 U	UG/L

Note : Exceedance criteria based on Non-residential soil cleanup criteria.

Table E-7: QC Chemical Data - VOC Analyses
Engineering Test Pit Sampling
Maywood Interim Storage Site, Maywood NJ

Result Qualifier Codes

U - Analyzed for but not detected
J - Compound detected, value is estimated
UJ - Compound not detected, quantitation limit is estimat
B - Analyte in blank as well as sample
E - Exceeds calibration curve range
D - Identified at secondary dilution factor

SW Sample ID: MISS-00120 — **Rough Pits**
Sample Type: Equipment Rinsate
Sample Date: 08/16/1999

Analysis Name	Result	Unit
1,1,1-Trichloroethane	5 U	UG/L
1,1,2,2-Tetrachloroethane	5 U	UG/L
1,1,2-Trichloroethane	5 U	UG/L
1,1-Dichloroethane	5 U	UG/L
1,1-Dichloroethene	5 U	UG/L
1,2-Dichloroethane	5 U	UG/L
1,2-Dichloropropane	5 U	UG/L
2-Butanone	10 U	UG/L
2-Hexanone	10 U	UG/L
4-Methyl-2-Pentanone	10 U	UG/L
Acetone	10 U	UG/L
Benzene	5 U	UG/L
Bromodichloromethane	5 U	UG/L
Bromoform	5 U	UG/L
Bromomethane	10 U	UG/L
Carbon Disulfide	5 U	UG/L
Carbon Tetrachloride	5 U	UG/L
Chlorobenzene	5 U	UG/L
Chloroethane	10 U	UG/L
Chloroform	5 U	UG/L
Chloromethane	10 U	UG/L
Cis-1,2-Dichloroethene	5 U	UG/L
cis-1,3-Dichloropropene	5 U	UG/L
Ethylbenzene	5 U	UG/L
m-Xylenes (Total)	5 U	UG/L
Methylene Chloride	5 U	UG/L
Styrene	5 U	UG/L
Tetrachloroethene	5 U	UG/L
Toluene	5 U	UG/L
Trans-1,2-Dichloroethene	5 U	UG/L
Trans-1,3-Dichloropropene	5 U	UG/L
Trichloroethene	5 U	UG/L
Vinyl Chloride	10 U	UG/L

SW Sample ID: MISS-0025V — **Test Pits**
Sample Type: Trip Blank
Sample Date:

Analysis Name	Result	Unit
1,1,1-Trichloroethane	740 U	UG/KG
1,1,2,2-Tetrachloroethane	740 U	UG/KG
1,1,2-Trichloroethane	740 U	UG/KG
1,1-Dichloroethane	740 U	UG/KG
1,1-Dichloroethene	740 U	UG/KG
1,2-Dichloroethane	740 U	UG/KG
1,2-Dichloropropane	740 U	UG/KG
2-Butanone	1400 U	UG/KG
2-Hexanone	1400 U	UG/KG
4-Methyl-2-Pentanone	1400 U	UG/KG
Acetone	1400 U	UG/KG
Benzene	740 U	UG/KG
Bromodichloromethane	740 U	UG/KG
Bromoform	740 U	UG/KG
Bromomethane	1400 U	UG/KG
Carbon Disulfide	740 U	UG/KG
Carbon Tetrachloride	740 U	UG/KG
Chlorobenzene	740 U	UG/KG
Chloroethane	1400 U	UG/KG
Chloroform	740 U	UG/KG
Chloromethane	1400 U	UG/KG
Cis-1,2-Dichloroethene	740 U	UG/KG
cis-1,3-Dichloropropene	740 U	UG/KG
Ethylbenzene	740 U	UG/KG
m-Xylenes (Total)	740 U	UG/KG
Methylene Chloride	740 U	UG/KG
Styrene	740 U	UG/KG
Tetrachloroethene	740 U	UG/KG
Toluene	740 U	UG/KG
Trans-1,2-Dichloroethene	740 U	UG/KG
Trans-1,3-Dichloropropene	740 U	UG/KG
Vinyl Chloride	1400 U	UG/KG

SW Sample ID: MISS-00300 — **Test Pits**
Sample Type: Equipment Rinsate
Sample Date: 08/19/1999

Analysis Name	Result	Unit
1,1,1-Trichloroethane	5.0 U	UG/L
1,1,2,2-Tetrachloroethane	5.0 U	UG/L
1,1,2-Trichloroethane	5.0 U	UG/L
1,1-Dichloroethane	5.0 U	UG/L
1,1-Dichloroethene	5.0 U	UG/L
1,2-Dichloroethane	5.0 U	UG/L
1,2-Dichloropropane	5.0 U	UG/L
2-Butanone	10 U	UG/L
2-Hexanone	10 U	UG/L
4-Methyl-2-Pentanone	10 U	UG/L
Acetone	10 U	UG/L
Benzene	5.0 U	UG/L
Bromodichloromethane	5.0 U	UG/L
Bromoform	5.0 U	UG/L
Bromomethane	10 U	UG/L
Carbon Disulfide	5.0 U	UG/L
Carbon Tetrachloride	5.0 U	UG/L
Chlorobenzene	5.0 U	UG/L
Chloroethane	10 U	UG/L
Chloroform	5.0 U	UG/L
Chloromethane	10 U	UG/L
Cis-1,2-Dichloroethene	5.0 U	UG/L
cis-1,3-Dichloropropene	5.0 U	UG/L
Ethylbenzene	5.0 U	UG/L
m-Xylenes (Total)	5.0 U	UG/L
Methylene Chloride	5.0 U	UG/L
Styrene	5.0 U	UG/L
Tetrachloroethene	5.0 U	UG/L
Toluene	5.0 U	UG/L
Trans-1,2-Dichloroethene	5.0 U	UG/L
Trans-1,3-Dichloropropene	5.0 U	UG/L
Trichloroethene	5.0 U	UG/L
Vinyl Chloride	10 U	UG/L

Note : Exceedance criteria based on Non-residential soil cleanup criteria.

Result Qualifier Codes

U - Analyzed for but not detected
J - Compound detected, value is estimated
UJ - Compound not detected, quantitation limit is estimat
B - Analyte in blank as well as sample
E - Exceeds calibration curve range
D - Identified at secondary dilution factor

SW Sample ID: MISS-0044V *Test Pits*
Sample Type: Trip Blank
Sample Date:

Analysis Name	Result	Unit
1,1,1-Trichloroethane	820 U	UG/KG
1,1,2,2-Tetrachloroethane	820 U	UG/KG
1,1,2-Trichloroethane	820 U	UG/KG
1,1-Dichloroethane	820 U	UG/KG
1,1-Dichloroethene	820 U	UG/KG
1,2-Dichloroethane	820 U	UG/KG
1,2-Dichloropropane	820 U	UG/KG
2-Butanone	1600 U	UG/KG
2-Hexanone	1600 U	UG/KG
4-Methyl-2-Pentanone	1600 U	UG/KG
Acetone	700 J	UG/KG
Benzene	820 U	UG/KG
Bromodichloromethane	820 U	UG/KG
Bromoform	820 U	UG/KG
Bromomethane	1600 U	UG/KG
Carbon Disulfide	820 U	UG/KG
Carbon Tetrachloride	820 U	UG/KG
Chlorobenzene	820 U	UG/KG
Chloroethane	1600 U	UG/KG
Chloroform	820 U	UG/KG
Chloromethane	1600 U	UG/KG
Cis-1,2-Dichloroethene	820 U	UG/KG
cis-1,3-Dichloropropene	820 U	UG/KG
Ethylbenzene	820 U	UG/KG
m-Xylenes (Total)	820 U	UG/KG
Methylene Chloride	820 U	UG/KG
Styrene	820 U	UG/KG
Tetrachloroethene	820 U	UG/KG
Toluene	820 U	UG/KG
Trans-1,2-Dichloroethene	820 U	UG/KG
Trans-1,3-Dichloropropene	820 U	UG/KG
Vinyl Chloride	1600 U	UG/KG

SW Sample ID: MISS-00490 *Test Pits*
Sample Type: Equipment Rinsate
Sample Date: 08/25/1999

Analysis Name	Result	Unit
1,1,1-Trichloroethane	5.0 U	UG/L
1,1,2,2-Tetrachloroethane	5.0 U	UG/L
1,1,2-Trichloroethane	5.0 U	UG/L
1,1-Dichloroethane	5.0 U	UG/L
1,1-Dichloroethene	5.0 U	UG/L
1,2-Dichloroethane	5.0 U	UG/L
1,2-Dichloropropane	5.0 U	UG/L
2-Butanone	10 U	UG/L
2-Hexanone	10 U	UG/L
4-Methyl-2-Pentanone	10 U	UG/L
Acetone	10 U	UG/L
Benzene	5.0 U	UG/L
Bromodichloromethane	5.0 U	UG/L
Bromoform	5.0 U	UG/L
Bromomethane	10 U	UG/L
Carbon Disulfide	5.0 U	UG/L
Carbon Tetrachloride	5.0 U	UG/L
Chlorobenzene	5.0 U	UG/L
Chloroethane	10 U	UG/L
Chloroform	5.0 U	UG/L
Chloromethane	10 U	UG/L
Cis-1,2-Dichloroethene	5.0 U	UG/L
cis-1,3-Dichloropropene	5.0 U	UG/L
Ethylbenzene	5.0 U	UG/L
m-Xylenes (Total)	5.0 U	UG/L
Methylene Chloride	5.0 U	UG/L
Styrene	5.0 U	UG/L
Tetrachloroethene	5.0 U	UG/L
Toluene	5.0 U	UG/L
Trans-1,2-Dichloroethene	5.0 U	UG/L
Trans-1,3-Dichloropropene	5.0 U	UG/L
Trichloroethene	5.0 U	UG/L
Vinyl Chloride	10 U	UG/L

SW Sample ID: MISS-0062V *Test Pits*
Sample Type: Trip Blank
Sample Date:

Analysis Name	Result	Unit
1,1,1-Trichloroethane	620 U	UG/KG
1,1,2,2-Tetrachloroethane	620 U	UG/KG
1,1,2-Trichloroethane	620 U	UG/KG
1,1-Dichloroethane	620 U	UG/KG
1,1-Dichloroethene	620 U	UG/KG
1,2-Dichloroethane	620 U	UG/KG
1,2-Dichloropropane	620 U	UG/KG
2-Butanone	1200 U	UG/KG
2-Hexanone	1200 U	UG/KG
4-Methyl-2-Pentanone	1200 U	UG/KG
Acetone	1200 U	UG/KG
Benzene	620 U	UG/KG
Bromodichloromethane	620 U	UG/KG
Bromoform	620 U	UG/KG
Bromomethane	1200 U	UG/KG
Carbon Disulfide	620 U	UG/KG
Carbon Tetrachloride	620 U	UG/KG
Chlorobenzene	620 U	UG/KG
Chloroethane	1200 U	UG/KG
Chloroform	620 U	UG/KG
Chloromethane	1200 U	UG/KG
Cis-1,2-Dichloroethene	620 U	UG/KG
cis-1,3-Dichloropropene	620 U	UG/KG
Ethylbenzene	620 U	UG/KG
m-Xylenes (Total)	620 U	UG/KG
Methylene Chloride	620 U	UG/KG
Styrene	620 U	UG/KG
Tetrachloroethene	620 U	UG/KG
Toluene	620 U	UG/KG
Trans-1,2-Dichloroethene	620 U	UG/KG
Trans-1,3-Dichloropropene	620 U	UG/KG
Vinyl Chloride	1200 U	UG/KG

Note : Exceedance criteria based on Non-residential soil cleanup criteria.

Table E-7: QC Chemical Data - VOC Analyses
Engineering Test Pit Sampling
Maywood Interim Storage Site, Maywood NJ

Result Qualifier Codes

U - Analyzed for but not detected
J - Compound detected, value is estimated
UJ - Compound not detected, quantitation limit is estimat
B - Analyte in blank as well as sample
E - Exceeds calibration curve range
D - Identified at secondary diluation factor

SW Sample ID: MISS-00670 **Test Pits**
Sample Type: Equipment Rinsate
Sample Date: 08/31/1999

Analysis Name	Result	Unit
1,1,1-Trichloroethane	5.0 U	UG/L
1,1,2,2-Tetrachloroethane	5.0 U	UG/L
1,1,2-Trichloroethane	5.0 U	UG/L
1,1-Dichloroethane	5.0 U	UG/L
1,1-Dichloroethene	5.0 U	UG/L
1,2-Dichloroethane	5.0 U	UG/L
1,2-Dichloropropane	5.0 U	UG/L
2-Butanone	10 U	UG/L
2-Hexanone	10 U	UG/L
4-Methyl-2-Pentanone	10 U	UG/L
Acetone	10 U	UG/L
Benzene	5.0 U	UG/L
Bromodichloromethane	5.0 U	UG/L
Bromoform	5.0 U	UG/L
Bromomethane	10 U	UG/L
Carbon Disulfide	5.0 U	UG/L
Carbon Tetrachloride	5.0 U	UG/L
Chlorobenzene	5.0 U	UG/L
Chloroethane	10 U	UG/L
Chloroform	5.0 U	UG/L
Chloromethane	10 U	UG/L
Cis-1,2-Dichloroethene	5.0 U	UG/L
cis-1,3-Dichloropropene	5.0 U	UG/L
Ethylbenzene	5.0 U	UG/L
m-Xylenes (Total)	5.0 U	UG/L
Methylene Chloride	5.0 U	UG/L
Styrene	5.0 U	UG/L
Tetrachloroethene	5.0 U	UG/L
Toluene	5.0 U	UG/L
Trans-1,2-Dichloroethene	5.0 U	UG/L
Trans-1,3-Dichloropropene	5.0 U	UG/L
Trichloroethene	5.0 U	UG/L
Vinyl Chloride	10 U	UG/L

SW Sample ID: MISS-0081V **Test Pits**
Sample Type: Trip Blank
Sample Date:

Analysis Name	Result	Unit
1,1,1-Trichloroethane	620 U	UG/KG
1,1,2,2-Tetrachloroethane	620 U	UG/KG
1,1,2-Trichloroethane	620 U	UG/KG
1,1-Dichloroethane	620 U	UG/KG
1,1-Dichloroethene	620 U	UG/KG
1,2-Dichloroethane	620 U	UG/KG
1,2-Dichloropropane	620 U	UG/KG
2-Butanone	1200 U	UG/KG
2-Hexanone	1200 U	UG/KG
4-Methyl-2-Pentanone	1200 U	UG/KG
Acetone	1200 U	UG/KG
Benzene	620 U	UG/KG
Bromodichloromethane	620 U	UG/KG
Bromoform	620 U	UG/KG
Bromomethane	1200 U	UG/KG
Carbon Disulfide	620 U	UG/KG
Carbon Tetrachloride	620 U	UG/KG
Chlorobenzene	620 U	UG/KG
Chloroethane	1200 U	UG/KG
Chloroform	620 U	UG/KG
Chloromethane	1200 U	UG/KG
Cis-1,2-Dichloroethene	620 U	UG/KG
cis-1,3-Dichloropropene	620 U	UG/KG
Ethylbenzene	620 U	UG/KG
m-Xylenes (Total)	620 U	UG/KG
Methylene Chloride	1400	UG/KG
Styrene	620 U	UG/KG
Tetrachloroethene	620 U	UG/KG
Toluene	620 U	UG/KG
Trans-1,2-Dichloroethene	620 U	UG/KG
Trans-1,3-Dichloropropene	620 U	UG/KG
Vinyl Chloride	1200 U	UG/KG

SW Sample ID: MISS-00860 **Test Pits**
Sample Type: Equipment Rinsate
Sample Date: 09/01/1999

Analysis Name	Result	Unit
1,1,1-Trichloroethane	5.0 U	UG/L
1,1,2,2-Tetrachloroethane	5.0 U	UG/L
1,1,2-Trichloroethane	5.0 U	UG/L
1,1-Dichloroethane	5.0 U	UG/L
1,1-Dichloroethene	5.0 U	UG/L
1,2-Dichloroethane	5.0 U	UG/L
1,2-Dichloropropane	5.0 U	UG/L
2-Butanone	10 U	UG/L
2-Hexanone	10 U	UG/L
4-Methyl-2-Pentanone	10 U	UG/L
Acetone	10 U	UG/L
Benzene	5.0 U	UG/L
Bromodichloromethane	5.0 U	UG/L
Bromoform	5.0 U	UG/L
Bromomethane	10 U	UG/L
Carbon Disulfide	5.0 U	UG/L
Carbon Tetrachloride	5.0 U	UG/L
Chlorobenzene	5.0 U	UG/L
Chloroethane	10 U	UG/L
Chloroform	5.0 U	UG/L
Chloromethane	10 U	UG/L
Cis-1,2-Dichloroethene	5.0 U	UG/L
cis-1,3-Dichloropropene	5.0 U	UG/L
Ethylbenzene	5.0 U	UG/L
m-Xylenes (Total)	5.0 U	UG/L
Methylene Chloride	9	UG/L
Styrene	5.0 U	UG/L
Tetrachloroethene	5.0 U	UG/L
Toluene	5.0 U	UG/L
Trans-1,2-Dichloroethene	5.0 U	UG/L
Trans-1,3-Dichloropropene	5.0 U	UG/L
Trichloroethene	5.0 U	UG/L
Vinyl Chloride	10 U	UG/L

Note : Exceedance criteria based on Non-residential soil cleanup criteria.

Table E-7: QC Chemical Data - VOC Analyses
Engineering Test Pit Sampling
Maywood Interim Storage Site, Maywood NJ

Result Qualifier Codes

U - Analyzed for but not detected
J - Compound detected, value is estimated
UJ - Compound not detected, quantitation limit is estimat
B - Analyte in blank as well as sample
E - Exceeds calibration curve range
D - Identified at secondary diluation factor

SW Sample ID: *MISS-0094V* *Test Pits*
Sample Type: *Trip Blank*
Sample Date:

Analysis Name	Result	Unit
1,1,1-Trichloroethane	620 U	UG/KG
1,1,2,2-Tetrachloroethane	620 U	UG/KG
1,1,2-Trichloroethane	620 U	UG/KG
1,1-Dichloroethane	620 U	UG/KG
1,1-Dichloroethene	620 U	UG/KG
1,2-Dichloroethane	620 U	UG/KG
1,2-Dichloropropane	620 U	UG/KG
2-Butanone	1200 U	UG/KG
2-Hexanone	1200 U	UG/KG
4-Methyl-2-Pentanone	1200 U	UG/KG
Acetone	1200 U	UG/KG
Benzene	620 U	UG/KG
Bromodichloromethane	620 U	UG/KG
Bromoform	620 U	UG/KG
Bromomethane	1200 U	UG/KG
Carbon Disulfide	620 U	UG/KG
Carbon Tetrachloride	620 U	UG/KG
Chlorobenzene	620 U	UG/KG
Chloroethane	1200 U	UG/KG
Chloroform	620 U	UG/KG
Chloromethane	1200 U	UG/KG
Cis-1,2-Dichloroethene	620 U	UG/KG
cis-1,3-Dichloropropene	620 U	UG/KG
Ethylbenzene	620 U	UG/KG
m-Xylenes (Total)	620 U	UG/KG
Methylene Chloride	620 U	UG/KG
Styrene	620 U	UG/KG
Tetrachloroethene	620 U	UG/KG
Toluene	620 U	UG/KG
Trans-1,2-Dichloroethene	620 U	UG/KG
Trans-1,3-Dichloropropene	620 U	UG/KG
Vinyl Chloride	1200 U	UG/KG

SW Sample ID: *MISS-00990* *Test Pits*
Sample Type: *Equipment Rinsate*
Sample Date:

Analysis Name	Result	Unit
1,1,1-Trichloroethane	5 U	UG/L
1,1,2,2-Tetrachloroethane	5 U	UG/L
1,1,2-Trichloroethane	5 U	UG/L
1,1-Dichloroethane	5 U	UG/L
1,1-Dichloroethene	5 U	UG/L
1,2-Dichloroethane	5 U	UG/L
1,2-Dichloropropane	5 U	UG/L
2-Butanone	10 U	UG/L
2-Hexanone	10 U	UG/L
4-Methyl-2-Pentanone	10 U	UG/L
Acetone	10 U	UG/L
Benzene	5 U	UG/L
Bromodichloromethane	5 U	UG/L
Bromoform	5 U	UG/L
Bromomethane	10 U	UG/L
Carbon Disulfide	13	UG/L
Carbon Tetrachloride	5 U	UG/L
Chlorobenzene	5 U	UG/L
Chloroethane	10 U	UG/L
Chloroform	5 U	UG/L
Chloromethane	10 U	UG/L
Cis-1,2-Dichloroethene	5 U	UG/L
cis-1,3-Dichloropropene	5 U	UG/L
Ethylbenzene	5 U	UG/L
m-Xylenes (Total)	5 U	UG/L
Methylene Chloride	5 U	UG/L
Styrene	5 U	UG/L
Tetrachloroethene	5 U	UG/L
Toluene	5 U	UG/L
Trans-1,2-Dichloroethene	5 U	UG/L
Trans-1,3-Dichloropropene	5 U	UG/L
Trichloroethene	5 U	UG/L
Vinyl Chloride	10 U	UG/L

Note : Exceedance criteria based on Non-residential soil cleanup criteria.

Table E-8a: Equipment Rinsate Data - Pesticide Analyses
Engineering Test Pit Sampling
Maywood Interim Storage Site, Maywood NJ

Result Qualifier Codes

U - Analyzed for but not detected
J - Compound detected, value is estimated
UJ - Compound not detected, quantitation limit is estimat
B - Analyte in blank as well as sample
E - Exceeds calibration curve range
D - Identified at secondary diluation facto

SW Sample ID: *MISS-00110* ***Rough Pits***
Sample Type: *Equipment Rinsate*
Sample Date: *08/10/1999*

Analysis Name	Result	Unit
4,4'-DDD	0.020 U	UG/L
4,4'-DDE	0.020 U	UG/L
4,4'-DDT	0.020 U	UG/L
Aldrin	0.010 U	UG/L
Alpha-BHC	0.010 U	UG/L
Beta-BHC	0.010 U	UG/L
Delta-BHC	0.010 U	UG/L
Dieldrin	0.020 U	UG/L
Endosulfan I	0.010 U	UG/L
Endosulfan II	0.020 U	UG/L
Endosulfan Sulfate	0.020 U	UG/L
Endrin	0.020 U	UG/L
Endrin Aldehyde	0.020 U	UG/L
Endrin Ketone	0.020 U	UG/L
Gamma-BHC	0.010 U	UG/L
Heptachlor	0.010 U	UG/L
Heptachlor Epoxide	0.010 U	UG/L
Methoxychlor	0.10 U	UG/L
Toxaphene	0.40 U	UG/L

SW Sample ID: *MISS-00120* ***Rough Pits***
Sample Type: *Equipment Rinsate*
Sample Date: *08/16/1999*

Analysis Name	Result	Unit
4,4'-DDD	0.020 U	UG/L
4,4'-DDE	0.020 U	UG/L
4,4'-DDT	0.020 U	UG/L
Aldrin	0.010 U	UG/L
Alpha-BHC	0.010 U	UG/L
Beta-BHC	0.010 U	UG/L
Delta-BHC	0.010 U	UG/L
Dieldrin	0.020 U	UG/L
Endosulfan I	0.010 U	UG/L
Endosulfan II	0.020 U	UG/L
Endosulfan Sulfate	0.020 U	UG/L
Endrin	0.020 U	UG/L
Endrin Aldehyde	0.020 U	UG/L
Endrin Ketone	0.020 U	UG/L
Gamma-BHC	0.010 U	UG/L
Heptachlor	0.010 U	UG/L
Heptachlor Epoxide	0.010 U	UG/L
Methoxychlor	0.10 U	UG/L
Toxaphene	0.40 U	UG/L

Note : Exceedance criteria based on NJDEP Non-residential soil cleanup criteria.

