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Formerly Utilized Sites Remedial  
Action Program (FUSRAP)

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**Maywood Chemical Company Superfund Site**

**ADMINISTRATIVE RECORD**

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**Document Number**

**MISS – 159**

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**US Army Corps  
of Engineers®**

# **TCRA Swale Post Removal Action Report**

**New York District  
Formerly Utilized Sites Remedial Action Program  
Maywood Superfund Site  
WAD 02, WBS 06**

**Prepared by:  
Stone & Webster, Inc.  
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**for:  
US Army Corps of Engineers - Kansas City District  
Formerly Utilized Sites Remedial Action Program  
Contract No. DACW41-99-D-9001**



**US Army Corps  
of Engineers**

December 2001

**TCRA SWALE POST REMOVAL ACTION REPORT**

**FUSRAP MAYWOOD SUPERFUND SITE  
MAYWOOD, NEW JERSEY**

**SITE-SPECIFIC ENVIRONMENTAL RESTORATION  
CONTRACT NO. DACW41-99-D-9001  
TASK ORDER 0002  
WAD 02 WBS 06**

**Submitted to:**

**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**

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

**Submitted by:**

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**December 2001**

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**Date:** \_\_\_\_\_

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**December 2001**

**Reviewed/  
Approved by:**

  
**Andy Mills  
Project Manager**


**Date:** 12/3/01

**Reviewed/  
Approved by:**

  
**Alan F. Brown, P.E.  
Construction Quality System Manager**

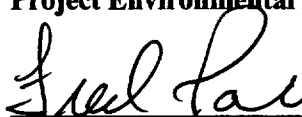
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Task Manager**

**Date:** 12-3-2001

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## ACRONYMS AND ABBREVIATIONS

BNI	Bechtel National, Inc.
CDQMP	Chemical Data Quality Management Plan
DAC	Derived Air Concentration
FUSRAP	Formerly Utilized Sites Remedial Action Program
GEPP	General Environmental Protection Plan
MDA	Minimum Detectable Activity
MISS	Maywood Interim Storage Site
MOU	Memorandum of Understanding
mrem	millirem
pCi/g	picoCuries per gram
Ra-226	Radium 226
ROD	Record of Decision
SSHP	Site Safety and Health Plan
Stone & Webster	Stone & Webster, Inc.
TCRA	Time-Critical Removal Action
Th-232	Thorium 232
U-238	Uranium 238
uCi/ml	microCuries per milliliter
ug/kg	micrograms per kilogram
USACE	United States Army Corps of Engineers



## 1.0 INTRODUCTION

This report documents a Time-Critical Removal Action (TCRA) that was performed on the Formerly Utilized Sites Remedial Action Program (FUSRAP) Maywood Chemical Company Site (FUSRAP Maywood Superfund Site) from February to March 2000. In addition, it documents the permanent disposal of waste associated with the Removal Action. The TCRA was performed at the West Howcroft Swale and Lodi Brook by Stone & Webster, Inc. (Stone & Webster) under the Maywood Environmental Remediation Contract with the U.S. Army Corps of Engineers (USACE).

The FUSRAP Maywood Superfund Site is located in a highly developed area of Bergen County in northeastern New Jersey, approximately 12 miles (20 kilometers) northwest of New York City and only 13 miles (21 kilometers) northeast of Newark, New Jersey (Figure 1). The FUSRAP Maywood Superfund Site encompasses portions of the Boroughs of Maywood and Lodi and the Township of Rochelle Park. The FUSRAP Maywood Superfund Site consists of 88 designated residential, commercial, municipal, and state or Federal properties. Portions of the FUSRAP Maywood Superfund Site are radiologically contaminated with process wastes and residues associated with the recovery and refining of thorium (Th) and Th compounds from monazite ores by the Maywood Chemical Works from 1916 to 1956 (Bechtel National, Inc., BNI 1992). Radionuclides of concern at the FUSRAP Maywood Superfund Site are limited to Th-232, radium 226 (Ra-226), and uranium 238 (U-238).

Extremely heavy rainfall associated with Hurricane Floyd on September 16 and 17, 1999, and additional heavy rains over the following 2 weeks created regional and localized flooding at the FUSRAP Maywood Superfund Site. The rainfall caused the West Howcroft Swale and Lodi Brook to backup due to sedimentation within the swale and Lodi Brook. Some of the sediments in the swale and Lodi Brook contain elevated levels of the radionuclides of concern.

