Formerly Utilized Sites Remedial
Action Program (FUSRAP)

Maywood Chemical Company Superfund Site

ADMINISTRATIVE RECORD

Document Number

MISS – 169

US Army Corps
of Engineers®

Job No. 14501, FUSRAP Project
USACE Contract No. DACW45-98-D-0028
WBS: 138

APR 30 2001

U.S. Army Corps of Engineers
New York District
CANAN-PP-M
26 Federal Plaza
New York, NY 10278-0090

Attention: Mr. Allen Roos, Project Manager

SUBJECT: **Final Post-Remedial Action Report for Fireman's Park**

Dear Mr. Roos:

Enclosed for your use are 10 copies of the final Post-Remedial Action Report and one copy of the Comments Resolution Package for Fireman's Park.

This document and all other attachments were prepared under my direction or supervision in accordance with a system designed to ensure that the information was properly gathered and evaluated. To the best of my knowledge and belief, they are true, accurate, and complete.

If you have any questions, please feel free to contact Liz Rudek at (865) 220-2138.

Sincerely,

John Potts
Contract Adminstrator – FUSRAP

BK:pw:4-12-1-3lr

Enclosures: (1) Final Post-Remedial Action Report for Fireman's Park
(2) Comments Resolution Package

cc: Daniel Lee (1 copy, Final Post-Remedial Action Report only)
Anne McCauley (6 copies, Final Post-Remedial Action Report only)
Paul Speckin (1 copy, all)

Formerly Utilized Sites Remedial Action Program (FUSRAP)
Contract No. DACW45-98-D-0028

Final Post-Remedial Action Report for Fireman's Park

Lodi, New Jersey

April 2001

US Army Corps of Engineers

FINAL POST-REMEDIAL ACTION REPORT

FOR

FIREMAN'S PARK

IN

LODI, NEW JERSEY

APRIL 2001

Prepared for

U.S. Army Corps of Engineers

Under Contract No. DACW45-98-D-0028

By

Bechtel National, Inc.

Oak Ridge, Tennessee

Bechtel Job No. 14501

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ACRONYMS

ANL	Argonne National Laboratory
ALARA	as low as reasonably achievable
BNI	Bechtel National, Inc.
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
DCG	derived concentration guide
DOE	U.S. Department of Energy
EE/CA	engineering evaluation/cost analysis
EPA	U.S. Environmental Protection Agency
FUSRAP	Formerly Utilized Sites Remedial Action Program
IVC	independent verification contractor
MCW	Maywood Chemical Works
MISS	Maywood Interim Storage Site
MVP	Maywood Vicinity Property
ORNL	Oak Ridge National Laboratory
PIC	pressurized ionization chamber
PPE	personal protective equipment
QC	quality control
SEC	Safety and Ecology Corporation
USACE	U.S. Army Corps of Engineers

UNITS OF MEASURE

cm	centimeter
dpm	disintegrations per minute
ft	foot
g	gram
h	hour
in.	inch
km	kilometer
L	liter
μCi	microcurie
μR	microroentgen
m	meter
mi	mile
mL	milliliter
mrem	millirem
pCi	picocurie
yd	yard
yr	year

1.0 INTRODUCTION

1.1 BACKGROUND

This report documents the remedial action conducted under the U.S. Army Corps of Engineers (USACE) Formerly Utilized Sites Remedial Action Program (FUSRAP) in 1997 and 1999 at Fireman's Park in Lodi, New Jersey. The purpose of this report is to document the compliance of areas remediated on the property with applicable federal radiological guidelines and to summarize and provide the results of final remediation data. Remedial action at Fireman's Park was conducted under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) in compliance with an engineering evaluation/cost analysis (EE/CA) (BNI 1995a).

The property at Fireman's Park is part of the Maywood Interim Storage Site (MISS). 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 (Figure 1-1). It consists of the MISS; the Stepan Chemical Company site; and 85 Maywood vicinity properties (MVPs) in the boroughs of Maywood and Lodi and the township of Rochelle Park. This property is approximately 3.4 km (2.1 mi) from MISS (Figure 1-2). The MISS and its vicinity properties are also included within FUSRAP.

FUSRAP was established in 1974 to identify and clean up, or otherwise control, sites where residual radioactive contamination remains from the early years of the nation's atomic energy program or where contamination remains from commercial operations that have caused conditions that Congress has authorized FUSRAP to remedy. The Maywood site was assigned to FUSRAP in 1984 after the cleanup was authorized by the US Congress in the Energy and Water Appropriations Act.

The objectives of FUSRAP, as they apply to the Maywood site, are

- to remove or otherwise control contamination on sites identified as contaminated at levels exceeding current guidelines, and

- to achieve and maintain compliance with applicable criteria for the protection of human health and the environment.

The Department of Energy (DOE) administered FUSRAP until October 1997, when management of the program was transferred to USACE. Bechtel National, Inc. (BNI), the project management contractor, assisted USACE in the planning, management, and implementation of the cleanup of Fireman's Park. Oak Ridge National Laboratory (ORNL) was the independent

verification contractor (IVC) assigned by USACE to provide autonomous assurance that site conditions after completion of the remedial action met the radiological cleanup criteria.

1.2 HISTORY

1.2.1 Prior Remedial Actions

From 1916 to 1959, the former Maywood Chemical Works (MCW) extracted radioactive thorium and rare earths from monazite sand for use in manufacturing industrial products such as mantles for gas lanterns. Slurry that contained waste from the thorium-processing operations was pumped to earthen diked areas. Nearby properties became contaminated when 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. Additional waste apparently migrated from the MCW property through natural drainage associated with the former Lodi Brook. In all, 87 commercial, governmental, and residential vicinity properties became radioactively contaminated by these transport mechanisms. A comprehensive history can be found in the CERCLA EE/CA documentation prepared for this activity (BNI 1995a).

Twenty-five residential properties and the Ballod property were remediated during 1984–85, and a property at 90 Avenue C was partially remediated during that period. Remediation of five residential properties, including 90 Avenue C, was completed during 1995. The MISS pile was removed in 1996, and material was transported to an offsite disposal facility. Additionally, eight other residential properties (7 Branca Court; 11 Redstone Lane; and 16, 18, 20, 22, 24, and 26 Long Valley Road) were remediated during 1996, and three more (5 and 7 Shady Lane and 34 Long Valley Road) were completed in 1997. USACE remediation of Fireman's Park was part of the remediation of 23 MVPs and 5 additional properties in Lodi and Maywood during 1997 through 1999.

1.2.2 Characterization Before Current Remedial Action

Initial radiological characterization of Fireman's Park to determine if the property should be included in FUSRAP was performed by ORNL in 1987 (ORNL 1989). Because sampling results exceeded applicable federal guidelines, the property was designated for inclusion in the program. Subsequent radiological testing occurred in 1987.

In 1987, testing was performed to locate the horizontal and vertical boundaries of contamination (BNI 1989). The contamination was primarily subsurface contamination ranging from a depth of 0 m (0 ft) to 2.3 m (7.5 ft).

Figure 1-3 shows the approximate area of subsurface contamination estimated by 1987 radiological characterization activities. Characterization results indicated contamination ranging from 0 to 2.3 m (0 to 7.5 ft) deep, based on the results of borehole logs and sample data. The data was then extrapolated to define the approximate boundaries of contamination.

Details on post-remedial action surveys and sampling results are provided in Section 4.0.

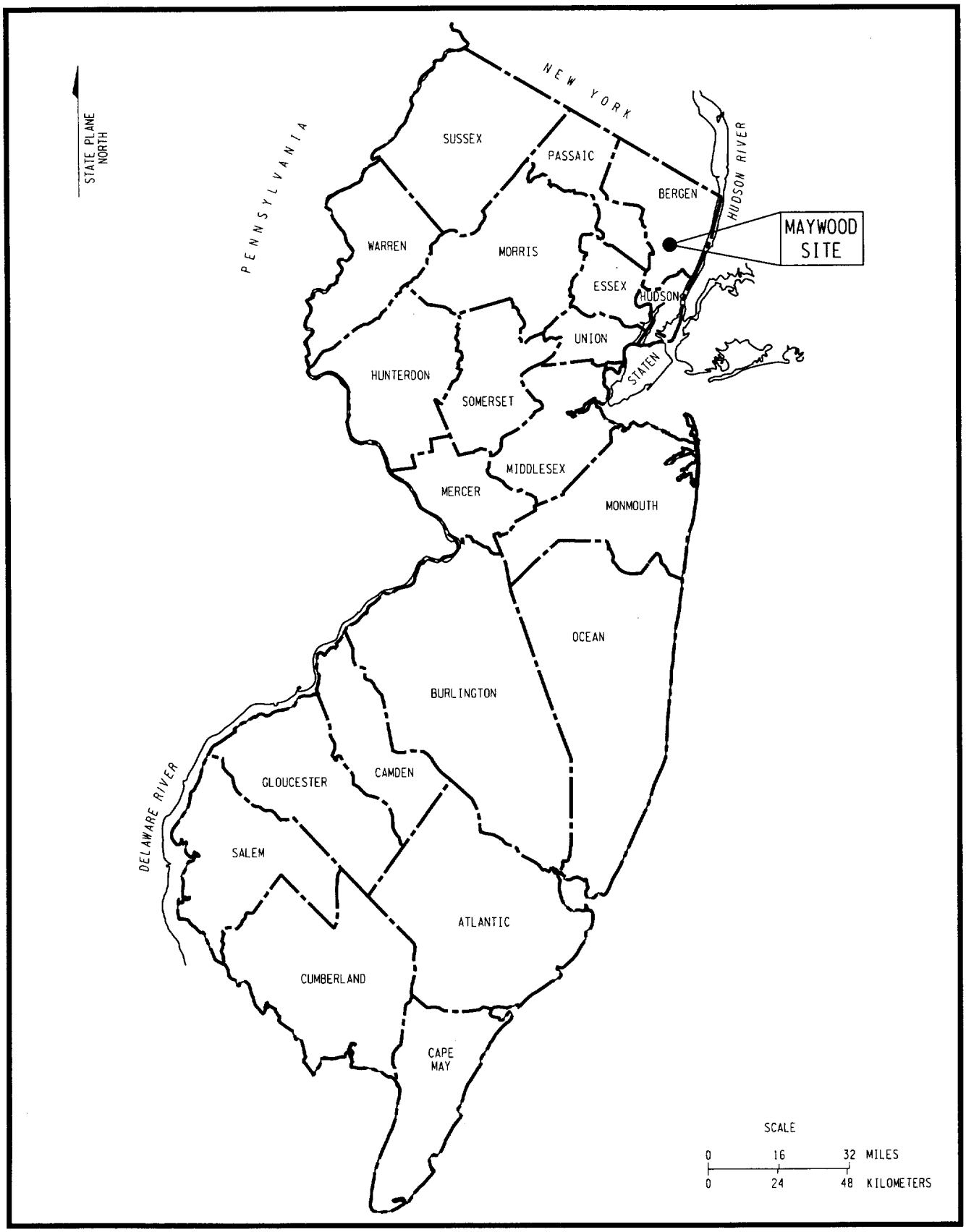

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Figure 1-1
Location of the Maywood Site
Bergen County, New Jersey

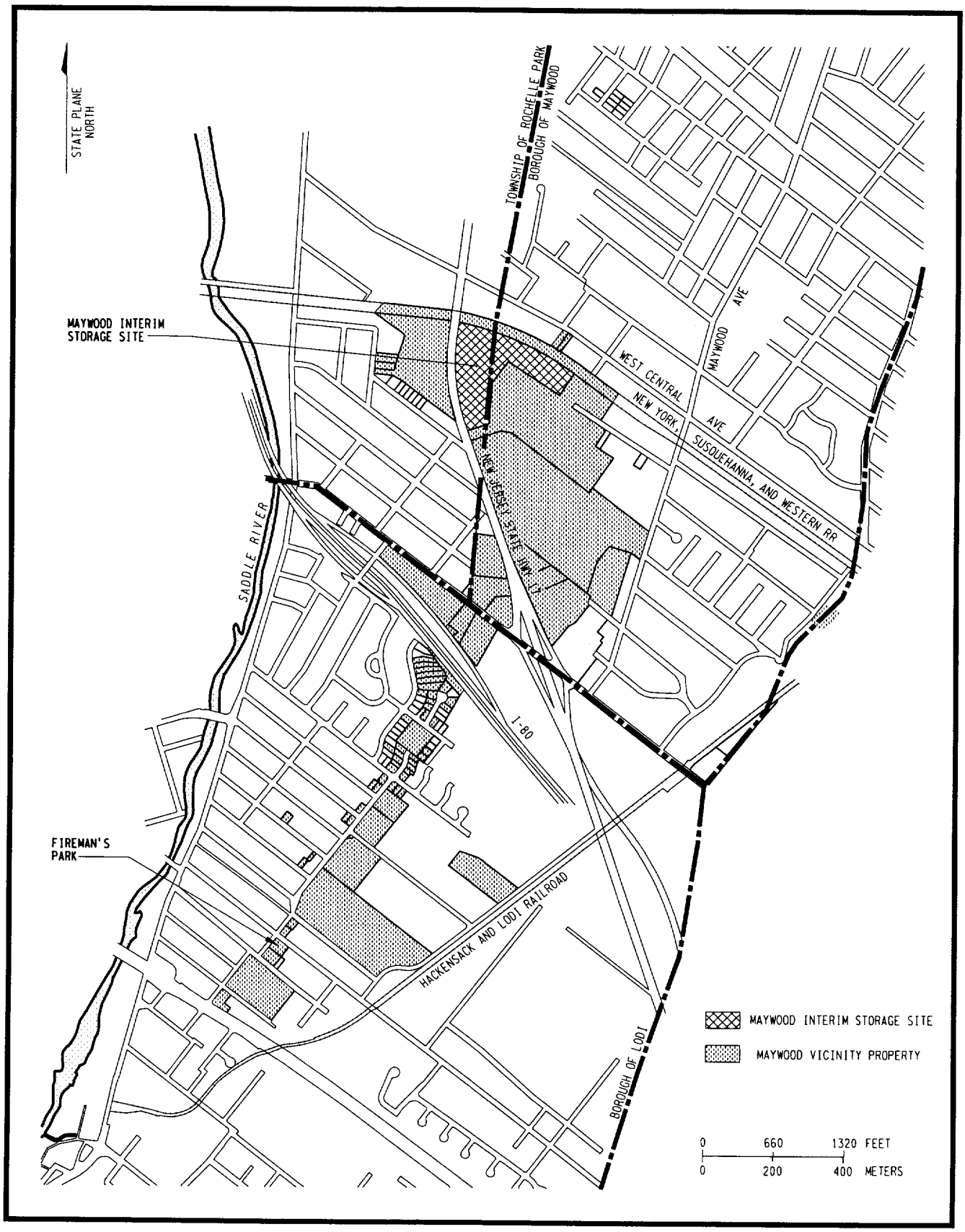

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Figure 1-2
Location of Fireman's Park

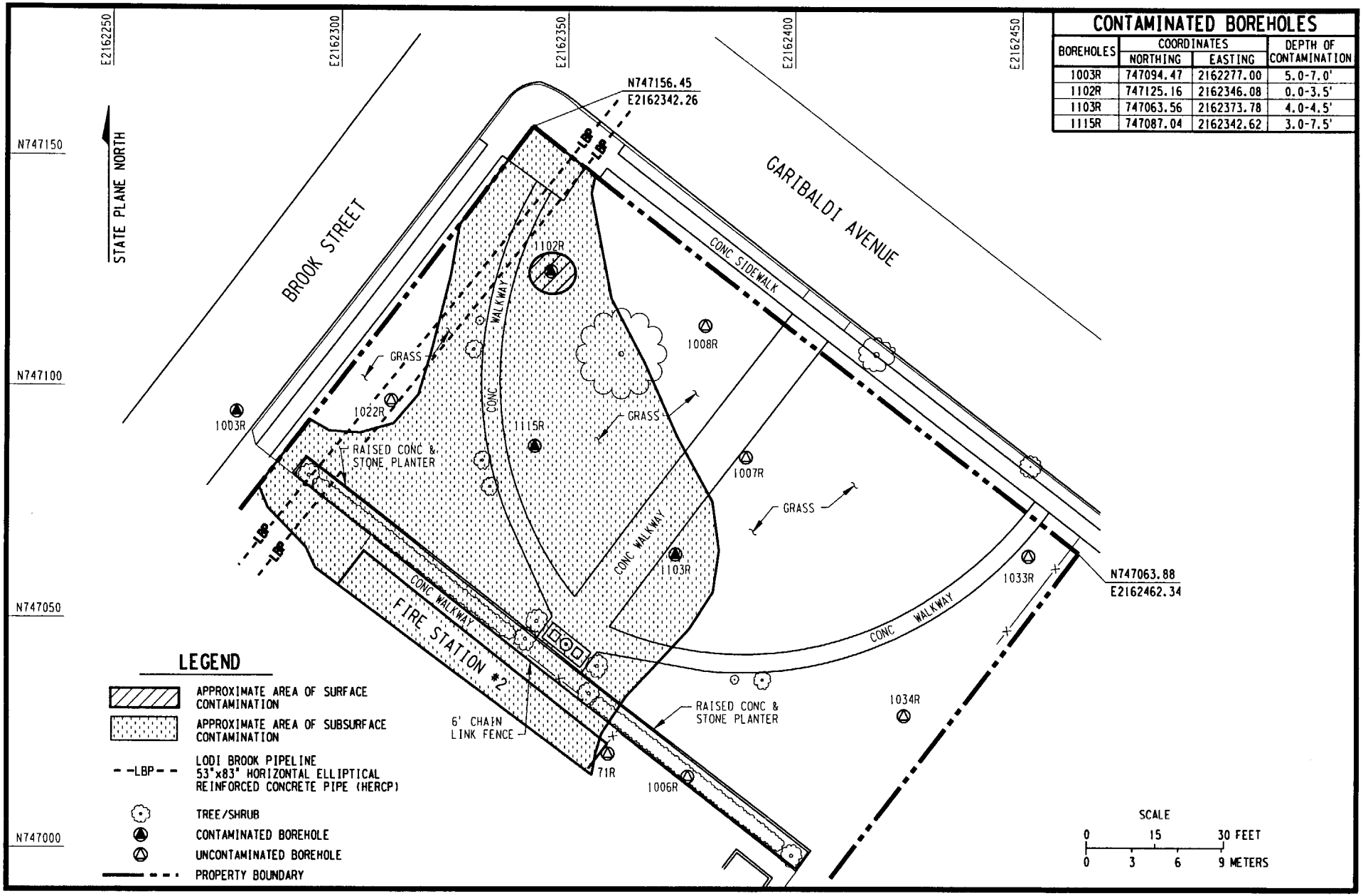

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Figure 1-3
Approximate Area of Surface and Subsurface Contamination
Fireman's Park

2.0 REMEDIATION CRITERIA

Remediation activities at Fireman's Park were conducted in accordance with the federal cleanup criteria contained in the 1994 agreement between the U.S. Environmental Protection Agency (EPA) and DOE and in accordance with the remedy provided in the CERCLA EE/CA prepared for properties comprising Phase 1 of MVP cleanup. The cleanup criteria contained in these documents were adopted by USACE to allow for cleanup of the MVPs addressed in the EE/CA to continue under USACE management without disruption.