Table E-8b: Equipment Rinsate Data - Pesticide Analyses
Engineering Test Pit Sampling
Maywood Interim Storage Site, Maywood NJ

Result Qualifier Codes

U - Analyzed for but not detected
J - Compound detected, value is estimated
UJ - Compound not detected, quantitation limit is estimat
B - Analyte in blank as well as sample
E - Exceeds calibration curve range
D - Identified at secondary diluation facto

SW Sample ID: *MISS-00300* **Test Pits**
Sample Type: *Equipment Rinsate*
Sample Date: *08/19/1999*

Analysis Name	Result	Unit
4,4'-DDD	0.02 U	UG/L
4,4'-DDE	0.02 U	UG/L
4,4'-DDT	0.02 U	UG/L
Aldrin	0.01 U	UG/L
Alpha-BHC	0.01 U	UG/L
Alpha-Chlordane	0.01 U	UG/L
Beta-BHC	0.01 U	UG/L
Delta-BHC	0.01 U	UG/L
Dieldrin	0.02 U	UG/L
Endosulfan I	0.01 U	UG/L
Endosulfan II	0.02 U	UG/L
Endosulfan Sulfate	0.023	UG/L
Endrin	0.02 U	UG/L
Endrin Aldehyde	0.010 J	UG/L
Endrin Ketone	0.02 U	UG/L
Gamma-BHC	0.01 U	UG/L
Gamma-Chlordane	0.01 U	UG/L
Heptachlor	0.01 U	UG/L
Heptachlor Epoxide	0.01 U	UG/L
Methoxychlor	0.012 J	UG/L
Toxaphene	0.40 U	UG/L

SW Sample ID: *MISS-00670* **Test Pits**
Sample Type: *Equipment Rinsate*
Sample Date: *08/31/1999*

Analysis Name	Result	Unit
4,4'-DDD	0.02 U	UG/L
4,4'-DDE	0.02 U	UG/L
4,4'-DDT	0.02 U	UG/L
Aldrin	0.01 U	UG/L
Alpha-BHC	0.01 U	UG/L
Alpha-Chlordane	0.01 U	UG/L
Beta-BHC	0.01 U	UG/L
Delta-BHC	0.01 U	UG/L
Dieldrin	0.02 U	UG/L
Endosulfan I	0.01 U	UG/L
Endosulfan II	0.02 U	UG/L
Endosulfan Sulfate	0.02 U	UG/L
Endrin	0.02 U	UG/L
Endrin Aldehyde	0.02 U	UG/L
Endrin Ketone	0.02 U	UG/L
Gamma-BHC	0.01 U	UG/L
Gamma-Chlordane	0.01 U	UG/L
Heptachlor	0.01 U	UG/L
Heptachlor Epoxide	0.01 U	UG/L
Methoxychlor	0.10 U	UG/L
Toxaphene	0.40 U	UG/L

SW Sample ID: *MISS-00990* **Test Pits**
Sample Type: *Equipment Rinsate*
Sample Date:

Analysis Name	Result	Unit
4,4'-DDD	0.02 U	UG/L
4,4'-DDE	0.02 U	UG/L
4,4'-DDT	0.02 U	UG/L
Aldrin	0.01 U	UG/L
Alpha-BHC	0.01 U	UG/L
Alpha-Chlordane	0.01 U	UG/L
Beta-BHC	0.01 U	UG/L
Delta-BHC	0.01 U	UG/L
Dieldrin	0.02 U	UG/L
Endosulfan I	0.01 U	UG/L
Endosulfan II	0.02 U	UG/L
Endosulfan Sulfate	0.02 U	UG/L
Endrin	0.02 U	UG/L
Endrin Aldehyde	0.02 U	UG/L
Endrin Ketone	0.02 U	UG/L
Gamma-BHC	0.01 U	UG/L
Gamma-Chlordane	0.01 U	UG/L
Heptachlor	0.01 U	UG/L
Heptachlor Epoxide	0.01 U	UG/L
Methoxychlor	0.10 U	UG/L
Toxaphene	0.40 U	UG/L

SW Sample ID: *MISS-00490* **Test Pits**
Sample Type: *Equipment Rinsate*
Sample Date: *08/25/1999*

Analysis Name	Result	Unit
4,4'-DDD	0.02 U	UG/L
4,4'-DDE	0.02 U	UG/L
4,4'-DDT	0.02 U	UG/L
Aldrin	0.01 U	UG/L
Alpha-BHC	0.01 U	UG/L
Alpha-Chlordane	0.01 U	UG/L
Beta-BHC	0.01 U	UG/L
Delta-BHC	0.01 U	UG/L
Dieldrin	0.02 U	UG/L
Endosulfan I	0.01 U	UG/L
Endosulfan II	0.02 U	UG/L
Endosulfan Sulfate	0.02 U	UG/L
Endrin	0.02 U	UG/L
Endrin Aldehyde	0.02 U	UG/L
Endrin Ketone	0.02 U	UG/L
Gamma-BHC	0.01 U	UG/L
Gamma-Chlordane	0.01 U	UG/L
Heptachlor	0.01 U	UG/L
Heptachlor Epoxide	0.01 U	UG/L
Methoxychlor	0.10 U	UG/L
Toxaphene	0.40 U	UG/L

SW Sample ID: *MISS-00860* **Test Pits**
Sample Type: *Equipment Rinsate*
Sample Date: *09/01/1999*

Analysis Name	Result	Unit
4,4'-DDD	0.02 U	UG/L
4,4'-DDE	0.02 U	UG/L
4,4'-DDT	0.02 U	UG/L
Aldrin	0.01 U	UG/L
Alpha-BHC	0.01 U	UG/L
Alpha-Chlordane	0.01 U	UG/L
Beta-BHC	0.01 U	UG/L
Delta-BHC	0.01 U	UG/L
Dieldrin	0.02 U	UG/L
Endosulfan I	0.01 U	UG/L
Endosulfan II	0.02 U	UG/L
Endosulfan Sulfate	0.02 U	UG/L
Endrin	0.02 U	UG/L
Endrin Aldehyde	0.02 U	UG/L
Endrin Ketone	0.02 U	UG/L
Gamma-BHC	0.01 U	UG/L
Gamma-Chlordane	0.01 U	UG/L
Heptachlor	0.01 U	UG/L
Heptachlor Epoxide	0.01 U	UG/L
Methoxychlor	0.10 U	UG/L
Toxaphene	0.40 U	UG/L

Note : Exceedance criteria based on NJDEP Non-residential soil cleanup criteria.

Table E-9: Equipment Rinsate Data - PCBs Analyses
Engineering Test Pit Sampling
Maywood Interim Storage Site, Maywood NJ

Result Qualifier Codes

U - Analyzed for but not detected
J - Compound detected, value is estimated
UJ - Compound not detected, quantitation limit is estimat
B - Analyte in blank as well as sample
E - Exceeds calibration curve range
D - Identified at secondary diluation fac

SW Sample ID: *MISS-00110* **Rough Pits**
Sample Type: *Equipment Rinsate*
Sample Date: *08/10/1999*

Analysis Name	Result	Unit
Arochlor-1016	1.0 U	UG/L
Arochlor-1221	2.0 U	UG/L
Arochlor-1232	1.0 U	UG/L
Arochlor-1242	1.0 U	UG/L
Arochlor-1248	1.0 U	UG/L
Arochlor-1254	1.0 U	UG/L
Arochlor-1260	1.0 U	UG/L

SW Sample ID: *MISS-00120* **Rough Pits**
Sample Type: *Equipment Rinsate*
Sample Date: *08/16/1999*

Analysis Name	Result	Unit
Arochlor-1016	1.0 U	UG/L
Arochlor-1221	2.0 U	UG/L
Arochlor-1232	1.0 U	UG/L
Arochlor-1242	1.0 U	UG/L
Arochlor-1248	1.0 U	UG/L
Arochlor-1254	1.0 U	UG/L
Arochlor-1260	1.0 U	UG/L

SW Sample ID: *MISS-00300* **Test Pits**
Sample Type: *Equipment Rinsate*
Sample Date: *08/19/1999*

Analysis Name	Result	Unit
Arochlor-1016	1.0 U	UG/L
Arochlor-1221	2.0 U	UG/L
Arochlor-1232	1.0 U	UG/L
Arochlor-1242	1.0 U	UG/L
Arochlor-1248	1.0 U	UG/L
Arochlor-1254	1.0 U	UG/L
Arochlor-1260	1.0 U	UG/L

SW Sample ID: *MISS-00490* **Test Pits**
Sample Type: *Equipment Rinsate*
Sample Date: *08/25/1999*

Analysis Name	Result	Unit
Arochlor-1016	1.0 U	UG/L
Arochlor-1221	2.0 U	UG/L
Arochlor-1232	1.0 U	UG/L
Arochlor-1242	1.0 U	UG/L
Arochlor-1248	1.0 U	UG/L
Arochlor-1254	1.0 U	UG/L
Arochlor-1260	1.0 U	UG/L

SW Sample ID: *MISS-00670* **Test Pits**
Sample Type: *Equipment Rinsate*
Sample Date: *08/31/1999*

Analysis Name	Result	Unit
Arochlor-1016	1.0 U	UG/L
Arochlor-1221	2.0 U	UG/L
Arochlor-1232	1.0 U	UG/L
Arochlor-1242	1.0 U	UG/L
Arochlor-1248	1.0 U	UG/L
Arochlor-1254	1.0 U	UG/L
Arochlor-1260	1.0 U	UG/L

SW Sample ID: *MISS-00860* **Test Pits**
Sample Type: *Equipment Rinsate*
Sample Date: *09/01/1999*

Analysis Name	Result	Unit
Arochlor-1016	1.0 U	UG/L
Arochlor-1221	2.0 U	UG/L
Arochlor-1232	1.0 U	UG/L
Arochlor-1242	1.0 U	UG/L
Arochlor-1248	1.0 U	UG/L
Arochlor-1254	1.0 U	UG/L
Arochlor-1260	1.0 U	UG/L

SW Sample ID: *MISS-00990* **Test Pits**
Sample Type: *Equipment Rinsate*
Sample Date:

Analysis Name	Result	Unit
Arochlor-1016	1.0 U	UG/L
Arochlor-1221	2.0 U	UG/L
Arochlor-1232	1.0 U	UG/L
Arochlor-1242	1.0 U	UG/L
Arochlor-1248	1.0 U	UG/L
Arochlor-1254	1.0 U	UG/L
Arochlor-1260	1.0 U	UG/L

Note : Exceedance criteria based on NJDEP Non-residential soil cleanup criteria.

Table E-10a: Equipment Rinsate Data - Metals Analyses
Engineering Test Pit Sampling
Maywood Interim Storage Site, Maywood NJ

Result Qualifier Codes

U - Analyzed for but not detected
J - Compound detected, value is estimated
UJ - Compound not detected, quantitation limit is estimat
B - Analyte in blank as
E - Exceeds calibration
D - Identified at seconda

SW Sample ID: *MISS-00110* ***Rough Pits***
Sample Type: *Equipment Rinsate*
Sample Date: *08/10/1999*

Analysis Name	Result	Unit
Aluminum	25.0 B	UG/L
Antimony	2.39 U	UG/L
Arsenic	4.18 U	UG/L
Barium	.631 U	UG/L
Beryllium	0.380 B	UG/L
Cadmium	.19 U	UG/L
Calcium	321. B	UG/L
Chromium	.239 U	UG/L
Cobalt	.347 U	UG/L
Copper	.603 U	UG/L
Iron	214.	UG/L
Lead	.957 U	UG/L
Magnesium	30.6 B	UG/L
Manganese	1.77 B	UG/L
Mercury	.2 U	UG/L
Nickel	.443 U	UG/L
Potassium	96.3 B	UG/L
Selenium	3.48 B	UG/L
Silver	.303 U	UG/L
Sodium	283 U	UG/L
Sulfate	5 <	MG/L
Thallium	2.8 U	UG/L
Vanadium	0.220 B	UG/L
Zinc	10.8 B	UG/L

SW Sample ID: *MISS-00120* ***Rough Pits***
Sample Type: *Equipment Rinsate*
Sample Date: *08/16/1999*

Analysis Name	Result	Unit
Aluminum	9.82 U	UG/L
Antimony	2.39 U	UG/L
Arsenic	4.18 U	UG/L
Barium	.631 U	UG/L
Beryllium	0.260 B	UG/L
Cadmium	.19 U	UG/L
Calcium	324. B	UG/L
Chromium	.239 U	UG/L
Cobalt	.347 U	UG/L
Copper	.603 U	UG/L
Iron	52.5 U	UG/L
Lead	.957 U	UG/L
Magnesium	11.9 U	UG/L
Manganese	0.650 B	UG/L
Mercury	.2 U	UG/L
Nickel	.443 U	UG/L
Potassium	42.3 B	UG/L
Selenium	2.04 U	UG/L
Silver	.303 U	UG/L
Sodium	283 U	UG/L
Sulfate	5 <	MG/L
Thallium	2.8 U	UG/L
Vanadium	0.220 B	UG/L
Zinc	15.8 B	UG/L

Note : Exceedance criteria based on NJDEP Non-residential soil cleanup criteria.

Table E-10b: Equipment Rinsate Data - Metals Analyses
Engineering Test Pit Sampling
Maywood Interim Storage Site, Maywood NJ

Result Qualifier Codes

U - Analyzed for but not detected
J - Compound detected, value is estimated
UJ - Compound not detected, quantitation limit is estimat
B - Analyte in blank as
E - Exceeds calibration
D - Identified at seconda

SW Sample ID: MISS-00300 *Test Pits*
Sample Type: Equipment Rinsate
Sample Date: 08/19/1999

Analysis Name	Result	Unit
Antimony	2.39 U	UG/L
Arsenic	4.18 U	UG/L
Beryllium	.177 U	UG/L
Cadmium	.19 U	UG/L
Chromium	0.970 B	UG/L
Copper	.603 U	UG/L
Lead	.957 U	UG/L
Mercury	.2 U	UG/L
Nickel	0.790 B	UG/L
Selenium	2.04 U	UG/L
Silver	.303 U	UG/L
Thallium	2.8 U	UG/L
Zinc	8.66 U	UG/L

SW Sample ID: MISS-00860 *Test Pits*
Sample Type: Equipment Rinsate
Sample Date: 09/01/1999

Analysis Name	Result	Unit
Antimony	2.39 U	UG/L
Arsenic	4.18 U	UG/L
Beryllium	0.630 B	UG/L
Cadmium	.19 U	UG/L
Chromium	2.12 B	UG/L
Copper	.603 U	UG/L
Lead	.957 U	UG/L
Mercury	.2 U	UG/L
Nickel	.443 U	UG/L
Selenium	2.04 U	UG/L
Silver	.303 U	UG/L
Thallium	2.8 U	UG/L
Zinc	46.2	UG/L

SW Sample ID: MISS-00490 *Test Pits*
Sample Type: Equipment Rinsate
Sample Date: 08/25/1999

Analysis Name	Result	Unit
Antimony	2.39 U	UG/L
Arsenic	4.18 U	UG/L
Beryllium	2.30 B	UG/L
Cadmium	.19 U	UG/L
Chromium	.239 U	UG/L
Copper	.603 U	UG/L
Lead	.957 U	UG/L
Mercury	.2 U	UG/L
Nickel	.443 U	UG/L
Selenium	2.04 U	UG/L
Silver	.303 U	UG/L
Thallium	2.8 U	UG/L
Zinc	13.4 B	UG/L

SW Sample ID: MISS-00990 *Test Pits*
Sample Type: Equipment Rinsate
Sample Date:

Analysis Name	Result	Unit
Antimony	2.39 U	UG/L
Arsenic	4.18 U	UG/L
Beryllium	.177 U	UG/L
Cadmium	0.190 B	UG/L
Chromium	0.780 B	UG/L
Copper	0.890 B	UG/L
Lead	.957 U	UG/L
Mercury	.2 U	UG/L
Nickel	0.610 B	UG/L
Selenium	2.04 U	UG/L
Silver	.303 U	UG/L
Thallium	2.8 U	UG/L
Zinc	17.9 B	UG/L

SW Sample ID: MISS-00670 *Test Pits*
Sample Type: Equipment Rinsate
Sample Date: 08/31/1999

Analysis Name	Result	Unit
Antimony	2.39 U	UG/L
Arsenic	4.18 U	UG/L
Beryllium	0.580 B	UG/L
Cadmium	.19 U	UG/L
Chromium	1.87 B	UG/L
Copper	.603 U	UG/L
Lead	1.69 B	UG/L
Mercury	.2 U	UG/L
Nickel	0.580 B	UG/L
Selenium	2.97 B	UG/L
Silver	.303 U	UG/L
Thallium	2.8 U	UG/L
Zinc	42.5	UG/L

Note : Exceedance criteria based on NJDEP Non-residential soil cleanup criteria.

APPENDIX F

ENGINEERING TEST PITS AT MISS
GROUNDWATER CHEMICAL DATA SUMMARY

FUSRAP MAYWOOD SUPERFUND SITE
MAYWOOD, NEW JERSEY

Groundwater Chemical Data Summary

Appendix F presents the groundwater chemical data results for the samples collected during the rough pit excavation. The following presents brief descriptions of the analysis methods used by the contract laboratory.

Volatile Organic Compounds

EPA SW846 Method 826B is used for the analysis of Volatile Organic Compounds. Helium is bubbled through a sample contained in a specifically designed purging chamber. The purgeables are efficiently transferred from the sample to the vapor phase. The vapor is swept through a sorbent column where the purgeables are trapped. After purging is completed, the sorbent column is heated and backflushed with Helium to desorb the purgeables onto a gas chromatographic column. The gas chromatograph is temperature programmed to separate the purgeables which are then detected with a mass spectrometer. The holding time for aqueous samples is fourteen (14) days from the date of collection, providing that the samples are preserved to pH <2 with HC1 (seven (7) days otherwise). The holding time for soil samples is also fourteen (14) days from collection.

Semivolatile Organic Compounds - Water

EPA SW846 Methods 3510C and 8270C are used for the extraction and analysis of Semivolatile Organics. Measured volumes of sample are pH adjusted to >12. The sample aliquots are then serially extracted with Methylene Chloride. The Methylene Chloride extracts are concentrated and analyzed by GC/MS. The holding time for extraction is seven (7) days from date of collection. The holding time for analysis is forty (40) days from date of extraction.

Pesticides - Water

EPA SW846 Methods 3510C and 8081A are used for the extraction and analysis of Pesticides and PCBs. One liter of sample is solvent extracted with tree 60-milliliter aliquots of Methylene Chloride. The Methylene Chloride extract is filtered through Sodium Sulfate, concentrated and exchanged to Hexane. Florisil cleanup may also be performed. The extract is analyzed by gas chromatography and target compounds are measured using an electron capture detector. The holding time for extraction is seven (7) days from date of collection. The holding time for analysis is forty (40) days from date of collection.

PCBs - Water

EPA Methods 3510C/8082 are used for the extraction analysis of PCBs. A measured volume of sample is solvent extracted with Methylene Chloride. The Methylene Chloride extract is filtered through Sodium Sulfate, exchanged to Hexane, concentrated and treated with Sulfuric Acid to remove interferences, if necessary. The extracted is separated by gas chromatography and the compounds are measured using an electron capture detector.

Metals

Metals analysis is based on SW846. Arsenic, Selenium, Thallium and Lead maybe analyzed by furnace AA with Zeeman background correction. Mercury is analyzed by cold vapor technique. All other metals are analyzed by Inductively Coupled Argon Plasma emission spectroscopy (if the ICP61E Trace is used, Arsenic, Selenium, Thallium and Lead can be analyzed by ICP). Samples for ICP analysis are digested with Hydrochloric and Nitric Acids. Samples for furnace analysis are digested with Nitric Acid. Samples for Mercury analysis are digested with Potassium permanganate and Nitric Acid. The holding time for all other Metals is six (6) months.

Groundwater Results

A comparison between groundwater chemical data results and water-screening levels was not performed. The data collected is not intended for use in the development of potential groundwater treatment. Rather, the groundwater data results are intended for preliminary information purposes only concerning direct disposal options of groundwater by tanker during construction operations.

Table F-1: Groundwater Chemical Data - SVOC Analyses
Engineering Test Pit Sampling
Maywood Interim Storage Site, Maywood NJ

Result Qualifier Codes

U - Analyzed for but not detected
J - Compound detected, value is estimated
UJ - Compound not detected, quantitation limit is estima
B - Analyte in blank as well as sampl
E - Exceeds calibration curve range
D - Identified at secondary dilution factor

SW Sample ID:	MISS-0001X (Rough Pit for TP4)		MISS-00030 (Rough Pit for TP2)		MISS-00040 (Rough Pit for TP1)	
Sample Type:	Groundwater		Groundwater		Groundwater	
Sample Date:	08/10/1999		08/16/1999		08/16/1999	
Analysis Name	**Result**	**Unit**	**Result**	**Unit**	**Result**	**Unit**
1,2,4-Trichlorobenzene	10 U	UG/L	10 U	UG/L	10 U	UG/L
1,2-Dichlorobenzene	10 U	UG/L	10 U	UG/L	10 U	UG/L
1,3-Dichlorobenzene	10 U	UG/L	10 U	UG/L	10 U	UG/L
1,4-Dichlorobenzene	10 U	UG/L	10 U	UG/L	10 U	UG/L
2,2'-Oxybis(1-Chloropropane)	10 U	UG/L	10 U	UG/L	10 U	UG/L
2,4,5-Trichlorophenol	50 U	UG/L	50 U	UG/L	50 U	UG/L
2,4,6-Trichlorophenol	10 U	UG/L	10 U	UG/L	10 U	UG/L
2,4-Dichlorophenol	10 U	UG/L	10 U	UG/L	10 U	UG/L
2,4-Dimethylphenol	10 U	UG/L	10 U	UG/L	10 U	UG/L
2,4-Dinitrophenol	50 U	UG/L	50 U	UG/L	50 U	UG/L
2,4-Dinitrotoluene	10 U	UG/L	10 U	UG/L	10 U	UG/L
2,6-Dinitrotoluene	10 U	UG/L	10 U	UG/L	10 U	UG/L
2-Chloronaphthalene	10 U	UG/L	10 U	UG/L	10 U	UG/L
2-Chlorophenol	10 U	UG/L	10 U	UG/L	10 U	UG/L
2-Methylnaphthalene	10 U	UG/L	10 U	UG/L	10 U	UG/L
2-Methylphenol	10 U	UG/L	10 U	UG/L	10 U	UG/L
2-Nitroaniline	50 U	UG/L	50 U	UG/L	50 U	UG/L
2-Nitrophenol	10 U	UG/L	10 U	UG/L	10 U	UG/L
3,3'-Dichlorobenzidine	10 U	UG/L	10 U	UG/L	10 U	UG/L
3-Nitroaniline	50 U	UG/L	50 U	UG/L	50 U	UG/L
4,6-Dinitro-2-Methylphenol	50 U	UG/L	50 U	UG/L	50 U	UG/L
4-Bromophenyl-Phenylether	10 U	UG/L	10 U	UG/L	10 U	UG/L
4-Chloro-3-Methylphenol	10 U	UG/L	10 U	UG/L	10 U	UG/L
4-Chloroaniline	10 U	UG/L	10 U	UG/L	10 U	UG/L
4-Chlorophenyl-Phenyl Ether	10 U	UG/L	10 U	UG/L	10 U	UG/L
4-Methylphenol	10 U	UG/L	10 U	UG/L	10 U	UG/L
4-Nitroaniline	50 U	UG/L	50 U	UG/L	50 U	UG/L
4-Nitrophenol	50 U	UG/L	50 U	UG/L	50 U	UG/L
Acenaphthene	10 U	UG/L	10 U	UG/L	10 U	UG/L
Acenaphthylene	10 U	UG/L	10 U	UG/L	10 U	UG/L
Anthracene	10 U	UG/L	10 U	UG/L	10 U	UG/L
Benzo(a)anthracene	10 U	UG/L	10 U	UG/L	10 U	UG/L
Benzo(a)pyrene	10 U	UG/L	10 U	UG/L	10 U	UG/L
Benzo(b)fluoranthene	10 U	UG/L	10 U	UG/L	10 U	UG/L
Benzo(g,h,i)perylene	10 U	UG/L	10 U	UG/L	10 U	UG/L
Benzo(k)fluoranthene	10 U	UG/L	10 U	UG/L	10 U	UG/L
Bis(2-chloroethoxy) methane	10 U	UG/L	10 U	UG/L	10 U	UG/L
Bis(2-chloroethyl) ether	10 U	UG/L	10 U	UG/L	10 U	UG/L
Bis(2-ethylhexyl)phthalate	10 U	UG/L	10 U	UG/L	10 U	UG/L
Butyl benzyl phthalate	10 U	UG/L	10 U	UG/L	10 U	UG/L
Carbazole	10 U	UG/L	10 U	UG/L	10 U	UG/L
Chrysene	10 U	UG/L	10 U	UG/L	10 U	UG/L
Di-N-Butylphthalate	10 U	UG/L	10 U	UG/L	10 U	UG/L
Di-N-Octylphthalate	10 U	UG/L	10 U	UG/L	10 U	UG/L
Dibenzo(a,h)anthracene	10 U	UG/L	10 U	UG/L	10 U	UG/L
Dibenzofuran	10 U	UG/L	10 U	UG/L	10 U	UG/L
Diethylphthalate	10 U	UG/L	10 U	UG/L	10 U	UG/L
Dimethylphthalate	10 U	UG/L	10 U	UG/L	10 U	UG/L
Fluoranthene	10 U	UG/L	10 U	UG/L	10 U	UG/L
Fluorene	10 U	UG/L	10 U	UG/L	10 U	UG/L
Hexachlorobenzene	10 U	UG/L	10 U	UG/L	10 U	UG/L
Hexachlorobutadiene	10 U	UG/L	10 U	UG/L	10 U	UG/L
Hexachlorocyclopentadiene	10 U	UG/L	10 U	UG/L	10 U	UG/L
Hexachloroethane	10 U	UG/L	10 U	UG/L	10 U	UG/L
Indeno(1,2,3-cd)pyrene	10 U	UG/L	10 U	UG/L	10 U	UG/L
Isophorone	10 U	UG/L	10 U	UG/L	10 U	UG/L
N-nitroso-di-n-propylamine	10 U	UG/L	10 U	UG/L	10 U	UG/L
N-nitroso-diphenylamine	3 J	UG/L	10 U	UG/L	10 U	UG/L
Naphthalene	10 U	UG/L	10 U	UG/L	10 U	UG/L
Nitrobenzene	10 U	UG/L	10 U	UG/L	10 U	UG/L
Pentachlorophenol	50 U	UG/L	50 U	UG/L	50 U	UG/L
Phenanthrene	10 U	UG/L	10 U	UG/L	10 U	UG/L
Phenol	10 U	UG/L	10 U	UG/L	10 U	UG/L
Pyrene	10 U	UG/L	10 U	UG/L	10 U	UG/L

Note : Exceedance criteria based on NJDEP Non-residential soil cleanup criteria.