The West Howcroft Swale and Lodi Brook are located on portions of the FUSRAP Maywood Superfund Site that comprise the following properties:

- 23 West Howcroft Road
- 85-101 NJ Route 17 North
- 137 NJ Route 17 North
- 167 NJ Route 17 North
- 149-151 Maywood Avenue

Given this situation, the USACE determined the need to perform a TCRA because additional rainfall had the potential to cause the migration, and release, of hazardous contaminants onto adjacent and nearby properties. The TCRA Work Plan (Stone & Webster 2000a) specified how the USACE would remove the contaminated sediments to restore the hydraulic capacity of the swale and brook.

## 2.0 TIME-CRITICAL REMOVAL ACTION

The Removal Action was performed consistent with the *TCRA Work Plan* (Stone & Webster 2000a) and the *Final Construction Quality Control Plan for Swale Time-Critical Removal Action at FUSRAP Maywood Superfund Site* (Stone & Webster 2000b). One modification to the Work Plan was authorized by the USACE. Along a portion of the West Howcroft Swale, the bank would not be restored to a 2:1 slope (refer to Design Change Notification 0001 included as Appendix A). In addition, Section 3.1 discusses environmental monitoring that was not performed per the TCRA Work Plan.

FUSRAP contaminated sediments within the swale and portions of Lodi Brook were removed per the TCRA Work Plan (Stone & Webster 2000a) and the Design Change Notification. During the removal process, two buried drums and one 5-gallon can were encountered. Section 4.1 discusses what measures were taken regarding the buried objects (refer to Appendix B for a copy of each Accident/Incident Report). After the removal of the sediments, measures were taken in the swale to stabilize surfaces and reduce the potential for future FUSRAP material erosion and transport downstream. In addition, grass was planted in other disturbed areas to control contaminated soil migration.

Contaminated soil, vegetation, debris, and drums were transported to the Maywood Interim Storage Site (MISS) for temporary staging and characterization. Section 4.1 discusses the results of drum sampling. Section 4.2 discusses the results of soil, vegetation, and debris sampling. Following waste sampling and designation, the soil, vegetation, and debris were transported and disposed of at the Envirocare of Utah, Inc. facility located in Clive, Utah.

In aggregate, measures taken under this scope included the following:

- Obtained all necessary approvals for initiation of site activities.
- Maintained community relations and information services related to project activities.
- Site preparation.
- Coordinated with PSE&G and others for overhead utilities.
- Cleaned out of stormwater pipes contributing to the swale flow (performed by the Borough of Maywood) consistent with the established Memorandum of Understanding (MOU) (USACE 2000).
- Reestablished effective hydraulic flow, through excavation, consistent with the approved engineering drawings.

- Established the horizontal alignment and side slopes of the swale consistent, to the extent possible, with the original plan (refer to Design Change Notification 0001, included in Appendix A).
- Installed geosynthetic fabric in the swale to minimize the potential for further erosion and to control contaminated soil migration.
- Installed scour and sediment control measures in areas of extremely high velocity to control contaminated soil migration.
- Monitored the soil, surface water, and air for potential releases of hazardous contaminants onto adjacent or nearby properties during the Removal Action.
- Transported all waste materials (soil, vegetation, debris, and drums) to the MISS for temporary staging.
- Characterized all waste materials for disposal classification.
- Restored areas disturbed by the Removal Action by planting grass to control contaminated soil migration.
- Performed an inspection with the Borough of Maywood.
- Performed a topographic survey and prepared an as-built survey of the area affected by the Removal Action.
- Demobilized.
- Transported and disposed of soil, vegetation, and debris at the Envirocare of Utah, Inc. facility located in Clive, Utah.
- Project closeout.

### 3.0 ENVIRONMENTAL MONITORING

Environmental Monitoring was performed in accordance with the *FUSRAP Maywood Superfund Site Safety and Health Plan* (SSHP) (Stone & Webster 1999a), the *FUSRAP Maywood Superfund Site General Environmental Protection Plan* (GEPP) (Stone & Webster 1999b), and the *FUSRAP Maywood Superfund Site Chemical Data Quality Management Plan* (CDQMP) (Stone & Webster 2000c). Media monitored during the Removal Action included soil, surface water, and air.