These documents are contained in the Administrative Record established for the Maywood site and are available for review at the USACE Information Center in the Borough of Maywood.

2.1 EPA AGREEMENT WITH DOE

The agreement between EPA and DOE reached in April 1994 establishes cleanup levels for radionuclide contamination in soil at all properties on the Maywood site (DOE 1994). Soil on Phase 1 properties, regardless of depth, is to be remediated to 5 pCi/g above background for thorium-232 and radium-226.

2.2 EE/CA

In September 1995, DOE made available for public review and comment the EE/CA announcing the preferred remedy for the cleanup of residential and other properties included in Phase 1 of cleanup activities at the Maywood site (BNI 1995a). The final EE/CA adopts the criteria for radionuclides contained in the EPA/DOE agreement and other site-specific, federal criteria developed for radionuclides of concern at the MVPs.

2.3 SITE-SPECIFIC TOTAL URANIUM GUIDELINE

In the absence of promulgated federal criteria for total uranium in soil, a site-specific criterion was developed for the Maywood site by the Argonne National Laboratory (ANL), an agency of the DOE. To develop the guideline for total uranium, site-specific soil data was used to determine the level of uranium that would result in the maximum public exposure limit of 100 mrem/yr for all plausible uses of land. The site-specific guideline for Maywood was developed based on hypothetical but reasonable exposure pathways from the site.

Based on the ANL analysis, the uranium limit is well below the dose guideline of 100 mrem/yr (910 pCi/g), which must be met under all worst case, plausible scenarios, including the assumed residential and agricultural use (BNI 1994). An as low as reasonably achievable (ALARA) analysis was conducted by DOE. The 100 pCi/g total uranium limit is considered

acceptable since no potential benefit is expected from a lower value due to the uranium being co-located with the thorium. Remediation of thorium contaminated soils will result in residual uranium concentrations much lower than 100 pCi/g (BNI 1994). The resulting uranium-238 guideline is 50 pCi/g, assuming that uranium exists in the naturally occurring abundance of 1:1:0.046 for uranium-234, uranium-238, and uranium-235, respectively (Shleien 1992).

2.4 APPLICATION OF CRITERIA

Historical data indicate that radioactive contamination at the MVPs consisted primarily of thorium-232 but also included uranium-238 and radium-226 and their decay products. Table 2-1 lists the residual contamination guidelines for these radionuclides and release of the Phase 1 MVPs without radiological restrictions. The following sections address key principles associated with the application of radiological criteria and assessment of compliance.

Appendix A includes a brief introduction to the nature, sources, and basic units of radiation.

2.4.1 Radionuclides of Concern

Radionuclides of concern at the Maywood site are thorium-232, radium-226, and uranium-238, identified based on the following:

- Reconstruction of the process used by the MCW to extract thorium, and
- Analysis of soil samples collected during the remedial investigation for radionuclides.

The explanation below discusses the thorium-232 and uranium-238 radioactive decay series, and then the results of remedial investigation sampling.

In unprocessed, undisturbed ores, thorium-232 coexists with all of the decay products in the thorium decay series and is often found in secular equilibrium, a state in which each radionuclide in the decay series has the same decay rate (activity) as the parent (thorium-232). Substantial amounts of thorium-232 and thorium-228 would be removed in the extraction process, leaving primarily decay products. The waste component would also contain unextracted thorium-232 and thorium-228. Due to the relatively short half-lives of their decay products, these radionuclides would reestablish equilibrium in 30 to 40 years. One of these decay products is radon-220, a gas that would be released by emission from exposed surfaces and would decay elsewhere.

Uranium-238 is also present in monazite ore (at lower concentrations), and its decay products would also be in secular equilibrium. Due to low natural abundance of these radionuclides and their low concentrations in the waste material, the total activity contributed by their decay series is only a small fraction of the total activity of the waste. Thorium-230 concentrations are expected to be lower than radium-226 based on the fact that the processing would remove most of thorium-230.

To determine whether secular equilibrium existed between thorium-232 and its daughters in contaminated soils at the Maywood site, five percent of all remedial investigation soil samples analyzed for uranium-238, radium-226, and thorium-232 were also randomly selected for isotopic analysis (radium-226, radium-228, uranium-238, uranium-235, uranium-234, thorium-232, thorium-230, and thorium-228). Fifty-four samples, representative of the sampling conducted at the Maywood site, excluding MISS, were selected.

Although a small number of samples were not in equilibrium, all contained progeny of the thorium-232 and uranium-238 decay series. It was therefore concluded that because all samples were analyzed for uranium-238, radium-226, and thorium-232, all radionuclides of interest at the Maywood site were detected. The results are provided in the remedial investigation done for the Maywood FUSRAP site (BNI 1992).

2.4.2 Background Levels

Because cleanup guidelines are based on radioactivity in addition to background levels, it was important to establish the levels of naturally occurring background radioactivity in soils near the site. Background data serve as a frame of reference for evaluating analytical data from the vicinity properties because they represent conditions typical of the areas unaffected by former MCW activities. During the remedial investigation, soil samples were obtained from three background locations in the general area of the vicinity properties. The locations were selected on the basis of their proximity to the site, relative independence from potential influence of the site, and representativeness of area land uses. The background locations are shown in Figure 2-1. Samples from these background areas were analyzed for radium-226, thorium-232, and uranium-238. Background external gamma radiation exposure rates were also measured at these three background locations using a pressurized ionization chamber (PIC). The average concentration of thorium-232 in background samples was 1.0 pCi/g, with a range of 0.9 to 1.1 pCi/g.

The average background concentration of radium-226 was 0.7 pCi/g with a range of 0.5 to 0.8 pCi/g. The average background concentration of uranium-238 was 2.9 pCi/g with a range of

2.4 to 3.5 pCi/g (BNI 1992). The average background external radiation exposure rate was determined to be 9.0 μR/h.

2.4.3 Sum-of-Ratios Calculation

Compliance with radionuclide criteria is determined by performing a sum-of-ratios calculation by first subtracting the background concentration for each isotope from the reported value for that isotope. If the net result of an isotope is negative, then the value for that isotope is reported as zero. The subtraction of background concentrations can cause the values of some isotopes to be reduced to 0, and in some cases this causes the sum of ratios to be 0 as well. Then the values are divided by the appropriate guideline number for thorium-232, uranium-238, and radium-226 (see Table 2-1 for guidelines). Finally, the three calculated values are summed. If the sum of the three calculated values is 1.0 or less, the soil is below the applicable guideline for radioactive contamination at Maywood and is thus considered clean.

2.4.4 Hot Spot Criteria

Hot spots are small areas that have levels of residual radioactive material that are considerably above the levels in the surrounding area. Residual concentrations of radioactive material in soil are defined as those in excess of background concentrations averaged over an area of 100 m^2. If the average concentration in any surface or below-surface area less than or equal to 25 m^2 exceeds the limit or guideline by a factor of $(100/A)^{1/2}$, where A is the area in square meters of the region in which concentrations are elevated, limits for "hot spots" are applicable. Procedures for calculating these hot spot limits, which depend on the extent of the elevated local concentrations, are given in the supplement—"A Manual for Implementing Residual Radioactive Material Guidelines – A Supplement to U.S. Department of Energy Guidelines for Residual Radioactive Material at Formerly Utilized Sites Remedial Action Program and Surplus Facilities Management Program Sites" (ANL 1989). In addition, the standard requires that every reasonable effort be made to remove any source of radionuclide that exceeds 30 times the appropriate limit for soil, irrespective of the average concentration in the soil.

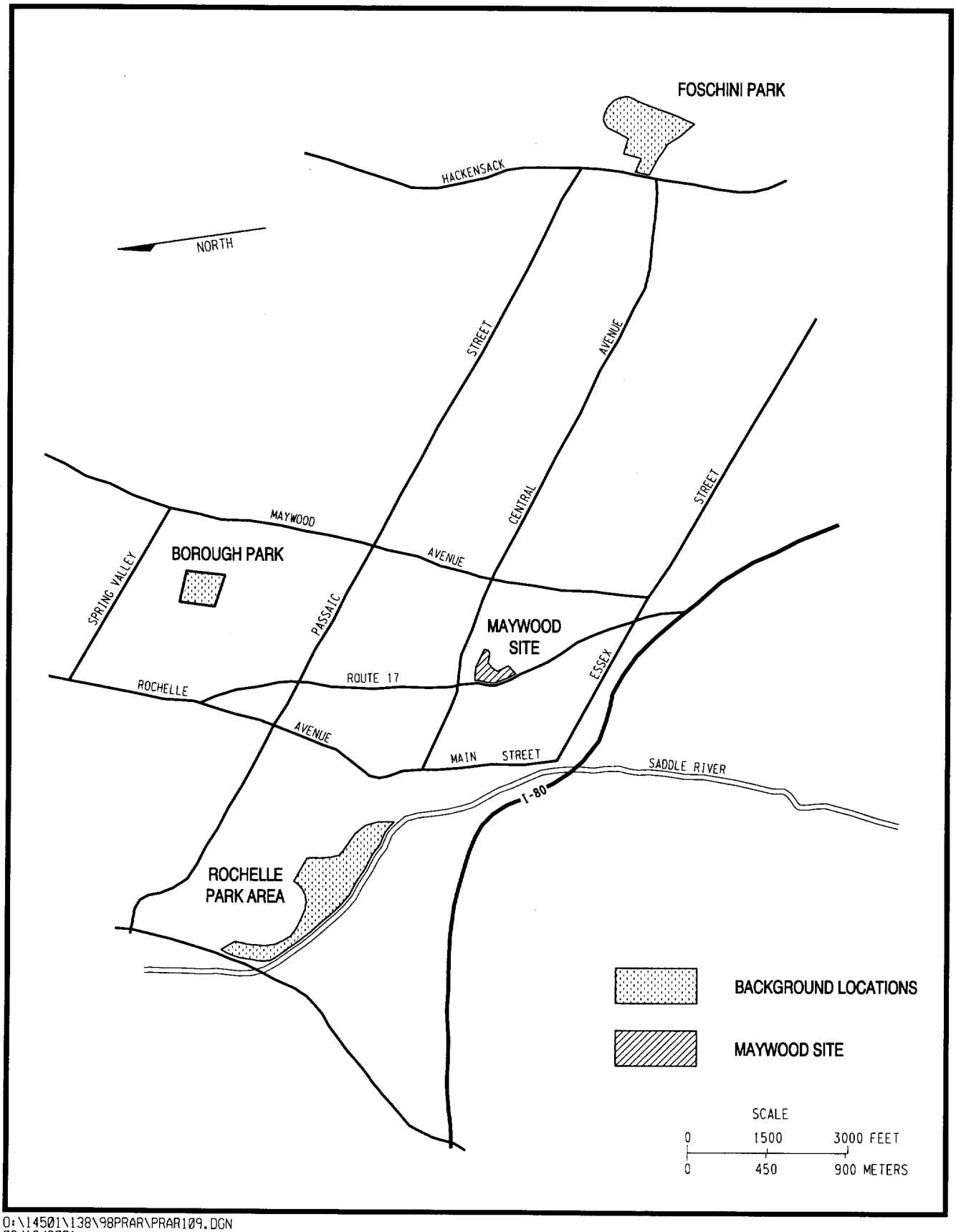

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Figure 2-1
Background Sampling Locations for
the Maywood Interim Storage Site

Table 2-1
Federal Guidelines for Residual Radioactive Contamination

Basic Dose Limits

The basic limit for the annual radiation dose received by an individual member of the general public is 100 mrem/yr [a]. In implementing this limit, as-low-as-reasonably-achievable (ALARA) principles are applied to set site-specific guidelines.

Soil Guidelines [b,c,d,e]

Radium-226 Radium-228 Thorium-230 Thorium-232	5 pCi/g when averaged over any 15-cm (6-in.)-thick layer of soil regardless of depth.
Uranium [f]	100 pCi/g total uranium, 50 pCi/g uranium-238 (BNI 1994).

Radionuclide [g]	Allowable Surface Residual Contamination [g] (dpm/100 cm^2)		
	Average [h,i]	Maximum [h,j]	Removable [h,k]
Transuranics, Ra-226, Ra-228, Th-230, Th-228, Pa-231, Ac-227, I-124, I-129	100	300	20
Th-Natural, Th-232, Sr-90, Ra-223, Ra-224, U-232, I-126, I-131, I-133	1,000	3,000	200
U-Natural, U-235, U-238. and associated decay products	5,000 [a]	15,000 [a]	1,000 [a]
Beta-gamma emitters (radionuclides with decay modes other than alpha emission or spontaneous fission except Sr-90 and others noted above)	5,000 [b-g]	15,000 [b-g]	1,000 [b-g]

[a] Department of Energy, 1990, Order 5400.5, "Radiation Protection of the Public and the Environment" (February 8).

[b] Soil guidelines are also used for sediment because there are no sediment guidelines. The soil guideline of 5 pCi/g regardless of depth is from DOE 1994.

[c] These guidelines take into account ingrowth of radium-226 from thorium-230 and of radium-228 from thorium-232, and assume secular equilibrium. If either thorium-230 and radium-226 or thorium-232 and radium-228 are both present, not in secular equilibrium, the guidelines apply to the higher concentration. If other mixtures of radionuclides occur, the concentrations of individual radionuclides must be reduced so that (1) the dose for the mixtures will not exceed the basic dose limit, or (2) the sum of ratios of the soil concentration of each radionuclide to the allowable limit for the radionuclide will not exceed 1 ("unity").

[d] These guidelines represent allowable residual concentration exceeding background levels averaged across any 15-cm (6-in.)-thick layer to any depth and over any contiguous 100-m^2 (1,076-ft^2) surface area, except as noted.

[e] If the average concentration in any surface or below-surface area less than or equal to 25 m^2 (269 ft^2) exceeds the authorized limit or guideline by a factor of $(100/A)^{1/2}$, where A is the area of the elevated region in square meters, limits for "hot spots" will also be applicable. Procedures for calculating these hot spot limits, which depend on the extent of the elevated local concentrations, are given in the supplement. In addition, every reasonable effort shall be made to remove any source of radionuclide that exceeds 30 times the appropriate limit for soil, irrespective of the average concentration in the soil.

[f] Guidelines are calculated on a site-specific basis using a DOE manual developed for this use.

[g] Where surface contamination by both alpha- and beta-gamma-emitting radionuclides exists, the limits established for alpha- and beta-gamma-emitting radionuclides should apply independently.