Table F-1: Groundwater Chemical Data - SVOC Analyses
Engineering Test Pit Sampling
Maywood Interim Storage Site, Maywood NJ

Result Qualifier Codes

U - Analyzed for but not detected
J - Compound detected, value is estimated
UJ - Compound not detected, quantitation limit is estima
B - Analyte in blank as well as sampl
E - Exceeds calibration curve range
D - Identified at secondary dilution factor

SW Sample ID: MISS-00050 — Rough Pit for TP2
Sample Type: Groundwater
Sample Date: 08/10/1999

Analysis Name	Result	Unit
1,2,4-Trichlorobenzene	10 U	UG/L
1,2-Dichlorobenzene	10 U	UG/L
1,3-Dichlorobenzene	10 U	UG/L
1,4-Dichlorobenzene	10 U	UG/L
2,2'-Oxybis(1-Chloropropane)	10 U	UG/L
2,4,5-Trichlorophenol	50 U	UG/L
2,4,6-Trichlorophenol	10 U	UG/L
2,4-Dichlorophenol	10 U	UG/L
2,4-Dimethylphenol	10 U	UG/L
2,4-Dinitrophenol	50 U	UG/L
2,4-Dinitrotoluene	10 U	UG/L
2,6-Dinitrotoluene	10 U	UG/L
2-Chloronaphthalene	10 U	UG/L
2-Chlorophenol	10 U	UG/L
2-Methylnaphthalene	10 U	UG/L
2-Methylphenol	10 U	UG/L
2-Nitroaniline	50 U	UG/L
2-Nitrophenol	10 U	UG/L
3,3'-Dichlorobenzidine	10 U	UG/L
3-Nitroaniline	50 U	UG/L
4,6-Dinitro-2-Methylphenol	50 U	UG/L
4-Bromophenyl-Phenylether	10 U	UG/L
4-Chloro-3-Methylphenol	10 U	UG/L
4-Chloroaniline	10 U	UG/L
4-Chlorophenyl-Phenyl Ether	10 U	UG/L
4-Methylphenol	10 U	UG/L
4-Nitroaniline	50 U	UG/L
4-Nitrophenol	50 U	UG/L
Acenaphthene	10 U	UG/L
Acenaphthylene	10 U	UG/L
Anthracene	10 U	UG/L
Benzo(a)anthracene	10 U	UG/L
Benzo(a)pyrene	10 U	UG/L
Benzo(b)fluoranthene	10 U	UG/L
Benzo(g,h,i)perylene	10 U	UG/L
Benzo(k)fluoranthene	10 U	UG/L
Bis(2-chloroethoxy) methane	10 U	UG/L
Bis(2-chloroethyl) ether	10 U	UG/L
Bis(2-ethylhexyl)phthalate	10 U	UG/L
Butyl benzyl phthalate	10 U	UG/L
Carbazole	10 U	UG/L
Chrysene	10 U	UG/L
Di-N-Butylphthalate	10 U	UG/L
Di-N-Octylphthalate	10 U	UG/L
Dibenzo(a,h)anthracene	10 U	UG/L
Dibenzofuran	10 U	UG/L
Diethylphthalate	10 U	UG/L
Dimethylphthalate	10 U	UG/L
Fluoranthene	10 U	UG/L
Fluorene	10 U	UG/L
Hexachlorobenzene	10 U	UG/L
Hexachlorobutadiene	10 U	UG/L
Hexachlorocyclopentadiene	10 U	UG/L
Hexachloroethane	10 U	UG/L
Indeno(1,2,3-cd)pyrene	10 U	UG/L
Isophorone	10 U	UG/L
N-nitroso-di-n-propylamine	10 U	UG/L
N-nitroso-diphenylamine	4 J	UG/L
Naphthalene	10 U	UG/L
Nitrobenzene	10 U	UG/L
Pentachlorophenol	50 U	UG/L
Phenanthrene	10 U	UG/L
Phenol	10 U	UG/L
Pyrene	10 U	UG/L

Note : Exceedance criteria based on NJDEP Non-residential soil cleanup criteria.

Table F-2: Groundwater Chemical Data - VOC Analyses
Engineering Test Pit Sampling
Maywood Interim Storage Site, Maywood NJ

Result Qualifier Codes

U - Analyzed for but not detected
J - Compound detected, value is estimated
UJ - Compound not detected, quantitation limit is estima
B - Analyte in blank as well as sampl
E - Exceeds calibration curve range
D - Identified at secondary dilution factor

SW Sample ID: *MISS-0001X* **Rough Pit for TP4**
Sample Type: *Groundwater*
Sample Date: *08/10/1999*

Analysis Name	Result	Unit
1,1,1-Trichloroethane	5 U	UG/L
1,1,2,2-Tetrachloroethane	5 U	UG/L
1,1,2-Trichloroethane	5 U	UG/L
1,1-Dichloroethane	5 U	UG/L
1,1-Dichloroethene	5 U	UG/L
1,2-Dichloroethane	5 U	UG/L
1,2-Dichloropropane	5 U	UG/L
2-Butanone	10 U	UG/L
2-Hexanone	10 U	UG/L
4-Methyl-2-Pentanone	10 U	UG/L
Acetone	10 U	UG/L
Benzene	5 U	UG/L
Bromodichloromethane	5 U	UG/L
Bromoform	5 U	UG/L
Bromomethane	10 U	UG/L
Carbon Disulfide	5 U	UG/L
Carbon Tetrachloride	5 U	UG/L
Chlorobenzene	5 U	UG/L
Chloroethane	10 U	UG/L
Chloroform	5 U	UG/L
Chloromethane	10 U	UG/L
Cis-1,2-Dichloroethene	5 U	UG/L
cis-1,3-Dichloropropene	5 U	UG/L
Ethylbenzene	5 U	UG/L
m-Xylenes (Total)	5 U	UG/L
Methylene Chloride	5 U	UG/L
Styrene	5 U	UG/L
Tetrachloroethene	5 U	UG/L
Toluene	5 U	UG/L
Trans-1,2-Dichloroethene	5 U	UG/L
Trans-1,3-Dichloropropene	5 U	UG/L
Trichloroethene	5 U	UG/L
Vinyl Chloride	10 U	UG/L

SW Sample ID: *MISS-00030* **Rough Pit for TP2**
Sample Type: *Groundwater*
Sample Date: *08/16/1999*

Analysis Name	Result	Unit
1,1,1-Trichloroethane	5 U	UG/L
1,1,2,2-Tetrachloroethane	5 U	UG/L
1,1,2-Trichloroethane	5 U	UG/L
1,1-Dichloroethane	5 U	UG/L
1,1-Dichloroethene	5 U	UG/L
1,2-Dichloroethane	5 U	UG/L
1,2-Dichloropropane	5 U	UG/L
2-Butanone	10 U	UG/L
2-Hexanone	10 U	UG/L
4-Methyl-2-Pentanone	10 U	UG/L
Acetone	10 U	UG/L
Benzene	5 U	UG/L
Bromodichloromethane	5 U	UG/L
Bromoform	5 U	UG/L
Bromomethane	10 U	UG/L
Carbon Disulfide	5 U	UG/L
Carbon Tetrachloride	5 U	UG/L
Chlorobenzene	5 U	UG/L
Chloroethane	10 U	UG/L
Chloroform	5 U	UG/L
Chloromethane	10 U	UG/L
Cis-1,2-Dichloroethene	5 U	UG/L
cis-1,3-Dichloropropene	5 U	UG/L
Ethylbenzene	5 U	UG/L
m-Xylenes (Total)	5 U	UG/L
Methylene Chloride	5 U	UG/L
Styrene	5 U	UG/L
Tetrachloroethene	5 U	UG/L
Toluene	5 U	UG/L
Trans-1,2-Dichloroethene	5 U	UG/L
Trans-1,3-Dichloropropene	5 U	UG/L
Trichloroethene	5 U	UG/L
Vinyl Chloride	10 U	UG/L

SW Sample ID: *MISS-00040* **Rough Pit for TP1**
Sample Type: *Groundwater*
Sample Date: *08/16/1999*

Analysis Name	Result	Unit
1,1,1-Trichloroethane	5 U	UG/L
1,1,2,2-Tetrachloroethane	5 U	UG/L
1,1,2-Trichloroethane	5 U	UG/L
1,1-Dichloroethane	5 U	UG/L
1,1-Dichloroethene	5 U	UG/L
1,2-Dichloroethane	5 U	UG/L
1,2-Dichloropropane	5 U	UG/L
2-Butanone	10 U	UG/L
2-Hexanone	10 U	UG/L
4-Methyl-2-Pentanone	10 U	UG/L
Acetone	10 U	UG/L
Benzene	5 U	UG/L
Bromodichloromethane	5 U	UG/L
Bromoform	5 U	UG/L
Bromomethane	10 U	UG/L
Carbon Disulfide	5 U	UG/L
Carbon Tetrachloride	5 U	UG/L
Chlorobenzene	5 U	UG/L
Chloroethane	10 U	UG/L
Chloroform	5 U	UG/L
Chloromethane	10 U	UG/L
Cis-1,2-Dichloroethene	5 U	UG/L
cis-1,3-Dichloropropene	5 U	UG/L
Ethylbenzene	5 U	UG/L
m-Xylenes (Total)	5 U	UG/L
Methylene Chloride	5 U	UG/L
Styrene	5 U	UG/L
Tetrachloroethene	5 U	UG/L
Toluene	5 U	UG/L
Trans-1,2-Dichloroethene	5 U	UG/L
Trans-1,3-Dichloropropene	5 U	UG/L
Trichloroethene	5 U	UG/L
Vinyl Chloride	10 U	UG/L

Table F-2: Groundwater Chemical Data - VOC Analyses
Engineering Test Pit Sampling
Maywood Interim Storage Site, Maywood NJ

Result Qualifier Codes

U - Analyzed for but not detected
J - Compound detected, value is estimated
UJ - Compound not detected, quantitation limit is estima
B - Analyte in blank as well as sampl
E - Exceeds calibration curve range
D - Identified at secondary dilution factor

SW Sample ID:	*MISS-00050*	*Rough Pit for TP2*
Sample Type:	*Groundwater*	
Sample Date:	*08/10/1999*	
Analysis Name	***Result***	***Unit***
1,1,1-Trichloroethane	5 U	UG/L
1,1,2,2-Tetrachloroethane	5 U	UG/L
1,1,2-Trichloroethane	5 U	UG/L
1,1-Dichloroethane	5 U	UG/L
1,1-Dichloroethene	5 U	UG/L
1,2-Dichloroethane	5 U	UG/L
1,2-Dichloropropane	5 U	UG/L
2-Butanone	10 U	UG/L
2-Hexanone	10 U	UG/L
4-Methyl-2-Pentanone	10 U	UG/L
Acetone	10 U	UG/L
Benzene	5 U	UG/L
Bromodichloromethane	5 U	UG/L
Bromoform	5 U	UG/L
Bromomethane	10 U	UG/L
Carbon Disulfide	5 U	UG/L
Carbon Tetrachloride	5 U	UG/L
Chlorobenzene	5 U	UG/L
Chloroethane	10 U	UG/L
Chloroform	5 U	UG/L
Chloromethane	10 U	UG/L
Cis-1,2-Dichloroethene	5 U	UG/L
cis-1,3-Dichloropropene	5 U	UG/L
Ethylbenzene	5 U	UG/L
m-Xylenes (Total)	5 U	UG/L
Methylene Chloride	5 U	UG/L
Styrene	5 U	UG/L
Tetrachloroethene	5 U	UG/L
Toluene	5 U	UG/L
Trans-1,2-Dichloroethene	5 U	UG/L
Trans-1,3-Dichloropropene	5 U	UG/L
Trichloroethene	5 U	UG/L
Vinyl Chloride	10 U	UG/L

Table F-3: Groundwater Chemical Data - Metals Analyses
Engineering Test Pit Sampling
Maywood Interim Storage Site, Maywood NJ

Result Qualifier Codes

U - Analyzed for but not detected
J - Compound detected, value is estimated
UJ - Compound not detected, quantitation limit is estima
B - Analyte in blank as well as
E - Exceeds calibration curve r
D - Identified at secondary dilu

SW Sample ID: MISS-0001X *Rough Pit for TP4*
Sample Type: Groundwater
Sample Date: 08/10/1999

Analysis Name	Result		Unit
Aluminum	4350		UG/L
Antimony	2.39	U	UG/L
Arsenic	23.5		UG/L
Barium	118.		UG/L
Beryllium	1.09	B	UG/L
Cadmium	.19	U	UG/L
Calcium	267000		UG/L
Chromium	97.6		UG/L
Cobalt	1.51	B	UG/L
Copper	27.1		UG/L
Iron	5730		UG/L
Lead	19.8		UG/L
Magnesium	14500		UG/L
Manganese	965.		UG/L
Mercury	0.482		UG/L
Nickel	22.0		UG/L
Potassium	47400		UG/L
Selenium	3.78	B	UG/L
Silver	.303	U	UG/L
Sodium	23100		UG/L
Sulfate	538		MG/L
Thallium	2.8	U	UG/L
Vanadium	15.1	B	UG/L
Zinc	150.		UG/L

SW Sample ID: MISS-00040 *Rough Pit for TP1*
Sample Type: Groundwater
Sample Date: 08/16/1999

Analysis Name	Result		Unit
Aluminum	3450		UG/L
Antimony	2.39	U	UG/L
Arsenic	17.9		UG/L
Barium	166.		UG/L
Beryllium	0.810	B	UG/L
Cadmium	.19	U	UG/L
Calcium	305000		UG/L
Chromium	46.3		UG/L
Cobalt	1.61	B	UG/L
Copper	18.3	B	UG/L
Iron	6440		UG/L
Lead	12.0		UG/L
Magnesium	9820		UG/L
Manganese	775.		UG/L
Mercury	.2	U	UG/L
Nickel	17.2		UG/L
Potassium	31700		UG/L
Selenium	3.37	B	UG/L
Silver	.303	U	UG/L
Sodium	15500		UG/L
Sulfate	626		MG/L
Thallium	2.8	U	UG/L
Vanadium	13.2	B	UG/L
Zinc	244.		UG/L

SW Sample ID: MISS-00030 *Rough Pit for TP2*
Sample Type: Groundwater
Sample Date: 08/16/1999

Analysis Name	Result		Unit
Aluminum	1460		UG/L
Antimony	2.39	U	UG/L
Arsenic	9.74		UG/L
Barium	76.4		UG/L
Beryllium	0.630	B	UG/L
Cadmium	.19	U	UG/L
Calcium	194000		UG/L
Chromium	4.25	B	UG/L
Cobalt	.347	U	UG/L
Copper	.603	U	UG/L
Iron	2160		UG/L
Lead	.957	U	UG/L
Magnesium	16100		UG/L
Manganese	1050		UG/L
Mercury	.2	U	UG/L
Nickel	16.2		UG/L
Potassium	41600		UG/L
Selenium	3.23	B	UG/L
Silver	.303	U	UG/L
Sodium	27600		UG/L
Sulfate	403		MG/L
Thallium	2.8	U	UG/L
Vanadium	4.58	B	UG/L
Zinc	40.9		UG/L

SW Sample ID: MISS-00050 *Rough Pit for TP2*
Sample Type: Groundwater
Sample Date: 08/10/1999

Analysis Name	Result		Unit
Aluminum	9820		UG/L
Antimony	2.39	U	UG/L
Arsenic	22.5		UG/L
Barium	224.		UG/L
Beryllium	1.57	B	UG/L
Cadmium	.19	U	UG/L
Calcium	257000		UG/L
Chromium	26.1		UG/L
Cobalt	4.71	B	UG/L
Copper	29.8		UG/L
Iron	13000		UG/L
Lead	22.4		UG/L
Magnesium	15700		UG/L
Manganese	1040		UG/L
Mercury	.2	U	UG/L
Nickel	16.5		UG/L
Potassium	49500		UG/L
Selenium	5.82		UG/L
Silver	.303	U	UG/L
Sodium	24200		UG/L
Sulfate	464		MG/L
Thallium	2.8	U	UG/L
Vanadium	35.0	B	UG/L
Zinc	173.		UG/L

Note : Exceedance criteria based on NJDEP Non-residential soil cleanup criteria.

Result Qualifier Codes
U - Analyzed for but not detected
J - Compound detected, value is estimated
UJ - Compound not detected, quantitation limit is estima
B - Analyte in blank as w
E - Exceeds calibration c
D - Identified at secondar

SW Sample ID: MISS-0001X	Rough Pit for TP4	
Sample Type: Groundwater		
Sample Date: 08/10/1999		
Analysis Name	Result	Unit
4,4'-DDD	0.020 U	UG/L
4,4'-DDE	0.020 U	UG/L
4,4'-DDT	0.020 U	UG/L
Aldrin	0.010 U	UG/L
Alpha-BHC	0.010 U	UG/L
Beta-BHC	0.010 U	UG/L
Delta-BHC	0.010 U	UG/L
Dieldrin	0.020 U	UG/L
Endosulfan I	0.010 U	UG/L
Endosulfan II	0.020 U	UG/L
Endosulfan Sulfate	0.020 U	UG/L
Endrin	0.020 U	UG/L
Endrin Aldehyde	0.020 U	UG/L
Endrin Ketone	0.020 U	UG/L
Gamma-BHC	0.010 U	UG/L
Heptachlor	0.010 U	UG/L
Heptachlor Epoxide	0.010 U	UG/L
Methoxychlor	0.10 U	UG/L
Toxaphene	0.40 U	UG/L

SW Sample ID: MISS-00040	Rough Pit for TP1	
Sample Type: Groundwater		
Sample Date: 08/16/1999		
Analysis Name	Result	Unit
4,4'-DDD	0.020 U	UG/L
4,4'-DDE	0.020 U	UG/L
4,4'-DDT	0.020 U	UG/L
Aldrin	0.010 U	UG/L
Alpha-BHC	0.010 U	UG/L
Beta-BHC	0.010 U	UG/L
Delta-BHC	0.010 U	UG/L
Dieldrin	0.020 U	UG/L
Endosulfan I	0.010 U	UG/L
Endosulfan II	0.020 U	UG/L
Endosulfan Sulfate	0.020 U	UG/L
Endrin	0.020 U	UG/L
Endrin Aldehyde	0.020 U	UG/L
Endrin Ketone	0.020 U	UG/L
Gamma-BHC	0.010 U	UG/L
Heptachlor	0.010 U	UG/L
Heptachlor Epoxide	0.010 U	UG/L
Methoxychlor	0.10 U	UG/L
Toxaphene	0.40 U	UG/L

SW Sample ID: MISS-00030	Rough Pit for TP2	
Sample Type: Groundwater		
Sample Date: 08/16/1999		
Analysis Name	Result	Unit
4,4'-DDD	0.020 U	UG/L
4,4'-DDE	0.020 U	UG/L
4,4'-DDT	0.020 U	UG/L
Aldrin	0.010 U	UG/L
Alpha-BHC	0.010 U	UG/L
Beta-BHC	0.010 U	UG/L
Delta-BHC	0.010 U	UG/L
Dieldrin	0.020 U	UG/L
Endosulfan I	0.010 U	UG/L
Endosulfan II	0.020 U	UG/L
Endosulfan Sulfate	0.020 U	UG/L
Endrin	0.020 U	UG/L
Endrin Aldehyde	0.020 U	UG/L
Endrin Ketone	0.020 U	UG/L
Gamma-BHC	0.010 U	UG/L
Heptachlor	0.010 U	UG/L
Heptachlor Epoxide	0.010 U	UG/L
Methoxychlor	0.10 U	UG/L
Toxaphene	0.40 U	UG/L

SW Sample ID: MISS-00050	Rough Pit for TP2	
Sample Type: Groundwater		
Sample Date: 08/10/1999		
Analysis Name	Result	Unit
4,4'-DDD	0.020 U	UG/L
4,4'-DDE	0.020 U	UG/L
4,4'-DDT	0.020 U	UG/L
Aldrin	0.010 U	UG/L
Alpha-BHC	0.010 U	UG/L
Beta-BHC	0.010 U	UG/L
Delta-BHC	0.010 U	UG/L
Dieldrin	0.020 U	UG/L
Endosulfan I	0.010 U	UG/L
Endosulfan II	0.020 U	UG/L
Endosulfan Sulfate	0.020 U	UG/L
Endrin	0.020 U	UG/L
Endrin Aldehyde	0.020 U	UG/L
Endrin Ketone	0.020 U	UG/L
Gamma-BHC	0.010 U	UG/L
Heptachlor	0.010 U	UG/L
Heptachlor Epoxide	0.010 U	UG/L
Methoxychlor	0.10 U	UG/L
Toxaphene	0.40 U	UG/L

Note : Exceedance criteria based on NJDEP Non-residential soil cleanup criteria.

Table F-5: Groundwater Chemical Data - PCBs Analyses
Engineering Test Pit Sampling
Maywood Interim Storage Site, Maywood NJ

Result Qualifier Codes

U - Analyzed for but not detected
J - Compound detected, value is estimated
UJ - Compound not detected, quantitation limit is estima
B - Analyte in blank as well as sampl
E - Exceeds calibration curve range
D - Identified at secondary diluation factor

SW Sample ID: MISS-0001X — **Rough Pit for TP4**
Sample Type: Groundwater
Sample Date: 08/10/1999

Analysis Name	Result	Unit
Arochlor-1016	1.0 U	UG/L
Arochlor-1221	2.0 U	UG/L
Arochlor-1232	1.0 U	UG/L
Arochlor-1242	1.0 U	UG/L
Arochlor-1248	1.0 U	UG/L
Arochlor-1254	1.0 U	UG/L
Arochlor-1260	1.0 U	UG/L

SW Sample ID: MISS-00030 — **Rough Pit for TP2**
Sample Type: Groundwater
Sample Date: 08/16/1999

Analysis Name	Result	Unit
Arochlor-1016	1.0 U	UG/L
Arochlor-1221	2.0 U	UG/L
Arochlor-1232	1.0 U	UG/L
Arochlor-1242	1.0 U	UG/L
Arochlor-1248	1.0 U	UG/L
Arochlor-1254	1.0 U	UG/L
Arochlor-1260	1.0 U	UG/L

SW Sample ID: MISS-00040 — **Rough Pit for TP1**
Sample Type: Groundwater
Sample Date: 08/16/1999

Analysis Name	Result	Unit
Arochlor-1016	1.0 U	UG/L
Arochlor-1221	2.0 U	UG/L
Arochlor-1232	1.0 U	UG/L
Arochlor-1242	1.0 U	UG/L
Arochlor-1248	1.0 U	UG/L
Arochlor-1254	1.0 U	UG/L
Arochlor-1260	1.0 U	UG/L

SW Sample ID: MISS-00050 — **Rough Pit for TP2**
Sample Type: Groundwater
Sample Date: 08/10/1999

Analysis Name	Result	Unit
Arochlor-1016	1.0 U	UG/L
Arochlor-1221	2.0 U	UG/L
Arochlor-1232	1.0 U	UG/L
Arochlor-1242	1.0 U	UG/L
Arochlor-1248	1.0 U	UG/L
Arochlor-1254	1.0 U	UG/L
Arochlor-1260	1.0 U	UG/L

Note : Exceedance criteria based on NJDEP Non-residential soil cleanup criteria.

APPENDIX G

ENGINEERING TEST PITS AT MISS
WORK PERMITS

FUSRAP MAYWOOD SUPERFUND SITE
MAYWOOD, NEW JERSEY

FRANKLIN ENVIRONMENTAL SERVICES, INC.
185 Industrial Road PO Box 617
Wrentham, MA 02093
TEL: (508) 384-6151 FAX: (508) 384-6028
E-MAIL: feshaz@ici.net

FAX TRANSMITTAL

COMPANY: Franklin

TO: John McKenney

FAX NUMBER: 201 556-0162

FROM: Dave Ciroli

NUMBER OF PAGES: 1

COMMENTS:

One Call Permit #'s for MISS:
Test Borings: 992 090 430
Push Pipes: 992 160 844
992 180 268

Should transmission be interrupted or documents appear illegible, please contact the representative noted above.

If you have any questions please call me at 800-426-9878 ext. 224

Atmospheric Testing Results

1. Oxygen Test NOTE: Safe Range of 20.5% to 22% required

   Initial Testing Required ________ Periodic Testing Required ________

   Test Time ________ % Oxygen ________

2. Combustible Test NOTE: Safe range < 10% LEL

   Initial Testing Required ________ Periodic Testing Required ________

   Test Time ________ % LEL ________

3. Toxicity Test Substance Tested For ________

   Time Tested ________ PEL/TLV ________ Exposure Level ________

   Person Taking Sample: ________

*** IN CASE OF EMERGENCY, CALL EXTENSION 222 *** radio channel 1

Protective System

1. Sloping and Benching	________	OPTION	1	2	3	4
2. Support System (Shoring)	________	OPTION	1	2	3	4
3. Shield System		OPTION	1	2	3	4

Not required – no entry below 4 ft.

Date/Time Work Start: 8/9/99 / ________ Date/Time Completed: ____ / ____

Approval: ________ Date/Time: ____ / ____
Owner Representative

________ Date/Time: ____ / ____
Stone & Webster Supervisor

[signature] Date/Time: 8/9/99
Stone & Webster Engineer

[signature] Date/Time: 8/9/99, 0800
Stone & Webster Safety Representative

THIS PERMIT MUST BE RETURNED TO THE SAFETY OFFICE UPON COMPLETION OF THIS JOB. PERMITS WILL BE RETAINED FOR TWO YEARS.

TGPL-2323
Rev. 9-95
Front

Transco
TRANSCONTINENTAL GAS PIPE LINE CORPORATION
ONE OF THE WILLIAMS COMPANIES, INC.