#### 3.1 SOIL

Excavation at the West Howcroft Swale and Lodi Brook generated waste soils, vegetation, and debris. Prior to loading of soils onto trucks, the soil was surveyed in-situ. For radiological monitoring, soil was surveyed with a sodium iodide meter per CDQMP procedure SW-MWD-404. For chemical monitoring, soil was surveyed with a photoionization detector per CDQMP procedure SW-MWD-401 or a flame ionization detector per CDQMP procedure SW-MWD-402. All waste materials were transported to the MISS for temporary storage pending off-site disposal.

After the appropriate hydraulic grade and alignment had been established and upon completion of excavation activities, soil samples were collected from the base and side slopes of the West Howcroft Swale and Lodi Brook for radiological analysis. Per the TCRA Work Plan (Stone & Webster 2000a), soil samples for radiological analysis were collected every 25 linear feet. Individual samples were taken from the base and side slopes. For the location of each sample refer to Appendix C.

The MISS On-site Laboratory analyzed soil samples collected for radiological analysis. For a summary of the radiological results for the West Howcroft Swale refer to Table 1. For a summary of the radiological results for Lodi Brook refer to Table 2. The analytical results indicate the presence of FUSRAP waste within the West Howcroft Swale and Lodi Brook that exceeds 5 pCi/g for Th-232 and Ra-226, and 50 pCi/g for U-238.

For quality control purposes, 10% of the soil samples collected and analyzed by the MISS On-site Laboratory were to be analyzed by an off-site USACE certified laboratory. This work was not performed since the data quality objective was not to support final cleanup. In addition, in areas where FUSRAP contamination remained following the TCRA, soil samples were to be collected for chemical analysis. This work was also not performed for the same reason as stated above.

Soil sampling and related activities were performed in accordance with the CDQMP and the following specific procedures:

- SW-MWD-301 – Sediment Sampling,
- SW-MWD-504 – Labeling, Packaging and Shipping Environmental Samples,

- SW-MWD-506 – Decontamination,
- SW-MWD-507 – Field Notebook Content and Control, and
- SW-MWD-508 – Procedure for Shipping Radiologically Contaminated Environmental Samples.

### **3.2 SURFACE WATER**

Downgradient surface water was monitored to determine the surface water quality. Surface water samples were collected within Lodi Brook immediately north of NJ Route 17 North. The location was the same as that sampled as part of the Environmental Monitoring Program. When flow was permitted in the swale, surface water samples were collected 1 day prior to and at the end of each day that sediment soils were disturbed. An additional surface water sample was collected 1 week after the completion of the Removal Action.

For a summary of the surface water results refer to Table 3. For analytes measured, all results were below the Nuclear Regulatory Commission Water Criteria (10 CFR 20, Appendix A, Table 2). One sample exceeded the New Jersey State Drinking Water Standard (NJAC 7:9-6) for U-238. The guidance limit for U-238 is established at 27 pCi/l. The result for this sample was 52.89 pCi/l. This sample was collected the last day intrusive activities were conducted within the swale. The results of the surface water sample collected 1 week following all intrusive activities was at a level below all regulatory limits.

Sample containers and preservatives were selected based on Tables 4-1 and 4-2 of the CDQMP Quality Assurance Project Plan. Each surface water sample was consigned to Severn Trent Laboratories for pickup at the MISS. Each filtered sample was analyzed for Ra-226, Th-232, and U-238. Testing of samples was performed in accordance with the Contract Laboratory standard operating procedures contained in Appendix D of the CDQMP.

Surface water sampling was performed in accordance with the CDQMP. The following CDQMP procedures were implemented:

- SW-MWD-302 – Surface Water Sampling,
- SW-MWD-504 – Labeling, Packaging and Shipping Environmental Samples,
- SW-MWD-506 – Decontamination,
- SW-MWD-507 – Field Notebook Content and Control, and
- SW-MWD-508 – Procedure for Shipping Radiologically Contaminated Environmental Samples.

### **3.3 AIR**

Air monitoring was conducted in accordance with the SSHP, Section 8.0 “ Air Monitoring Program.” Both personal and ambient air monitoring were performed. Real-time (direct reading) instruments measured the following:

- Oxygen,
- Flammable/combustible vapors,

- Organic vapors, and
- Dust.

Monitoring results for oxygen, flammable/combustible vapors, and/or organic vapors did not exceed the personal protective equipment upgrade criteria established by the SSHP.