[h] Measurements of average contamination should not be averaged over more than 1 m^2 (10.8 ft^2). For objects of less surface area, the average must be derived for each such object.

[i] The average and maximum radiation levels associated with surface contamination resulting from beta-gamma emitters should not exceed 0.2 mrad/h and 1.0 mrad/h, respectively, at 1 cm (0.4 in.).

[j] The maximum contamination level applies to an area of not more than 100 cm^2 (16 $in.^2$).

[k] The amount of removable radioactive material per 100 cm^2 (16 $in.^2$) of surface area should be determined by wiping that area with dry filter or soft absorbent paper, applying moderate pressure, and measuring the amount of radioactive material on the wipe with an appropriate instrument of known efficiency. When removable contamination on objects of surface area less than 100 cm^2 (16 $in.^2$) is determined, the activity per unit area should be based on the actual area or the entire surface should be wiped. The numbers in this column are maximum amounts.

3.0 REMEDIAL ACTION

3.1 CLEANUP ACTIVITIES

Generally, pre-remediation work activities at Fireman's Park consisted of documentation of existing conditions and preparation of the property for remedial action. This included the performance of inspections and the preparation of videotapes.

Prior to remediation, the results of earlier characterization investigations were used to help plan remediation activities. Walkover surface scans were conducted during remediation to direct the excavation. As remediation was completed, soil samples were collected and analyzed to verify that residual radioactive material above the cleanup criteria had been removed. Additionally, exposure rate measurements were taken with a PIC to confirm that residual radiation levels were in compliance with applicable guidelines. Details are provided in Section 4.0.

The primary technique used in the remedial action was excavation of the contaminated materials. A jackhammer was used to break up concrete, asphalt, and debris before removal. Because of the limited working space available, small volumes of soil were removed with picks and shovels, while a backhoe was used to remove larger volumes. After remedial action, areas were restored to the condition agreed upon by the property owners.

After the material was excavated, direct gamma measurements were taken with an Eberline SPA-3 gamma scintillation detector. When survey results indicated that remediation was complete, post-remediation soil samples were collected from the excavated areas in accordance with the *FUSRAP Post-Remedial Action Survey Plan* (BNI 1996). The soil samples were sent to a laboratory at the MISS for gamma spectral analysis to ensure that all soils contaminated above the cleanup criteria had been removed. If the analysis showed that residual radioactive material exceeding criteria remained, then additional excavation was conducted and additional post-remedial action samples were collected and analyzed. The rationale for the sampling program and the analytical results are presented in Section 4.0.

Following verification that cleanup criteria had been met, excavated areas were either backfilled with clean fill purchased from a vendor or with clean soil, i.e., overburden, removed from other properties in the vicinity being remediated. Radiological results were compared to applicable guidelines identified in section 2.0. Chemical results were compared to applicable New Jersey soil cleanup criteria/background concentrations (NJDEP 1996, BNI 1992). The backfill and clean overburden soil results were below applicable regulatory criteria.

During remediation, approximately 1,048 m^3 (1,370 yd^3) of radioactively contaminated soil was removed from Fireman's Park (BNI 1999a). Excavated material was transported to the MISS, where it was loaded into railcars and shipped to the Envirocare of Utah disposal facility in Clive, Utah.

Details on the results of post-remedial action surveys and sampling are provided in Section 4.0. Information pertaining to contamination control during remedial action is provided in Appendix B.

4.0 POST-REMEDIAL ACTION MEASUREMENTS

After each portion of the property was remediated, each area was surveyed to confirm that all radioactive contamination exceeding cleanup criteria had been removed. Safety and Ecology Corporation (SEC), a subcontractor to BNI, conducted the initial post-remediation surveys. Verification techniques included walkover gamma scans, external gamma radiation exposure rate measurements, and soil sampling. ORNL, as the IVC, performed independent verification surveys of the remediated areas using similar or identical survey techniques. The results of IVC final survey data and conclusions are to be issued as a separate report.

As excavation proceeded, walkover surface scans were conducted with an Eberline SPA-3 gamma scintillation detector to determine whether all soil that was radioactively contaminated in excess of the cleanup criteria had been removed from the remediated areas. The walkover survey provided immediate feedback so that additional excavation could be performed if residual contamination appeared to exceed remedial action guidelines. The area was scanned after each lift of soil was removed to verify that the contamination had been removed. Soil samples also were collected throughout the excavation and analyzed at the MISS laboratory as an additional verification measure on the surface scans.

In addition, external gamma radiation exposure rates were taken and measured with a PIC at 1 m (3 ft) above the ground surface in each open excavation prior to its backfilling with clean fill. PIC readings were compared with the background exposure rate (9.0 μR/h) established for the area.

The procedure followed for performing post-remedial action sampling is provided in the "FUSRAP Post-Remedial Action Survey Plan" (BNI 1996). Upon completion of remediation, a survey grid of 100 m^2 (1,076 ft^2) was established over the excavated area to conduct radiological surveys. If there were small irregularities in the excavated area, the total area for each grid did not exceed 100 m^2 (1,076 ft^2). Composite post-remediation soil samples were collected (from a depth of 0 to 6 in.) from each remediated grid by taking individual samples [at a frequency of 25 per 100 m^2 (1,076 ft^2)] from each sample grid and compositing these individual samples into one sample for that grid. A bias sample was also collected from the bottom of the excavation at an area indicating the highest gamma reading for that grid. Soil sampling, using gamma spectroscopy, was the primary method used to confirm that all radioactive contamination exceeding the cleanup criteria had been removed. External gamma exposure rates were measured in excavated areas using a PIC.

Samples for radiological parameters were analyzed at the onsite MISS laboratory. Samples for chemical analysis were sent to Adirondack laboratory in Albany, New York, or the RECRA laboratory in Lionsville, Pennsylvania.

Material purchased from a vendor was used as backfill after remediation. Before excavated areas were backfilled, samples were tested for radiological and chemical parameters to ensure the backfill material was not contaminated.

The radiological data packages were validated as required by project procedures. Post-remedial action radiological results are reported in Table C-1 (Appendix C).

4.1 FIREMAN'S PARK

This municipal property is a grassy, landscaped park consisting of a memorial, ornamental planter, and sidewalks. It is situated on the southeastern corner of the intersection of Brook Street and Garibaldi Avenue. The entrance to the park is from Garibaldi Avenue. The park is located in a densely populated residential area and is dedicated to local firefighters. The approximate areas of surface and subsurface contamination are shown in Figure 1-3.

During remediation, surface scans were performed on each lift of soil removed to determine if the material was below or above the cleanup criteria. Clean soil from the excavation, i.e., overburden, was staged separately at Lodi Park. Five samples were collected during excavation at depths from 0.6 to 1.2 m (2 to 4 ft). Results of analyses for thorium-232, radium-226, and uranium-238 were below the cleanup criteria. Data for clean overburden soil are reported in Appendices D and E. All soil exceeding the cleanup criteria was excavated and transported to the MISS for later shipment to Envirocare of Utah.

Clean soil from residential property excavations in addition to material obtained from off-site vendor(s) was used to backfill the site. Soils naturally contain certain metals and organic compounds. All sources of backfill were tested for radiological and chemical parameters. USACE review of this data indicates that the levels of contamination fall within or below the CERCLA (cancer) risk range of $1x\ 10^{-4}$ to $1x10^{-6}$. Radiological and chemical data associated with all backfill sources potentially used on this site are contained in Appendix F.

The excavated area shown in Figure 4-1 was larger in comparison to the extrapolated area of contamination shown in Figure 1-3 because surface scans performed during remediation indicated that a narrow lens of contamination was present in various areas that was undetected by previous sampling activities. The results of further sampling required the removal of additional soil, so the excavated area shown in Figure 4-1 was larger than predicted. Also, some areas indicated on Figure 1-3 to be contaminated, based on estimates from then available data, were

found not to be contaminated as screening was performed during remediation in the field, thus these areas did not require excavation.

Because of sloping requirements, soil was left on this property in 1977 along the wall of Fire Station No. 2, an adjacent property to be remediated (Figure 4-1). A plastic sheet was placed along this area before excavated areas were backfilled. During remediation of the Fire Station in 1999, the remaining soil on Fireman's Park was removed.

4.1.1 Post-Remedial Action Survey

Figure 4-1 shows the areas of excavation and property elevation contours. The areas and depths of excavation, grid locations, and locations of post-remedial action soil samples are shown in Figure 4-2. Twenty-six samples were collected from grid locations 1 through 16 (see Figure 4-2).

The net result for each radionuclide reported in Table 4-1 is obtained by subtracting the background concentration for each radionuclide from the reported value for that radionuclide. If the net result of a radionuclide is negative, then the value for that radionuclide is reported as zero. As indicated in Table 4-1, the sum-of-ratios for each sample was below 1.

In post-remedial action composite samples, thorium-232 and radium-226 concentrations were not detected, and uranium-238 net concentrations ranged from non-detect to 0.29 pCi/g.

In post-remedial action bias samples, thorium-232 net concentrations ranged from non-detect to 2.36 pCi/g; radium-226 was not detected; and uranium-238 net concentrations ranged from non-detect to 0.15 pCi/g.

Figure 4-3 shows the locations of the 10 gamma exposure rate measurements taken with the PIC following excavation. The exposure rates ranged from 8.6 to 10.6 μR/h; background is 9.0 μR/h. The PIC readings were taken in excavated areas prior to backfilling as a remedial action evaluation survey. If PIC readings were elevated, the readings would have indicated potential exposure concerns thus indicating missed contamination above the release criteria and triggering additional excavation. Although the reported values are above background, they do not represent the final status of the property. The exposures from external gamma radiation would be further reduced after the excavations were backfilled with clean fill. The clean fill would cause a shielding effect on the remaining soils, reducing gamma ray, dust, and radon exposures. Even without the clean fill and assuming continuous exposure at the point of measurement, the average dose calculated from measured gamma radiation exposure rates was below the guideline of 100 mrem/yr.

4.1.2 Photographs

Figure 4-4 through 4-9 show some of the photographs taken during remediation.

4.1.3 Chemical Sampling after Remediation

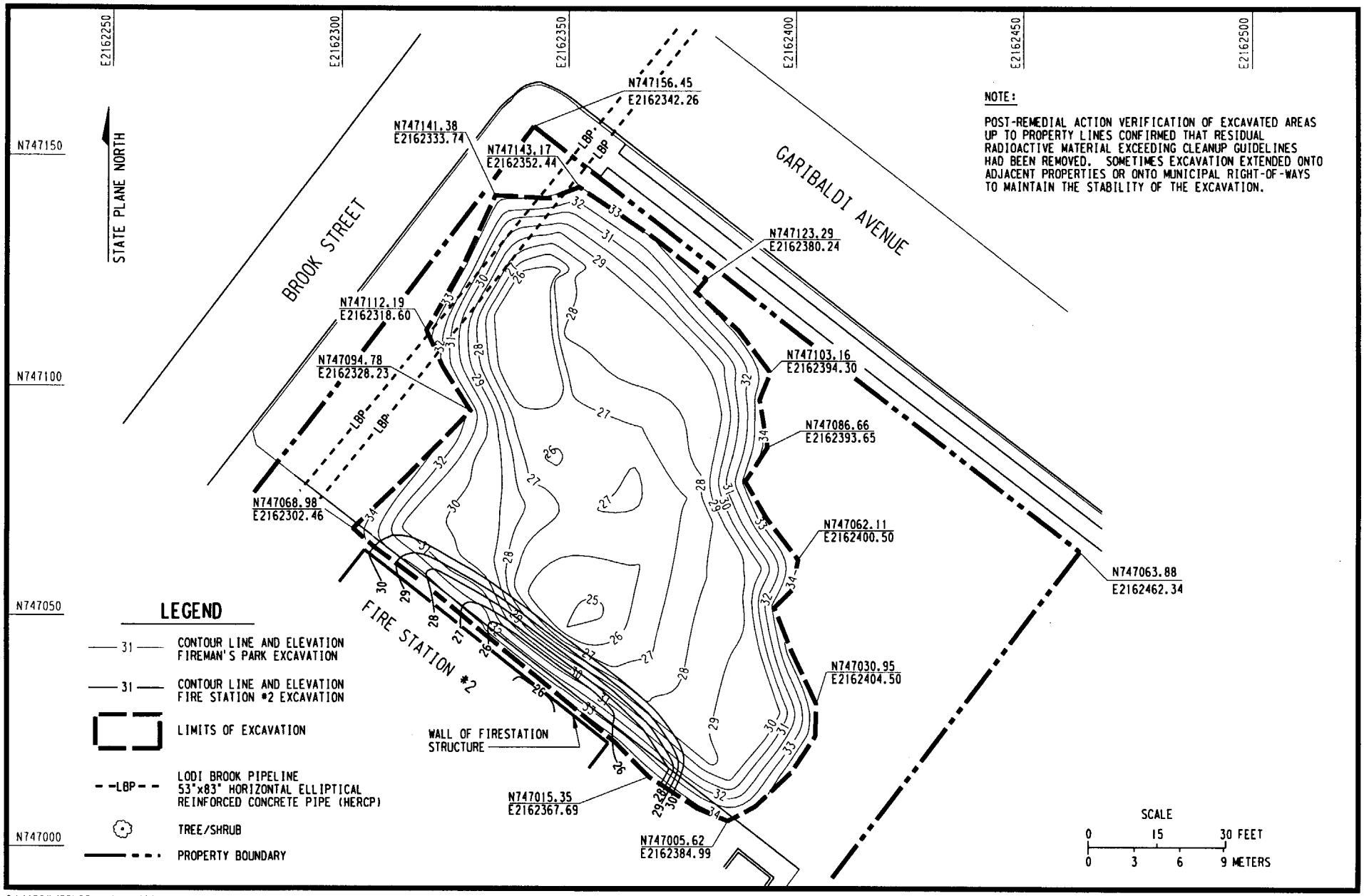
Samples were collected by EPA Region II after remediation from the excavated area for chemical analysis. Concentrations of chemicals were compared to applicable New Jersey soil cleanup criteria and site background concentrations (NJDEP 1996, BNI 1992). Chemical analytical results were below the applicable criteria.

4.1.4 IVC Verification

After remediation, BNI provided post-remedial action data to the IVC for review. The IVC verified excavated areas to determine if remediated areas were in compliance with the cleanup criteria. Upon completion of verification, the IVC gave verbal approval so that excavated areas could be backfilled. This was followed by e-mail confirming their approval. The final IVC report is to be published separately.

4.1.5 Summary

The results of data taken at the conclusion of remediation for the open excavations were below the cleanup criteria (see Table 2-1). On verification of results, the remediated areas were restored.