3200 South Wood Avenue
Linden, New Jersey 07036

1999

Stone + Webster Engineering Co.
100 West Hunter Ave.
Maywood, NJ 07067

99218026 8

TGPL-2323
Rev. 9-95
Back

In response to the One Call request referenced on the opposite side, Transcontinental Gas Pipe Line Corp. has evaluated the request and feels that the proposed task will not affect any of Transco's facilities. Thank you for using the One Call System.

NOTED AUG 16 1999 B. E. Marquis

SAFETY INSPECTION FORM

PROJECT NAME Maywood **DATE** 8/6/97

	Not ~~Acceptable~~ Applicable	Not Acceptable	Acceptable
HOUSEKEEPING AND SANITATION			
Adequate Illumination	✓		
Drinking Water/Disposable Cups			✓
Sanitary Facilities			✓
Break Area			✓
General Housekeeping			✓
Walkways Clear			✓
LADDERS			
Regular Inspections	✓		
Secured at Top and Bottom	✓		
Side Rails Extended 3 Feet Above Top of Landing	✓		
Ladders not painted	✓		
Step Ladders Fully Opened When in Use	✓		
Safety Feet in Use	✓		
Rungs not over 1 foot on Center	✓		
Ladder Training	✓		
Top of Step Ladder Not Used as Step	✓		
SITE MONITORING			
Volatile Organics	✓		
Dust	✓		
Noise	✓		
Radiation			✓
Illumination	✓		
Semivolatile Organics	✓		
Inorganics	✓		

	Not Applicable	Not Acceptable	Acceptable
ELECTRICAL			
GFCIs in Place			✓
Lockout/Tagout Procedures	✓		
Equipment UL Listed or FM Approved			✓
Adequate Clearance from Overhead Lines	✓		
Grounding and Bonding			✓
Qualified Electricians	✓		
Uncompromised Insulation			✓
Utility Markouts Completed	✓		
Switches, circuit breakers, and switchboards installed in wet locations are enclosed in weatherproof enclosures			✓
Electric extension cords rated for hard or extra hard usage.			✓
HAND TOOLS			
Correct Tool Being Used for Job			✓
Damaged Tools Repaired or Replaced	✓		
All Guards in Place			✓
Neat Storage, Safe Carrying			✓
Grounded 3-prong plugs			✓
VEHICLE/EQUIPMENT OPERATIONS			
Record of Regular Inspection and Maintenance			✓
Safe Driver Training	✓		
Back-up Alarms			✓
Qualified Operators			✓
Proof of Insurance			
Wheels Chocked	✓		
STAIRWAYS			
Handrail and siderail are installed along the unprotected sides of the stairways having 4 or more risers or rising more than 30 inches			✓

Any "Not Acceptable" response must be documented on the corrective action form.

NOTED AUG 0 6 1999 B. E. Marquis

HAZARDOUS WASTE AUDIT CHECKLIST (Page 1 of 5)

Client: USACE
Location: Maywood
J.O. Number: 08575 0303
Project Manager: J. Green
Site Safety and Health Officer: D. Decker
Audit Number:
Date: 8/19/99 - 8/24/99

WORK FORCE
Stone & Webster: 4
Contractor: 5 FES 6 SEC
Client: 1
TOTAL: 17

AUDIT AREA	YES	NO	REMARKS
WRITTEN SAFETY AND HEALTH PROGRAM			
Is there a written and approved Site-Specific Safety and Health Plan (SSHP)?			
Does the SSHP address: × Key personnel and their responsibilities? × A safety and health risk hazard analysis for each task? × Employee training assignments? × The level of PPE required for each task? × Medical Surveillance requirements? × Frequency and types of air monitoring, personnel monitoring and environmental sampling? × Site Control Measures? × Decontamination procedures? × Confined Space Procedures? × Emergency Response Plan? × Spill Containment program?	✓		
Are safety and health briefings held prior to the start of site activities and as necessary to ensure employees remain apprised of the SSHP?	✓		
Are inspections of the site being conducted by the Site Safety and Health Officer?	✓		
Is the SSHP readily available to all site employees, OSHA and other regulatory agency personnel?	✓		
COMPREHENSIVE WORK PLAN			
Does a Comprehensive Work Plan exist separately or as part of the SSHP?	✓		
Does it address:			
× The anticipated activities which may expose employees to hazardous waste?	✓		
× Standard operating procedures?	✓		
× Include a requirement for a hazardous communication program?	SSHP	SHG	
× Identify personnel requirements by title and/or function?	✓		
× Define work tasks and objectives and describe the methods for accomplishing them?	✓		

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HAZARDOUS WASTE AUDIT CHECKLIST (Page 2 of 5)

AUDIT AREA	YES	NO	REMARKS
SITE CONTROL			
Is there a site map available to employees?	✓		
Does the site control program indicate site work zones such as exclusion zones, contamination reduction zones and support zones?	✓		
Are site work zones clearly defined?	✓		
Are onsite communication systems available to alert employees in the event of evacuation?	✓		
Has the route to the nearest medical treatment facility been made available to site employees?	✓		
Is the site perimeter indicated appropriately and labeled with appropriate warning signs to alert nearby residents to the potential hazards?	✓		
Is the buddy system used when appropriate?	✓		
Are emergency phone numbers conspicuously posted?	✓		
TRAINING			
Do all employees working onsite have initial and on the job safety and health training documentation?	✓		
Do applicable employees have documentation of annual refresher training?	✓		
Do supervisors directly responsible for supervision of employees engaged in hazardous waste activities have additional training documentation?	✓		
Do employees know the names of personnel responsible for site safety ?	✓		
Have employees received appropriate training in medical surveillance requirements including symptoms and signs that might indicate overexposure?	✓		Initial will sch review for Tailgate 8/24
Have employees who may be exposed to special hazards been provided training beyond the minimum for the specific hazard?	✓		phosphorus
MEDICAL SURVEILLANCE			
Have employees wearing respiratory protection for 30 days or more per year or who may be exposed to hazardous substances at or above exposure limits had baseline, yearly and termination physicals?	✓		
Have employees who have been injured or show symptoms of overexposure received followup physicals?			NA
Is documentation available certifying that employees are physically able to wear a respirator for employees wearing respiratory protection for less than 30 days?			NA all receive medical exam.
Are employees provided medical reports from the physician in writing?	✓		
Is information provided to the physician as required?	✓		
Are employee medical records available upon request and do they contain the doctor's written opinion and recommended limitations if any?	✓		

HAZARDOUS WASTE AUDIT CHECKLIST (Page 3 of 5)

AUDIT AREA	YES	NO	REMARKS
PERSONNEL PROTECTIVE EQUIPMENT			
Does a written PPE program exist and does it meeting the requirements of 29 CFR 1910.120(g)?	✓		
Are employees trained in the selection, use care and storage of PPE?	✓		
Are employees informed of the estimated length of time for a task?	✓		
Is the appropriate PPE used properly?	✓		
Is the PPE stored properly?	✓		
Is PPE decontaminated and disposed of properly?	✓		
Are employees fitted correctly for PPE?	✓		
Do employees know how to inspect PPE properly?	✓		
Is there a system to evaluate the adequacy of the PPE program?	✓		Discuss concerns w/emp
Is the PPE adequate for the chemical and physical hazards on site?	✓		
Is a written respiratory program available?	✓		
Have all employees been fit-tested successfully for negative pressure respirators?	✓		
Are ear plugs or muffs worn when applicable?	✓		
Are hard hats worn when there are overhead hazards?	✓		
If heat or cold stress is a factor, are engineering or administrative controls implemented to ensure that PPE can be worn and still be protective?	✓		
If "hot work" occurs, is a CGI air monitoring conducted?	✓		If enclosed or below ground
If any other unique hazards exist, is the appropriate PPE worn?			NA
MONITORING			
Is air monitoring being conducted to first identify IDLH levels and other dangerous situations such as flammable atmospheres, O_2 deficiency, ionizing radiation etc.?	✓		
Are risks initially identified and employees notified?	✓		
Is air monitoring performed when work begins in a different area of the site or any time new contaminants are encountered?	✓		
Is air monitoring performed when new operations begin?	✓		
Is air monitoring performed when employees are working in an area with liquid contamination?			NA so far
Are employees who are likely to have exposures above the OSHA PELs using personal air sampling devices or a representative a sampling approach?			NA none likely to have exp > PE
Is health and safety instrumentation (e.g., sampling pumps) maintained and calibrated on site?	✓		
Are there up-to-date maintenance and calibration logs for the air monitoring equipment?	✓		

HAZARDOUS WASTE AUDIT CHECKLIST (Page 4 of 5)

AUDIT AREA	YES	NO	REMARKS
DRUM AND CONTAINER HANDLING			
Do drums used for cleanup meet DOT, OSHA and EPA regulations?	NA		
Are existing drums and containers inspected for structural integrity before moving?			
Is there a spill containment program in place to contain and isolate the entire potential volume of a spill?			
Is a detection system used to estimate location and depth of drums and containers prior to excavation activities.			
Is a fire extinguisher onsite during any drum/container moving operation?			
Is employee training adequate for drum/container opening operations?			
Are only required personnel present during drum/container opening and others at a safe distance?			
If employees must work close to the drum/container opening operation are they adequately shielded?			
Do drum/container staging areas have adequate access/egress?			
Are sampling procedures for drums, tanks, containers, etc. documented and available?			
DECONTAMINATION			
Is there a decontamination procedure and does it contain: × Number and location of decontamination stations? × Required equipment? × Appropriate methods to prevent contamination of clean areas/equipment? × Methods to minimize worker contact? × Disposal methods for contaminated clothing and equipment?	✓		
Has the plan been communicated to employees prior to commencing work?	✓		
Do work practices and procedures minimize employee contact with hazardous substances?	✓		
Do decontamination areas minimize potential for contamination of clean employees or equipment?	✓		
Are all employees, equipment, etc., decontaminated properly prior to leaving the contaminated area?	✓		
Is all equipment and solvents used for decontamination disposed of or decontaminated properly?	✓		
If a commercial laundry is used, has it been notified of the hazards involved?	NA		
Is the decontamination area properly controlled?	✓		

HAZARDOUS WASTE AUDIT CHECKLIST (Page 5 of 5)

EMERGENCY RESPONSE	yes	no	
Is there a written and approved Emergency Response Plan available to all employees? (may be part of SSHP)	✓		
Does the Emergency Response Plan reflect coordination with outside parties and clearly define roles, lines of authority, training and communication? Does it take advantage of local/state plans?	✓		Coordination, communication
Does the plan address safe distances, place of refuge, security, control and emergency recognition/prevention?	✓		except no tornado shelter yet
Are emergency alerting and response procedures included in the plan?	✓		
Are site security and control measures evident?	✓		
Are employees aware of alerting procedures and evacuation routes and procedures?	✓		
Is first aid and medical treatment available?	✓		
Is a procedure in place for employees to critique a response?			
Are PPE and emergency equipment readily available in the field?	✓		
Is training of responders and response personnel adequate and properly documented?	✓		
Have all subcontractors and contractors been informed and familiar with the Emergency Response Plan and procedures?	✓		
Are procedures in place and adequate for reporting emergencies to local, state and federal authorities?	✓		
Does an adequate alarm system exist to notify employees of an emergency?	✓		
GENERAL SAFETY			
Is lighting in work areas adequate?	✓		
Are sanitation facilities provided and adequate?	✓		
Are nonpotable water sources labeled as such?			NA
Are washing facilities adequate and away from hazardous substances?	✓		
Are excavations shored/sloped in accordance with 29 CFR 1926 Subpart P?			NA no one enters pits ≥ 4 ft
If necessary, is there a confined space entry procedure, is it adequate and properly followed?			NA so far
Were qualitative parameters such as Experience Modification Rates and OSHA Incidence Rates considered in the hiring of subcontractors?	✓		
If necessary, do procedures exist for other areas of safety such as crane operations, electrical work, handling of compressed gas cylinders, etc.? Are these procedures followed?	✓		

COMMENTS AND RECOMMENDATIONS

Bechtel notified of waste oil storage in Sealand Trailer - D. Andrews of Bechtel said he would have the material removed.
8/24 Pickup truck vehicle inspection log sheet not found in log book. Operator said it was completed but removed.

INDUSTRIAL HYGIENE AIR MONITORING DATA SHEET

HAZARDOUS SUBSTANCES DATA SHEET

1. COMPANY NAME	2. CONTRACT NO.	3. SAMPLING NO.	
Stone & Webster Engineering Corp.	DACW 41-99-D-9001	TP1IHM-00001	
4. WORK ACTIVITY Excavation of rough pits in Test Pit Area 1 ("TP-1")		5. SAMPLING DATE 08/11/1999	6. SHIPPING DATE 08/18/1999
7. PERSON PERFORMING SAMPLING (SIGNATURE) Brian Miller		8. PRINT LAST NAME Miller	9. SSHO Decker, D.

10. MONITORED WORKER (NAME, ADDRESS, PHONE NUMBE	14. EXP. INFO.	a. NUMBER	B. DURATION
Paul Filippi (Franklin Environmental) Franklin Supervisor (508) 245-1307	C. FREQUENCY		
11. JOB TITLE Operator	15. WEATHER CONDITIONS Mostly sunny, v. warm, light & variable		16. PHOTO(S) YES NO
13. PPE (TYPE AND EFFECTIVENESS) Modified Level D (latex + cotton gloves, booties, hard hat safety glasses)	17. PUMP CHECKS AND ADJUSTMENTS Pre-use flow check with dry calibration standard Post-use flow check with dry calibration standard Visual flow & battery check periodically throughout day		

18. JOB DESCRIPTION, OPERATION, WORK LOCATION(S), VERIFICATION, AND CONTROLS

JOB DESCRIPTION: Operates hydraulic excavator: 95% of time spent inside machine

OPERATION: Hydraulic excavator digs trench approximately 5' wide and 15' long until groundwater or bedrock is encountered

WORK LOCATION: MISS western grounds:inside main RMA

VERIFICATION:

CONTROLS: Dust suppression with nozzled water hose

FIELD SAMPLING DATA

			30. CALCULATIONS AND NOTES:
19. PUMP NUMBER: Rented SKC #14299			See attached analytical report from Severn Trent Laboratories, Ltd.
20. SAMPLE SUBMITTAL NO. TP1IHM-00001			
21. SAMPLE TYPE Air			**Arsenic Result: Not Detected**
22. SAMPLE MEDIA 0.8 um Mixed Cellulose Ester			**Chromium Result: 0.00014 mg/m3**
23. FILTER/TUBE NUMBER N/A			**Chromium PEL-TWA: 0.5 mg/m3**
24. TIME ON/OFF	ON	730	**Nickel Result: 0.00013 mg/m3**
	OFF	1720	**Nickel PEL-TWA: 1 mg/m3**
25. TOTAL TIME IN MINUTES		590	**Lead Result: 0.00017 mg/m3**
26. FLOW RATE	PRE	1.893	**Lead PEL-TWA: 0.050 mg/m3**
L/MIN CC/MIN	POST	1.955	
27. VOLUME (IN LITERS)		1135.16	
28. NET SAMPLE WEIGHT (IN MG)		N/A	
29. ANALYZE SAMPLES FOR: Arsenic Chromium Nickel Lead			

INDUSTRIAL HYGIENE AIR MONITORING DATA SHEET

HAZARDOUS SUBSTANCES DATA SHEET

1. COMPANY NAME Stone & Webster Engineering Corp.	2. CONTRACT NO. DACW 41-99-D-9001	3. SAMPLING NO. TP1IHM-00002	
4. WORK ACTIVITY Excavation of rough pits in Test Pit Area 1 ("TP-1")		5. SAMPLING DATE 08/11/1999	6. SHIPPING DATE 08/18/1999
7. PERSON PERFORMING SAMPLING (SIGNATURE)		8. PRINT LAST NAME Miller	9. SSHO Decker, D.
10. MONITORED WORKER (NAME, ADDRESS, PHONE NUMBE David Carroll (Franklin Environmental) Franklin Supervisor (508) 245-1307	14. EXP. INFO.	a. NUMBER	B. DURATION
	C. FREQUENCY		
11. JOB TITLE Laborer	15. WEATHER CONDITIONS Mostly sunny, v. warm, light & variable		16. PHOTO(S) YES NO
13. PPE (TYPE AND EFFECTIVENESS) Modified Level D (Tyvek coveralls, latex + cotton gloves, booties, hard hat safety glasses)	17. PUMP CHECKS AND ADJUSTMENTS Pre-use flow check with dry calibration standard Post-use flow check with dry calibration standard Visual flow & battery check periodically throughout day		

18. JOB DESCRIPTION, OPERATION, WORK LOCATION(S), VERIFICATION, AND CONTROLS

JOB DESCRIPTION: Laborer: Dust suppression; various light duty manual labor

OPERATION: Hydraulic excavator digs trench approximately 5' wide and 15' long until groundwater or bedrock is encountered

WORK LOCATION: MISS western grounds:inside main RMA

VERIFICATION:

CONTROLS: Dust suppression with nozzled water hose

FIELD SAMPLING DATA

19. PUMP NUMBER: Rented SKC #14304			30. CALCULATIONS AND NOTES:
20. SAMPLE SUBMITTAL NO. TP1IHM-00002			See attached analytical report from Severn Trent Laboratories, Ltd.
21. SAMPLE TYPE Air			**Arsenic Result: Not Detected**
22. SAMPLE MEDIA 0.8 um Mixed Cellulose Ester			**Chromium Result: 0.00027 mg/m3**
23. FILTER/TUBE NUMBER N/A			**Chromium PEL-TWA: 0.5 mg/m3**
24. TIME ON/OFF	ON	730	**Nickel Result: Not Detected**
	OFF	1730	
25. TOTAL TIME IN MINUTES		600	**Lead Result: Not Detected**
26. FLOW RATE	PRE	1.967	
L/MIN CC/MIN	POST	1.967	
27. VOLUME (IN LITERS)		1180.2	
28. NET SAMPLE WEIGHT (IN MG)		N/A	
29. ANALYZE SAMPLES FOR: Arsenic Chromium Nickel Lead			

FUSRAP S-024 (9/22/94)

INDUSTRIAL HYGIENE AIR MONITORING DATA SHEET

HAZARDOUS SUBSTANCES DATA SHEET

1. COMPANY NAME Stone & Webster Engineering Corp.	2. CONTRACT NO. DACW 41-99-D-9001	3. SAMPLING NO. TP2IHM-00001	
4. WORK ACTIVITY Excavation of rough pits in Test Pit Area 2 ("TP-2")		5. SAMPLING DATE 08/09/1999	6. SHIPPING DATE 08/18/1999
7. PERSON PERFORMING SAMPLING (SIGNATURE) Eric Antillon		8. PRINT LAST NAME Miller	9. SSHO Decker, D.
10. MONITORED WORKER (NAME, ADDRESS, PHONE NUMBE Paul Filippi (Franklin Environmental) Franklin Supervisor (508) 245-1307	14. EXP. INFO.	a. NUMBER	B. DURATION
	C. FREQUENCY		
11. JOB TITLE Operator	15. WEATHER CONDITIONS Mostly sunny, v. warm, light & variable		16. PHOTO(S) YES NO
13. PPE (TYPE AND EFFECTIVENESS) Modified Level D (latex + cotton gloves, booties, hard hat safety glasses)	17. PUMP CHECKS AND ADJUSTMENTS Pre-use flow check with dry calibration standard Post-use flow check with dry calibration standard Visual flow & battery check periodically throughout day		

18. JOB DESCRIPTION, OPERATION, WORK LOCATION(S), VERIFICATION, AND CONTROLS

JOB DESCRIPTION: Operator of hydraulic excavator--95% of time spent inside machine

OPERATIO Hydraulic excavator excavates trench approximately 5' wide and 15' long until groundwater or bedrock is encountered

WORK LOCATION: MISS western grounds: temporary RMA installed

VERIFICATION:

CONTROLS: Dust suppression with nozzled water hose

FIELD SAMPLING DATA

19. PUMP NUMBER: Rented SKC #14299			30. CALCULATIONS AND NOTES:
20. SAMPLE SUBMITTAL NO. TP2IHM-00001			See attached analytical report from Severn Trent Laboratories, Ltd.
21. SAMPLE TYPE Air			**Arsenic Result: Not Detected**
22. SAMPLE MEDIA 0.8 um Mixed Cellulose Ester			**Chromium Result: 0.00058 mg/m3**
23. FILTER/TUBE NUMBER N/A			**Chromium PEL-TWA: 0.5 mg/m3**
24. TIME ON/OFF	ON	1355	**Nickel Result: Not Detected**
	OFF	1645	
25. TOTAL TIME IN MINUTES		170	**Lead Result: Not Detected**
26. FLOW RATE	PRE	1.535	
L/MIN CC/MIN	POST	1.568	
27. VOLUME (IN LITERS)		263.84	
28. NET SAMPLE WEIGHT (IN MG)		N/A	
29. ANALYZE SAMPLES FOR: Arsenic Chromium Nickel Lead			

INDUSTRIAL HYGIENE AIR MONITORING DATA SHEET

HAZARDOUS SUBSTANCES DATA SHEET

1. COMPANY NAME Stone & Webster Engineering Corp.	2. CONTRACT NO. DACW 41-99-D-9001	3. SAMPLING NO. TP2IHM-00002

4. WORK ACTIVITY Excavation of rough pits in Test Pit Area 2 ("TP-2")	5. SAMPLING DATE 08/09/1999	6. SHIPPING DATE 08/18/1999
7. PERSON PERFORMING SAMPLING (SIGNATURE)	8. PRINT LAST NAME Miller	9. SSHO Decker, D.

10. MONITORED WORKER (NAME, ADDRESS, PHONE NUMBE Brian Miller (SEC) SEC Supervisor (201) 843-7080 ext. 230	14. EXP. INFO.	a. NUMBER	B. DURATION
	C. FREQUENCY		
11. JOB TITLE RPT	15. WEATHER CONDITIONS Mostly sunny, v. warm, light & variable		16. PHOTO(S) YES NO
13. PPE (TYPE AND EFFECTIVENESS) Modified Level D (Tyvek coveralls, latex + cotton gloves, booties, hard hat safety glasses)	17. PUMP CHECKS AND ADJUSTMENTS Pre-use flow check with dry calibration standard Post-use flow check with dry calibration standard Visual flow & battery check periodically throughout day		

18. JOB DESCRIPTION, OPERATION, WORK LOCATION(S), VERIFICATION, AND CONTROLS

JOB DESCRIPTION: Radiological Protection Technician (RPT): Perform radiological and IH surveys within RMA; collect soil samples

OPERATION: Hydraulic excavator digs trench approximately 5' wide and 15' long until groundwater or bedrock is encountered

WORK LOCATION: MISS western grounds: temporary RMA installed

VERIFICATION:

CONTROLS: Dust suppression with nozzled water hose

FIELD SAMPLING DATA

19. PUMP NUMBER: Rented SKC #14304			30. CALCULATIONS AND NOTES:
20. SAMPLE SUBMITTAL NO. TP2IHM-00002			See attached analytical report from Severn Trent Laboratories, Ltd.
21. SAMPLE TYPE Air			**Arsenic Result: Not Detected**
22. SAMPLE MEDIA 0.8 um Mixed Cellulose Ester			**Chromium Result: 0.00089 mg/m3**
23. FILTER/TUBE NUMBER N/A			**Chromium PEL-TWA: 0.5 mg/m3**
24. TIME ON/OFF	ON	1400	**Nickel Result: Not Detected**
	OFF	1645	
25. TOTAL TIME IN MINUTES		165	**Lead Result: 0.00064 mg/m3**
26. FLOW RATE	PRE	1.477	**Lead PEL-TWA: 0.050 mg/m3**
L/MIN CC/MIN	POST	1.473	
27. VOLUME (IN LITERS)		243.38	
28. NET SAMPLE WEIGHT (IN MG)		N/A	
29. ANALYZE SAMPLES FOR: Arsenic Chromium Nickel Lead			

INDUSTRIAL HYGIENE AIR MONITORING DATA SHEET

HAZARDOUS SUBSTANCES DATA SHEET

1. COMPANY NAME Stone & Webster Engineering Corp.	2. CONTRACT NO. DACW 41-99-D-9001	3. SAMPLING NO. TP2IHM-00003	
4. WORK ACTIVITY Excavation of rough pits in Test Pit Area 2 ("TP-2")		5. SAMPLING DATE 08/10/1999	6. SHIPPING DATE 08/18/1999
7. PERSON PERFORMING SAMPLING (SIGNATURE) Brian Miller		8. PRINT LAST NAME Miller	9. SSHO Decker, D.
10. MONITORED WORKER (NAME, ADDRESS, PHONE NUMBE Paul Filippi (Franklin Environmental) Franklin Supervisor (508) 245-1307	14. EXP. INFO. C. FREQUENCY	a. NUMBER	B. DURATION
11. JOB TITLE Operator	15. WEATHER CONDITIONS Mostly sunny, v. warm, light & variable		16. PHOTO(S) YES NO
13. PPE (TYPE AND EFFECTIVENESS) Modified Level D (latex + cotton gloves, booties, hard hat safety glasses)	17. PUMP CHECKS AND ADJUSTMENTS Pre-use flow check with dry calibration standard Post-use flow check with dry calibration standard Visual flow & battery check periodically throughout day		

18. JOB DESCRIPTION, OPERATION, WORK LOCATION(S), VERIFICATION, AND CONTROLS

JOB DESCRIPTION: Operator of hydraulic excavator: 95% of time spent inside machine

OPERATION: Hydraulic excavator digs trench approximately 5' wide and 15' long until groundwater or bedrock is encountered

WORK LOCATION: MISS western grounds: temporary RMA installed

VERIFICATION:

CONTROLS: Dust suppression with nozzled water hose

FIELD SAMPLING DATA

19. PUMP NUMBER: Rented SKC #14304			30. CALCULATIONS AND NOTES:
20. SAMPLE SUBMITTAL NO. TP2IHM-00003			See attached analytical report from Severn Trent Laboratories, Ltd.
21. SAMPLE TYPE Air			**Arsenic Result: Not Detected**
22. SAMPLE MEDIA 0.8 um Mixed Cellulose Ester			**Chromium Result: 0.00033 mg/m3**
23. FILTER/TUBE NUMBER N/A			**Chromium PEL-TWA: 0.5 mg/m3**
24. TIME ON/OFF	ON	740	**Nickel Result: Not Detected**
	OFF	1700	
25. TOTAL TIME IN MINUTES		560	**Lead Result: Not Detected**
26. FLOW RATE L/MIN CC/MIN	PRE	1.968	
	POST	1.999	
27. VOLUME (IN LITERS)		1111.04	
28. NET SAMPLE WEIGHT (IN MG)		N/A	
29. ANALYZE SAMPLES FOR: Arsenic Chromium Nickel Lead			

INDUSTRIAL HYGIENE AIR MONITORING DATA SHEET

HAZARDOUS SUBSTANCES DATA SHEET

1. COMPANY NAME Stone & Webster Engineering Corp.	2. CONTRACT NO. DACW 41-99-D-9001	3. SAMPLING NO. TP2IHM-00004	
4. WORK ACTIVITY Excavation of rough pits in Test Pit Area 2 ("TP-2")		5. SAMPLING DATE 08/10/1999	6. SHIPPING DATE 08/18/1999
7. PERSON PERFORMING SAMPLING (SIGNATURE)		8. PRINT LAST NAME Miller	9. SSHO Decker, D.
10. MONITORED WORKER (NAME, ADDRESS, PHONE NUMBE A. Restrego (Franklin Environmental) Franklin Supervisor (508) 245-1307	14. EXP. INFO. C. FREQUENCY	a. NUMBER	B. DURATION
11. JOB TITLE Operator	15. WEATHER CONDITIONS Mostly sunny, v. warm, light & variable		16. PHOTO(S) YES NO
13. PPE (TYPE AND EFFECTIVENESS) Modified Level D (Tyvek coveralls, latex + cotton gloves, booties, hard hat safety glasses)	17. PUMP CHECKS AND ADJUSTMENTS Pre-use flow check with dry calibration standard Post-use flow check with dry calibration standard Visual flow & battery check periodically throughout day		

18. JOB DESCRIPTION, OPERATION, WORK LOCATION(S), VERIFICATION, AND CONTROLS

JOB DESCRIPTION: Laborer: Dust suppression with water hose; various light duty manual labor

OPERATION: Hydraulic excavator digs trench approximately 5' wide and 15' long until groundwater or bedrock is encountered

WORK LOCATION: MISS western grounds: temporary RMA installed

VERIFICATION:

CONTROLS: Dust suppression with nozzled water hose

FIELD SAMPLING DATA

19. PUMP NUMBER: Rented SKC #14299			30. CALCULATIONS AND NOTES:
20. SAMPLE SUBMITTAL NO. TP2IHM-00004			See attached analytical report from Severn Trent Laboratories, Ltd.
21. SAMPLE TYPE Air			**Arsenic Result: Not Detected**
22. SAMPLE MEDIA 0.8 um Mixed Cellulose Ester			**Chromium Result: 0.0010 mg/m3**
23. FILTER/TUBE NUMBER N/A			**Chromium PEL-TWA: 0.5 mg/m3**
24. TIME ON/OFF	ON	750	**Nickel Result: Not Detected**
	OFF	1630	
25. TOTAL TIME IN MINUTES		520	**Lead Result: 0.00017 mg/m3**
26. FLOW RATE	PRE	1.881	**Lead PEL-TWA: 0.050 mg/m3**
L/MIN CC/MIN	POST	1.939	
27. VOLUME (IN LITERS)		993.2	
28. NET SAMPLE WEIGHT (IN MG)		N/A	
29. ANALYZE SAMPLES FOR: Arsenic Chromium Nickel Lead			

INDUSTRIAL HYGIENE AIR MONITORING DATA SHEET

HAZARDOUS SUBSTANCES DATA SHEET

1. COMPANY NAME Stone & Webster Engineering Corp.	2. CONTRACT NO. DACW 41-99-D-9001	3. SAMPLING NO. TP3IHM-00001	
4. WORK ACTIVITY Excavation of rough pits in Test Pit Area 3 ("TP-3")		5. SAMPLING DATE 08/12/1999	6. SHIPPING DATE 08/18/1999
7. PERSON PERFORMING SAMPLING (SIGNATURE) Eric Miller		8. PRINT LAST NAME Miller	9. SSHO Decker, D.
10. MONITORED WORKER (NAME, ADDRESS, PHONE NUMBE Rodney Gendreau (SEC SEC Supervisor (201) 843-7080 ext. 230	14. EXP. INFO.	a. NUMBER	B. DURATION
	C. FREQUENCY		
11. JOB TITLE RPT	15. WEATHER CONDITIONS Mostly sunny, v. warm, light & variable		16. PHOTO(S) YES NO
13. PPE (TYPE AND EFFECTIVENESS) Modified Level D (latex + cotton gloves, booties, hard hat safety glasses)	17. PUMP CHECKS AND ADJUSTMENTS Pre-use flow check with dry calibration standard Post-use flow check with dry calibration standard Visual flow & battery check periodically throughout day		

18. JOB DESCRIPTION, OPERATION, WORK LOCATION(S), VERIFICATION, AND CONTROLS

JOB DESCRIPTION: RPT: Perform radiological and IH surveys within RMA; collect soil samples

OPERATION: Hydraulic excavator digs a trench approximately 5' wide and 15' long until groundwater or bedrock is encountered

WORK LOCATION: MISS grounds: 50' south of Stepan RR spur; temporary RMA installed

VERIFICATION:

CONTROLS: Dust suppression with nozzled water hose

FIELD SAMPLING DATA

19. PUMP NUMBER: Rented SKC #14304			30. CALCULATIONS AND NOTES:
20. SAMPLE SUBMITTAL NO. TP3IHM-00001			See attached analytical report from Severn Trent Laboratories, Ltd.
21. SAMPLE TYPE Air			**Arsenic Result: Not Detected**
22. SAMPLE MEDIA 0.8 um Mixed Cellulose Ester			**Chromium Result: 0.00022 mg/m3**
23. FILTER/TUBE NUMBER N/A			**Chromium PEL-TWA: 0.5 mg/m3**
24. TIME ON/OFF	ON	720	**Nickel Result: Not Detected**
	OFF	1600	
25. TOTAL TIME IN MINUTES		520	**Lead Result: Not Detected**
26. FLOW RATE L/MIN CC/MIN	PRE	1.955	
	POST	1.941	
27. VOLUME (IN LITERS)		1012.96	
28. NET SAMPLE WEIGHT (IN MG)		N/A	
29. ANALYZE SAMPLES FOR: Arsenic Chromium Nickel Lead			

INDUSTRIAL HYGIENE AIR MONITORING DATA SHEET

HAZARDOUS SUBSTANCES DATA SHEET

1. COMPANY NAME Stone & Webster Engineering Corp.	2. CONTRACT NO. DACW 41-99-D-9001	3. SAMPLING NO. TP3IHM-00002	
4. WORK ACTIVITY Excavation of rough pits in Test Pit Area 3 ("TP-3")		5. SAMPLING DATE 08/12/1999	6. SHIPPING DATE 08/18/1999
7. PERSON PERFORMING SAMPLING (SIGNATURE)		8. PRINT LAST NAME Miller	9. SSHO Decker, D.
10. MONITORED WORKER (NAME, ADDRESS, PHONE NUMBE Paul Filippi (Franklin Environmental) Franklin Supervisor (508) 245-1307	14. EXP. INFO. C. FREQUENCY	a. NUMBER	B. DURATION
11. JOB TITLE Operator	15. WEATHER CONDITIONS Mostly sunny, v. warm, light & variable		16. PHOTO(S) YES NO
13. PPE (TYPE AND EFFECTIVENESS) Modified Level D (latex + cotton gloves, booties, hard hat safety glasses)	17. PUMP CHECKS AND ADJUSTMENTS Pre-use flow check with dry calibration standard Post-use flow check with dry calibration standard Visual flow & battery check periodically throughout day		

18. JOB DESCRIPTION, OPERATION, WORK LOCATION(S), VERIFICATION, AND CONTROLS

JOB DESCRIPTION: Operates hydraulic excavator: 95% of time spent inside machine

OPERATION: Hydraulic excavator digs trench approximately 5' wide and 15' long until groundwater or bedrock is encountered

WORK LOCATION: MISS grounds: 50' south of Stepan RR spur; temporary RMA installed

VERIFICATION:

CONTROLS: Dust suppression with nozzled water hose

FIELD SAMPLING DATA

19. PUMP NUMBER: Rented SKC #14299			30. CALCULATIONS AND NOTES:
20. SAMPLE SUBMITTAL NO. TP3IHM-00002			See attached analytical report from Severn Trent Laboratories, Ltd.
21. SAMPLE TYPE Air			**Arsenic Result: Not Detected**
22. SAMPLE MEDIA 0.8 um Mixed Cellulose Ester			**Chromium Result: 0.000092 mg/m3**
23. FILTER/TUBE NUMBER N/A			**Chromium PEL-TWA: 0.5 mg/m3**
24. TIME ON/OFF	ON	740	**Nickel Result: Not Detected**
	OFF	1630	
25. TOTAL TIME IN MINUTES		530	**Lead Result: Not Detected**
26. FLOW RATE	PRE	1.885	
L/MIN CC/MIN	POST	1.869	
27. VOLUME (IN LITERS)		994.81	
28. NET SAMPLE WEIGHT (IN MG)		N/A	
29. ANALYZE SAMPLES FOR: Arsenic Chromium Nickel Lead			

INDUSTRIAL HYGIENE AIR MONITORING DATA SHEET

HAZARDOUS SUBSTANCES DATA SHEET

1. COMPANY NAME Stone & Webster Engineering Corp.	2. CONTRACT NO. DACW 41-99-D-9001	3. SAMPLING NO. TP3IHM-00003

4. WORK ACTIVITY Excavation of rough pits in Test Pit Area 3 ("TP-3")	5. SAMPLING DATE 08/16/1999	6. SHIPPING DATE 08/18/1999
7. PERSON PERFORMING SAMPLING (SIGNATURE) [illegible]	8. PRINT LAST NAME Miller	9. SSHO Decker, D.

10. MONITORED WORKER (NAME, ADDRESS, PHONE NUMBE Paul Filippi (Franklin Environmental) Franklin Supervisor (508) 245-1307	14. EXP. INFO. C. FREQUENCY	a. NUMBER	B. DURATION
11. JOB TITLE Operator	15. WEATHER CONDITIONS Mostly sunny, v. warm, light & variable		16. PHOTO(S) YES NO
13. PPE (TYPE AND EFFECTIVENESS) Modified Level D (latex + cotton gloves, booties, hard hat safety glasses)	17. PUMP CHECKS AND ADJUSTMENTS Pre-use flow check with dry calibration standard Post-use flow check with dry calibration standard Visual flow & battery check periodically throughout day		

18. JOB DESCRIPTION, OPERATION, WORK LOCATION(S), VERIFICATION, AND CONTROLS

JOB DESCRIPTION: Operates hydraulic excavator: 95% of time spent inside machine

OPERATION: Hydraulic excavator digs trench approximately 5' wide and 15' long until groundwater or bedrock is encountered

WORK LOCATION: MISS grounds: 50' south of Stepan RR spur; temporary RMA installed

VERIFICATION:

CONTROLS: Dust suppression with nozzled water hose

FIELD SAMPLING DATA

			30. CALCULATIONS AND NOTES:
19. PUMP NUMBER:			
Rented SKC #14299			
20. SAMPLE SUBMITTAL NO.			See attached analytical report from Severn Trent Laboratories, Ltd.
TP3IHM-00003			
21. SAMPLE TYPE			**Arsenic Result: Not Detected**
Air			
22. SAMPLE MEDIA			
0.8 um Mixed Cellulose Ester			**Chromium Result: 0.00022 mg/m3**
23. FILTER/TUBE NUMBER			**Chromium PEL-TWA: 0.5 mg/m3**
N/A			
24. TIME ON/OFF	ON	745	**Nickel Result: Not Detected**
	OFF	1600	
25. TOTAL TIME			**Lead Result: 0.00019 mg/m3**
IN MINUTES		495	**Lead PEL-TWA: 0.050 mg/m3**
26. FLOW RATE	PRE	1.884	
L/MIN CC/MIN	POST	1.897	
27. VOLUME (IN LITERS)			
		936.05	
28. NET SAMPLE WEIGHT			
(IN MG)		N/A	
29. ANALYZE SAMPLES FOR:			
Arsenic Chromium Nickel		Lead	

INDUSTRIAL HYGIENE AIR MONITORING DATA SHEET

HAZARDOUS SUBSTANCES DATA SHEET

1. COMPANY NAME Stone & Webster Engineering Corp.	2. CONTRACT NO. DACW 41-99-D-9001	3. SAMPLING NO. TP3IHM-00004	
4. WORK ACTIVITY Excavation of rough pits in Test Pit Area 3 ("TP-3")		5. SAMPLING DATE 08/16/1999	6. SHIPPING DATE 08/18/1999
7. ~~PERSON PERFORMING SAMPLING (SIGNATURE)~~ Eric Miller		8. PRINT LAST NAME Miller	9. SSHO Decker, D.
10. MONITORED WORKER (NAME, ADDRESS, PHONE NUMBE Sergio Guitian (Franklin Environmental) Franklin Supervisor (508) 245-1307	14. EXP. INFO. C. FREQUENCY	a. NUMBER	B. DURATION
11. JOB TITLE Laborer	15. WEATHER CONDITIONS Mostly sunny, v. warm, light & variable		16. PHOTO(S) YES NO
13. PPE (TYPE AND EFFECTIVENESS) Modified Level D (Tyvek coveralls, latex + cotton gloves, booties, hard hat safety glasses)	17. PUMP CHECKS AND ADJUSTMENTS Pre-use flow check with dry calibration standard Post-use flow check with dry calibration standard Visual flow & battery check periodically throughout day		

18. JOB DESCRIPTION, OPERATION, WORK LOCATION(S), VERIFICATION, AND CONTROLS

JOB DESCRIPTION: Laborer: Dust suppression; various light duty manual labor

OPERATION: Hydraulic excavator digs trench approximately 5' wide and 15' long until groundwater or bedrock is encountered

WORK LOCATION: MISS grounds: 50' south of Stepan RR spur; temporary RMA installed

VERIFICATION:

CONTROLS: Dust suppression with nozzled water hose

FIELD SAMPLING DATA

19. PUMP NUMBER: Rented SKC #14304			30. CALCULATIONS AND NOTES:
20. SAMPLE SUBMITTAL NO. TP3IHM-00004			See attached analytical report from Severn Trent Laboratories, Ltd.
21. SAMPLE TYPE Air			**Arsenic Result: Not Detected**
22. SAMPLE MEDIA 0.8 um Mixed Cellulose Ester			**Chromium Result: 0.00030 mg/m3**
23. FILTER/TUBE NUMBER N/A			**Chromium PEL-TWA: 0.5 mg/m3**
24. TIME ON/OFF	ON	745	**Nickel Result: Not Detected**
	OFF	1610	
25. TOTAL TIME IN MINUTES		505	**Lead Result: Not Detected**
26. FLOW RATE	PRE	1.951	
L/MIN CC/MIN	POST	1.985	
27. VOLUME (IN LITERS)		993.84	
28. NET SAMPLE WEIGHT (IN MG)		N/A	
29. ANALYZE SAMPLES FOR: Arsenic Chromium Nickel Lead			

INDUSTRIAL HYGIENE AIR MONITORING DATA SHEET

HAZARDOUS SUBSTANCES DATA SHEET

1. COMPANY NAME Stone & Webster Engineering Corp.	2. CONTRACT NO. DACW 41-99-D-9001	3. SAMPLING NO. TP2IHM-00001	
4. WORK ACTIVITY Excavation of rough pits in Test Pit Area 2 ("TP-2")		5. SAMPLING DATE 08/09/1999	6. SHIPPING DATE 08/18/1999
7. PERSON PERFORMING SAMPLING (SIGNATURE) Brian Antillon		8. PRINT LAST NAME Miller	9. SSHO Decker, D.
10. MONITORED WORKER (NAME, ADDRESS, PHONE NUMBE Paul Filippi (Franklin Environmental) Franklin Supervisor (508) 245-1307	14. EXP. INFO. C. FREQUENCY	a. NUMBER	B. DURATION
11. JOB TITLE Operator	15. WEATHER CONDITIONS Mostly sunny, v. warm, light & variable		16. PHOTO(S) YES NO
13. PPE (TYPE AND EFFECTIVENESS) Modified Level D (latex + cotton gloves, booties, hard hat safety glasses)	17. PUMP CHECKS AND ADJUSTMENTS Pre-use flow check with dry calibration standard Post-use flow check with dry calibration standard Visual flow & battery check periodically throughout day		

18. JOB DESCRIPTION, OPERATION, WORK LOCATION(S), VERIFICATION, AND CONTROLS

JOB DESCRIPTION: Operator of hydraulic excavator--95% of time spent inside machine

OPERATIO Hydraulic excavator excavates trench approximately 5' wide and 15' long until groundwater or bedrock is encountered

WORK LOCATION: MISS western grounds: temporary RMA installed

VERIFICATION:

CONTROLS: Dust suppression with nozzled water hose

FIELD SAMPLING DATA

19. PUMP NUMBER: Rented SKC #14299			30. CALCULATIONS AND NOTES:
20. SAMPLE SUBMITTAL NO. TP2IHM-00001			See attached analytical report from Severn Trent Laboratories, Ltd.
21. SAMPLE TYPE Air			**Arsenic Result: Not Detected**
22. SAMPLE MEDIA 0.8 um Mixed Cellulose Ester			**Chromium Result: 0.00058 mg/m3**
23. FILTER/TUBE NUMBER N/A			**Chromium PEL-TWA: 0.5 mg/m3**
24. TIME ON/OFF	ON	1355	**Nickel Result: Not Detected**
	OFF	1645	
25. TOTAL TIME IN MINUTES		170	**Lead Result: Not Detected**
26. FLOW RATE	PRE	1.535	
L/MIN CC/MIN	POST	1.568	
27. VOLUME (IN LITERS)		263.84	
28. NET SAMPLE WEIGHT (IN MG)		N/A	
29. ANALYZE SAMPLES FOR: Arsenic Chromium Nickel Lead			

INDUSTRIAL HYGIENE AIR MONITORING DATA SHEET

HAZARDOUS SUBSTANCES DATA SHEET

1. COMPANY NAME Stone & Webster Engineering Corp.	2. CONTRACT NO. DACW 41-99-D-9001	3. SAMPLING NO. TP2IHM-00002	
4. WORK ACTIVITY Excavation of rough pits in Test Pit Area 2 ("TP-2")		5. SAMPLING DATE 08/09/1999	6. SHIPPING DATE 08/18/1999
7. PERSON PERFORMING SAMPLING (SIGNATURE) Brian Miller		8. PRINT LAST NAME Miller	9. SSHO Decker, D.
10. MONITORED WORKER (NAME, ADDRESS, PHONE NUMBE Brian Miller (SEC) SEC Supervisor (201) 843-7080 ext. 230	14. EXP. INFO. C. FREQUENCY	a. NUMBER	B. DURATION
11. JOB TITLE RPT	15. WEATHER CONDITIONS Mostly sunny, v. warm, light & variable		16. PHOTO(S) YES NO
13. PPE (TYPE AND EFFECTIVENESS) Modified Level D (Tyvek coveralls, latex + cotton gloves, booties, hard hat safety glasses)	17. PUMP CHECKS AND ADJUSTMENTS Pre-use flow check with dry calibration standard Post-use flow check with dry calibration standard Visual flow & battery check periodically throughout day		

18. JOB DESCRIPTION, OPERATION, WORK LOCATION(S), VERIFICATION, AND CONTROLS

JOB DESCRIPTION: Radiological Protection Technician (RPT): Perform radiological and IH surveys within RMA; collect soil samples

OPERATION: Hydraulic excavator digs trench approximately 5' wide and 15' long until groundwater or bedrock is encountered

WORK LOCATION: MISS western grounds: temporary RMA installed

VERIFICATION:

CONTROLS: Dust suppression with nozzled water hose

FIELD SAMPLING DATA

19. PUMP NUMBER: Rented SKC #14304			30. CALCULATIONS AND NOTES:
20. SAMPLE SUBMITTAL NO. TP2IHM-00002			See attached analytical report from Severn Trent Laboratories, Ltd.
21. SAMPLE TYPE Air			**Arsenic Result: Not Detected**
22. SAMPLE MEDIA 0.8 um Mixed Cellulose Ester			**Chromium Result: 0.00089 mg/m3**
23. FILTER/TUBE NUMBER N/A			**Chromium PEL-TWA: 0.5 mg/m3**
24. TIME ON/OFF	ON	1400	**Nickel Result: Not Detected**
	OFF	1645	
25. TOTAL TIME IN MINUTES		165	**Lead Result: 0.00064 mg/m3**
26. FLOW RATE	PRE	1.477	**Lead PEL-TWA: 0.050 mg/m3**
L/MIN CC/MIN	POST	1.473	
27. VOLUME (IN LITERS)		243.38	
28. NET SAMPLE WEIGHT (IN MG)		N/A	
29. ANALYZE SAMPLES FOR: Arsenic Chromium Nickel Lead			

INDUSTRIAL HYGIENE AIR MONITORING DATA SHEET

HAZARDOUS SUBSTANCES DATA SHEET

1. COMPANY NAME Stone & Webster Engineering Corp.	2. CONTRACT NO. DACW 41-99-D-9001	3. SAMPLING NO. TP2IHM-00003	
4. WORK ACTIVITY Excavation of rough pits in Test Pit Area 2 ("TP-2")		5. SAMPLING DATE 08/10/1999	6. SHIPPING DATE 08/18/1999
7. PERSON PERFORMING SAMPLING (SIGNATURE) Brian Miller		8. PRINT LAST NAME Miller	9. SSHO Decker, D.
10. MONITORED WORKER (NAME, ADDRESS, PHONE NUMBE Paul Filippi (Franklin Environmental) Franklin Supervisor (508) 245-1307	14. EXP. INFO. C. FREQUENCY	a. NUMBER	B. DURATION
11. JOB TITLE Operator	15. WEATHER CONDITIONS Mostly sunny, v. warm, light & variable		16. PHOTO(S) YES NO
13. PPE (TYPE AND EFFECTIVENESS) Modified Level D (latex + cotton gloves, booties, hard hat safety glasses)	17. PUMP CHECKS AND ADJUSTMENTS Pre-use flow check with dry calibration standard Post-use flow check with dry calibration standard Visual flow & battery check periodically throughout day		

18. JOB DESCRIPTION, OPERATION, WORK LOCATION(S), VERIFICATION, AND CONTROLS

JOB DESCRIPTION: Operator of hydraulic excavator: 95% of time spent inside machine

OPERATION: Hydraulic excavator digs trench approximately 5' wide and 15' long until groundwater or bedrock is encountered

WORK LOCATION: MISS western grounds: temporary RMA installed

VERIFICATION:

CONTROLS: Dust suppression with nozzled water hose

FIELD SAMPLING DATA

19. PUMP NUMBER: Rented SKC #14304			30. CALCULATIONS AND NOTES:
20. SAMPLE SUBMITTAL NO. TP2IHM-00003			See attached analytical report from Severn Trent Laboratories, Ltd.
21. SAMPLE TYPE Air			**Arsenic Result: Not Detected**
22. SAMPLE MEDIA 0.8 um Mixed Cellulose Ester			**Chromium Result: 0.00033 mg/m3**
23. FILTER/TUBE NUMBER N/A			**Chromium PEL-TWA: 0.5 mg/m3**
24. TIME ON/OFF	ON	740	**Nickel Result: Not Detected**
	OFF	1700	
25. TOTAL TIME IN MINUTES		560	**Lead Result: Not Detected**
26. FLOW RATE L/MIN CC/MIN	PRE	1.968	
	POST	1.999	
27. VOLUME (IN LITERS)		1111.04	
28. NET SAMPLE WEIGHT (IN MG)		N/A	
29. ANALYZE SAMPLES FOR: Arsenic Chromium Nickel Lead			

INDUSTRIAL HYGIENE AIR MONITORING DATA SHEET

HAZARDOUS SUBSTANCES DATA SHEET

1. COMPANY NAME Stone & Webster Engineering Corp.	2. CONTRACT NO. DACW 41-99-D-9001	3. SAMPLING NO. TP2IHM-00004	
4. WORK ACTIVITY Excavation of rough pits in Test Pit Area 2 ("TP-2")		5. SAMPLING DATE 08/10/1999	6. SHIPPING DATE 08/18/1999
7. PERSON PERFORMING SAMPLING (SIGNATURE) Brian A Miller		8. PRINT LAST NAME Miller	9. SSHO Decker, D.
10. MONITORED WORKER (NAME, ADDRESS, PHONE NUMBE A. Restrego (Franklin Environmental) Franklin Supervisor (508) 245-1307	14. EXP. INFO. C. FREQUENCY	a. NUMBER	B. DURATION
11. JOB TITLE Operator	15. WEATHER CONDITIONS Mostly sunny, v. warm, light & variable		16. PHOTO(S) YES NO
13. PPE (TYPE AND EFFECTIVENESS) Modified Level D (Tyvek coveralls, latex + cotton gloves, booties, hard hat safety glasses)	17. PUMP CHECKS AND ADJUSTMENTS Pre-use flow check with dry calibration standard Post-use flow check with dry calibration standard Visual flow & battery check periodically throughout day		