For a summary of the occupational monitoring results for particulate airborne radioactivity refer to Table 4. All results were below 10% of the derived air concentration (DAC) value for Th-232 listed in 10 CFR 20 Appendix B, Table 1 (Occupational Values), Column 3. The DAC is the concentration of a given radionuclide in air which, if breathed by a reference worker for a year would result in a committed effective dose equivalent of 5000 millirem (mrem).

Air monitoring results were also compared to 10 CFR 20 Appendix B, Table 2 (Effluent Concentrations), Column 1 in order to evaluate potential exposure to a member of the public under worst-case conditions. Based upon this conservative evaluation exposure to the public was less than 10 mrem. The 10 mrem/y exposure limit is derived from 20% of the 10 CFR 20 Appendix B, Table 2 value for Th-232.

The Annual NESHAPS Compliance Report – Year 2000 that is included as Appendix C in the Annual Environmental Monitoring Report – 2000 (Stone & Webster 2000d) independently evaluated occupational and resident exposures using a CAP-88-PC modeling program. Calculated dose equivalents from Swale activities were 0.00187 and 0.00006 mrem, respectively.

## **4.0 WASTE MANAGEMENT**

### **4.1 BURIED DRUMS**

During the excavation, two buried drums and one 5-gallon can were unearthed. Each container was sampled and the contents analyzed for waste designation purposes. Each container was placed in a separate overpack container and transported to the MISS for temporary staging. An Accident/Incident Report was prepared for each occurrence. For a copy of each report refer to Appendix B.

For a summary of the initial results refer to Tables 5 and 6. The contents of one container exceeded regulatory limits for benzene established by the U.S. Environmental Protection Agency and the State of New Jersey. Three additional samples were collected from these drums and analyzed specifically for benzene per the toxic characteristic leaching procedure. The results of the additional analysis indicated that the contents in these drums were not a hazardous waste.

### **4.2 SOIL, VEGETATION, AND DEBRIS**

Approximately 450 loose cubic yards of waste (e.g., soil, vegetation, and debris) was removed from the West Howcroft Swale and Lodi Brook. All excavated material was transported to the MISS, where it was stockpiled and covered for temporary staging pending off-site disposal. At the MISS the waste was sampled and analyzed for waste designation purposes.

For a summary of the radiological results refer to Table 7. For a summary of the chemical results refer to Table 8. The result of radiological analysis indicates that the soil, vegetation, and debris meet the definition of FUSRAP waste.

Following waste designation, the waste was transported from the MISS by rail car and disposed at the Envirocare of Utah, Inc. facility located in Clive, Utah.

## 5.0 CHRONOLOGY OF EVENTS

December 6, 1999: The Action Memorandum for the Time-Critical Removal Action – Removal of Contaminated Sediments at Vicinity Properties of the Maywood Interim Storage Site (MISS) CERCLIS #NJD980529762 was signed by the USACE.

January 27, 2000: TCRA Work Plan issued.

February 17, 2000: TCRA Construction Work Plan issued.

February 22, 2000: Initiated mobilization activities.

March 1, 2000: The Borough of Maywood performs an inspection of the West Howcroft Swale.

March 17, 2000: Complete demobilization from the site.

April 13, 2001: Initiated transport of waste soil, vegetation, and debris from the MISS to Envirocare of Utah, Inc.

June 7, 2001: Completed transport of waste soil, vegetation, and debris from the MISS to Envirocare of Utah, Inc.



## **6.0 CERTIFICATION THAT THE REMEDY IS OPERATIONAL & FUNCTIONAL**

### **6.1 AS BUILT DRAWINGS**

An as-built survey of the West Howcroft Swale and Lodi Brook was prepared following the Removal Action. Only those areas disturbed or modified were surveyed (refer to Appendix C for a copy of the survey).

In addition, construction photos were taken after the Removal Action to document that the objectives of the TCRA were achieved (refer to Appendix C for a copy of the photos).

### **6.2 ACCEPTANCE BY BOROUGH OF MAYWOOD**

Upon completion of the Removal Action, an inspection was conducted by the Borough of Maywood to document that work had been completed in accordance with the TCRA Work Plan and Memorandum of Understanding between the USACE and the Borough. The work was performed to the satisfaction of the Borough of Maywood Engineer.

## **7.0 OPERATION AND MAINTENANCE**

The Time-Critical Removal Action was not considered a final remedy. Therefore, there are no formal operation and maintenance requirements associated with this action.