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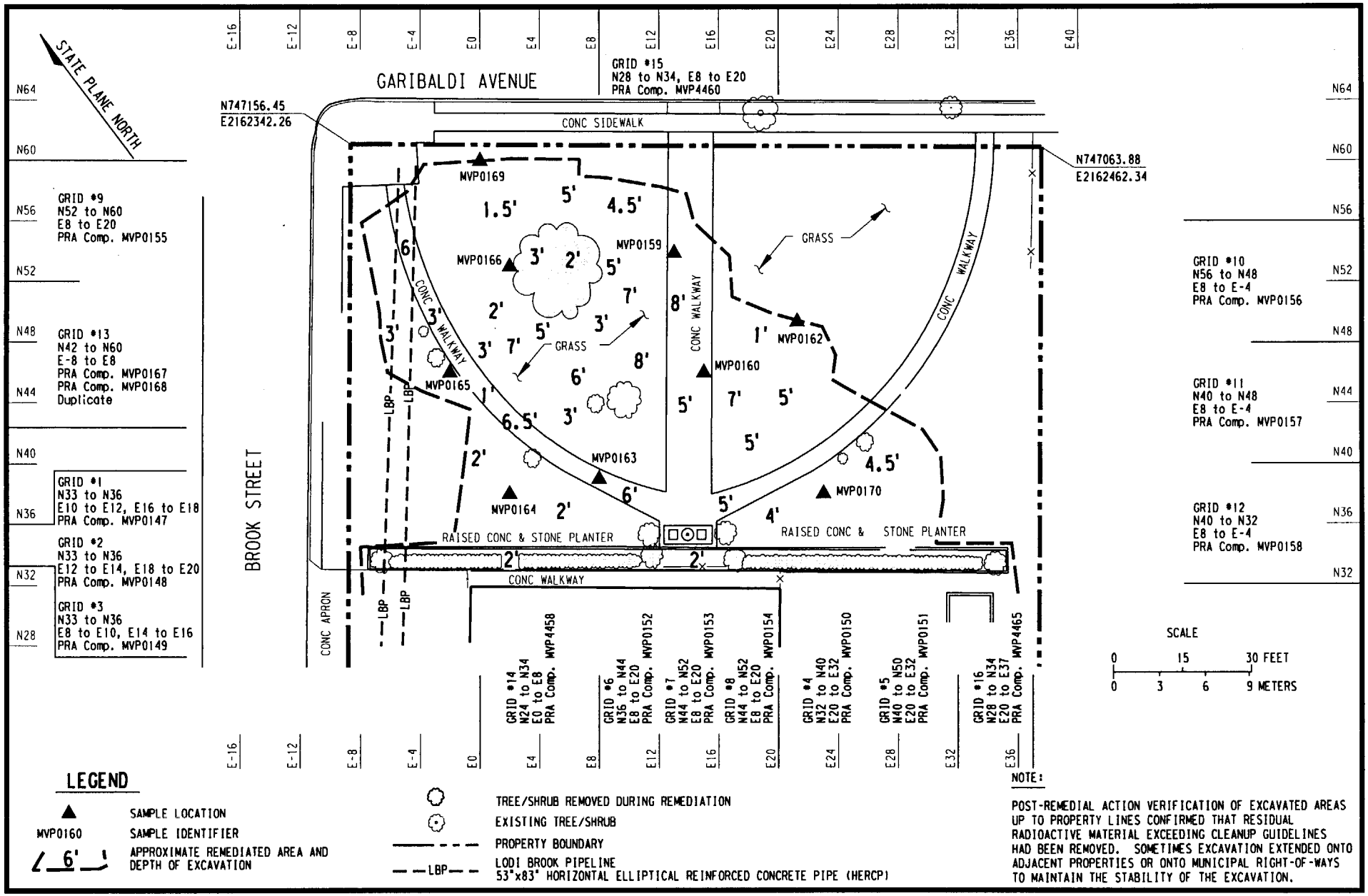
04/12/2001

Figure 4-1
Areas of Excavation and Elevation Contours
Fireman's Park



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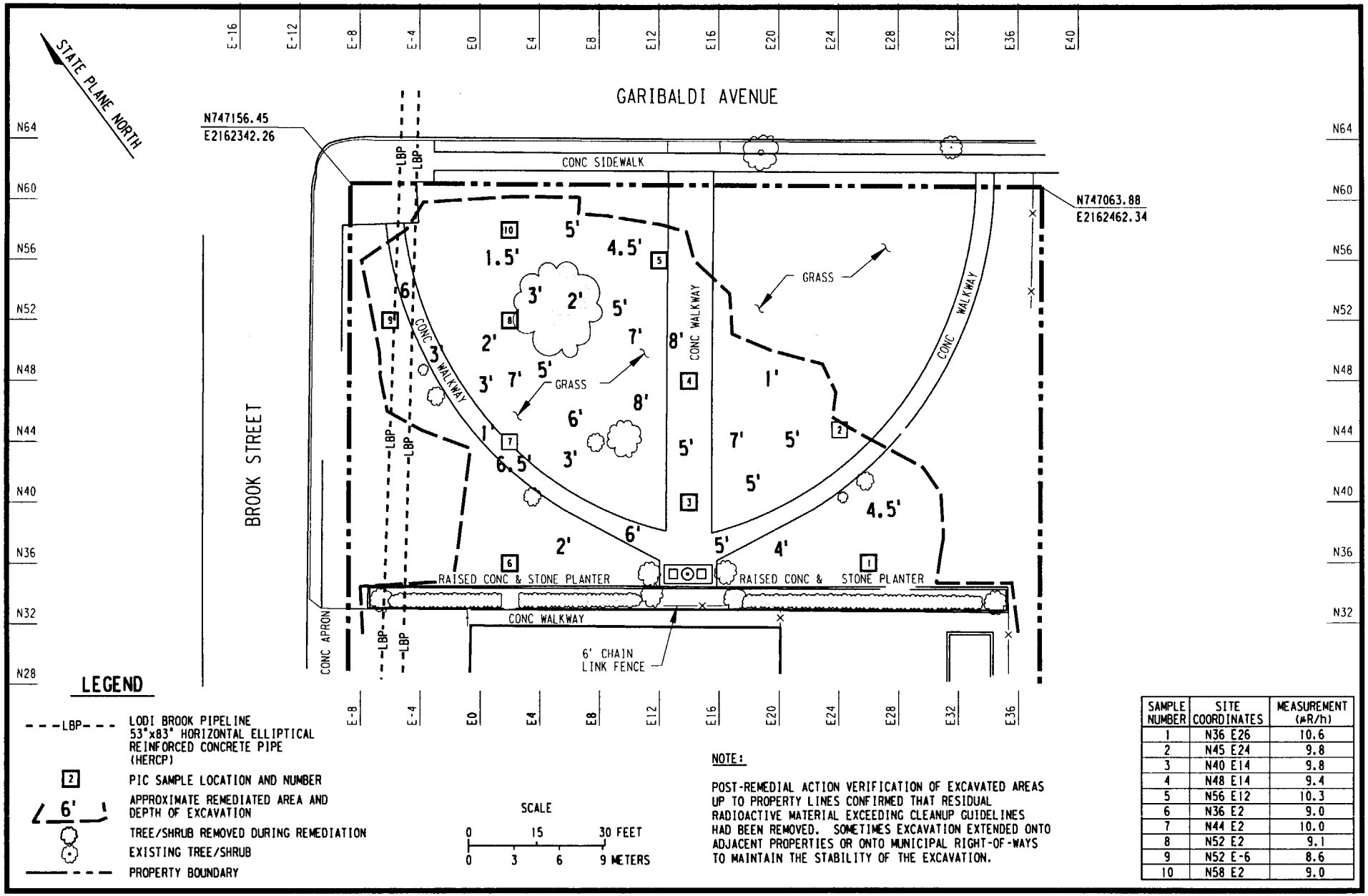
04/12/2001

Figure 4-2
Areas of Excavation and Post-Remedial Action Samples
Fireman's Park



SAMPLE NUMBER	SITE COORDINATES	MEASUREMENT (μR/h)
1	N36 E26	10.6
2	N45 E24	9.8
3	N40 E14	9.8
4	N48 E14	9.4
5	N56 E12	10.3
6	N36 E2	9.0
7	N44 E2	10.0
8	N52 E2	9.1
9	N52 E-6	8.6
10	N58 E2	9.0

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04/12/2001

Figure 4-3
PIC Readings
Fireman's Park

Photo 1

Photo 2

Photo 3

Photo 4

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04/30/2001

Figure 4-4
Photographs Taken During Remediation (Photos 1 through 4)
Fireman's Park

Photo 5

Photo 6

Photo 7

Photo 8

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04/30/2001

Figure 4-5
Photographs Taken During Remediation (Photos 5 through 8)
Fireman's Park

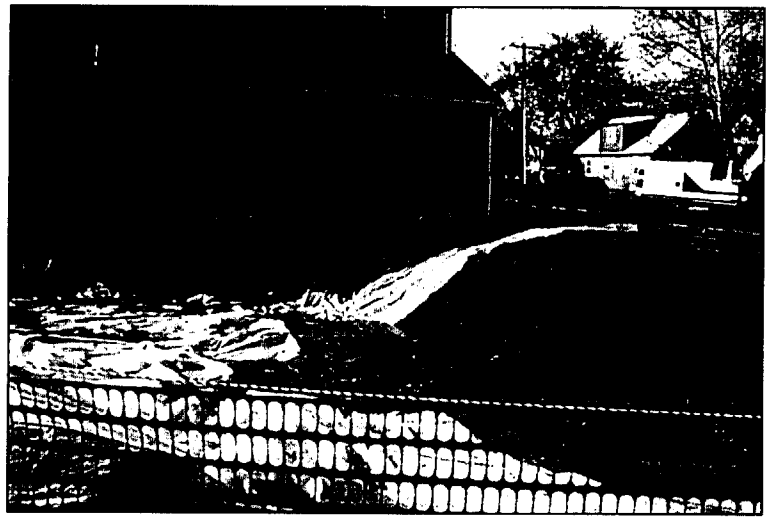

Photo 9

Photo 10

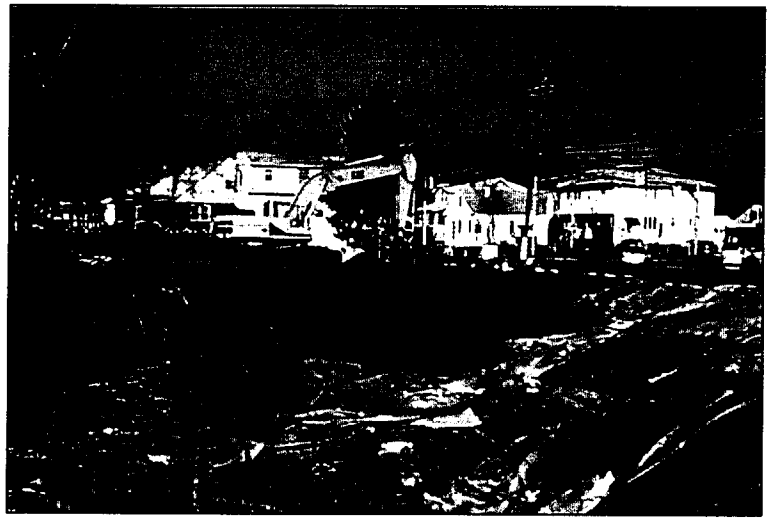

Photo 11

Photo 12

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04/30/2001

Figure 4-6
Photographs Taken During Remediation (Photos 9 through 12)
Fireman's Park

Photo 13

Photo 14

Photo 15

Photo 16

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Figure 4-7
Photographs Taken During Remediation (Photos 13 through 16)
Fireman's Park

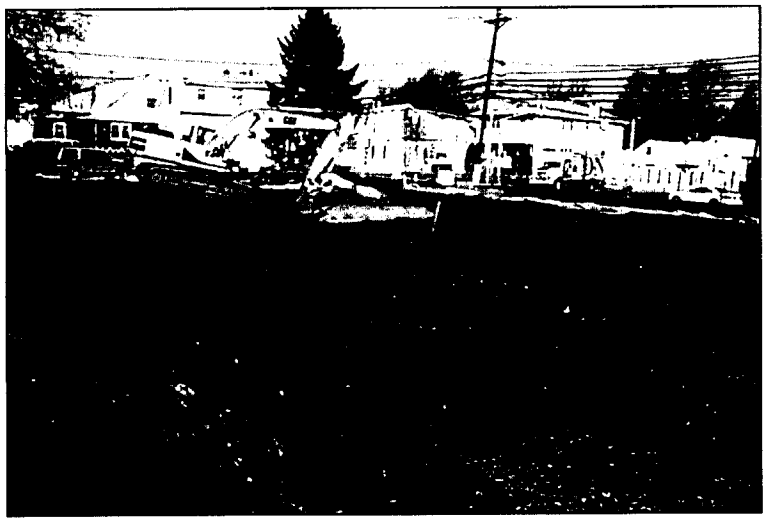

Photo 17

Photo 18

Photo 19

Photo 20

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04/30/2001

Figure 4-8
Photographs Taken During Remediation (Photos 17 through 20)
Fireman's Park

Photo 21

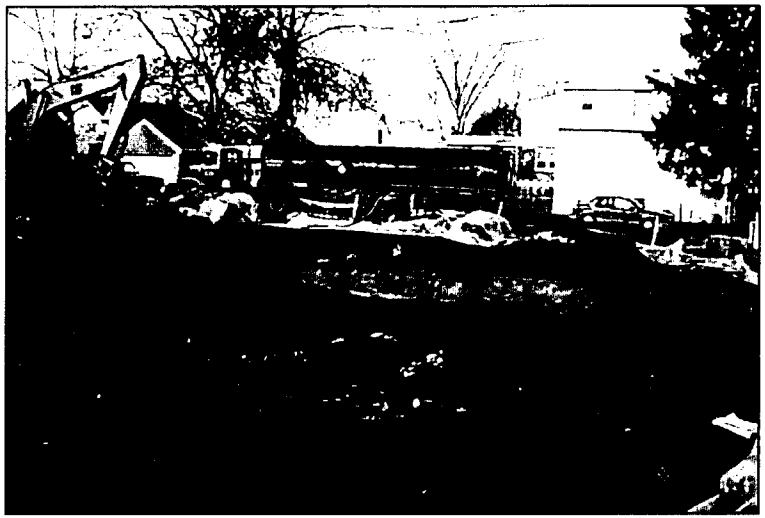

Photo 22

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04/30/2001

Figure 4-9
Photographs Taken During Remediation (Photos 21 and 22)
Fireman's Park

TABLE 4-1
FINAL STATUS SURVEY RESULTS FOR FIREMAN'S PARK

Sample ID	COC #	Collection Date	Comments	Matrix	Coordinates	Depth (ft)	Lab	Th-232 (pCi/g)	Error +/	Ra-226 (pCi/g)	Error +/-	U-238 (pCi/g)	Error +/-	Sum Ratios
Background								1		0.70		2.90		
MVP0147	138971121	11/24/1997	Post-RA composite	sfs	N33~36 E16~18, E10~12	0.0-0.5	MISS	0.00	0.04	0.00	0.02	0.00	0.00	0.000
MVP0148	138971122	11/25/1997	Post-RA composite	sfs	N33~36 E12~14, E-18~20	0.0-0.5	MISS	0.00	0.04	0.00	0.03	0.00	0.00	0.000
MVP0149	138971122	11/25/1997	Post-RA composite	sfs	N33~36 E8~10, E14~16	0.0-0.5	MISS	0.00	0.05	0.00	0.03	0.00	0.00	0.000
MVP0150	138971123	11/26/1997	Post-RA composite	sfs	N32~40 E20~32	0.0-0.5	MISS	0.00	0.05	0.00	0.03	0.00	0.00	0.000
MVP0151	138971123	11/26/1997	Post-RA composite	sfs	N40~50 E 20~32	0.0-0.5	MISS	0.00	0.05	0.00	0.03	0.00	0.00	0.000
MVP0152	138971124	11/26/1997	Post-RA composite	sfs	N36~44 E8~20	0.0-0.5	MISS	0.00	0.05	0.00	0.03	0.29	0.80	0.006
MVP0153	138971124	11/26/1997	Post-RA composite	sfs	N44~52 E8~20	0.0-0.5	MISS	0.00	0.05	0.00	0.03	0.00	0.00	0.000
MVP0154	138971124	11/26/1997	Post-RA composite	sfs	N44~52 E8~20	0.0-0.5	MISS	0.00	0.05	0.00	0.03	0.00	0.00	0.000
MVP0155	138971124	11/26/1997	Post-RA composite	sfs	N52~60 E8~20	0.0-0.5	MISS	0.00	0.05	0.00	0.03	0.00	0.64	0.000
MVP0156	138971201	12/1/1997	Post-RA composite	sfs	N56~48 E8~4	0.0-0.5	MISS	0.00	0.04	0.00	0.02	0.00	0.69	0.000
MVP0157	138971201	12/1/1997	Post-RA composite	sfs	N40~48 E8~4	0.0-0.5	MISS	0.00	0.06	0.00	0.03	0.00	0.00	0.000
MVP0158	138971201	12/1/1997	Post-RA composite	sfs	N40~32 E8~4	0.0-0.5	MISS	0.00	0.05	0.00	0.03	0.00	0.00	0.000
MVP0167	138971203	12/2/1997	Post-RA composite	sfs	N42~60 E-8~8	0.0-0.5	MISS	0.00	0.06	0.00	0..03	0.00	0.00	0.000
MVP0168	138971203	12/2/1997	Post-RA composite Dup for MVP0167	sfs	N42~60 E-8~8	0.0-0.5	MISS	0.00	0.06	0.00	0.03	0.00	0.00	0.000
MVP4458	138990511	5/14/1999	Post-RA composite	sfs	N24~34 E0~8	0.0-0.5	MISS	0.00	0.04	0.00	0.03	0.00	0.51	0.000
MVP4460	138990511	5/14/1999	Post-RA composite	sfs	N28~34 E8~20	0.0-0.5	MISS	0.00	0.05	0.00	0.03	0.00	0.00	0.000
MVP4465	138990514	5/18/1999	Post-RA composite	sfs	N28~34 E20~37	0.0-0.5	MISS	0.00	0.04	0.00	0.02	0.00	0.45	0.000
MVP0159	138971202	12/1/1997	Post-RA bias	sfs	N54 E13	0.0-0.5	MISS	2.36	0.11	0.00	0.03	0.15	0.00	0.475
MVP0160	138971202	12/1/1997	Post-RA bias	sfs	N46 E15	0.0-0.5	MISS	0.63	0.07	0.00	0.03	0.00	0.00	0.126
MVP0162	138971202	12/1/1997	Post-RA bias	sfs	N50 E22	0.0-0.5	MISS	0.00	0.06	0.00	0.03	0.00	0.00	0.000
MVP0163	138971202	12/1/1997	Post-RA bias	sfs	N39 E8	0.0-0.5	MISS	0.00	0.04	0.00	0.03	0.00	0.00	0.000
MVP0164	138971202	12/1/1997	Post-RA bias	sfs	N38 E2	0.0-0.5	MISS	0.00	0.05	0.00	0.03	0.00	0.00	0.000
MVP0165	138971202	12/1/1997	Post-RA bias	sfs	N46 E-2	0.0-0.5	MISS	0.28	0.07	0.00	0.03	0.00	0.00	0.056
MVP0166	138971202	12/1/1997	Post-RA bias	sfs	N53 E2	0.0-0.5	MISS	0.49	0.04	0.00	0.03	0.00	0.58	0.000
MVP0169	138971203	12/2/1997	Post-RA bias	sfs	N60 E0	0.0-0.5	MISS	0.09	0.07	0.00	0.03	0.00	0.00	0.018
MVP0170	138971204	12/2/1997	Post-RA bias	sfs	N38 E23	0.0-0.5	MISS	1.59	0.09	0.00	0.03	0.00	0.00	0.318

NOTES:

RA - remedial action

sfs - surface soil

Dup - duplicate sample

Net results presented. The net result is obtained by subtracting the background concentration for each radionuclide (Th - 232, 1 pCi/g; Ra-226, 0.70 pCi/g; U-238, 2.90 pCi/g) from the gross reported value for that radionuclide. If the net result for a radionuclide is negative, the value for that radionuclide is reported as zero.