18. JOB DESCRIPTION, OPERATION, WORK LOCATION(S), VERIFICATION, AND CONTROLS
JOB DESCRIPTION: Laborer: Dust suppression with water hose; various light duty manual labor
OPERATION: Hydraulic excavator digs trench approximately 5' wide and 15' long until groundwater or bedrock is encountered
WORK LOCATION: MISS western grounds: temporary RMA installed
VERIFICATION:
CONTROLS: Dust suppression with nozzled water hose

FIELD SAMPLING DATA

19. PUMP NUMBER: Rented SKC #14299			30. CALCULATIONS AND NOTES:
20. SAMPLE SUBMITTAL NO. TP2IHM-00004			See attached analytical report from Severn Trent Laboratories, Ltd.
21. SAMPLE TYPE Air			**Arsenic Result: Not Detected**
22. SAMPLE MEDIA 0.8 um Mixed Cellulose Ester			**Chromium Result: 0.0010 mg/m3**
23. FILTER/TUBE NUMBER N/A			**Chromium PEL-TWA: 0.5 mg/m3**
24. TIME ON/OFF	ON	750	**Nickel Result: Not Detected**
	OFF	1630	
25. TOTAL TIME IN MINUTES		520	**Lead Result: 0.00017 mg/m3**
26. FLOW RATE	PRE	1.881	**Lead PEL-TWA: 0.050 mg/m3**
L/MIN CC/MIN	POST	1.939	
27. VOLUME (IN LITERS)		993.2	
28. NET SAMPLE WEIGHT (IN MG)		N/A	
29. ANALYZE SAMPLES FOR: Arsenic Chromium Nickel		Lead	

INDUSTRIAL HYGIENE AIR MONITORING DATA SHEET

HAZARDOUS SUBSTANCES DATA SHEET

1. COMPANY NAME Stone & Webster Engineering Corp.	2. CONTRACT NO. DACW 41-99-D-9001	3. SAMPLING NO. TP1IHM-00001	
4. WORK ACTIVITY Excavation of rough pits in Test Pit Area 1 ("TP-1")		5. SAMPLING DATE 08/11/1999	6. SHIPPING DATE 08/18/1999
7. PERSON PERFORMING SAMPLING (SIGNATURE) Brian Miller		8. PRINT LAST NAME Miller	9. SSHO Decker, D.
10. MONITORED WORKER (NAME, ADDRESS, PHONE NUMBE Paul Filippi (Franklin Environmental) Franklin Supervisor (508) 245-1307	14. EXP. INFO. C. FREQUENCY	a. NUMBER	B. DURATION
11. JOB TITLE Operator	15. WEATHER CONDITIONS Mostly sunny, v. warm, light & variable		16. PHOTO(S) YES NO
13. PPE (TYPE AND EFFECTIVENESS) Modified Level D (latex + cotton gloves, booties, hard hat safety glasses)	17. PUMP CHECKS AND ADJUSTMENTS Pre-use flow check with dry calibration standard Post-use flow check with dry calibration standard Visual flow & battery check periodically throughout day		

18. JOB DESCRIPTION, OPERATION, WORK LOCATION(S), VERIFICATION, AND CONTROLS

JOB DESCRIPTION: Operates hydraulic excavator: 95% of time spent inside machine

OPERATION: Hydraulic excavator digs trench approximately 5' wide and 15' long until groundwater or bedrock is encountered

WORK LOCATION: MISS western grounds:inside main RMA

VERIFICATION:

CONTROLS: Dust suppression with nozzled water hose

FIELD SAMPLING DATA

19. PUMP NUMBER: Rented SKC #14299			30. CALCULATIONS AND NOTES:
20. SAMPLE SUBMITTAL NO. TP1IHM-00001			See attached analytical report from Severn Trent Laboratories, Ltd.
21. SAMPLE TYPE Air			**Arsenic Result: Not Detected**
22. SAMPLE MEDIA 0.8 um Mixed Cellulose Ester			**Chromium Result: 0.00014 mg/m3**
23. FILTER/TUBE NUMBER N/A			**Chromium PEL-TWA: 0.5 mg/m3**
24. TIME ON/OFF	ON	730	**Nickel Result: 0.00013 mg/m3**
	OFF	1720	**Nickel PEL-TWA: 1 mg/m3**
25. TOTAL TIME IN MINUTES		590	**Lead Result: 0.00017 mg/m3**
26. FLOW RATE	PRE	1.893	**Lead PEL-TWA: 0.050 mg/m3**
L/MIN CC/MIN	POST	1.955	
27. VOLUME (IN LITERS)		1135.16	
28. NET SAMPLE WEIGHT (IN MG)		N/A	
29. ANALYZE SAMPLES FOR: Arsenic Chromium Nickel Lead			

INDUSTRIAL HYGIENE AIR MONITORING DATA SHEET

HAZARDOUS SUBSTANCES DATA SHEET

1. COMPANY NAME Stone & Webster Engineering Corp.	2. CONTRACT NO. DACW 41-99-D-9001	3. SAMPLING NO. TP1IHM-00002	
4. WORK ACTIVITY Excavation of rough pits in Test Pit Area 1 ("TP-1")		5. SAMPLING DATE 08/11/1999	6. SHIPPING DATE 08/18/1999
7. PERSON PERFORMING SAMPLING (SIGNATURE)		8. PRINT LAST NAME Miller	9. SSHO Decker, D.
10. MONITORED WORKER (NAME, ADDRESS, PHONE NUMBE David Carroll (Franklin Environmental) Franklin Supervisor (508) 245-1307	14. EXP. INFO. C. FREQUENCY	a. NUMBER	B. DURATION
11. JOB TITLE Laborer	15. WEATHER CONDITIONS Mostly sunny, v. warm, light & variable		16. PHOTO(S) YES NO
13. PPE (TYPE AND EFFECTIVENESS) Modified Level D (Tyvek coveralls, latex + cotton gloves, booties, hard hat safety glasses)	17. PUMP CHECKS AND ADJUSTMENTS Pre-use flow check with dry calibration standard Post-use flow check with dry calibration standard Visual flow & battery check periodically throughout day		

18. JOB DESCRIPTION, OPERATION, WORK LOCATION(S), VERIFICATION, AND CONTROLS
JOB DESCRIPTION: Laborer: Dust suppression; various light duty manual labor
OPERATION: Hydraulic excavator digs trench approximately 5' wide and 15' long until groundwater or bedrock is encountered
WORK LOCATION: MISS western grounds:inside main RMA
VERIFICATION:
CONTROLS: Dust suppression with nozzled water hose

FIELD SAMPLING DATA

19. PUMP NUMBER: Rented SKC #14304			30. CALCULATIONS AND NOTES:
20. SAMPLE SUBMITTAL NO. TP1IHM-00002			See attached analytical report from Severn Trent Laboratories, Ltd.
21. SAMPLE TYPE Air			**Arsenic Result: Not Detected**
22. SAMPLE MEDIA 0.8 um Mixed Cellulose Ester			**Chromium Result: 0.00027 mg/m3**
23. FILTER/TUBE NUMBER N/A			**Chromium PEL-TWA: 0.5 mg/m3**
24. TIME ON/OFF	ON	730	**Nickel Result: Not Detected**
	OFF	1730	
25. TOTAL TIME IN MINUTES		600	**Lead Result: Not Detected**
26. FLOW RATE	PRE	1.967	
L/MIN CC/MIN	POST	1.967	
27. VOLUME (IN LITERS)		1180.2	
28. NET SAMPLE WEIGHT (IN MG)		N/A	
29. ANALYZE SAMPLES FOR: Arsenic Chromium Nickel Lead			

INDUSTRIAL HYGIENE AIR MONITORING DATA SHEET

HAZARDOUS SUBSTANCES DATA SHEET

1. COMPANY NAME Stone & Webster Engineering Corp.	2. CONTRACT NO. DACW 41-99-D-9001	3. SAMPLING NO. TP3IHM-00001	
4. WORK ACTIVITY Excavation of rough pits in Test Pit Area 3 ("TP-3")		5. SAMPLING DATE 08/12/1999	6. SHIPPING DATE 08/18/1999
7. PERSON PERFORMING SAMPLING (SIGNATURE) Eric Miller		8. PRINT LAST NAME Miller	9. SSHO Decker, D.
10. MONITORED WORKER (NAME, ADDRESS, PHONE NUMBE Rodney Gendreau (SEC SEC Supervisor (201) 843-7080 ext. 230	14. EXP. INFO.	a. NUMBER	B. DURATION
	C. FREQUENCY		
11. JOB TITLE RPT	15. WEATHER CONDITIONS Mostly sunny, v. warm, light & variable		16. PHOTO(S) YES NO
13. PPE (TYPE AND EFFECTIVENESS) Modified Level D (latex + cotton gloves, booties, hard hat safety glasses)	17. PUMP CHECKS AND ADJUSTMENTS Pre-use flow check with dry calibration standard Post-use flow check with dry calibration standard Visual flow & battery check periodically throughout day		

18. JOB DESCRIPTION, OPERATION, WORK LOCATION(S), VERIFICATION, AND CONTROLS

JOB DESCRIPTION: RPT: Perform radiological and IH surveys within RMA; collect soil samples

OPERATION: Hydraulic excavator digs a trench approximately 5' wide and 15' long until groundwater or bedrock is encountered

WORK LOCATION: MISS grounds: 50' south of Stepan RR spur; temporary RMA installed

VERIFICATION:

CONTROLS: Dust suppression with nozzled water hose

FIELD SAMPLING DATA

19. PUMP NUMBER: Rented SKC #14304			30. CALCULATIONS AND NOTES:
20. SAMPLE SUBMITTAL NO. TP3IHM-00001			See attached analytical report from Severn Trent Laboratories, Ltd.
21. SAMPLE TYPE Air			**Arsenic Result: Not Detected**
22. SAMPLE MEDIA 0.8 um Mixed Cellulose Ester			**Chromium Result: 0.00022 mg/m3**
23. FILTER/TUBE NUMBER N/A			**Chromium PEL-TWA: 0.5 mg/m3**
24. TIME ON/OFF	ON	720	**Nickel Result: Not Detected**
	OFF	1600	
25. TOTAL TIME IN MINUTES		520	**Lead Result: Not Detected**
26. FLOW RATE	PRE	1.955	
L/MIN CC/MIN	POST	1.941	
27. VOLUME (IN LITERS)		1012.96	
28. NET SAMPLE WEIGHT (IN MG)		N/A	
29. ANALYZE SAMPLES FOR: Arsenic Chromium Nickel Lead			

FUSRAP S-024 (9/22/94)

INDUSTRIAL HYGIENE AIR MONITORING DATA SHEET

HAZARDOUS SUBSTANCES DATA SHEET

1. COMPANY NAME Stone & Webster Engineering Corp.	2. CONTRACT NO. DACW 41-99-D-9001	3. SAMPLING NO. TP3IHM-00002
4. WORK ACTIVITY Excavation of rough pits in Test Pit Area 3 ("TP-3")	5. SAMPLING DATE 08/12/1999	6. SHIPPING DATE 08/18/1999
7. PERSON PERFORMING SAMPLING (SIGNATURE) [signature]	8. PRINT LAST NAME Miller	9. SSHO Decker, D.

10. MONITORED WORKER (NAME, ADDRESS, PHONE NUMBE Paul Filippi (Franklin Environmental) Franklin Supervisor (508) 245-1307	14. EXP. INFO. C. FREQUENCY	a. NUMBER	B. DURATION
11. JOB TITLE Operator	15. WEATHER CONDITIONS Mostly sunny, v. warm, light & variable		16. PHOTO(S) YES NO
13. PPE (TYPE AND EFFECTIVENESS) Modified Level D (latex + cotton gloves, booties, hard hat safety glasses)	17. PUMP CHECKS AND ADJUSTMENTS Pre-use flow check with dry calibration standard Post-use flow check with dry calibration standard Visual flow & battery check periodically throughout day		

18. JOB DESCRIPTION, OPERATION, WORK LOCATION(S), VERIFICATION, AND CONTROLS

JOB DESCRIPTION: Operates hydraulic excavator: 95% of time spent inside machine

OPERATION: Hydraulic excavator digs trench approximately 5' wide and 15' long until groundwater or bedrock is encountered

WORK LOCATION: MISS grounds: 50' south of Stepan RR spur; temporary RMA installed

VERIFICATION:

CONTROLS: Dust suppression with nozzled water hose

FIELD SAMPLING DATA

19. PUMP NUMBER: Rented SKC #14299			30. CALCULATIONS AND NOTES:
20. SAMPLE SUBMITTAL NO. TP3IHM-00002			See attached analytical report from Severn Trent Laboratories, Ltd.
21. SAMPLE TYPE Air			**Arsenic Result: Not Detected**
22. SAMPLE MEDIA 0.8 um Mixed Cellulose Ester			**Chromium Result: 0.000092 mg/m3**
23. FILTER/TUBE NUMBER N/A			**Chromium PEL-TWA: 0.5 mg/m3**
24. TIME ON/OFF	ON	740	**Nickel Result: Not Detected**
	OFF	1630	
25. TOTAL TIME IN MINUTES		530	**Lead Result: Not Detected**
26. FLOW RATE	PRE	1.885	
L/MIN CC/MIN	POST	1.869	
27. VOLUME (IN LITERS)		994.81	
28. NET SAMPLE WEIGHT (IN MG)		N/A	
29. ANALYZE SAMPLES FOR: Arsenic Chromium Nickel Lead			

INDUSTRIAL HYGIENE AIR MONITORING DATA SHEET

HAZARDOUS SUBSTANCES DATA SHEET

1. COMPANY NAME Stone & Webster Engineering Corp.	2. CONTRACT NO. DACW 41-99-D-9001	3. SAMPLING NO. TP3IHM-00003	
4. WORK ACTIVITY Excavation of rough pits in Test Pit Area 3 ("TP-3")		5. SAMPLING DATE 08/16/1999	6. SHIPPING DATE 08/18/1999
7. PERSON PERFORMING SAMPLING (SIGNATURE) Craig Miller		8. PRINT LAST NAME Miller	9. SSHO Decker, D.
10. MONITORED WORKER (NAME, ADDRESS, PHONE NUMBE Paul Filippi (Franklin Environmental) Franklin Supervisor (508) 245-1307	14. EXP. INFO. C. FREQUENCY	a. NUMBER	B. DURATION
11. JOB TITLE Operator	15. WEATHER CONDITIONS Mostly sunny, v. warm, light & variable		16. PHOTO(S) YES NO
13. PPE (TYPE AND EFFECTIVENESS) Modified Level D (latex + cotton gloves, booties, hard hat safety glasses)	17. PUMP CHECKS AND ADJUSTMENTS Pre-use flow check with dry calibration standard Post-use flow check with dry calibration standard Visual flow & battery check periodically throughout day		

18. JOB DESCRIPTION, OPERATION, WORK LOCATION(S), VERIFICATION, AND CONTROLS

JOB DESCRIPTION: Operates hydraulic excavator: 95% of time spent inside machine

OPERATION: Hydraulic excavator digs trench approximately 5' wide and 15' long until groundwater or bedrock is encountered

WORK LOCATION: MISS grounds: 50' south of Stepan RR spur; temporary RMA installed

VERIFICATION:

CONTROLS: Dust suppression with nozzled water hose

FIELD SAMPLING DATA

19. PUMP NUMBER: Rented SKC #14299			30. CALCULATIONS AND NOTES:
20. SAMPLE SUBMITTAL NO. TP3IHM-00003			See attached analytical report from Severn Trent Laboratories, Ltd.
21. SAMPLE TYPE Air			**Arsenic Result: Not Detected**
22. SAMPLE MEDIA 0.8 um Mixed Cellulose Ester			**Chromium Result: 0.00022 mg/m3**
23. FILTER/TUBE NUMBER N/A			**Chromium PEL-TWA: 0.5 mg/m3**
24. TIME ON/OFF	ON	745	**Nickel Result: Not Detected**
	OFF	1600	
25. TOTAL TIME IN MINUTES		495	**Lead Result: 0.00019 mg/m3** **Lead PEL-TWA: 0.050 mg/m3**
26. FLOW RATE	PRE	1.884	
L/MIN CC/MIN	POST	1.897	
27. VOLUME (IN LITERS)		936.05	
28. NET SAMPLE WEIGHT (IN MG)		N/A	
29. ANALYZE SAMPLES FOR: Arsenic Chromium Nickel Lead			

INDUSTRIAL HYGIENE AIR MONITORING DATA SHEET

HAZARDOUS SUBSTANCES DATA SHEET

1. COMPANY NAME Stone & Webster Engineering Corp.	2. CONTRACT NO. DACW 41-99-D-9001	3. SAMPLING NO. TP3IHM-00004	
4. WORK ACTIVITY Excavation of rough pits in Test Pit Area 3 ("TP-3")		5. SAMPLING DATE 08/16/1999	6. SHIPPING DATE 08/18/1999
7. ~~PERSON PERFORMING SAMPLING (SIGNATURE)~~		8. PRINT LAST NAME Miller	9. SSHO Decker, D.
10. MONITORED WORKER (NAME, ADDRESS, PHONE NUMBE Sergio Guitian (Franklin Environmental) Franklin Supervisor (508) 245-1307	14. EXP. INFO. C. FREQUENCY	a. NUMBER	B. DURATION
11. JOB TITLE Laborer	15. WEATHER CONDITIONS Mostly sunny, v. warm, light & variable		16. PHOTO(S) YES NO
13. PPE (TYPE AND EFFECTIVENESS) Modified Level D (Tyvek coveralls, latex + cotton gloves, booties, hard hat safety glasses)	17. PUMP CHECKS AND ADJUSTMENTS Pre-use flow check with dry calibration standard Post-use flow check with dry calibration standard Visual flow & battery check periodically throughout day		

18. JOB DESCRIPTION, OPERATION, WORK LOCATION(S), VERIFICATION, AND CONTROLS

JOB DESCRIPTION: Laborer: Dust suppression; various light duty manual labor

OPERATION: Hydraulic excavator digs trench approximately 5' wide and 15' long until groundwater or bedrock is encountered

WORK LOCATION: MISS grounds: 50' south of Stepan RR spur; temporary RMA installed

VERIFICATION:

CONTROLS: Dust suppression with nozzled water hose

FIELD SAMPLING DATA

19. PUMP NUMBER:			30. CALCULATIONS AND NOTES:
Rented SKC #14304			
20. SAMPLE SUBMITTAL NO.			See attached analytical report from Severn Trent Laboratories, Ltd.
TP3IHM-00004			
21. SAMPLE TYPE			**Arsenic Result: Not Detected**
Air			
22. SAMPLE MEDIA			
0.8 um Mixed Cellulose Ester			**Chromium Result: 0.00030 mg/m3**
23. FILTER/TUBE NUMBER			**Chromium PEL-TWA: 0.5 mg/m3**
N/A			
24. TIME ON/OFF	ON	745	**Nickel Result: Not Detected**
	OFF	1610	
25. TOTAL TIME			**Lead Result: Not Detected**
IN MINUTES		505	
26. FLOW RATE	PRE	1.951	
L/MIN CC/MIN	POST	1.985	
27. VOLUME (IN LITERS)			
		993.84	
28. NET SAMPLE WEIGHT			
(IN MG)		N/A	
29. ANALYZE SAMPLES FOR:			
Arsenic Chromium Nickel		Lead	

FMSS HAZARDOUS WORK PERMIT (HWP)

NO. 9 9 0 0 0 1

Revision Number 0

Technical Work Document Number:	WORK LOCATION:
Work Description:	MISS RETENTION POND AREA
ENGINEERING TEST PITS	Est. Start Date /Time 8-6-99/0700
EXCAVATION AND ASSOCIATED SUPPORT	Termination Date
ACTIVITIES TO INCLUDE: Manual labor and Heavy	Requested by DICK SKRYNESS
Equipment Operations	Request Date 8-2-99

Is a Radiological/ ALARA Review Required? No ■ Yes ☐ (see Rad Con 312)

CHEMICALS/DUST LIMITS:	RADIATION /CONTAM. LEVELS:	COMBUSTABLES/FLAMMABLE:	SITE SURVEYS: Type	Number	Date	By
	Exposure Rate: <500 uR/hr					
> 4 mg/m3 DUST	Loose Alpha: <1K dpm/100cm2					
> 10% lel	Limiting Isotope: TH 232	Other (Specify):				
< 20% OXYGEN	Limiting DAC: 1E-12 uCi/ml					
>10 PPM ~~VOA~~ VOC	DAC Limits: 5E-13 uCi/ml					
	Soil Conc: <2000 pCi/gm					

Head/Eyes	Feet/Legs	Body
■ Hard Hat	■ Sturdy Work Shoes	☐ Cotton Coveralls
■ Safety Glasses	■ Disposable shoe covers	■ Tyvek Coveralls (Regular) B
☐ Monogoggles	■ Other (Specify):	☐ Tyvek Coveralls (Coated)
☐ Face Shield	Rubber overshoes/boots	☐ Other (Specify)
☐ Other (specify)		
Respiratory	**Hands**	**Miscellaneous**
■ Full Face (Negative Pressure) * B	■ Cotton Work Gloves	■ Tape Gloves & Boots to Coveralls
☐ Powered Air Purifying	■ Latex Gloves	☐ Fall Protection
* Specify Cartridge or Canister Type Below	☐ Rubber Gloves	■ Hearing Protection B
☐ Other (specify)	☐ Other (Specify):	☐ Other (Specify)

- ☐ MSDS
- ☐ Firewatch
- ■ Portable Fire Extinguisher
- ☐ Tagging and Lockout
- ☐ Confined Space Entry Permit
- ■ Pre-Entry Monitoring
- ☐ Emergency Response Equipment
- ■ Hand-Held Radio Communication
- ■ Portable Eyewash Station
- ■ "Buddy System" in effect
- ■ Job Coverage by Safety and Health Personnel
- ■ Special training Pre-job briefing
- ☐ Excavation Permit
- ☐ Fire Retardent Clothing
- ☐ Special Personnel Frisking Consideration
- ☐ Special Dose or Contamination Reduction Considerations
- ☐ Stay Time Controls
- ■ Other (Specify) FIRST AID KIT

Required Engineering Controls (Specify):

TYVEK NOT REQUIRED FOR OPERATOR PROVIDED THEY STAY IN CAB AND PERFORM NO MANUAL LABOR

FF RESPIRATORS W/COMBINATION CARTRIDGE REQUIRED DURING INITIAL SURFACE BREACH OF EACH ROUGH PIT AND AS REQUIRED BASED ON ATMOSPHERIC MONITORING DATA >10 PPM VOC

HEARING PROTECTION FOR NOISE LEVELS EXCEEDING 85 dB A

Dosimetry	Indiv.	Group
TLD Badge	x	
Extremity TLD		
Other (Specify):		

Air Monitoring	Indiv.	Work Area
Lapel Sampler	x	
Dust		x
LOW VOLUME		x

Expiration: 9-30-99/2400

Comments:
This permit will be reviewed for revision as conditions change or at 1 year from the date of implementation.

Approvals

Site RSO [signature]	8/6/99	Site RSO or SSHO
SSHO [signature]	8/9/99	Reason:

FMSS HAZARDOUS WORK PERMIT (HWP)

NO. 9 9 0 0 0 2

Revision Number 0

Technical Work Document Number:

Work Description:

ENGINEERING TEST PITS
RADIOLOGICAL AND CHEMICAL SAMPLING ACTIVITIES INSIDE RMA.

WORK LOCATION:	MISS RETENTION POND AREAS
Est. Start Date /Time	8-6-99/0700
Termination Date	
Requested by	DICK SKRYNESS
Request Date	8-2-99

Is a Radiological/ ALARA Review Required? No ■ Yes ☐ (see Rad Con 312)

CHEMICALS/DUST LIMITS:	RADIATION LEVELS:	COMBUSTABLES/FLAMMABLE:
	Exposure Rate: <500 uR/hr	
> 4 mg/m3 DUST	Loose Alpha: <IK <1K	
> 10% lel	Limiting isotope: TH 232	Other (Specify):
< 20% OXYGEN	Limiting DAC: <1K dpm/100cm2	
> 10 PPM ~~VOA~~ VOC uz	DAC Limits: 5E-13 uCi/ml	
	Soil Conc: <2000 pCi/gm	

SITE SURVEYS:

Type	Number	Date	By

Head/Eyes	Feet/Legs	Body
■ Hard Hat	■ Sturdy Work Shoes	☐ Cotton Coveralls
■ Safety Glasses	■ Disposable shoe covers	■ Tyvek Coveralls (Regular)
☐ Monogoggles	■ Other (Specify):	☐ Tyvek Coveralls (Coated)
☐ Face Shield	Rubber overshoes/boots	☐ Other (Specify)
☐ Other (specify)		

Respiratory	Hands	Miscellaneous
■ Full Face (Negative Pressure) * B	■ Cotton Work Gloves	■ Tape Gloves & Boots to Coveralls
☐ Powered Air Purifying	■ Latex Gloves	☐ Fall Protection
* Specify Cartridge or Canister Type Below	☐ Rubber Gloves	■ Hearing Protection B
☐ Other (specify)	☐ Other (Specify):	☐ Other (Specify)

- ☐ MSDS
- ☐ Firewatch
- ■ Portable Fire Extinguisher (HEAVY EQUIPMENT)
- ☐ Tagging and Lockout
- ☐ Confined Space Entry Permit
- ■ Pre-Entry Monitoring
- ☐ Emergency Response Equipment
- ■ Hand-Held Radio Communication
- ■ Portable Eyewash Station
- ■ "Buddy System" in effect
- ■ Job Coverage by Safety and Health Personnel
- ■ Special training Pre-job briefing
- ☐ Excavation Permit
- ☐ Fire Retardant Clothing
- ☐ Special Personnel Frisking Consideration
- ☐ Special Dose or Contamination Reduction Considerations
- ☐ Stay Time Controls
- ■ Other (Specify) FIRST AID KIT

Required Engineering Controls (Specify):

HEARING PROTECTION FOR NOISE LEVELS EXCEEDING 85 dB A

FF RESPIRATOR W/COMBINATION CARTRIDGE AS REQUIRED , BASED ON ATMOSPHERIC MONIRORING DATA > 10 PPM VOC

Dosimetry	Indiv.	Group
TLD Badge	x	
Extremity TLD		
Other (Specify):		

Air Monitoring	Indiv.	Work Area
Lapel Sampler	x	
Dust:		x
LOW VOLUME		x

9-30-99/2400

Comments:
This permit will be reviewed for revision as conditions change or at 1 year from the date of implementation.