According to the MOU with the Borough of Maywood, the Borough will periodically monitor and clean all upgradient and downgradient culverts to prevent buildup of debris or sediment within the swale, and be responsible for physically maintaining the swale (USACE 2000).

As shown by Tables 1 and 2, FUSRAP contaminated soil remains within the West Howcroft Swale and Lodi Brook. This waste will be addressed upon the issuance of the Record of Decision (ROD) for the FUSRAP Maywood Superfund Site. The ROD will specify the final remedy and dictate the need for any future operational and maintenance activities.

## 8.0 COMMUNITY RELATIONS

In accordance with the National Oil and Hazardous Substances Pollution Contingency Plan and U.S. Environmental Protection Agency guidance outlined in *Community Relations in Superfund: A Handbook* (EPA 1992), an administrative record file for the TCRA was established within 60 days of the start of onsite Removal Action. The file is located at the FUSRAP Public Information Center, 75A West Pleasant Avenue, Maywood, NJ. A Notice of Availability of the administrative record file was also published in the Record on February 21, 2000 and The Shopper News on February 23, 2000. The notices also designated a USACE spokesperson for the Removal Action.

In addition to these required actions, the USACE publicized plans for the Removal Action in a newsletter that was distributed to the community mailing list and made available at the Public Information Center in January 2000. The USACE also notified affected property owners of pending removal activities on their properties in accordance with existing Rights-of-Entry Agreements. Briefings on the Removal Action were provided to affected property owners, tenants and their employees as requested.

## 9.0 SUMMARY OF PROJECT COSTS

Included below are Stone & Webster's costs to perform all efforts associated with the TCRA. USACE costs are not included.

TCRA Work Plan Preparation and Planning:	\$54,755
TCRA Implementation:	\$287,518
TCRA Waste Transportation and Disposal:	\$101,526
TCRA Removal Action Report:	\$14,000
<b>Total Cost</b>	<b>\$457,799</b>

## 10.0 REFERENCES

EPA 1992. *Community Relations in Superfund: A Handbook*, January 1992.

Stone & Webster 1999a. *FUSRAP Maywood Superfund Site Safety and Health Plan*, August 1999.

Stone & Webster 1999b. *FUSRAP Maywood Superfund Site General Environmental Protection Plan*, November 1999.

Stone & Webster 2000a. *Time Critical Removal Action Draft Work Plan*, January 2000.

Stone & Webster 2000b. *Final Construction Quality Control Plan for Swale Time-Critical Removal Action at FUSRAP Maywood Superfund Site*, February 2000.

Stone & Webster 2000c. *FUSRAP Maywood Superfund Site Chemical Data Quality Management Plan*, February 2000.

Stone & Webster 2000d. *Annual Environmental Monitoring Report - 2000*, April 2000.

USACE 2000. *Memorandum of Understanding Between Borough of Maywood, New Jersey and the United States Army Corps of Engineers*, January 2000.