5.0 POST-REMEDIAL ACTION STATUS

Final analytical results for Fireman's Park demonstrate that remediated areas are in compliance with applicable cleanup guidelines for radioactive contamination and that chemicals were not detected in soils exceeding the applicable chemical criteria.

The IVC is responsible for preparing a plan outlining the procedures used in conducting verification activities (ORNL 1998). In accordance with its verification plan, Type A and Type B reviews were conducted by the IVC following the completion of remediation at Fireman's Park.

Type A verification consisted of reviewing the existing post-remedial action survey results. After review of the results, the IVC determined if there was a need to collect additional samples from the location(s) listed in the survey results. In performing Type B verification review, the IVC conducted a survey of the site that included direct radiological measurements, review of the post-remedial action survey methods and results, sampling, and laboratory analysis of separate soil samples. On publication, the IVC's verification report will become part of the CERCLA Administrative Record for the Maywood FUSRAP site.

6.0 REFERENCES

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APPENDIX A

RADIATION AT A GLANCE

RADIATION AT A GLANCE

Of all activities at FUSRAP sites, those associated with radiation receive the most attention. What exactly is radiation and where does it come from? To answer these questions, it is best to start with a few basics.

All matter is made up of extremely small particles called atoms. Atoms contain even smaller particles called protons, neutrons, and electrons. When an atom has a stable mix of protons and neutrons, it is nonradioactive. However, when atoms have too many of either protons or neutrons, these unstable atoms can break apart, or decay, in an attempt to become stable. As atoms decay, energy is released; this released energy is called radiation.

Sources of Radiation

Radiation originates from natural events that happen all the time, but it can also be made by man. Most of the radiation people are exposed to occurs naturally. Radiation has always been present, and every person who has ever lived has been exposed to it. Although modern technology may seem to have greatly increased the exposure rate, this is not necessarily the case. Exposure to manmade radiation varies greatly based on a given individual's lifestyle choices and medical treatments.

Sources of natural, or background, radiation include internal radiation from food (we all have approximately 500,000 atoms disintegrating in our bodies every minute), cosmic radiation from the sun and from outside the solar system, and terrestrial radiation from rocks, soils, and minerals. People have no control over the amount of natural radiation around them, and the amount of natural radiation stays about the same over time. The natural radiation present in the environment today is not much different than it was hundreds of years ago. In general, over 80 percent of the radiation the average person is exposed to is from natural sources. Manmade radiation accounts for less than 20 percent of the total; most of it is from medical procedures.

Manmade sources of radiation include consumer products, medical procedures, and the nuclear industry. Some consumer products such as smoke detectors and even porcelain dentures contain radioactive elements. Probably the best-known source of manmade radiation is nuclear medicine. For example, to conduct a brain, liver, lung, or bone scan, doctors inject patients with radioactive compounds and then use radiation detectors to make a diagnosis by examining the resulting image of the organ. Manmade radioactive materials also include cesium-137 and strontium-90, present in the environment as a result of previous nuclear weapons testing.

As with background radiation, exposure to other sources of radiation varies greatly depending on individual choices, such as smoking tobacco products (which contain polonium-210) and eating certain foods (bananas contain potassium-40).

Levels of Radiation

The average dose caused by background radiation varies widely. In the United States, the average is about 300 mrem/yr; some people in other parts of the world receive a dose more than four times this amount. For example, in some areas of Brazil, doses to inhabitants can be more than 2,000 mrem/yr from background radiation. These wide variations are the result of several factors, most notably the types and amounts of radionuclides in the soil.

This diversity in background radiation is responsible for the large differences in doses. Because people live in areas with high levels of background radiation without proven harm, it is assumed by most in the scientific community that small variations in environmental radiation levels have an inconsequential effect, if any, on humans.

Measuring Radiation

To determine the possible effects of radiation on the health of the environment and people, these effects must be measured. More precisely, the potential for radiation to cause damage must be ascertained. Measurements of these potential effects are derived from the activity of each isotope and are expressed in terms of the absorbed dose to an individual and the effective dose or potential to cause biological damage.

Activity

When we measure the amount of radiation in the environment, what is actually being measured is the rate of radioactive decay, or radioactivity, of a given element. This radioactivity is expressed in a unit of measure known as a curie (Ci). A curie is a measure of radioactivity, not a set quantity of material. More specifically, one curie equals 37,000,000,000 (3.7×10^{10}) radioactive disintegrations per second. One gram of a radioactive substance may contain the same amount of radioactivity as several tons of another radioactive substance. For example, one gram of tritium (a radioactive form of hydrogen) emits about 10,000 Ci, while one gram of uranium emits about 0.000000333 (333×10^{-9}) Ci. Because the levels of radioactive contamination at most FUSRAP sites are very low, the picocurie is commonly used in reporting contaminant levels. One picocurie is equal to 1×10^{-12} curies. Contaminants in water are reported in picocuries per liter (pCi/L), and contaminants in soil are reported in picocuries per gram (pCi/g).

Absorbed Dose

The total amount of absorbed energy per unit mass as a result of exposure to radiation is expressed in a unit of measure known as a rad. However, in terms of human health, it is the relative effectiveness of the absorbed energy in causing biological damage that is important, not the actual amount of energy absorbed.

Dose Equivalent

The absorbed dose needed to achieve a given level of biological damage is different for different kinds of radiation. To allow for the different biological effectiveness of different kinds of radiation, the concept of dose equivalent is used. The dose equivalent is the product of the absorbed dose and a dimensionless quality factor. The unit of dose equivalent is called the rem (roentgen-equivalent-man). A rem is a fairly large dose; therefore, the most common unit of dose equivalent is the millirem (mrem), or 1/1,000 of a rem. Table A-1 describes some potential health effects over a wide range of radiation doses.

Table A-1
Comparison and Description of Various Dose Levels

Dose	Description
1 mrem	Approximate daily dose from natural background radiation, including that from radon.
2.5 mrem	Cosmic dose to a person on a one-way airplane flight from New York to Los Angeles.
4 mrem	Annual exposure limit set by EPA for manmade radiation in drinking water.
10 mrem	Typical dose from one chest X-ray using modern equipment.
10 mrem	Annual exposure limit, set by EPA, for exposures from airborne emissions (excluding radon) from operations of nuclear fuel cycle facilities, including power plants, uranium mines, and mills.
25 mrem	Annual exposure limit set by EPA for low-level waste-related exposures.
65 mrem	Average yearly dose to people in the United States from manmade sources.
60-80 mrem	Average yearly dose from cosmic radiation to people in the Rocky Mountain States.
83 mrem	Estimate of the largest dose any offsite person could have received from the March 28, 1979, Three Mile Island nuclear accident.
100 mrem	Annual limit of dose from all DOE facilities to a member of the public who is not a radiation worker.
110 mrem	Average occupational dose received by United States commercial radiation workers in 1980.

170 mrem	Average yearly dose to an airline flight crew member from cosmic radiation.
300 mrem	Average yearly dose to people in the United States from all sources of natural background radiation.
900 mrem	Average dose from a lower-intestine diagnostic X-ray series.
1,000–5,000 mrem	EPA's Protective Action Guidelines state that public officials should take emergency action when the dose to a member of the public from a nuclear accident will likely reach this range.
5,000 mrem	Annual limit for occupational exposure of radiation workers set by the U.S. Nuclear Regulatory Commission and DOE.
8,000 mrem	Average yearly dose to the lungs from smoking 1½ packs of cigarettes per day.
10,000 mrem	The BEIR V report estimated that an acute dose at this level would result in a lifetime excess risk of death from cancer, caused by the radiation, of 0.8 percent.
25,000 mrem	EPA's guideline for voluntary maximum dose to emergency workers for non-lifesaving work during an emergency.
75,000 mrem	EPA's guideline for maximum dose to emergency workers volunteering for lifesaving work.
50,000–600,000 mrem	Doses in this range received over a short period of time will produce radiation sickness in varying degrees. At the lower end of this range, people are expected to recover completely, given proper medical attention. At the top of this range, most people will die within 60 days.

APPENDIX B

CONTAMINATION CONTROL DURING REMEDIAL ACTION

CONTAMINATION CONTROL DURING REMEDIAL ACTION

During the removal action, engineering and administrative controls (such as dust control, hazardous work permits, and installation of silt fences) and personal protective equipment (PPE) were used to protect remediation workers and members of the public from exposure to radiation in excess of applicable guidelines. These measures also controlled the migration of radioactive material to uncontaminated areas next to these vicinity properties.

All personnel working in contaminated areas were required to wear protective clothing, safety glasses, rubber boots, hard hat, and gloves.

Workers exiting controlled areas were checked for radioactive contamination (frisked) at the control point with a hand-held radiation detection instrument. Conducted by personnel who have received Radiological Worker II training, the frisk ensured that workers were not contaminated and prevented the potential spread of radioactive material from the work area. A frisk is simply a search for radioactive material that may have been transferred onto the skin or clothing of individuals inside the work area. The AC-3 alpha probe radiation detection instrument is hand-held approximately 0.5 cm (0.2 in.) away from the area to be frisked and moved slowly [about 5 cm (2 in.) per second] across the body or clothing by the worker. Portions of the worn PPE that were suspected or known to be contaminated were packaged and shipped to Envirocare of Utah for disposal.

The primary pathway by which persons onsite and offsite could be exposed to radioactive material during removal activities at the site was inhalation and ingestion of radioactively contaminated airborne dust generated during excavation. The spread of contamination and personnel exposure during remedial action were minimized by the following measures:

- A fine water mist was sprayed as needed to control dust during soil removal and transport.

- Trucks hauling contaminated materials were fitted with liners, and the loads were covered with tarps to prevent spillage.

- Silt fences were placed around excavated areas to prevent runoff of potentially contaminated sediment and were maintained until restoration activities were completed.

Water accumulated in the excavated area was sampled first for shipment to an offsite laboratory for radionuclides analysis. Then the water was pumped into a tanker and transported to the MISS.

Area air particulate sampling was also performed adjacent to areas being remediated to ensure that no member of the general public was exposed at levels exceeding the guidelines (DOE 1990). The limits expressed are derived concentration guides (DCGs); a DCG is the concentration of a particular radionuclide that would provide an effective dose equivalent of 100 mrem/yr to an individual continuously inhaling the radionuclide for an entire year. These guidelines were established by the International Commission on Radiation Protection and the National Commission on Radiation Protection to protect the environment and members of the general public. Eberline RAS-1 high-volume and SKC low-volume samplers were used, and the filters were collected daily and counted after 4 days to allow for radon decay. As an extra precaution, the area monitors were placed well within the site perimeter. The average concentration of thorium-232 measured by area air particulate monitors was 2.67×10^{-15} μCi/mL (2.67×10^{-6} pCi/L) (BNI 1999b).

Most results were below the DCG of 1.0×10^{-5} pCi/L for thorium-232. Even though the DCG was exceeded for a few 8-h periods, a person would need to be exposed to the thorium-232 DCG continuously for 1 year to receive a dose greater than the 100 mrem/yr guideline.

APPENDIX C

POST-REMEDIAL ACTION DATA FOR FIREMAN'S PARK

TABLE C-1
POST-REMEDIAL ACTION DATA FOR FIREMAN'S PARK

Sample ID	COC #	Collection Date	Comments	Matrix	Coordinates	Depth (ft)	Lab	Th-232 (pCi/g)	Qual[a] review	Error +/-	Ra-226 (pCi/g)	Qual[a] review	Error +/-	U-238 (pCi/g)	Qual[a] review	Error +/-
Background								1			0.70			2.9		
MVP0147	138971121	11/24/1997	Post-RA composite	sfs	N33~36 E16~18, E10~12	0.0-0.5	MISS	0.58	j	0.04	0.42		0.02	1.74	uj	0.00
MVP0148	138971122	11/25/1997	Post-RA composite	sfs	N33~36 E12~14, E-18~20	0.0-0.5	MISS	0.54	j	0.04	0.38		0.03	1.78	uj	0.00
MVP0149	138971122	11/25/1997	Post-RA composite	sfs	N33~36 E8~10, E14~16	0.0-0.5	MISS	0.64	j	0.05	0.44		0.03	1.86	uj	0.00
MVP0150	138971123	11/26/1997	Post-RA composite	sfs	N32~40 E20~32	0.0-0.5	MISS	0.81	j	0.05	0.42		0.03	1.92	uj	0.00
MVP0151	138971123	11/26/1997	Post-RA composite	sfs	N40~50 E 20~32	0.0-0.5	MISS	0.88	j	0.05	0.45		0.03	1.84	uj	0.00
MVP0152	138971124	11/26/1997	Post-RA composite	sfs	N36~44 E8~20	0.0-0.5	MISS	0.89	j	0.05	0.34		0.03	3.19	j	0.80
MVP0153	138971124	11/26/1997	Post-RA composite	sfs	N44~52 E8~20	0.0-0.5	MISS	0.76	j	0.05	0.38		0.03	1.99	uj	0.00
MVP0154	138971124	11/26/1997	Post-RA composite	sfs	N44~52 E8~20	0.0-0.5	MISS	0.69	j	0.05	0.36		0.03	1.97	uj	0.00
MVP0155	138971124	11/26/1997	Post-RA composite	sfs	N52~60 E8~20	0.0-0.5	MISS	0.81	j	0.05	0.35		0.03	0.02	uj	0.64
MVP0156	138971201	12/1/1997	Post-RA composite	sfs	N56~48 E8~4	0.0-0.5	MISS	0.70		0.04	0.30	j	0.02	1.59	uj	0.69
MVP0157	138971201	12/1/1997	Post-RA composite	sfs	N40~48 E8~4	0.0-0.5	MISS	0.98		0.06	0.32	j	0.03	1.96	uj	0.00
MVP0158	138971201	12/1/1997	Post-RA composite	sfs	N40~32 E8~4	0.0-0.5	MISS	0.82		0.05	0.39	j	0.03	1.93	uj	0.00
MVP0167	138971203	12/2/1997	Post-RA composite	sfs	N42~60 E-8~8	0.0-0.5	MISS	1.00		0.06	0.37	j	0..03	2.21	uj	0.00
MVP0168	138971203	12/2/1997	Post-RA composite	sfs	N42~60 E-8~8	0.0-0.5	MISS	0.98		0.06	0.40		0.03	2.26	uj	0.00
			Dup for MVP0167													
MVP4458	138990511	5/14/1999	Post-RA composite	sfs	N24~34 E0~8	0.0-0.5	MISS	0.75	j	0.04	0.39	j	0.03	0.74	uj	0.51
MVP4460	138990511	5/14/1999	Post-RA composite	sfs	N28~34 E8~20	0.0-0.5	MISS	0.74		0.05	0.42	j	0.03	2.18	uj	0.00
MVP4465	138990514	5/18/1999	Post-RA composite	sfs	N28~34 E20~37	0.0-0.5	MISS	0.55	j	0.04	0.33	j	0.02	0.90	uj	0.45
MVP0159	138971202	12/1/1997	Post-RA bias	sfs	N54 E13	0.0-0.5	MISS	3.36		0.11	0.34	j	0.03	3.05	uj	0.00
MVP0160	138971202	12/1/1997	Post-RA bias	sfs	N46 E15	0.0-0.5	MISS	1.63		0.07	0.40	j	0.03	2.33	uj	0.00
MVP0162	138971202	12/1/1997	Post-RA bias	sfs	N50 E22	0.0-0.5	MISS	0.74		0.06	0.35	j	0.03	2.13	uj	0.00
MVP0163	138971202	12/1/1997	Post-RA bias	sfs	N39 E8	0.0-0.5	MISS	0.49		0.04	0.40	j	0.03	1.83	uj	0.00
MVP0164	138971202	12/1/1997	Post-RA bias	sfs	N38 E2	0.0-0.5	MISS	0.75		0.05	0.36	j	0.03	2.01	uj	0.00
MVP0165	138971202	12/1/1997	Post-RA bias	sfs	N46 E-2	0.0-0.5	MISS	1.28		0.07	0.38	j	0.03	2.18	uj	0.00
MVP0166	138971202	12/1/1997	Post-RA bias	sfs	N53 E2	0.0-0.5	MISS	0.49		0.04	0.46	j	0.03	1.35	uj	0.58
MVP0169	138971203	12/2/1997	Post-RA bias	sfs	N60 E0	0.0-0.5	MISS	1.09		0.07	0.40	j	0.03	2.33	uj	0.00
MVP0170	138971204	12/2/1997	Post-RA bias	sfs	N38 E23	0.0-0.5	MISS	2.59		0.09	0.54	j	0.03	2.77	uj	0.00

NOTES:

RA - remedial action

sfs - surface soil

Gross results reported.

j - Estimate, qualitatively correct but quantitatively suspect.

uj - Undetected, estimated. The result is below the MDA or less than the associated error.