Site RSO [signature]	8/6/99	Site RSO or SSHO
SSHO Dick Doolier	8/9/99	Reason:

FMSS HAZARDOUS WORK PERMIT (HWP)

NO. 9 9 0 0 0 3

Revision Number 0

Technical Work Document Number:	WORK LOCATION:
Work Description:	MISS RETENTION POND AREAS
ENGINEERING TEST PITS	Est. Start Date /Time 8-6-99/0700
RADIOLOGICAL /INDUSTRIAL HYGEINE SURVEYING	Termination Date
ACTIVITIES INSIDE RMA.	Requested by DICK SKRYNESS
	Request Date 8-2-99

Is a Radiological/ ALARA Review Required? No ■ Yes ☐ (see Rad Con 312)

CHEMICALS/DUST LIMITS:	RADIATION /CONTAM. LEVELS:	COMBUSTABLES/FLAMMABLE:	SITE SURVEYS: Type	Number	Date	By
	Exposure Rate: <500 uR/hr					
> 4 mg/m3 DUST	Loose Alpha: <1K dpm/100cm2					
> 10% lel	Limiting Isotope: TH 232	Other (Specify):				
< 20% OXYGEN	Limiting DAC: 1E-12 uCi/ml					
> 10 PPM ~~VOA~~ VOC 8/2	DAC Limits: 5E-13 uCi/ml					
	Soil Conc: <2000 pCi/gm					

Head/Eyes	Feet/Legs	Body
■ Hard Hat	■ Sturdy Work Shoes	☐ Cotton Coveralls
■ Safety Glasses	■ Disposable shoe covers	■ Tyvek Coveralls (Regular) B
☐ Monogoggles	■ Other (Specify):	☐ Tyvek Coveralls (Coated)
☐ Face Shield	Rubber overshoes/boots	☐ Other (Specify)
☐ Other (specify)		

Respiratory	Hands	Miscellaneous
■ Full Face (Negative Pressure) * B	■ Cotton Work Gloves	■ Tape Gloves & Boots to Coveralls
☐ Powered Air Purifying	■ Latex Gloves	☐ Fall Protection
* Specify Cartridge or Canister Type Below	☐ Rubber Gloves	■ Hearing Protection B
☐ Other (specify)	☐ Other (Specify):	☐ Other (Specify)

☐ MSDS	Required Engineering Controls (Specify):
☐ Firewatch	
☐ Portable Fire Extinguisher	
☐ Tagging and Lockout	FF RESPIRATORS W/COMBINATION
☐ Confined Space Entry Permit	CARTRIDGE /TYVEK REQUIRED
☐ Pre-Entry Monitoring	DURING INITIAL SURFACE BREACH
☐ Emergency Response Equipment	OF EACH ROUGH PIT AND AS
■ Hand-Held Radio Communication	REQUIRED BASED ON ATMOSPERIC
☐ Portable Eyewash Station	MONITORING DATA > 10 PPM VOC
■ "Buddy System" in effect	
■ Job Coverage by Safety and Health Personnel	
■ Special training Pre-job briefing	HEARING PROTECTION FOR NOISE
☐ Excavation Permit	LEVELS EXCEEDING 85 dB A
☐ Fire Retardant Clothing	
☐ Special Personnel Frisking Consideration	
☐ Special Dose or Contamination Reduction Considerations	
☐ Stay Time Controls	
■ Other (Specify) FIRST AID KIT	

Dosimetry	Indiv.	Group
TLD Badge	x	
Extremity TLD		
Other (Specify):		

Air Monitoring	Indiv.	Work Area
Lapel Sampler	x	
Dust:		
LOW VOLUME		

9-30-99/2400

Comments:
This permit will be reviewed for revision as conditions change or at 1 year from the date of implementation.

Site RSO [signature]	8/6/99	Site RSO or SSHO
SSHO [signature]	8/9/99	Reason:

FMSS HAZARDOUS WORK PERMIT (HWP)

NO. | 9 | 9 | 0 | 0 | 0 | 4

Revision Number

Technical Work Document Number:	WORK LOCATION:
Work Description:	MISS RADIOACTIVE MATERIAL AREAS
ROUTINE SITE OPERATIONS	Est. Start Date /Time 8-6-99/0700
TOURS, INSPECTIONS, "LIGHT WORK" ACTIVITIES	Termination Date
INSIDE RMA.	Requested by DICK SKRYNESS
	Request Date 8-2-99

Is a Radiological/ ALARA Review Required? No ■ Yes ☐ (see Rad Con 312)

CHEMICALS/DUST LIMITS:	RADIATION /CONTAM. LEVELS:	COMBUSTABLES/FLAMMABLE:	SITE SURVEYS: Type	Number	Date	By
	Exposure Rate: <500 uR/hr					
> 4 mg/m3 DUST	Loose Alpha:<200 dpm/100cm2					
> 10% lel	Limiting Isotope: TH 232	Other (Specify):				
< 20% OXYGEN	Limiting DAC: 1E-12 uCi/ml					
> 10 PPM VOC	DAC Limits: 5E-13 uCi/ml					
	Soil Conc: <2000 pCi/gm					

Head/Eyes	Feet/Legs	Body
■ Hard Hat	■ Sturdy Work Shoes	☐ Cotton Coveralls
■ Safety Glasses	■ Disposable shoe covers	☐ Tyvek Coveralls (Regular)
☐ Monogoggles	■ Other (Specify):	☐ Tyvek Coveralls (Coated)
☐ Face Shield	Rubber overshoes/boots	☐ Other (Specify)
☐ Other (specify)		

Respiratory	Hands	Miscellaneous
☐ Full Face (Negative Pressure) *	■ Cotton Work Gloves	■ Tape Gloves & Boots to Coveralls
☐ Powered Air Purifying	■ Latex Gloves	☐ Fall Protection
* Specify Cartridge or Canister Type Below	☐ Rubber Gloves	■ Hearing Protection B
☐ Other (specify)	☐ Other (Specify):	☐ Other (Specify)

	Required Engineering Controls (Specify):	Dosimetry	Indiv.	Group
☐ MSDS	HEARING PROTECTION FOR NOISE	TLD Badge	X	
☐ Firewatch	LEVELS EXCEEDING 85 dB A	Extremity TLD		
☐ Portable Fire Extinguisher		Other (Specify):		
☐ Tagging and Lockout	NO INTRUSIVE ACTIVITIES			
☐ Confined Space Entry Permit	PERMITTED ON THIS HWP.			
☐ Pre-Entry Monitoring		**Air Monitoring**	**Indiv.**	**Work Area**
☐ Emergency Response Equipment	NO AIRBORNE GENERATING	Lapel Sampler		
■ Hand-Held Radio Communication	ACTIVITIES PERMITTED ON THIS	Dust:		
☐ Portable Eyewash Station	HWP	LOW VOLUME		X
■ "Buddy System" in effect				
■ Job Coverage by Safety and Health Personnel				
■ Special training Pre-job briefing				
☐ Excavation Permit			9-30-99/2400	
☐ Fire Retardant Clothing		Comments:		
☐ Special Personnel Frisking Consideration		This permit will be reviewed for revision as conditions change or at 1 year from the date of implementation.		
☐ Special Dose or Contamination Reduction Considerations				
☐ Stay Time Controls				
■ Other (Specify) FIRST AID KIT				

Approvals

Site RSO [signature]	8/6/99	Site RSO or SSHO
SSHO [signature]	8/9/99	Reason:

APPENDIX H

ENGINEERING TEST PITS AT MISS
WETLANDS DELINEATION

FUSRAP MAYWOOD SUPERFUND SITE
MAYWOOD, NEW JERSEY

Dul → Skrzypek
Bryson
Brown

Memorandum

To: Dan Samella

CC: Emil Dul, Dave Doyle

From: Gary Bickle

Date: 08/04/99

Re: Presence of wetlands at MISS site

Per my site visit with you of July 28, 1999, this memo provides my initial evaluation of the referenced site for the presence of regulated wetlands. Based on the site maps provided to me and the assumption that the property boundaries are reflected by the perimeter fences on the site, it is my professional opinion that there are no regulated wetlands on the site.

There were, however, several preliminary indicators to suggest that wetlands might be on the site. Specifically, representations on existing maps indicate that NJDEP identified two areas of the site as wetlands. Based on my field investigations, neither area had the vegetation or hydrology characteristics to indicate wetland conditions. Furthermore, the soils have been sufficiently disturbed so that indicators of wetland presence cannot be determined. While NJDEP maps provide guidance regarding the presence of freshwater wetlands, they are not regulatory in nature. Furthermore, I have no basis at this time to determine whether the provided maps accurately reflect NJDEP data. In any event, the absence of physical indications of wetlands in the areas preliminarily identified, preclude regulatory authority.

Isolated *Phragmites* plants were also found on the site. *Phragmites* can be considered an indicator of wet conditions. However, it is also an indicator of disturbed condition. The *Phragmites* on the site is isolated, stunted, and located in areas that provide no other evidence of wetland conditions.

Based on the field visits, it is my conclusion that there are no regulated wetland on the site and the implementation of the test pits can proceed without further wetland evaluation.

[redacted]

August 4, 1999

Please be advised, however, that the only way to absolutely guarantee the absence of regulated wetlands on the site is through a Letter of Interpretation through NJDEP. The process for securing such a letter can take upwards of 45 days or more.

I will provide you with a full report on the site as well as an analysis of the other sites visited. In the interim, please call me at 609-339-1853 or 609-932-4597 should there be any questions.

RESPONSE TO REGULATOR COMMENTS – DRAFT FINAL PILOT DEMONSTRATION WORK PLAN – General

Attached are the responses to comments on the Pilot Demonstration Work Plan by the US Environmental Protection Agency. Comments which were revised based on the 6/14/00 conference call are shaded.

PDWP Volume	**Page(s)**
General	2 – 10
1 – Overview	11 – 12
2 – Soil Acquisition Work Plan and Pilot Plant Pad Design	13 – 14
2 – Processed Material Soil Reuse Evaluation Plan	15
3 – Pilot Plant Operation Plan	16 – 18
4 – Sampling and Analysis Plan	19 – 20
4 – Safety and Health Plan	21 – 23
5 – Results of Engineering Test Pits Program at MISS	24

RESPONSE TO REGULATOR COMMENTS – DRAFT FINAL PILOT DEMONSTRATION WORK PLAN – General

#	Page and Sec. Nos.	Comment	Response
		Carpenter	
	Determination of Criteria/Ability to Meet Criteria		
1		In reviewing the work plan, several questions arise regarding the "above criteria" and "below criteria" soil. Three specific areas of concern are 1) the determination of criteria for processing, 2) the ability to distinguish the contaminants of concern in the screening and separation processes, and 3) the useful determination of the effectiveness of the technology with limited isotopic data.	See Below for Responses to Comments.
2		The work plan indicates that the criteria will be based on the reuse or disposal requirement. While the work plan presents numerical values for the criteria the radiological contaminants of concern, EPA notes that these criteria are subject to change pending public comment and issuance of a record of decision. The pilot demonstration project does not, but should, evaluate the economic and technical ability of the treatment system(s) to achieve criteria suitable for unrestricted use in addition to the criteria for restricted use.	The criteria by which the systems are evaluated will be varied during the pilot demonstration. These criteria will include the clean-up levels and reuse levels for the site as well as possible disposal criteria. It is acknowledged that the cleanup and onsite reuse criteria are subject to change pending an approved Record of Decision. The evaluation of the degree to which the systems meet the selected criteria is limited only by the detection limits of the equipment and laboratory methods chosen. These limits are low enough to perform an adequate assessment for unrestricted use.
3		Volume 4 page 15 describes additional review of data and additional sodium iodide measurements prior to pilot plant start up with the objective of determining a "rough correlation" between the sodium iodide counts and the concentration of isotopes of concern. This correlation will be used to relate the count rates to the SOR. The count rate that correlates to an SOR of 1 will be used as the criteria to determine soils greater and lower than criteria. EPA is concerned that this approach may be oversimplified for soils containing a mixture of radionuclides. Improper separation of soils containing Th-232 contamination is of particular concern since gamma spectroscopy is less useful for Th-232 measurements than it is for Ra-226 and U-238.	This correlation of the count rate to the SOR will only be used during the initial screening of each 1-foot cut of soil during soil acquisition. It will be used to guide the selection of the batches and slugs for processing. Once the selection is made, samples will be collected from the slug and analyzed by the onsite laboratory using gamma spectroscopy methods. The slugs will be characterized using this definitive analysis both prior to and at the conclusion of processing. Additional radiological sampling and onsite laboratory analysis will be performed of the batch following processing. Thus contaminant levels will be quantified definitively at various points during the pilot demonstration in order to facilitate a comparison of the total activities of the pre- and post-

Shading indicates change based on 6/14/00 Conference Call with EPA.

RESPONSE TO REGULATOR COMMENTS – DRAFT FINAL PILOT DEMONSTRATION WORK PLAN – General

#	Page and Sec. Nos.	Comment	Response
			processed soils and to evaluate whether the equipment has correctly separated the above criteria soil from the below criteria soil. For additional sampling details please refer to the General Sampling Sequence provided with these responses.
4		The work plan should discuss how much variability is there around the set point for the radiological sorting system. What percentage of soil with concentration below the set point is dropped out as being greater than the set point? While the pilot demonstration scenarios listed in Section 4.4.4 Volume 3 do pose questions for investigation regarding separation of material near the set point for clean up criteria and for disposal criteria and whether field screening could supplement the sorting system, the overriding concern is the ability to fully characterize the activity in the soil with the measurement techniques proposed. It is unclear as to whether or not there will be any detailed analysis of the greater than 3/8 inch fraction remaining from the gravel separation or the "clean pile" from the radiological sorting system to ensure that no contaminants are improperly segregated.	The variability in the set points for the radiological sorting system is equipment specific. Thermo Nutech, the vendor for the system, has been consulted regarding this issue. Based on the information they provide, the set points will be chosen such that sufficient conservatism is built in to account for the variability. Both the greater than 3/8 inch fraction remaining from the gravel separation and the "clean pile" from the radiological sorting system will be radiologically sampled at the conclusion of processing. As part of the activity tracking, three samples will be collected of the less than 3/8 inch "clean" material for each slug processed. For each batch, sampling will occur for each pile at a frequency of one sample per batch or every 50 cubic yards whichever is less. These samples will be submitted for definitive analysis by the onsite laboratory using gamma spectroscopy. For additional sampling details please refer to the General Sampling Sequence provided with these responses.
	Soil Characterization		
1		The work plan indicates that the radiological, chemical, and geotechnical characteristics of the soils at MISS were developed using the field measurements and sampling performed for the Engineering Test Pits (Volume 5, pg. 10). It also states that the technologies selected are based on the recognition that the bulk of the soils are not uniformly contaminated and that the radiological contamination is concentrated in the finer fractions of the soil mass. The measurement process presented may be appropriate for	Definitive analysis by the onsite laboratory will be used to characterize the slugs and batches as discussed in previous Comments 3 and 4 under Determination of Criteria/Ability to Meet Criteria. This sampling is also summarized in the General Sampling Sequence provided with these responses. Sampling will be performed on a slug and batch basis. Because the slug is intended to track the activity of the pre- and post-processed material and because the majority of the

Shading indicates change based on 6/14/00 Conference Call with EPA.

#	Page and Sec. Nos.	Comment	Response
		determining the gross activity levels and profile at the site; however, it does not seem sufficient to fully determine the radiological characteristics of the soils at MISS and subsequently the efficiency of the separation technologies.	radiological contamination is believed to occur in the less than 3/8 inch material, only samples of the less than 3/8 inch material that enters and exits the processing systems will be collected for each slug. Note that the slug is not intended to characterize the batch. It is intended only to serve as a small subset of the soil within the batch which, given its smaller size, will facilitate better tracking of the radioactivity. In response to the comments received, the frequency per slug has been increased to three samples of the output stockpiles and three samples between the two systems. The remainder of the slug sampling will stay the same and is believed to be sufficient for the intended purpose. The batch will be used to evaluate options for final disposition of the processed materials. Batch sampling is proposed to occur at a frequency of the lesser of either 1 sample from each post-processed stockpile comprising the batch or every 50 cubic yards in individual stockpiles if the stockpiles themselves are greater than 50 cubic yards. The 50 cubic yard measurement was selected based on a general average of the proposed sampling for evaluating soil reuse (1 sample per 20 cubic yards for the first 100 cubic yards and 1 sample per 100 cubic yards for each additional 100 cubic yards thereafter). This reuse sampling frequency is the recommended protocol for characterizing waste piles as stated in the State of New Jersey's *1998 Revised Guidance Document for the Remediation of Contaminated Soils*. Thus this sampling is also believed to be sufficient for the intended purpose.
2		During the pilot, it is important to know the characteristics of the test soil prior to processing to determine the performance of the system. Volume 4, Section 4.1 indicates "This characterization will occur in place, prior to the excavation, and between each excavation cut." The use of in situ	ISOCS is not proposed to be used for characterizing pre- or post-processed soils. Prior to excavation, samples will be collected from the soil acquisition footprint and they will be submitted to the onsite laboratory for gamma spectroscopy analysis. Gamma spectroscopy will be used because it can be

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RESPONSE TO REGULATOR COMMENTS – DRAFT FINAL PILOT DEMONSTRATION WORK PLAN – General

#	Page and Sec. Nos.	Comment	Response
		measurements for isotopic specific concentration in soil and characterization is addressed in my December 2, 1999. In this letter EPA noted that while in situ gamma spectrometry is superior to field scanning techniques, it is not as useful for quantification as laboratory analysis. Alpha spectroscopy versus gamma spectroscopy for the identification of Th-232 and U-238 is also discussed in the December letter. For the explicit purpose of determining the applicability of separation technologies for the purpose of achieving volume reduction and remediation cost savings, further characterization of the feedstock, separated materials, and waste streams would produce more verifiable results and is strongly recommended.	done by the onsite laboratory and in general has a faster turnaround time. It is felt that gamma spectroscopy will provide adequate results for this demonstration. Since Th-232 and Ra-226 do not have strong gammas, the activities of the daughter products are analyzed as detailed below: The laboratory samples are prepared by drying the sample to a constant weight, pulverizing the sample to a constant mesh, sealing the sample, leak testing the container and allowing sufficient time for the daughter products to reach secular equilibrium. Currently the samples are allowed to equilibrate for a minimum of 21 days. Note: this length of time is to allow the equilibration of Ra-226 daughter products. For the determination of Th-232 activity the assumption is made that the Ra-228 daughter is in secular equilibrium with the Th-232. As no chemical process has been performed with the source material since approximately 1958, this is a safe assumption. The longest-lived daughter product of Ra-228 is approximately 10.6 hours. Therefore within approximately 80 hours after sealing the sample, the activity of the daughter products will be within 99% of the activity of the parent. The Th-232 activity in soil is determined by the analysis of 8 gamma energy lines from the Th-232 daughters: Ac-228, Pb-212 and Tl-208. The same method is used to determine the Ra-226 activity. The daughter products are allowed to equilibrate and the sample is analyzed for the daughter products. Six energy lines from Pb-214 and Bi-214 are analyzed to determine the activity of the Ra-226. Two energy lines from U-238 daughters are used to determine

RESPONSE TO REGULATOR COMMENTS – DRAFT FINAL PILOT DEMONSTRATION WORK PLAN – General

#	Page and Sec. Nos.	Comment	Response
			the U-238 activity, one from Th-234 and one from Pa-234m for which secular equilibrium is assumed.
2a		Additional Comments from EPA Lab.	
		a. The container used for holding samples to be analyzed for Rn-222 daughters should be verified radon tight (i.e., no or minimal radon diffusion through the plastic). Some plastics exhibit relatively significant radon diffusion, even when sealed tight.	Presently, the FUSRAP Maywood Radiological Laboratory uses a metal sample container with a triple friction lid, i.e. paint can style. This lid seal is augmented with silicon sealant. The silicon is allowed to set, and 100 % of the sample containers are leak-tested. Each sample container is immersed in warm water and observed for leaks. The results of the leak test are logged along with the sample ID, date and the initials of the person performing the test. Note that the project is considering switching to a sample container that utilizes a double folded seal, i.e. a true can seal. This system would give a higher degree of assurance of an air-tight seal.
		b. I agree that the assumption that Th-232 and Ra-228 will be in equilibrium is a good assumption. However, there are some factors which tend to drive this out of equilibrium, such as soil pH and solubility. Ra tends to be rather mobile in the state of NJ, especially into groundwater, based on information from USGS. I would recommend that this assumption be verified for a limited number of samples during the pilot study.	The document "Characterization of Soil Samples from the Maywood Chemical Company Site," March , 1993 (Maywood Administrative Record # MISS-044), prepared by Sanford Cohen and Associates for EPA's National Air and Radiation Environmental Laboratory, documented the analysis of soil samples from the MISS and the vicinity properties by both alpha and gamma spectroscopy. As part of its conclusions, it reported the following: "The comparison between the alpha and gamma analyses for the whole soil samples demonstrates that radium-228 and thorium-232 are in equilibrium; that is, the radium-228 concentration is equal to the thorium-232 concentration." (page 6-5)
		c. Rather than to combine the activities based on energy lines for daughters (e.g., Ac-228, Pb-212, and Tl-208), I	To the first part of this comment regarding the combination of activities based on the energy lines for the Th-232 daughters

Shading indicates change based on 6/14/00 Conference Call with EPA.