**Table 1: Summary of Radiological Data – Soil,  
 West Howcroft Swale Environmental Monitoring**

Sample Location		Laboratory Sample ID	Depth (feet)	Laboratory Results								
				TH-232 (pCi/g)			RA-226 (pCi/g)			U-238 (pCi/g)		
				Result	Error	MDA	Result	Error	MDA	Result	Error	MDA
0+50	North Bank	09a020135	0.5	90.28	1.28	1.13	18.10	0.54	1.55	36.59	15.38	50.10
0+50	Center	09a020134	0.5	9.10	0.23	0.40	2.92	0.16	0.56	22.16	6.67	21.20
0+50	South Bank	09a020136	0.5	3.25	0.12	0.24	1.31	0.10	0.39	10.82	3.07	9.58
0+75	North Bank	09a020018	0.5	38.41	0.58	0.60	8.60	0.27	0.89	24.70	----	24.70
0+75	Center	09a020017	0.5	29.70	0.52	0.64	5.46	0.22	0.79	25.43	8.02	33.10
0+75	South Bank	09a020019	0.5	2.50	0.09	0.24	1.26	0.08	0.22	11.40	----	11.40
1+00	North Bank	09a020013	0.5	33.21	0.55	0.64	6.22	0.24	0.85	32.30	9.85	31.60
1+00	Center	09a020012	0.5	14.18	0.32	0.48	3.35	0.18	0.71	16.36	5.73	18.40
1+00	South Bank	09a020011	0.5	2.40	0.11	0.39	1.05	0.12	0.32	12.80	----	12.80
1+25	North Bank	09a020015	0.5	9.27	0.24	0.42	3.71	0.18	0.68	25.28	6.86	21.60
1+25	Center	09a020014	0.5	20.66	0.39	0.52	4.40	0.21	0.65	21.93	6.54	20.80
1+25	South Bank	09a020016	0.5	7.51	0.20	0.34	2.59	0.13	0.39	13.50	----	13.50
1+50	North Bank	09a020021	0.5	2.88	0.10	0.21	1.51	0.08	0.22	12.10	----	12.10
1+50	Center	09a020020	0.5	6.51	0.20	0.51	1.83	0.13	0.51	13.20	----	13.20
1+50	South Bank	09a020022	0.5	2.04	0.10	0.32	1.23	0.09	0.29	7.38	2.44	7.66
1+75	North Bank	09a020027	0.5	209.44	2.43	1.58	31.66	0.67	1.55	80.10	----	80.10
1+75	Center	09a020026	0.5	14.33	0.31	0.45	3.38	0.17	0.63	8.88	5.75	18.90
1+75	South Bank	09a020025	0.5	1.44	0.07	0.26	0.70	0.07	0.28	9.31	----	9.31
2+00	North Bank	09a020029	0.5	146.25	1.82	1.31	25.58	0.60	1.79	73.70	----	73.70
2+00	Center	09a020028	0.5	52.55	0.95	1.06	9.24	0.43	1.64	46.30	----	46.30
2+00	South Bank	09a020030	0.5	1.30	0.13	0.41	0.64	----	0.64	11.60	----	11.60
2+25	North Bank	09a020033	0.5	220.29	2.54	1.50	45.07	0.91	2.21	58.50	----	58.50
2+25	Center	09a020031	0.5	113.64	1.66	1.39	22.94	0.68	2.21	59.20	----	59.20
2+25	South Bank	09a020032	0.5	1.05	0.06	0.22	0.35	----	0.35	7.96	----	7.96
2+50	North Bank	09a020035	0.5	195.95	2.28	1.49	39.68	0.85	2.23	59.10	----	59.10
2+50	Center	09a020036	0.5	103.98	1.49	1.37	20.64	0.61	1.89	77.20	----	77.20
2+50	South Bank	09a020034	0.5	11.50	0.22	0.30	2.53	0.11	0.36	17.20	----	17.20
2+75	North Bank	09a020037	0.5	236.19	2.71	1.66	45.99	0.87	2.12	87.20	----	87.20
2+75	Center	09a020038	0.5	131.61	1.85	1.68	24.31	0.72	2.01	93.10	----	93.10
2+75	South Bank	09a020039	0.5	4.89	0.12	0.22	1.35	0.07	0.25	1.18	3.10	10.40
3+00	North Bank	09a020043	0.5	189.17	2.23	1.54	46.68	0.86	2.02	79.20	----	79.20
3+00	Center	09a020042	0.5	72.08	1.33	1.59	15.71	0.64	2.16	86.40	----	86.40
3+00	South Bank	09a020044	0.5	4.62	0.12	0.33	1.02	0.08	0.33	11.10	----	11.10
3+25	North Bank	09a020046	0.5	296.65	3.28	1.83	64.84	1.10	2.39	19.03	17.64	75.50
3+25	Center	09a020045	0.5	129.04	1.97	1.84	30.93	0.90	2.81	88.29	28.94	93.30
3+25	South Bank	09a020047	0.5	45.71	0.76	0.82	10.61	0.34	1.01	46.70	----	46.70
3+50	North Bank	09a020049	0.5	820.73	8.50	3.86	112.65	1.87	4.29	157.00	----	157.00
3+50	Center	09a020050	0.5	96.69	1.44	1.36	24.41	0.68	2.15	79.60	----	79.60
3+50	South Bank	09a020048	0.5	18.71	0.40	0.60	4.54	0.22	0.88	33.00	----	33.00
3+75	North Bank	09a020052	0.5	280.25	3.14	1.80	63.58	1.26	2.41	18.64	20.55	79.80
3+75	Center	09a020053	0.5	90.50	1.34	1.34	19.72	0.60	1.86	72.50	----	72.50
3+75	South Bank	09a020051	0.5	15.50	0.30	0.40	3.78	0.18	0.55	5.57	2.62	14.50
4+00	North Bank	09a020055	0.5	117.67	1.49	1.25	48.71	0.87	1.71	65.50	----	65.50
4+00	Center	09a020054	0.5	37.61	0.82	1.85	11.34	0.53	1.55	64.80	----	64.80
4+00	South Bank	09A-020056	0.5	20.19	0.42	0.67	6.73	0.28	0.92	37.60	----	37.60