[a]Data validation - Document ID # S97-507, S97-508, 99G1048, 99G1049

APPENDIX D

RADIOLOGICAL DATA FOR CLEAN OVERBURDEN SOIL

TABLE D-1
RADIOLOGICAL DATA FOR MAYWOOD VICINITY PROPERTY CLEAN OVERBURDEN SAMPLES

Property	Document ID	COC #	Collection Date	Sample ID	Matrix	Coordinates	Depth (ft)	Th-232 (pCi/g)	Review Qual.	Error +\-	Ra-226 (pCi/g)	Review Qual.	Error +\-	U-238 (pCi/g)	Review Qual.	Error +\-
Background								1.00			0.70			2.90		
Fireman's Park	S97-510	138971001	10/10/1997	MVP0092	sbs	N40 E20	2.0-2.5	0.71		0.05	0.47		0.03	2.17	uj	0.00
Fireman's Park	S97-510	138971001	10/10/1997	MVP0093	sbs	N44 E13	2.5-3	0.70		0.05	0.55		0.03	2.06	uj	0.00
Fireman's Park	S97-510	138971001	10/10/1997	MVP0094	sbs	N36 E4	3-3.5	1.42		0.07	0.63		0.04	2.60	uj	0.00
Fireman's Park	S97-510	138971002	10/31/1997	MVP0095	sbs	N34 E22	3-3.5	1.05		0.06	0.45		0.04	2.33	uj	0.00
Fireman's Park	S97-510	138971101	11/3/1997	MVP0096	sbs	N35 E24	3.5-4	4.57		0.14	0.71		0.05	2.80	uj	1.48

NOTES:
COC # - chain of custody number
sbs - subsurface soil
Samples were analyzed at the MISS laboratory.
uj - Undetected-estimated. The result is below the minimum detectable activity level or less than the associated error.

TABLE D-2
SUM-OF-RATIOS FOR RADIOLOGICAL DATA FOR MAYWOOD VICINITY PROPERTY
CLEAN OVERBURDEN SAMPLES

Property	COC #	Collection Date	Sample ID	Matrix	Coordinates	Depth (ft)	Th-232 (pCi/g)	Error +\-	Ra-226 (pCi/g)	Error +\-	U-238 (pCi/g)	Error +\-	Sum Ratios
Fireman's Park	138971001	10/10/1997	MVP0092	sbs	N40 E20	2.0-2.5	0.00	0.05	0.00	0.03	0.00	0.00	0.000
Fireman's Park	138971001	10/10/1997	MVP0093	sbs	N44 E13	2.5-3	0.00	0.05	0.00	0.03	0.00	0.00	0.000
Fireman's Park	138971001	10/10/1997	MVP0094	sbs	N36 E4	3-3.5	0.42	0.07	0.00	0.04	0.00	0.00	0.084
Fireman's Park	138971002	10/31/1997	MVP0095	sbs	N34 E22	3-3.5	0.05	0.06	0.00	0.04	0.00	0.00	0.010
Fireman's Park	138971101	11/3/1997	MVP0096	sbs	N35 E24	3.5-4	3.57	0.14	0.01	0.05	0.00	1.48	0.716

NOTES:
COC # - chain of custody number
sbs - subsurface soil
Samples were analyzed at the MISS laboratory.
Background values: Th-232, 1.00 pCi/g; Ra-226, 0.70 pCi/g; U-238, 2.90 pCi/g.
Net results are reported. The net result is obtained by subtracting background concentration for each radionuclide from the reported gross value for that radionuclide. If the net result of a radionuclide is negative, then the value for that radionuclide is reported zero.

APPENDIX E

CHEMICAL DATA FOR CLEAN OVERBURDEN SOIL

TABLE E-1
CHEMICAL DATA FOR CLEAN OVERBURDEN SAMPLES COLLECTED FROM MAYWOOD VICINITY PROPERTIES

Sample ID	Document ID	COC #	Collection Date	Analyte	Concentration	Qualifier review	Unit
Overburden Soil from Lodi Park Pile staged at Lodi Park							
MVP1806	9809L578	138980905	9/2/98	Chloromethane	11	U	UG/KG
MVP1806	9809L578	138980905	9/2/98	Bromomethane	11	U	UG/KG
MVP1806	9809L578	138980905	9/2/98	Vinyl chloride	11	U	UG/KG
MVP1806	9809L578	138980905	9/2/98	Chloroethane	11	U	UG/KG
MVP1806	9809L578	138980905	9/2/98	Methylene chloride	15	U	UG/KG
MVP1806	9809L578	138980905	9/2/98	Acetone	8	UJ	UG/KG
MVP1806	9809L578	138980905	9/2/98	Carbon disulfide	6	U	UG/KG
MVP1806	9809L578	138980905	9/2/98	1,1-Dichloroethene	6	U	UG/KG
MVP1806	9809L578	138980905	9/2/98	1,1-Dichloroethane	6	U	UG/KG
MVP1806	9809L578	138980905	9/2/98	1,2-Dichloroethene (total)	6	U	UG/KG
MVP1806	9809L578	138980905	9/2/98	Chloroform	6	U	UG/KG
MVP1806	9809L578	138980905	9/2/98	1,2-Dichloroethane	6	U	UG/KG
MVP1806	9809L578	138980905	9/2/98	2-Butanone	11	U	UG/KG
MVP1806	9809L578	138980905	9/2/98	1,1,1-Trichloroethane	6	U	UG/KG
MVP1806	9809L578	138980905	9/2/98	Carbon tetrachloride	6	U	UG/KG
MVP1806	9809L578	138980905	9/2/98	Bromodichloromethane	6	U	UG/KG
MVP1806	9809L578	138980905	9/2/98	1,2-Dichloropropane	6	U	UG/KG
MVP1806	9809L578	138980905	9/2/98	cis-1,3-Dichloropropene	6	U	UG/KG
MVP1806	9809L578	138980905	9/2/98	trans-1,3-Dichloropropene	6	U	UG/KG
MVP1806	9809L578	138980905	9/2/98	Trichloroethene	6	U	UG/KG
MVP1806	9809L578	138980905	9/2/98	Dibromochloromethane	6	U	UG/KG
MVP1806	9809L578	138980905	9/2/98	1,1,2-Trichloroethane	6	U	UG/KG
MVP1806	9809L578	138980905	9/2/98	Benzene	6	U	UG/KG
MVP1806	9809L578	138980905	9/2/98	Bromoform	6	U	UG/KG
MVP1806	9809L578	138980905	9/2/98	4-methyl-2-pentanone	11	U	UG/KG
MVP1806	9809L578	138980905	9/2/98	2-Hexanone	11	U	UG/KG
MVP1806	9809L578	138980905	9/2/98	Tetrachloroethene	6	U	UG/KG
MVP1806	9809L578	138980905	9/2/98	1,1,2,2-Tetrachloroethane	6	U	UG/KG
MVP1806	9809L578	138980905	9/2/98	Toluene	6	U	UG/KG
MVP1806	9809L578	138980905	9/2/98	Chlorobenzene	6	U	UG/KG
MVP1806	9809L578	138980905	9/2/98	Ethylbenzene	6	U	UG/KG
MVP1806	9809L578	138980905	9/2/98	Styrene	6	U	UG/KG
MVP1806	9809L578	138980905	9/2/98	Xylene (total)	6	U	UG/KG
MVP1806	9809L578	138980905	9/2/98	Vinyl acetate	11	U	UG/KG
MVP1806	9809L578	138980905	9/2/98	Phenol	330	U	UG/KG
MVP1806	9809L578	138980905	9/2/98	bis (2-chloroethyl) ether	330	U	UG/KG
MVP1806	9809L578	138980905	9/2/98	2-Chlorophenol	330	U	UG/KG
MVP1806	9809L578	138980905	9/2/98	1,3-Dichlorobenzene	330	U	UG/KG
MVP1806	9809L578	138980905	9/2/98	1,4-Dichlorobenzene	330	U	UG/KG
MVP1806	9809L578	138980905	9/2/98	1,2-Dichlorobenzene	330	U	UG/KG
MVP1806	9809L578	138980905	9/2/98	2-Methyl phenol	330	U	UG/KG
MVP1806	9809L578	138980905	9/2/98	4- Methyl phenol	330	U	UG/KG
MVP1806	9809L578	138980905	9/2/98	N-Nitroso-di-n-propylamine	330	U	UG/KG
MVP1806	9809L578	138980905	9/2/98	Hexachloroethane	330	U	UG/KG
MVP1806	9809L578	138980905	9/2/98	Nitrobenzene	330	U	UG/KG
MVP1806	9809L578	138980905	9/2/98	Isophorone	330	U	UG/KG
MVP1806	9809L578	138980905	9/2/98	2-Nitrophenol	330	U	UG/KG
MVP1806	9809L578	138980905	9/2/98	2,4-Dimethyl phenol	330	U	UG/KG
MVP1806	9809L578	138980905	9/2/98	Cabazole	64	J	UG/KG
MVP1806	9809L578	138980905	9/2/98	bis (2-Chloroethoxy) methane	330	U	UG/KG
MVP1806	9809L578	138980905	9/2/98	2,4-Dichlorophenol	330	U	UG/KG
MVP1806	9809L578	138980905	9/2/98	1,2,4-Trichlorobenzene	330	U	UG/KG
MVP1806	9809L578	138980905	9/2/98	Naphthalene	330	U	UG/KG
MVP1806	9809L578	138980905	9/2/98	4-Chloroaniline	330	U	UG/KG
MVP1806	9809L578	138980905	9/2/98	Hexachlorobutadiene	330	U	UG/KG
MVP1806	9809L578	138980905	9/2/98	4-Chloro-3-methyl phenol	330	U	UG/KG
MVP1806	9809L578	138980905	9/2/98	2-Methylnaphthalene	34	J	UG/KG
MVP1806	9809L578	138980905	9/2/98	Hexachlorocyclopentadiene	330	U	UG/KG
MVP1806	9809L578	138980905	9/2/98	2,4,6-Trichlorophenol	330	U	UG/KG
MVP1806	9809L578	138980905	9/2/98	2,4,5-Trichlorophenol	840	U	UG/KG

TABLE E-1
CHEMICAL DATA FOR CLEAN OVERBURDEN SAMPLES COLLECTED FROM MAYWOOD VICINITY PROPERTIES

Sample ID	Document ID	COC #	Collection Date	Analyte	Concentration	Qualifier review	Unit
MVP1806	9809L578	138980905	9/2/98	2-Chloronaphthalene	330	U	UG/KG
MVP1806	9809L578	138980905	9/2/98	2-Nitroaniline	840	U	UG/KG
MVP1806	9809L578	138980905	9/2/98	Dimethylphthalate	330	U	UG/KG
MVP1806	9809L578	138980905	9/2/98	Acenaphthylene	32	J	UG/KG
MVP1806	9809L578	138980905	9/2/98	2,6-Dinitrotoluene	330	U	UG/KG
MVP1806	9809L578	138980905	9/2/98	3-Nitroaniline	840	U	UG/KG
MVP1806	9809L578	138980905	9/2/98	Acenaphthene	66	J	UG/KG
MVP1806	9809L578	138980905	9/2/98	2,4-Dinitrophenol	840	U	UG/KG
MVP1806	9809L578	138980905	9/2/98	4-Nitrophenol	840	U	UG/KG
MVP1806	9809L578	138980905	9/2/98	Dibenzofuran	43	J	UG/KG
MVP1806	9809L578	138980905	9/2/98	2,4-Dinitrotoluene	330	U	UG/KG
MVP1806	9809L578	138980905	9/2/98	Diethylphthalate	330	U	UG/KG
MVP1806	9809L578	138980905	9/2/98	4-Chlorophenyl-phenylether	330	U	UG/KG
MVP1806	9809L578	138980905	9/2/98	Fluorene	100	J	UG/KG
MVP1806	9809L578	138980905	9/2/98	4-Nitroaniline	840	U	UG/KG
MVP1806	9809L578	138980905	9/2/98	4,6-Dinitro-2-methylphenol	840	U	UG/KG
MVP1806	9809L578	138980905	9/2/98	N-Nitrosodiphenylamine	330	U	UG/KG
MVP1806	9809L578	138980905	9/2/98	4-Bromophenyl-phenylether	330	U	UG/KG
MVP1806	9809L578	138980905	9/2/98	Hexachlorobenzene	330	U	UG/KG
MVP1806	9809L578	138980905	9/2/98	Pentachlorophenol	840	U	UG/KG
MVP1806	9809L578	138980905	9/2/98	Phenanthrene	710		UG/KG
MVP1806	9809L578	138980905	9/2/98	Anthracene	200	J	UG/KG
MVP1806	9809L578	138980905	9/2/98	Di-n-butylphthalate	1700	U	UG/KG
MVP1806	9809L578	138980905	9/2/98	Fluoranthene	990		UG/KG
MVP1806	9809L578	138980905	9/2/98	2,2'-oxybis(1-cloropropane)	330	U	UG/KG
MVP1806	9809L578	138980905	9/2/98	Pyrene	960		UG/KG
MVP1806	9809L578	138980905	9/2/98	Butylbenzylphthalate	17	J	UG/KG
MVP1806	9809L578	138980905	9/2/98	3,3'-Dichlorobenzidine	330	U	UG/KG
MVP1806	9809L578	138980905	9/2/98	Benzo (a) anthracene	440		UG/KG
MVP1806	9809L578	138980905	9/2/98	Chrysene	460		UG/KG
MVP1806	9809L578	138980905	9/2/98	bis (2-ethylhexyl) phthalate	58	J	UG/KG
MVP1806	9809L578	138980905	9/2/98	Di-n-octyl phthalate	330	U	UG/KG
MVP1806	9809L578	138980905	9/2/98	Benzo (b) fluoranthene	320	J	UG/KG
MVP1806	9809L578	138980905	9/2/98	Benzo (k) fluoranthene	360		UG/KG
MVP1806	9809L578	138980905	9/2/98	Benzo (a) pyrene	370		UG/KG
MVP1806	9809L578	138980905	9/2/98	Indeno (1,2,3-cd) pyrene	210	J	UG/KG
MVP1806	9809L578	138980905	9/2/98	Dibenzo (a,h) anthracene	82	J	UG/KG
MVP1806	9809L578	138980905	9/2/98	Benzo (g,h,i) perylene	230	J	UG/KG
MVP1806	9809L578	138980905	9/2/98	Aluminum	7720		MG/KG
MVP1806	9809L578	138980905	9/2/98	Antimony	0.42	UJ	MG/KG
MVP1806	9809L578	138980905	9/2/98	Arsenic	5		MG/KG
MVP1806	9809L578	138980905	9/2/98	Barium	77.2		MG/KG
MVP1806	9809L578	138980905	9/2/98	Beryllium	0.48		MG/KG
MVP1806	9809L578	138980905	9/2/98	Cadmium	0.26		MG/KG
MVP1806	9809L578	138980905	9/2/98	Calcium	4980		MG/KG
MVP1806	9809L578	138980905	9/2/98	Chromium	23.8		MG/KG
MVP1806	9809L578	138980905	9/2/98	Cobalt	5.9		MG/KG
MVP1806	9809L578	138980905	9/2/98	Copper	20.9		MG/KG
MVP1806	9809L578	138980905	9/2/98	Iron	15200		MG/KG
MVP1806	9809L578	138980905	9/2/98	Lead	41.2		MG/KG
MVP1806	9809L578	138980905	9/2/98	Magnesium	3790		MG/KG
MVP1806	9809L578	138980905	9/2/98	Manganese	428	J	MG/KG
MVP1806	9809L578	138980905	9/2/98	Mercury	0.11	J	MG/KG
MVP1806	9809L578	138980905	9/2/98	Nickel	11.5		MG/KG
MVP1806	9809L578	138980905	9/2/98	Potassium	726		MG/KG
MVP1806	9809L578	138980905	9/2/98	Selenium	0.73		MG/KG
MVP1806	9809L578	138980905	9/2/98	Silver	0.12	U	MG/KG
MVP1806	9809L578	138980905	9/2/98	Sodium	135		MG/KG
MVP1806	9809L578	138980905	9/2/98	Thallium	1.4		MG/KG
MVP1806	9809L578	138980905	9/2/98	Vanadium	21.9		MG/KG
MVP1806	9809L578	138980905	9/2/98	Zinc	60.8		MG/KG