#	Page and Sec. Nos.	Comment	Response
		recommend using peaks from each nuclide to quantify that nuclide, then see if the results are consistent. This can provide greater assurance that equilibrium assumptions (especially for Ra-226) are satisfied. Also, Ra-226 will probably show up in the 186 keV peak. This peak can be used to quantify Ra-226, but it may overestimate Ra-226 concentrations due to emission of 186 keV gammas by U-235. d. Caution must be used for determining the branching ratio for Th-234 if the 92 keV peak is used for quantification (I've seen rather large sites use a value that is half of the effective value - there are 2 peaks at about the 92 keV range that must be summed). Also, caution must be used when quantifying Tl-208 peaks since it is only present at 36% of the Pb-212 concentration.	Ac-228, Pb-212, and Tl-208, this is effectively performed though Canberra's software. Although this is not presented in the final results summary it is available in the "raw data" report that is part of the final data package. The degree of agreement between the activities of the individual energy lines is part of the QA review process performed by the laboratory staff. The on-site laboratory does not use the 186 keV energy line for quantifying Ra-226 due to the conflict with U-235. If the daughters are shown to be in equilibrium their activity equals the activity of the parent Ra-226. This should be sufficient to quantify the Ra-226 activity. The FUSRAP Maywood Radiological Laboratory does not use the 92 keV photon peaks. The Lab presently uses the 63.3 keV Th-234 and the 1001keV Pa-234m energy lines to quantify U-238. The Lab does use Tl-208 energy lines in part to quantify Th-232, also Ac-228 and Pb-212. Again the Canberra software does a weighted average activity for the energy lines used. These line activities are available in the "raw data" presented in the final data package.
3		In general, EPA agrees with the approach of performing initial screening to determine if the levels of soil are too high to even warrant processing (Volume 4, pg. 10). However, it should be noted that a contaminated layer could mask a significant amount of clean soil below the initial top layer (for example, the top half-inch has several hotspots with clean soil below). It may be useful to determine how frequently these situations may occur or to perform separations initially to test the theory that the 1x1x1 sections can be disposed rather than processed	Based on past observations at the site, the distribution of contamination is variable at the MISS. Significant effort would be required to identify the distribution of small isolated hot spots that might exist at the site. This is one of the reasons why radiological sorting has a good potential to work successfully at the MISS. One would not have to fully characterize the site in order to separate the "clean" material from the contaminated material as would be required under traditional hog and haul remedial measures. The processing

#	Page and Sec. Nos.	Comment	Response
		based on screening.	equipment itself separates the materials according to contaminant levels. Thus the amount of "clean" material requiring offsite disposal as radiologically contaminated is minimized.
4		The measurement processes for the characterization of the Engineering Test Pits described the use of gamma screening of the excavator bucket with hand held instruments, sodium iodide scan at the field sample preparation area, and compositing based on zones selected on field screening measurements and visual observations for on site gamma spectroscopy. It is indicated that the material stockpiled on the site will not have detailed characterization data but will be surface scanned using sodium iodide survey instrument lined to G.P.S. and mapping software. The ability to fully characterize the contaminants and the representativeness of the slug samples are of central importance in the analysis proposed. As noted previously, if the purpose of the demonstration is to determine the efficiency of the separation systems more thorough analysis of the feedstock, pre/post processed streams is needed to determine the effectiveness of the separation techniques and, similarly, to determine if the use of the technology is economically viable and appropriate for full scale implementation at this site.	As stated in previous responses (Comments 3 and 4 under Determination of Criteria/Ability to Meet Criteria and Comment 1 under Soil Characterization), the separated material will undergo detailed characterization by the onsite laboratory using gamma spectroscopy. The sampling frequencies as currently proposed are believed to be sufficient for the respective purposes of the slug and batch. Please also refer to the General Sampling Sequence provided with these responses.
	Phase III (currently referred to as Stage III) Activities (Volume 4, Section 4.3)		
1		Included in Phase III activities, are the evaluation of other excavation and material handing techniques and the impact of these techniques. Potentially larger cuts amplifies the concerns expressed previously regarding detection of radiological contaminates of concern in the soil and the need for additional characterization of the radiological characteristics of the site.	Radiological sorting will not be performed during Stage III (formerly Phase III). Stage III will be used to test other operational issues associated with remedial construction, such as excavation methods and hot spot removal.
2		How will homogeneity of the soil be verified? It appears that protocols will be established using field screening techniques	It is presumed that once the contamination has been excavated, the soils will be homogeneous at the base of the

#	Page and Sec. Nos.	Comment	Response
		rather than isotopic characterization of the soil. It would be useful to verify the field screening results prior to protocol development.	excavation. This point is supported by previous data collected for the project during the test pit program. This data shows less than 10% variability among samples collected below the bottom of contamination. In addition, samples will be collected to confirm this assumption.
3		EPA's December letter proposed an iterative approach to integrating ISOCS into the field survey work and recommended intercomparison if ISOCS was to be used to replace laboratory analyses. This intercomparison appears to be part of Phase III, although is seems to be utilized in Phases I and II, please clarify.	The Stage III data collected regarding ISOCS will be added to the data collected as part of the comparison study in order to augment the data set. ISOCS will not be used during Stages I and II. No final status survey decisions will be made based on the ISOCS data. It is being collected for information only.
	Gravel Separation		
1		For the gravel separation system, the vendor is proposing to dry screen the contaminated materials through a 3/8 inch screen. Dry screening of soils usually results in an inadequate separation of the fines from the coarse fraction. A lot of greater than 3/8-inch material will remain on top of the screen as clumps because of the moisture content and plastic properties of the fines (present at up to 40%). Excavation and dry screening present the potential for dust generation. Adding water to the material to control dust exacerbates the problem with clumping and inadequate fines separation. As a consequence, the gravel rinsing step will have to handle a large volume of fines, including dewatering the fines, to achieve the desired fines separation and contaminant levels in the gravel fraction. Given that significant dewatering may be performed anyway, it is suggested that wet screening be considered.	The effectiveness of the gravel screen will be evaluated as part of the demonstration. Proposed locations of dust monitoring stations are provided in Volume 4 (SSHP). It is believed that the dry screening proposed will be effective without generating excess dust. The dry-screen unit is fully enclosed, which will also limit dust generation. This will be evaluated as part of the demonstration.
2		To accurately determine whether dry screening will be a problem, excavation and handling of the soil must be conducted so as to preserve the moisture content of the in situ material.	Material will be excavated and processed the same day. To the extent possible, moisture content will be preserved.
3		For the radiological separation of the high fines content	This will be evaluated as part of the demonstration. Based on

Shading indicates change based on 6/14/00 Conference Call with EPA.

#	Page and Sec. Nos.	Comment	Response
		retention pond soil, high moisture content in the material may make a successful screening difficult, even with the relatively large 1-1/2-inch screen planned for use with this material.	information analyzed to date, the radiological sorting system will be capable of processing the material.
4		Despite the amount of detail provided in the plan, there is no clear overall picture of how the soil batches will be formed from the stockpiles and how the batches relate to the 9 processing scenarios in Table 8 of the Pilot Plant Operation Plan. This should be denoted in the plan.	Soil batches will not be formed from stockpiles. They will be identified prior to excavation. Please refer to the *General Soil Acquisition Sampling Sequence for Pilot Demonstration*. This description will be incorporated into the Work Plan.

Shading indicates change based on 6/14/00 Conference Call with EPA.

RESPONSE TO REGULATOR COMMENTS – DRAFT FINAL PILOT DEMONSTRATION WORK PLAN - Volume 1 Overview

#	Page and Sec. Nos.	Comment	Response
		Carpenter	
1	General	The work plan should include some discussion of the basis for selecting dry screening and radiological sorting. This information could be added as a brief summary supported by references to any bench-scale testing reports.	Additional information will be provided regarding the selection of these processing technologies.
2	General	The work plan should identify the radiological criteria to be used in the demonstration project in this Volume.	The criteria will be varied during the pilot demonstration. It may consist of the cleanup criteria, reuse criteria, or disposal criteria.
3	Page 7, Section 3.0, Paragraph 3	The meaning of the sentence "None of this data led to reduce the economic viability of soil management." Is not clear. The sentence should be revised.	This statement will be clarified to indicate that following the economic analysis, the use of soil management (e.g. soil processing) was still considered viable.
4	Page 18, Section 5.5.2, Paragraph 2	Recommend that the USACE conduct an evaluation to ensure that dust emissions of radioactive contaminants do not exceed dose limits established in 40 CFR 61, National Emissions Standards for Hazardous Air Pollutants.	A calculation was performed for the pilot demonstration using the CAP88-PC computer code. The results of this calculation will be included in the final version of the Pilot Demonstration Work Plan. It concluded that the annual effective population dose to the public within 80 km of the MISS from airborne particulate releases during the pilot demonstration was estimated to be 0.05 person-rem. The annual effective dose to the maximally exposed resident (90 m NE) and worker (90 m NE), primarily from inhalation of airborne particulate releases during the pilot demonstration, is estimated to be 0.04 mrem and 0.02 mrem, respectively. These doses are well below the NESHAPS standard of 10 mrem/yr. This calculation is currently being reviewed by the USACE.
5	Page 20, Section 5.6, 2nd and 5th bullets	Any protocols for identification and removal of residual contamination as well as any work plans for final status surveys should be submitted to EPA for review prior to implementation.	Identification and removal of any residual contamination will take place during Stage III of the pilot demonstration. Prior to initiating this stage, existing data will have been reviewed to pre-determine where the residual contamination exists and how deep it occurs. During Stage III, the base of the excavation will be scanned using a NaI detector to verify the previously determined areas of residual contamination and identify any additional hot spots. If a reasonable effort is required to remove this material, then it will be excavated until

Shading indicates change based on 6/14/00 Conference Call with EPA.

RESPONSE TO REGULATOR COMMENTS – DRAFT FINAL PILOT DEMONSTRATION WORK PLAN - Volume 1 Overview

#	Page and Sec. Nos.	Comment	Response
			the surface scans indicate radiological contamination is below cleanup criteria. If excavating the material would require too significant an effort, this material will be left in place and demarcated so that it can be removed during full-scale operation. At the conclusion of the Stage III excavation, a final status survey will be performed of the clean portion of the base. A Final Status Survey Work Plan is in the process of being developed for the pilot demonstration. It will be provided to the EPA and NJDEP for review once it is drafted.

Shading indicates change based on 6/14/00 Conference Call with EPA.

RESPONSE TO REGULATOR COMMENTS – DRAFT FINAL PILOT DEMONSTRATION WORK PLAN – Volume 2 Soil Acquisition Plan and Pilot Plant Pad Design

#	Page and Sec. Nos.	Comment	
		EPA - Carpenter	
6	Section 4.3, Page 10, last bullet	see Comment 5 regarding MARSSIM surveys, also EPA notes that pending final selection of clean up criteria the excavation may need additional remediation.	Agreed. Markers will be left in place indicating the extent of contamination. These will be used should additional excavation be necessary.
7	Section 4.11, Page 15, Paragraph 3;	Specify the basis the field operation leader (FOL) will use to select which stockpile will receive the excavated material. Will the decision be made entirely on visual observation and the location of the source or will field scanning and/or laboratory results be available?	Field Screening (NaI) and visual inspection will be the primary tools.
8	Section 4.11, Page 15, Paragraph 3;	The text reads "The FOL will direct each of the truckloads to one of the three stockpiles shown in Figure 3." However, the text describes four stockpiles A, B, C, and K. The location of stockpile K, which is not shown in Figure 3, should be specified.	Stockpile K will be added to the drawing.
9	Section 4.11, Page 15, Paragraph 3;	Briefly summarize how the stockpiles relate to the processing scenarios in Table 8 of the Pilot Plant Operation Plan and how processing batches will be formed and selected.	The following will be incorporated into the text: ♦ The stockpiles are not related to the processing scenarios in Volume 3 except as follows: - Retention Pond material not to be processed through the gravel separation system goes to Stockpile B - Material going to Stockpiles A and K will not be processed through either system. - Granular material to be processed through the gravel separation system goes to Stockpile C. This is also called the "Day Pile" ♦ Batches are determined in-situ, prior to excavation. They are not formed from stockpiles. Based on visual and NaI scan data, the batches for whatever cut elevation is being worked will be determined. For instance, at initial grade, if NaI scans show a distinct area of higher activity, and a distinct area of lower activity (all granular), then two batches will be identified. A slug will be identified within

Shading indicates change based on 6/14/00 Conference Call with EPA.

#	Page and Sec. Nos.	Comment	
			each batch (still prior to excavation). Slug samples be collected from the excavation for onsite laboratory gamma spectroscopy. Slug material will be excavated and processed, and sampled at the outputs. The remainder of the batch will then be excavated and processed, and sampled at the outputs. This will be repeated for each batch identified. Please refer to the *General Soil Acquisition Sampling Sequence for Pilot Demonstration* for additional details. This document will be incorporated into the Work Plan.
10	Section 5.0, Page 17;	Again EPA notes that the development of a work plan for a final status survey is dependent on the formal selection of clean up criteria in a record of decision.	Agreed. A Final Status Survey Work Plan is under development, and will be submitted for EPA and NJDEP review prior to implementation. As stated in the response to Comment 6, markers will be left at the limits of the excavation in case additional excavation is required.

RESPONSE TO REGULATOR COMMENTS - DRAFT FINAL PILOT DEMONSTRATION WORK PLAN - Volume 2 Processed Material Soil Reuse Evaluation Plan

#	Page and Sec. Nos.	Comment	
		EPA - Carpenter	
11	*Section 1.0, Page 1, Last Sentence*	The text reads "During remediation (including soil processing) of the FMSS, three separate material streams described as follows are anticipated:" However, the table that follows contains four stream numbers and a total of five entries. Editorial/technical correction needed.	Agreed. Text now reads: "During remediation (including soil processing) of the FMSS, separate material streams described as follows are anticipated:"
12	*Section 4.0, Page 6, General*;	The stream numbers used in this section do not appear to be consistent with the numbers used throughout the other plans. It would help clarify if the stream numbering system were used for the reuse evaluation plan.	The stream numbers in this section are different, since this plan will not be implemented during the pilot demonstration. However, a correlation between the streams identified in the other plans will be provided.
13	*Section 4.0, page 6, General*	The sampling for the reuse evaluation is not described in the operation plan. The plans should be cross referenced to clarify how the samples discussed in this section relate to the batch and slug samples and assist the reader in understanding the total amount of sampling to be done.	The sampling programs are slightly different. For the pilot demonstration, sampling will be performed every 50 cubic yards to evaluate reuse. Samples collected for the tracking of the slugs will also be used to evaluate for reuse. This sampling frequency is an average of the reuse sampling frequency. It is based on NJ DEP protocols. Refer to comment response number 1 under "Soil Characterization". Note, however, that <u>no</u> reuse will take place during the pilot demonstration. This plan is included for consideration of future reuse. Future reuse is relevant to the pilot demonstration because it impacts the overall economics of the soil processing systems. Sampling frequencies proposed in the work plan are based generally on the proposed sampling for reuse, to support any future decisions to reuse the material. All material from the pilot demonstration will be disposed of offsite.

Shading indicates change based on 6/14/00 Conference Call with EPA.

RESPONSE TO REGULATOR COMMENTS - DRAFT FINAL PILOT DEMONSTRATION WORK PLAN – Volume 3 – Pilot Plant Operation Plan

#	Page and Sec. Nos.	Comment	
		EPA - Carpenter	
14	Section 3.3, Page 11, last paragraph;	Radiological set points should be specified.	These setpoints will be developed. They are currently based on an SOR < 1, with criteria of 15 pCi/g Th-232 and Ra-226; 50 pCi/g U-238 or 5 pCi/g Th-232 and Ra-226; 50 pCi/g U-238. Waste acceptance criteria may also be used. Thermo Nutech will translate this criteria to their equipment's setpoint.
15	Section 3.5, Page 13, paragraph 2;	How will contamination at depths greater than 6 feet be handled?	Stage III of the soil acquisition plan will address deeper contamination. Refer to Volume 2. Volume 3 is intended to address the operation of the systems only. Volume 2 – Soil Acquisition Plan and Pilot Plant Pad Design addresses the removal of contamination from the soil acquisition area.
16	Section 3.6, Page 18, General;	More information should be provided about operation of the radiological sorting system. The detection limit for the system should be stated and compared to the radiological sorting criteria. A method should be described to check for increasing background activity in the system to determine if the system is becoming contaminated and giving false high readings (i.e, sending clean material to the contaminated pile).	Methods for checking for increased background radiation are in place. These include: ♦ Scans on empty conveyors. ♦ Daily Checks/Calibrations ♦ Confirmatory sampling on output piles.
17	Section 4.1, Page 18, General;	The decision criteria for sorting the soil on radioactivity should be tabulated. Numerical values for these criteria are important for determining if the instrument detection limits for the processing system and the analysis effort are adequate.	See Response to Comment No. 14
18	Section 4.2, Page 20, General;	The ability to control airborne contamination is critical to the success of this technology. The frequency and location of air sampling monitors should be described in this section with a reference to specific sampling and analysis methods provided	Refer to response to Comment No. 31 (SHP). Location of air monitors will be determined after the erection of the equipment. The air sampling philosophy is discussed in the SHP.

Shading indicates change based on 6/14/00 Conference Call with EPA.

#	Page and Sec. Nos.	Comment	
		either in the Sampling and Analysis Plan or the Safety and Health Plan.	Also, note that a "no visible dust" policy will be in effect for the pilot demonstration. Additionally, CAP88-PC calculations performed for the pilot demonstration, assuming no dust mitigation, showed a negligible offsite impact.
19	Section 4.2, Page 20, Item 1 "Specific activity of selected process streams";	Stream 7 "input from gravel separation system" should also be included in the slug sampling to allow closing the radiological mass balance on a consistent basis (see "Radiological Sorting" at the bottom of Page 28).	Stream 7 will be sampled to facilitate a tighter evaluation around the radiological sorting unit. Three grab samples per slug will be collected.
20	Section 4.2, Page 20, Item 1 "Specific activity of selected process streams"	The sampling envisioned for each slug should be described in more detail. In particular how many subsamples will be collected from each processed stream resulting from each slug and will the subsamples be analyzed individually or mixed to form a composite? If a composite is formed, how many duplicates will be analyzed from the composite?	Stream — Samples 1 — 9 samples (grab – 1 per grid) 7 — 3 samples (grab) 8 — 3 samples (grab) – Note – 100% scan performed 9 — 3 samples (grab) – Note – 100% scan performed No compositing of samples will be conducted.
21	Section 4.2, Page 20, Item 1 "Specific activity of selected process stream";	One slug from each batch is inadequate to provide information about how well the slug represents the batch. At least 3 to 5 slugs should be analyzed.	The purpose of the slug is not to characterize the batch. The slugs and batches have distinct purposes: Slug – to track weight and activity of a small volume of material. This will be used to evaluate mixing/dilution and how well the radioactive material can be accounted for. Batch – Full production level type effort. Only weight will be tracked. Will be used to evaluate effectiveness and economics of the systems.
22	Section 4.2, Page 20, Item 1	Last sentence; Sampling every 50 cubic yards as described here is not consistent with the sampling every 20 cubic yards for the	These are different programs. No material from the pilot demonstration will be reused. The selection of 50 cubic yards

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RESPONSE TO REGULATOR COMMENTS – DRAFT FINAL PILOT DEMONSTRATION WORK PLAN – Volume 3 – Pilot Plant Operation Plan

#	Page and Sec. Nos.	Comment	
	"Specific activity of selected process streams";	first 100 cubic yards and every 100 cubic yards thereafter as described in Section 4.0 of the Reuse Evaluation Plan. Clarify whether these are intended as two separate sampling programs or an inconsistent description of the same program.	is an average based on the proposed reuse sampling. Refer to comment response number 1 under "Soil Characterization".
23	Table 6, Page 24;	The second "7" should be deleted.	Agreed. This change will be made
24	Section 50, Page 31, Paragraph 2;	Once the disposal facility has been identified, ensure that sampling every 1,000 cubic yards is acceptable to the facility. A sampling frequency of once every 1,000 cubic yards seems low with samples every 100 to 150 cubic yards more typical.	A Materials Handling Transport & Disposal Plan (MHTDP) is in use at the site. Disposal site specific information will be included in updates to it. Radiological sampling will be more frequent. Sampling will be consistent with the disposal site requirements.
25	Section 5.1, Page 31;.	Disposal of waste that is both radiologically contaminated and RCRA hazardous may be difficult and expensive. More information should be provided about the possible alternatives for disposal of this type of waste	Information on the soil acquisition area gathered to date does not indicate the presence of RCRA levels of any chemical contaminants. The area is being pre-characterized for chemical contamination, as we do not intend to process any RCRA hazardous material. Should any RCRA hazardous material be encountered, it will be handled in accordance with the MHTDP

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RESPONSE TO REGULATOR COMMENTS – DRAFT FINAL PILOT DEMONSTRATION WORK PLAN - Volume 4 Sampling and Analysis Plan

#	Page and Sec. Nos.	Comment	Response
		Carpenter	
26	Page 15, Section 5.2.1	The sampling envisioned for each slug should be described in more detail. In particular how many subsamples will be collected from each processed stream resulting from each slug and will the subsamples be analyzed individually or mixed to form a composite? If a composite is formed, how many duplicates will be analyzed from the composite?	Please refer to General Sampling Sequence provided with these responses for a summary of the slug sampling. No compositing will be performed. There is a sensitivity to the concerns the EPA and NJDEP have expressed in the past regarding compositing samples. Past comments have indicated a concern regarding the impact compositing has on the analytical detection limits (i.e. elevating them).
27	Page 15, Section 5.2.1	Batch sampling methods should be described in more detail. Accurate statistical sampling from stockpiles is very difficult. When possible, samples should be collected as random grab samples from a conveyor belt (Gy, 1982; Pitard, 1992; see reference citations at the end of these comments).	Please refer to the General Sampling Sequence provided with these responses for a summary of the batch sampling. Sampling from conveyors will be investigated and implemented where practical.
28	Page 15, Section 5.2.1	There should be at least 3 slugs studied for each batch to allow a statistical determination of how well the slugs represent the batch.	The slugs and the batches are intended to serve different purposes. The slug will not be used to characterize the batch. It is intended only to serve as a small subset of the soil within the batch which, given its smaller size, will facilitate better tracking of the radioactivity and mass. The batch will be used to evaluate options for final disposition of the processed materials. The sampling protocols proposed for the slug and the batch are different as they are designed to meet the stated objective of each. The results of one are not dependent on and have no bearing on the other.
29	Page 20, Section 5.4.1	The radiological and chemical criteria and method detection limits should be tabulated to ensure that the methods are sufficiently sensitive.	This evaluation is documented in the CDQMP for the radiological constituents of concern, volatile organic compounds, semivolatile organic compounds, metals, pesticides, and polychlorinated biphenyls for both soil and water. It is also documented for total recoverable petroleum hydrocarbons, toxicity characteristic leaching procedure, total organic halides, paint filter liquid test, flashpoint, reactive cyanide, and reactive sulfide for soils and total suspended

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RESPONSE TO REGULATOR COMMENTS – DRAFT FINAL PILOT DEMONSTRATION WORK PLAN - Volume 4 Sampling and Analysis Plan

#	Page and Sec. Nos.	Comment	Response
			solids for water.
30	Page 20, Section 5.4.1	This section refers to a QAPP that is a section of the CDQMP. Is this the same QAP that is included as a tab in Volume four with the notation "will be issued at a later date".	The QAPP referred to in the SAP is the Quality Assurance Project Plan. It is the first part of the Chemical Data Quality Management Plan (CDQMP) and it addresses sampling and analysis procedural requirements for the entire FUSRAP Maywood Superfund Site. The "QAP" you refer to is actually a Construction Quality Control Plan which is for the pilot demonstration only and is a task specific document which details how the Contractor Quality Control Plan (CQCP) will be implemented for the individual task.

#	Page and Sec. Nos.	Comment	
		EPA - Carpenter	
31	*Section 8.0*;	The ability to control airborne contamination is critical to the success of this technology. Air sampling should be described explicitly on a project specific basis rather than included by reference to another plan. See previous comment.	See the following discussion. The initial location of samplers is shown in the SHP. The location may be modified based on the final orientation of the equipment. This discussion will be added to the SHP. **Radiological** *Personnel* Personnel exposures will be monitored using lapel air samplers. Lapel air samples will be collected at the end of each work shift, or upon completion of a specific task. Lapel air samples will be screened on site for gross alpha/beta activity using a low background counting system equipped with a gas flow proportional detector. Samples exceeding the minimum detectable activity of the screening instrument will be sent to an off site laboratory for analysis by alpha spectroscopy. Results of the alpha spectroscopy analyses will be used to assign personnel exposures when compared to the Derived Air Concentration (DAC) values outlined in 10 CFR 20 Appendix B, Table 1, Column 3 *Work Area* At a minimum, four (4) low volume air samplers will be strategically placed within the work area to assess airborne radioactivity as it pertains to radiological posting. These samplers will be placed downwind of suspected airborne generating components when practical. The samples will be collected at the end of each work shift. These air samples will be analyzed on site for gross alpha/beta activity using a low

#	Page and Sec. Nos.	Comment	
			background counting system equipped with a gas flow proportional detector. Results of these samples will be compared to the DAC values outlined in 10 CFR 20 Appendix B, Table 1, Column 3 *Perimeter* At a minimum, four (4) low volume air samples will be placed around the site perimeter to assess airborne radioactivity as it pertains to off site release. These air samples will be collected twice per week. These air samples will be screened on site for gross alpha/beta activity using a low background counting system equipped with a gas flow proportional detector. Samples exceeding the minimum detectable activity of the screening instrument will be sent to an off site laboratory for analysis by alpha spectroscopy. Results of these samples will be compared to the DAC values outlined in 10 CFR 20 Appendix B, Table 2, Column 1. **Industrial Hygiene** Dust Dust monitoring will be performed in both the immediate work area and along the site perimeter using a "real-time" aerosol monitor. Correlations between dust and our various radiological and chemical contaminants have been pre-established. Stop-work values have also been established for both the work area and site perimeter. They are: Work Area > 4mg/m3 Perimeter > 0.05 mg/m3

#	Page and Sec. Nos.	Comment	
			Additional Monitoring Additionally, air monitoring for volatile organics, LEL, oxygen, carbon monoxide, and hydrogen sulfide will be performed throughout the excavation process and intermittently during processing of the material. This monitoring will be accomplished using a real-time combination PID/4-GAS meter.

RESPONSE TO REGULATOR COMMENTS - DRAFT FINAL PILOT DEMONSTRATION WORK PLAN – Volume 5 Engineering Test Pits at MISS Report

#	Page and Sec. Nos.	Comment	
		EPA - Carpenter	
32	Cover Page;	The current title is confusing. A title such as "Results from Engineering Test Pits at MISS" would be more clear.	Title will be changed to "Results of Engineering Test Pits Program at MISS"
33	Section 4.2.1.4, Page 21, Paragraph 1;	Quantitative information, even if it is preliminary, should be provided about the expected criteria for radiological levels of waste that is to be disposed of at non-radioactive waste sites. If this criteria is different than the NJDEP soil criteria, the feasibility of radiological sorting could be reduced. Section 4.4 indicates that a quote was obtained from a RCRA Subtitle D landfill. Information on the criteria for disposal at the facility should be provided.	The purpose of the analysis in this document is to demonstrate the economic feasibility of the proposed soil processing systems. Once the pilot demonstration is completed, a number of assumptions in this analysis will be changed to reflect the results of the pilot demonstration. Any revised economic analysis will be incorporated into the Pilot Demonstration Report.
34	Section 4.2.1.4, Page 21, Last sentence of last paragraph in section	"fifty-six (61) percent" should be changed to "fifty-six (56) percent" – providing that it is 56%.	"Fifty-six (56) percent" is correct. It will be changed.
35	Section 10.2, Page 32, paragraph 3	This paragraph appears to be missing text.	Note – this text is in Appendix A. The missing text appears in the next paragraph. The paragraphs have been merged.
36	Appendix E;	If the purpose of the comparison to the NJDEP Non-residential clean up values in this section is to demonstrate that material can be reused on site once radiological contamination has been addressed post treatment then the comparison should be to the NJDEP impact-to-groundwater values where available.	The NJDEP Non-residential clean up values are provided for general comparison purposes. No material from the demonstration is to be reused. Additionally, note that the predominant non-radiological contaminant in the soil acquisition area is metals, for which there are no impact-to-groundwater values.

Shading indicates change based on 6/14/00 Conference Call with EPA.