**Table 1: Summary of Radiological Data – Soil,  
 West Howcroft Swale Environmental Monitoring**

Sample Location		Laboratory Sample ID	Depth (feet)	Laboratory Results								
				TH-232 (pCi/g)			RA-226 (pCi/g)			U-238 (pCi/g)		
				Result	Error	MDA	Result	Error	MDA	Result	Error	MDA
4+25	North Bank	09A-020058	0.5	80.34	1.07	0.96	28.39	0.55	1.29	50.30	----	50.30
4+25	Center	09A-020057	0.5	39.47	0.67	0.82	12.89	0.39	1.09	20.87	12.14	39.80
4+25	South Bank	09A-020059	0.5	32.93	0.64	0.82	9.82	0.37	1.16	47.30	----	47.30
4+50	North Bank	09A-020061	0.5	184.50	2.21	1.46	69.84	1.22	1.88	29.63	9.61	50.10
4+50	Center	09A-020060	0.5	108.56	1.68	1.74	37.40	0.91	2.28	7.40	31.09	47.00
4+50	South Bank	09A-020062	0.5	15.82	0.40	0.64	5.59	0.31	0.94	16.68	9.38	39.90
4+75	North Bank	08B-020064	0.5	214.31	2.50	1.68	68.98	1.18	2.13	85.40	----	85.40
4+75	Center	08B-020063	0.5	57.95	0.89	0.92	14.94	0.43	1.27	35.10	----	35.10
4+75	South Bank	08B-020065	0.5	11.64	0.30	0.46	3.39	0.21	0.72	18.00	----	18.00
5+00	North Bank	08B-020067	0.5	138.06	1.68	1.19	33.52	0.67	1.68	24.30	14.46	47.40
5+00	Center	08B-020066	0.5	38.45	0.68	0.86	10.80	0.39	1.13	49.40	----	49.40
5+00	South Bank	08B-020068	0.5	8.71	0.26	0.52	2.64	0.18	0.71	25.90	----	25.90
5+25	North Bank	08B-020088	0.5	2.70	0.17	0.49	1.27	0.18	0.49	13.00	----	13.00
5+25	Center	08B-020089	0.5	2.85	0.15	0.39	1.54	0.17	0.28	6.72	5.33	17.70
5+25	South Bank	08B-020090	0.5	1.20	0.12	0.43	1.20	0.13	0.38	11.10	----	11.10
5+50	North Bank	08B-020085	0.5	4.50	0.13	0.27	1.72	0.13	0.43	15.00	----	15.00
5+50	Center	08B-020086	0.5	2.49	0.11	0.25	1.32	0.13	0.42	10.30	----	10.30
5+50	South Bank	08B-020087	0.5	4.28	0.17	0.51	1.54	0.16	0.54	18.30	----	18.30
5+75	North Bank	08B-020082	0.5	1.76	0.15	0.54	0.88	----	0.88	12.70	----	12.70
5+75	Center	08B-020083	0.5	2.80	0.17	0.57	1.22	0.18	0.58	8.11	5.21	17.10
5+75	South Bank	08B-020084	0.5	1.34	0.14	0.46	0.90	0.16	0.45	13.20	----	13.20
6+00	North Bank	08B-020079	0.5	1.68	0.13	0.46	0.89	0.14	0.35	15.70	----	15.70
6+00	Center	08B-020080	0.5	0.68	----	0.68	0.76	----	0.76	12.60	----	12.60
6+00	South Bank	08B-020081	0.5	1.62	0.21	0.75	1.29	----	1.29	28.20	----	28.20
6+25	North Bank	08B-020076	0.5	0.55	----	0.55	0.81	0.13	0.45	9.76	----	9.76
6+25	Center	08B-020077	0.5	1.27	0.10	0.38	0.43	0.12	0.44	13.70	----	13.70
6+25	South Bank	08B-020078	0.5	0.78	0.08	0.29	0.47	----	0.47	6.99	----	6.99
6+50	North Bank	08B-020073	0.5	1.05	0.08	0.31	0.46	----	0.46	11.10	----	11.10
6+50	Center	08B-020074	0.5	0.75	0.08	0.28	0.59	0.09	0.27	6.99	----	6.99
6+50	South Bank	08B-020075	0.5	1.29	0.09	0.30	0.78	0.10	0.25	10.70	----	10.70
6+75	North Bank	08B-020071	0.5	0.87	0.07	0.27	0.68	0.08	0.25	9.17	----	9.17
6+75	Center	08B-020072	0.5	0.73	0.08	0.29	0.50	0.08	0.22	7.31	----	7.31
6+75	South Bank	08B-020070	0.5	0.66	0.06	0.24	0.42	0.07	0.24	5.56	----	5.56