TABLE E-1
CHEMICAL DATA FOR CLEAN OVERBURDEN SAMPLES COLLECTED FROM MAYWOOD VICINITY PROPERTIES

Sample ID	Document ID	COC #	Collection Date	Analyte	Concentration	Qualifier review	Unit
MVP1806	9809L578	138980905	9/2/98	Arochlor-1016	190	UJ	UG/KG
MVP1806	9809L578	138980905	9/2/98	Arochlor-1221	380	UJ	UG/KG
MVP1806	9809L578	138980905	9/2/98	Arochlor-1232	190	UJ	UG/KG
MVP1806	9809L578	138980905	9/2/98	Arochlor-1242	190	UJ	UG/KG
MVP1806	9809L578	138980905	9/2/98	Arochlor-1248	270	J	UG/KG
MVP1806	9809L578	138980905	9/2/98	Arochlor-1254	190	UJ	UG/KG
MVP1806	9809L578	138980905	9/2/98	Arochlor-1260	190	UJ	UG/KG
MVP1806	9809L578	138980905	9/2/98	Aldrin	I	R	UG/KG
MVP1806	9809L578	138980905	9/2/98	alpha-BHC	9.6	UJ	UG/KG
MVP1806	9809L578	138980905	9/2/98	beta-BHC	9.6	UJ	UG/KG
MVP1806	9809L578	138980905	9/2/98	delta-BHC	17	NJ	UG/KG
MVP1806	9809L578	138980905	9/2/98	gamma-BHC (lindane)	19	NJ	UG/KG
MVP1806	9809L578	138980905	9/2/98	alpha-chlordane	20	J	UG/KG
MVP1806	9809L578	138980905	9/2/98	gamma-chlordane	27	J	UG/KG
MVP1806	9809L578	138980905	9/2/98	4,4'-DDD	19	UJ	UG/KG
MVP1806	9809L578	138980905	9/2/98	4,4'-DDE	19	UJ	UG/KG
MVP1806	9809L578	138980905	9/2/98	4,4'-DDT	26	J	UG/KG
MVP1806	9809L578	138980905	9/2/98	Dieldrin	19	UJ	UG/KG
MVP1806	9809L578	138980905	9/2/98	Endosulfan I	9.6	UJ	UG/KG
MVP1806	9809L578	138980905	9/2/98	Endosulfan II	19	UJ	UG/KG
MVP1806	9809L578	138980905	9/2/98	Endosulfan sulfate	19	UJ	UG/KG
MVP1806	9809L578	138980905	9/2/98	Endrin	19	UJ	UG/KG
MVP1806	9809L578	138980905	9/2/98	Endrin aldehyde	19	UJ	UG/KG
MVP1806	9809L578	138980905	9/2/98	Endrin ketone	19	UJ	UG/KG
MVP1806	9809L578	138980905	9/2/98	Heptachlor	9.6	UJ	UG/KG
MVP1806	9809L578	138980905	9/2/98	Heptachlor epoxide	9.6	UJ	UG/KG
MVP1806	9809L578	138980905	9/2/98	Methoxychlor	96	UJ	UG/KG
MVP1806	9809L578	138980905	9/2/98	Toxaphene	960	UJ	UG/KG
MVP1806	9809L578	138980905	9/2/98	2,4-D	38	UJ	UG/KG
MVP1806	9809L578	138980905	9/2/98	2,4,5-T	19	U	UG/KG
MVP1806	9809L578	138980905	9/2/98	2,4,5-TP (silvex)	19	U	UG/KG
Overburden Soil from Lodi Park Pile staged at Lodi Park							
MVP1809	9812L717	138981237	12/17/98	Chloromethane	11	U	UG/KG
MVP1809	9812L717	138981237	12/17/98	Bromomethane	11	U	UG/KG
MVP1809	9812L717	138981237	12/17/98	Vinyl chloride	11	U	UG/KG
MVP1809	9812L717	138981237	12/17/98	Chloroethane	11	U	UG/KG
MVP1809	9812L717	138981237	12/17/98	Methylene chloride	8	UJ	UG/KG
MVP1809	9812L717	138981237	12/17/98	Acetone	10	UJ	UG/KG
MVP1809	9812L717	138981237	12/17/98	Carbon disulfide	6	U	UG/KG
MVP1809	9812L717	138981237	12/17/98	1,1-Dichloroethene	6	UJ	UG/KG
MVP1809	9812L717	138981237	12/17/98	1,1-Dichloroethane	6	U	UG/KG
MVP1809	9812L717	138981237	12/17/98	1,2-Dichloroethene (total)	6	U	UG/KG
MVP1809	9812L717	138981237	12/17/98	Chloroform	6	U	UG/KG
MVP1809	9812L717	138981237	12/17/98	1,2-Dichloroethane	6	U	UG/KG
MVP1809	9812L717	138981237	12/17/98	2-Butanone	11	U	UG/KG
MVP1809	9812L717	138981237	12/17/98	1,1,1-Trichloroethane	6	U	UG/KG
MVP1809	9812L717	138981237	12/17/98	Carbon tetrachloride	6	U	UG/KG
MVP1809	9812L717	138981237	12/17/98	Bromodichloromethane	6	U	UG/KG
MVP1809	9812L717	138981237	12/17/98	1,2-Dichloropropane	6	U	UG/KG
MVP1809	9812L717	138981237	12/17/98	cis-1,3-Dichloropropene	6	U	UG/KG
MVP1809	9812L717	138981237	12/17/98	trans-1,3-Dichloropropene	6	U	UG/KG
MVP1809	9812L717	138981237	12/17/98	Trichloroethene	6	U	UG/KG
MVP1809	9812L717	138981237	12/17/98	Dibromochloromethane	6	U	UG/KG
MVP1809	9812L717	138981237	12/17/98	1,1,2-Trichloroethane	6	U	UG/KG
MVP1809	9812L717	138981237	12/17/98	Benzene	6	U	UG/KG
MVP1809	9812L717	138981237	12/17/98	Bromoform	6	U	UG/KG
MVP1809	9812L717	138981237	12/17/98	4-methyl-2-pentanone	11	U	UG/KG
MVP1809	9812L717	138981237	12/17/98	2-Hexanone	11	U	UG/KG
MVP1809	9812L717	138981237	12/17/98	Tetrachloroethene	6	U	UG/KG
MVP1809	9812L717	138981237	12/17/98	1,1,2,2-Tetrachloroethane	6	U	UG/KG

TABLE E-1
CHEMICAL DATA FOR CLEAN OVERBURDEN SAMPLES COLLECTED FROM MAYWOOD VICINITY PROPERTIES

Sample ID	Document ID	COC #	Collection Date	Analyte	Concentration	Qualifier review	Unit
MVP1809	9812L717	138981237	12/17/98	Toluene	6	U	UG/KG
MVP1809	9812L717	138981237	12/17/98	Chlorobenzene	6	U	UG/KG
MVP1809	9812L717	138981237	12/17/98	Ethylbenzene	6	U	UG/KG
MVP1809	9812L717	138981237	12/17/98	Styrene	6	U	UG/KG
MVP1809	9812L717	138981237	12/17/98	Xylene (total)	6	U	UG/KG
MVP1809	9812L717	138981237	12/17/98	Phenol	380	U	UG/KG
MVP1809	9812L717	138981237	12/17/98	bis (2-chloroethyl) ether	380	U	UG/KG
MVP1809	9812L717	138981237	12/17/98	2-Chlorophenol	380	U	UG/KG
MVP1809	9812L717	138981237	12/17/98	1,3-Dichlorobenzene	380	U	UG/KG
MVP1809	9812L717	138981237	12/17/98	1,4-Dichlorobenzene	380	U	UG/KG
MVP1809	9812L717	138981237	12/17/98	1,2-Dichlorobenzene	380	U	UG/KG
MVP1809	9812L717	138981237	12/17/98	2-Methyl phenol	380	U	UG/KG
MVP1809	9812L717	138981237	12/17/98	4- Methyl phenol	380	U	UG/KG
MVP1809	9812L717	138981237	12/17/98	N-Nitroso-di-n-propylamine	380	U	UG/KG
MVP1809	9812L717	138981237	12/17/98	Hexachloroethane	380	U	UG/KG
MVP1809	9812L717	138981237	12/17/98	Nitrobenzene	380	U	UG/KG
MVP1809	9812L717	138981237	12/17/98	Isophorone	380	U	UG/KG
MVP1809	9812L717	138981237	12/17/98	2-Nitrophenol	380	U	UG/KG
MVP1809	9812L717	138981237	12/17/98	2,4-Dimethyl phenol	380	U	UG/KG
MVP1809	9812L717	138981237	12/17/98	2,2'-oxybis(1-chloropropane)	380	U	UG/KG
MVP1809	9812L717	138981237	12/17/98	bis (2-Chloroethoxy) methane	380	U	UG/KG
MVP1809	9812L717	138981237	12/17/98	2,4-Dichlorophenol	380	U	UG/KG
MVP1809	9812L717	138981237	12/17/98	1,2,4-Trichlorobenzene	380	U	UG/KG
MVP1809	9812L717	138981237	12/17/98	Naphthalene	380	U	UG/KG
MVP1809	9812L717	138981237	12/17/98	4-Chloroaniline	380	U	UG/KG
MVP1809	9812L717	138981237	12/17/98	Hexachlorobutadiene	380	U	UG/KG
MVP1809	9812L717	138981237	12/17/98	4-Chloro-3-methyl phenol	380	U	UG/KG
MVP1809	9812L717	138981237	12/17/98	2-Methylnaphthalene	380	U	UG/KG
MVP1809	9812L717	138981237	12/17/98	Hexachlorocyclopentadiene	380	U	UG/KG
MVP1809	9812L717	138981237	12/17/98	2,4,6-Trichlorophenol	380	U	UG/KG
MVP1809	9812L717	138981237	12/17/98	2,4,5-Trichlorophenol	940	U	UG/KG
MVP1809	9812L717	138981237	12/17/98	2-Chloronaphthalene	380	U	UG/KG
MVP1809	9812L717	138981237	12/17/98	2-Nitroaniline	940	U	UG/KG
MVP1809	9812L717	138981237	12/17/98	Dimethylphthalate	380	U	UG/KG
MVP1809	9812L717	138981237	12/17/98	Acenaphthylene	28	J	UG/KG
MVP1809	9812L717	138981237	12/17/98	2,6-Dinitrotoluene	380	U	UG/KG
MVP1809	9812L717	138981237	12/17/98	3-Nitroaniline	940	U	UG/KG
MVP1809	9812L717	138981237	12/17/98	Acenaphthene	380	U	UG/KG
MVP1809	9812L717	138981237	12/17/98	2,4-Dinitrophenol	940	U	UG/KG
MVP1809	9812L717	138981237	12/17/98	4-Nitrophenol	940	U	UG/KG
MVP1809	9812L717	138981237	12/17/98	Dibenzofuran	380	U	UG/KG
MVP1809	9812L717	138981237	12/17/98	2,4-Dinitrotoluene	380	U	UG/KG
MVP1809	9812L717	138981237	12/17/98	Diethylphthalate	380	U	UG/KG
MVP1809	9812L717	138981237	12/17/98	4-Chlorophenyl-phenylether	380	U	UG/KG
MVP1809	9812L717	138981237	12/17/98	Fluorene	33	J	UG/KG
MVP1809	9812L717	138981237	12/17/98	4-Nitroaniline	940	U	UG/KG
MVP1809	9812L717	138981237	12/17/98	4,6-Dinitro-2-methylphenol	940	U	UG/KG
MVP1809	9812L717	138981237	12/17/98	N-Nitrosodiphenylamine	380	U	UG/KG
MVP1809	9812L717	138981237	12/17/98	4-Bromophenyl-phenylether	380	U	UG/KG
MVP1809	9812L717	138981237	12/17/98	Hexachlorobenzene	380	U	UG/KG
MVP1809	9812L717	138981237	12/17/98	Pentachlorophenol	940	U	UG/KG
MVP1809	9812L717	138981237	12/17/98	Phenanthrene	280	J	UG/KG
MVP1809	9812L717	138981237	12/17/98	Anthracene	45	J	UG/KG
MVP1809	9812L717	138981237	12/17/98	Di-n-butylphthalate	380	U	UG/KG
MVP1809	9812L717	138981237	12/17/98	Fluoranthene	240	J	UG/KG
MVP1809	9812L717	138981237	12/17/98	Carbazole	380	U	UG/KG
MVP1809	9812L717	138981237	12/17/98	Pyrene	330	J	UG/KG
MVP1809	9812L717	138981237	12/17/98	Butylbenzylphthalate	380	U	UG/KG
MVP1809	9812L717	138981237	12/17/98	3,3'-Dichlorobenzidine	380	U	UG/KG
MVP1809	9812L717	138981237	12/17/98	Benzo (a) anthracene	120	J	UG/KG
MVP1809	9812L717	138981237	12/17/98	Chrysene	180	J	UG/KG

TABLE E-1
CHEMICAL DATA FOR CLEAN OVERBURDEN SAMPLES COLLECTED FROM MAYWOOD VICINITY PROPERTIES

Sample ID	Document ID	COC #	Collection Date	Analyte	Concentration	Qualifier review	Unit
MVP1809	9812L717	138981237	12/17/98	bis (2-ethylhexyl) phthalate	380	U	UG/KG
MVP1809	9812L717	138981237	12/17/98	Di-n-octyl phthalate	380	U	UG/KG
MVP1809	9812L717	138981237	12/17/98	Benzo (b) fluoranthene	82	J	UG/KG
MVP1809	9812L717	138981237	12/17/98	Benzo (k) fluoranthene	88	J	UG/KG
MVP1809	9812L717	138981237	12/17/98	Benzo (a) pyrene	110	J	UG/KG
MVP1809	9812L717	138981237	12/17/98	Indeno (1,2,3-cd) pyrene	52	J	UG/KG
MVP1809	9812L717	138981237	12/17/98	Dibenzo (a,h) anthracene	380	U	UG/KG
MVP1809	9812L717	138981237	12/17/98	Benzo (g,h,i) perylene	68	J	UG/KG
MVP1809	9812L717	138981237	12/17/98	Aluminum	8600		MG/KG
MVP1809	9812L717	138981237	12/17/98	Antimony	0.39	UJ	MG/KG
MVP1809	9812L717	138981237	12/17/98	Arsenic	3.3		MG/KG
MVP1809	9812L717	138981237	12/17/98	Barium	48		MG/KG
MVP1809	9812L717	138981237	12/17/98	Beryllium	0.39		MG/KG
MVP1809	9812L717	138981237	12/17/98	Cadmium	0.24		MG/KG
MVP1809	9812L717	138981237	12/17/98	Calcium	4230		MG/KG
MVP1809	9812L717	138981237	12/17/98	Chromium	16.8		MG/KG
MVP1809	9812L717	138981237	12/17/98	Cobalt	6.2		MG/KG
MVP1809	9812L717	138981237	12/17/98	Copper	22.7		MG/KG
MVP1809	9812L717	138981237	12/17/98	Iron	14100		MG/KG
MVP1809	9812L717	138981237	12/17/98	Lead	27.7		MG/KG
MVP1809	9812L717	138981237	12/17/98	Magnesium	3290		MG/KG
MVP1809	9812L717	138981237	12/17/98	Manganese	242		MG/KG
MVP1809	9812L717	138981237	12/17/98	Mercury	0.04		MG/KG
MVP1809	9812L717	138981237	12/17/98	Nickel	12.4		MG/KG
MVP1809	9812L717	138981237	12/17/98	Potassium	501		MG/KG
MVP1809	9812L717	138981237	12/17/98	Selenium	0.4	U	MG/KG
MVP1809	9812L717	138981237	12/17/98	Silver	0.06	U	MG/KG
MVP1809	9812L717	138981237	12/17/98	Sodium	148		MG/KG
MVP1809	9812L717	138981237	12/17/98	Thallium	0.46		MG/KG
MVP1809	9812L717	138981237	12/17/98	Vanadium	31.6		MG/KG
MVP1809	9812L717	138981237	12/17/98	Zinc	48.5		MG/KG
MVP1809	9812L717	138981237	12/17/98	Arochlor-1016	380	UJ	UG/KG
MVP1809	9812L717	138981237	12/17/98	Arochlor-1221	750	UJ	UG/KG
MVP1809	9812L717	138981237	12/17/98	Arochlor-1232	380	UJ	UG/KG
MVP1809	9812L717	138981237	12/17/98	Arochlor-1242	380	UJ	UG/KG
MVP1809	9812L717	138981237	12/17/98	Arochlor-1248	380	UJ	UG/KG
MVP1809	9812L717	138981237	12/17/98	Arochlor-1254	380	UJ	UG/KG
MVP1809	9812L717	138981237	12/17/98	Arochlor-1260	380	UJ	UG/KG
MVP1809	9812L717	138981237	12/17/98	Aldrin	30	J	UG/KG
MVP1809	9812L717	138981237	12/17/98	alpha-BHC	19	UJ	UG/KG
MVP1809	9812L717	138981237	12/17/98	beta-BHC	19	UJ	UG/KG
MVP1809	9812L717	138981237	12/17/98	delta-BHC	19	UJ	UG/KG
MVP1809	9812L717	138981237	12/17/98	gamma-BHC (lindane)	19	UJ	UG/KG
MVP1809	9812L717	138981237	12/17/98	alpha-chlordane	62	J	UG/KG
MVP1809	9812L717	138981237	12/17/98	gamma-chlordane	58	J	UG/KG
MVP1809	9812L717	138981237	12/17/98	4,4'-DDD	38	UJ	UG/KG
MVP1809	9812L717	138981237	12/17/98	4,4'-DDE	38	UJ	UG/KG
MVP1809	9812L717	138981237	12/17/98	4,4'-DDT	38	UJ	UG/KG
MVP1809	9812L717	138981237	12/17/98	Dieldrin	38	UJ	UG/KG
MVP1809	9812L717	138981237	12/17/98	Endosulfan I	19	UJ	UG/KG
MVP1809	9812L717	138981237	12/17/98	Endosulfan II	38	UJ	UG/KG
MVP1809	9812L717	138981237	12/17/98	Endosulfan sulfate	38	UJ	UG/KG
MVP1809	9812L717	138981237	12/17/98	Endrin	38	UJ	UG/KG
MVP1809	9812L717	138981237	12/17/98	Endrin aldehyde	38	UJ	UG/KG
MVP1809	9812L717	138981237	12/17/98	Endrin ketone	38	UJ	UG/KG
MVP1809	9812L717	138981237	12/17/98	Heptachlor	19	UJ	UG/KG
MVP1809	9812L717	138981237	12/17/98	Heptachlor epoxide	19	UJ	UG/KG
MVP1809	9812L717	138981237	12/17/98	Methoxychlor	190	UJ	UG/KG
MVP1809	9812L717	138981237	12/17/98	Toxaphene	1900	UJ	UG/KG
MVP1809	9812L717	138981237	12/17/98	2,4-D	38	U	UG/KG
MVP1809	9812L717	138981237	12/17/98	2,4,5-T	19	U	UG/KG

TABLE E-1
CHEMICAL DATA FOR CLEAN OVERBURDEN SAMPLES COLLECTED FROM MAYWOOD VICINITY PROPERTIES

Sample ID	Document ID	COC #	Collection Date	Analyte	Concentration	Qualifier review	Unit
MVP1809	9812L717	138981237	12/17/98	2,4,5-TP (silvex)	19	U	UG/KG
MVP1809	9812L717	138981237	12/17/98	Dalapon	190	U	UG/KG
MVP1809	9812L717	138981237	12/17/98	Dicamba	75	U	UG/KG
MVP1809	9812L717	138981237	12/17/98	Dichloroprop	190	U	UG/KG
MVP1809	9812L717	138981237	12/17/98	2,4-DB	190	U	UG/KG
MVP1809	9812L717	138981237	12/17/98	Dinoseb	19	UJ	UG/KG

NOTES:
U - Analyte was analyzed for, but not detected.
J - estimated value
UJ - Analyte was analyzed for but bot detected,but must be estimated due to quality control considerations.
NJ - This is an estimated value. The analyte is presumed to be present although the peaks in the retention time window showed poor comparison and could not be dismissed.
R - rejected

APPENDIX F

RADIOLOGICAL AND CHEMICAL DATA FOR BACKFILL RECEIVED FROM VENDORS

TABLE F-1
RADIOLOGICAL AND CHEMICAL DATA FOR BACKFILL MATERIAL RECEIVED FROM VENDORS

Sample ID	Document ID	COC #	Collection Date	Analyte	Concentration	Qualifier Review	Unit
Fill Material from Parsippany Construction							
34646	a	NA	12/5/1997	Chloromethane	ND		UG/KG
34646	a	NA	12/5/1997	Bromomethane	ND		UG/KG
34646	a	NA	12/5/1997	Vinyl chloride	ND		UG/KG
34646	a	NA	12/5/1997	Chloroethane	ND		UG/KG
34646	a	NA	12/5/1997	Methylene chloride	2 B		UG/KG
34646	a	NA	12/5/1997	Acetone	ND		UG/KG
34646	a	NA	12/5/1997	Carbon disulfide	ND		UG/KG
34646	a	NA	12/5/1997	1,1-Dichloroethene	ND		UG/KG
34646	a	NA	12/5/1997	1,1-Dichloroethane	ND		UG/KG
34646	a	NA	12/5/1997	1,2-Dichloroethene (cis)	ND		UG/KG
34646	a	NA	12/5/1997	1,2-Dichloroethene (trans)	ND		UG/KG
34646	a	NA	12/5/1997	Chloroform	ND		UG/KG
34646	a	NA	12/5/1997	1,2-Dichloroethane	ND		UG/KG
34646	a	NA	12/5/1997	2-Butanone	ND		UG/KG
34646	a	NA	12/5/1997	1,1,1-Trichloroethane	ND		UG/KG
34646	a	NA	12/5/1997	Carbon tetrachloride	ND		UG/KG
34646	a	NA	12/5/1997	Bromodichloromethane	ND		UG/KG
34646	a	NA	12/5/1997	1,2-Dichloropropane	ND		UG/KG
34646	a	NA	12/5/1997	cis-1,3-Dichloropropene	ND		UG/KG
34646	a	NA	12/5/1997	trans-1,3-Dichloropropene	ND		UG/KG
34646	a	NA	12/5/1997	Trichloroethene	ND		UG/KG
34646	a	NA	12/5/1997	Dibromochloromethane	ND		UG/KG
34646	a	NA	12/5/1997	1,1,2-Trichloroethane	ND		UG/KG
34646	a	NA	12/5/1997	Benzene	ND		UG/KG
34646	a	NA	12/5/1997	Bromoform	ND		UG/KG
34646	a	NA	12/5/1997	4-methyl-2-pentanone	ND		UG/KG
34646	a	NA	12/5/1997	2-Hexanone	ND		UG/KG
34646	a	NA	12/5/1997	Tetrachloroethene	ND		UG/KG
34646	a	NA	12/5/1997	1,1,2,2-Tetrachloroethane	ND		UG/KG
34646	a	NA	12/5/1997	Toluene	ND		UG/KG
34646	a	NA	12/5/1997	Chlorobenzene	ND		UG/KG
34646	a	NA	12/5/1997	Ethylbenzene	ND		UG/KG
34646	a	NA	12/5/1997	Styrene	ND		UG/KG
34646	a	NA	12/5/1997	Xylene (total)	ND		UG/KG
34646	a	NA	12/5/1997	N-Nitrosodimethylamine	ND		UG/KG
34646	a	NA	12/5/1997	Phenol	ND		UG/KG
34646	a	NA	12/5/1997	bis (2-chloroethyl) ether	ND		UG/KG
34646	a	NA	12/5/1997	2-Chlorophenol	ND		UG/KG
34646	a	NA	12/5/1997	1,3-Dichlorobenzene	ND		UG/KG
34646	a	NA	12/5/1997	1,4-Dichlorobenzene	ND		UG/KG
34646	a	NA	12/5/1997	1,2-Dichlorobenzene	ND		UG/KG
34646	a	NA	12/5/1997	bis (2-chloroisopropyl) ether	ND		UG/KG
34646	a	NA	12/5/1997	N-Nitroso-di-n-propylamine	ND		UG/KG
34646	a	NA	12/5/1997	Hexachloroethane	ND		UG/KG
34646	a	NA	12/5/1997	Nitrobenzene	ND		UG/KG

TABLE F-1
RADIOLOGICAL AND CHEMICAL DATA FOR BACKFILL MATERIAL RECEIVED FROM VENDORS

Sample ID	Document ID	COC #	Collection Date	Analyte	Concentration	Qualifier Review	Unit
Fill Material from Parsippany Construction							
34646	a	NA	12/5/1997	Isophorone	ND		UG/KG
34646	a	NA	12/5/1997	2-Nitrophenol	ND		UG/KG
34646	a	NA	12/5/1997	2,4-Dimethyl phenol	ND		UG/KG
34646	a	NA	12/5/1997	bis (2-Chloroethoxy) methane	ND		UG/KG
34646	a	NA	12/5/1997	2,4-Dichlorophenol	ND		UG/KG
34646	a	NA	12/5/1997	1,2,4-Trichlorobenzene	ND		UG/KG
34646	a	NA	12/5/1997	Naphthalene	55.00		UG/KG
34646	a	NA	12/5/1997	Hexachlorobutadiene	ND		UG/KG
34646	a	NA	12/5/1997	4-Chloro-3-methyl phenol	ND		UG/KG
34646	a	NA	12/5/1997	Hexachlorocyclopentadiene	ND		UG/KG
34646	a	NA	12/5/1997	2,4,6-Trichlorophenol	ND		UG/KG
34646	a	NA	12/5/1997	2-Chloronaphthalene	ND		UG/KG
34646	a	NA	12/5/1997	Dimethylphthalate	ND		UG/KG
34646	a	NA	12/5/1997	Acenaphthylene	120.00		UG/KG
34646	a	NA	12/5/1997	2,6-Dinitrotoluene	ND		UG/KG
34646	a	NA	12/5/1997	Acenaphthene	55.00		UG/KG
34646	a	NA	12/5/1997	2,4-Dinitrophenol	ND		UG/KG
34646	a	NA	12/5/1997	4-Nitrophenol	ND		UG/KG
34646	a	NA	12/5/1997	2,4-Dinitrotoluene	ND		UG/KG
34646	a	NA	12/5/1997	Diethylphthalate	ND		UG/KG
34646	a	NA	12/5/1997	4-Chlorophenyl-phenylether	ND		UG/KG
34646	a	NA	12/5/1997	Fluorene	67.00		UG/KG
34646	a	NA	12/5/1997	4,6-Dinitro-2-methylphenol	ND		UG/KG
34646	a	NA	12/5/1997	N-Nitrosodiphenylamine	ND		UG/KG
34646	a	NA	12/5/1997	4-Bromophenyl-phenylether	ND		UG/KG
34646	a	NA	12/5/1997	Hexachlorobenzene	ND		UG/KG
34646	a	NA	12/5/1997	Pentachlorophenol	ND		UG/KG
34646	a	NA	12/5/1997	Phenanthrene	530.00		UG/KG
34646	a	NA	12/5/1997	Anthracene	160.00		UG/KG
34646	a	NA	12/5/1997	Di-n-butylphthalate	ND		UG/KG
34646	a	NA	12/5/1997	Fluoranthene	1100.00		UG/KG
34646	a	NA	12/5/1997	Benzidine	ND		UG/KG
34646	a	NA	12/5/1997	Pyrene	1000.00		UG/KG
34646	a	NA	12/5/1997	Butylbenzylphthalate	ND		UG/KG
34646	a	NA	12/5/1997	3,3'-Dichlorobenzidine	ND		UG/KG
34646	a	NA	12/5/1997	Benzo (a) anthracene	580.00		UG/KG
34646	a	NA	12/5/1997	Chrysene	590.00		UG/KG
34646	a	NA	12/5/1997	bis (2-ethylhexyl) phthalate	ND		UG/KG
34646	a	NA	12/5/1997	Di-n-octyl phthalate	ND		UG/KG
34646	a	NA	12/5/1997	Benzo (b) fluoranthene	830.00		UG/KG
34646	a	NA	12/5/1997	Benzo (k) fluoranthene	310.00		UG/KG
34646	a	NA	12/5/1997	Benzo (a) pyrene	640.00		UG/KG
34646	a	NA	12/5/1997	Indeno (1,2,3-cd) pyrene	410.00		UG/KG
34646	a	NA	12/5/1997	Dibenzo (a,h) anthracene	99.00		UG/KG
34646	a	NA	12/5/1997	Benzo (g,h,i) perylene	410.00		UG/KG

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Sample ID	Document ID	COC #	Collection Date	Analyte	Concentration	Qualifier Review	Unit
Fill Material from Parsippany Construction							
34646	a	NA	12/5/1997	Aluminum	6510.00		MG/KG
34646	a	NA	12/5/1997	Antimony	ND		MG/KG
34646	a	NA	12/5/1997	Arsenic	3.10		MG/KG
34646	a	NA	12/5/1997	Barium	40.60		MG/KG
34646	a	NA	12/5/1997	Beryllium	0.28		MG/KG
34646	a	NA	12/5/1997	Cadmium	ND		MG/KG
34646	a	NA	12/5/1997	Calcium	3060.00		MG/KG
34646	a	NA	12/5/1997	Chromium	10.50		MG/KG
34646	a	NA	12/5/1997	Cobalt	4.70		MG/KG
34646	a	NA	12/5/1997	Copper	31.90		MG/KG
34646	a	NA	12/5/1997	Iron	11900.00		MG/KG
34646	a	NA	12/5/1997	Lead	49.60		MG/KG
34646	a	NA	12/5/1997	Magnesium	2460.00		MG/KG
34646	a	NA	12/5/1997	Manganese	209.00		MG/KG
34646	a	NA	12/5/1997	Mercury	0.13		MG/KG
34646	a	NA	12/5/1997	Nickel	10.90		MG/KG
34646	a	NA	12/5/1997	Potassium	396.00		MG/KG
34646	a	NA	12/5/1997	Selenium	ND		MG/KG
34646	a	NA	12/5/1997	Silver	ND		MG/KG
34646	a	NA	12/5/1997	Sodium	317.00		MG/KG
34646	a	NA	12/5/1997	Thallium	ND		MG/KG
34646	a	NA	12/5/1997	Vanadium	20.80		MG/KG
34646	a	NA	12/5/1997	Zinc	62.80		MG/KG
34646	a	NA	12/5/1997	Arochlor-1016	ND		UG/KG
34646	a	NA	12/5/1997	Arochlor-1221	ND		UG/KG
34646	a	NA	12/5/1997	Arochlor-1232	ND		UG/KG
34646	a	NA	12/5/1997	Arochlor-1242	ND		UG/KG
34646	a	NA	12/5/1997	Arochlor-1248	ND		UG/KG
34646	a	NA	12/5/1997	Arochlor-1254	ND		UG/KG
34646	a	NA	12/5/1997	Arochlor-1260	ND		UG/KG
34646	a	NA	12/5/1997	Aldrin	ND		UG/KG
34646	a	NA	12/5/1997	alpha-BHC	ND		UG/KG
34646	a	NA	12/5/1997	beta-BHC	ND		UG/KG
34646	a	NA	12/5/1997	delta-BHC	ND		UG/KG
34646	a	NA	12/5/1997	gamma-BHC (lindane)	ND		UG/KG
34646	a	NA	12/5/1997	alpha-chlordane	170.00		UG/KG
34646	a	NA	12/5/1997	4,4'-DDD	7.60		UG/KG
34646	a	NA	12/5/1997	4,4'-DDE	8.40		UG/KG
34646	a	NA	12/5/1997	4,4'-DDT	20.00		UG/KG
34646	a	NA	12/5/1997	Dieldrin	20.00		UG/KG
34646	a	NA	12/5/1997	Endosulfan I	ND		UG/KG
34646	a	NA	12/5/1997	Endosulfan II	ND		UG/KG
34646	a	NA	12/5/1997	Endosulfan sulfate	ND		UG/KG
34646	a	NA	12/5/1997	Endrin	ND		UG/KG
34646	a	NA	12/5/1997	Endrin aldehyde	ND		UG/KG

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RADIOLOGICAL AND CHEMICAL DATA FOR BACKFILL MATERIAL RECEIVED FROM VENDORS

Sample ID	Document ID	COC #	Collection Date	Analyte	Concentration	Qualifier Review	Unit
Fill Material from Parsippany Construction							
34646	a	NA	12/5/1997	Endrin ketone	ND		UG/KG
34646	a	NA	12/5/1997	Heptachlor	ND		UG/KG
34646	a	NA	12/5/1997	Heptachlor epoxide	4.40		UG/KG
34646	a	NA	12/5/1997	Methoxychlor	ND		UG/KG
34646	a	NA	12/5/1997	Toxaphene	ND		UG/KG
34646	a	NA	12/5/1997	Thorium-232	0.60		PCI/G
34646	a	NA	12/5/1997	Radium-226	0.91		PCI/G

NOTES:

ND - not detected

NA - not applicable

a - BNI 1997 [FUSRAP Subcontractor Submittal Status Sheet Analytical Test Results, BPO-5996-1.1-002-1 (December 30)]