**Table 2: Summary of Radiological Data – Soil,  
 Lodi Brook Environmental Monitoring**

Sample Location		Laboratory Sample ID	Depth (feet)	Laboratory Results								
				TH-232 (pCi/g)			RA-226 (pCi/g)			U-238 (pCi/g)		
				Result	Error	MDA	Result	Error	MDA	Result	Error	MDA
0+00	North Bank	06C-020095	0.5	2.79	0.10	0.22	1.15	0.08	0.29	12.00	----	12.00
0+00	Center	06C-020094	0.5	1.68	0.08	0.24	0.64	0.07	0.25	6.85	----	6.85
0+00	South Bank	06C-020096	0.5	2.76	0.12	0.37	0.92	0.10	0.40	9.81	----	9.81
0+25	North Bank	06C-020098	0.5	4.07	0.16	0.40	1.12	0.10	0.21	10.70	----	10.70
0+25	Center	06C-020097	0.5	2.11	0.09	0.31	0.64	0.09	0.27	9.99	----	9.99
0+25	South Bank	06C-020099	0.5	10.42	0.28	0.47	2.79	0.17	0.69	26.00	----	26.00
0+50	North Bank	06C-020101	0.5	5.65	0.15	0.28	1.76	0.10	0.42	15.00	----	15.00
0+50	Center	06C-020100	0.5	3.75	0.14	0.38	1.20	0.10	0.37	10.10	----	10.10
0+50	South Bank	06C-020102	0.5	4.16	0.15	0.38	1.13	0.10	0.32	9.47	----	9.47
0+75	North Bank	06C-020104	0.5	4.23	0.14	0.36	1.38	0.10	0.37	9.41	----	9.41
0+75	Center	06C-020103	0.5	2.64	0.10	0.32	0.86	0.08	0.30	11.30	----	11.30
0+75	South Bank	06C-020105	0.5	5.48	0.16	0.35	1.86	0.12	0.47	16.10	----	16.10
1+00	North Bank	06C-020107	0.5	11.74	0.27	0.47	3.33	0.17	0.55	25.50	----	25.50
1+00	Center	06C-020106	0.5	4.87	0.16	0.41	1.22	0.10	0.39	10.50	----	10.50
1+00	South Bank	06C-020108	0.5	16.80	0.40	0.64	3.93	0.24	0.99	22.90	----	22.90
1+25	North Bank	06C-020110	0.5	7.38	0.21	0.35	2.24	0.14	0.50	14.60	----	14.60
1+25	Center	06C-020109	0.5	8.97	0.25	0.70	2.18	0.15	0.49	23.50	----	23.50
1+25	South Bank	06C-020111	0.5	20.83	0.48	1.15	4.07	0.29	1.16	38.50	----	38.50
1+50	North Bank	06C-020113	0.5	16.17	0.38	0.65	3.78	0.23	0.97	35.00	----	35.00
1+50	Center	06C-020112	0.5	3.28	0.13	0.38	1.11	0.12	0.35	10.10	----	10.10
1+50	South Bank	06C-020114	0.5	10.26	0.29	0.74	2.19	0.19	0.69	19.20	----	19.20
1+75	North Bank	06C-020116	0.5	13.65	0.35	0.57	3.71	0.23	0.86	23.10	----	23.10
1+75	Center	06C-020115	0.5	6.03	0.20	0.59	1.50	0.13	0.51	18.90	----	18.90
1+75	South Bank	06C-020117	0.5	12.08	0.33	0.63	2.98	0.21	0.76	31.40	----	31.40
2+00	North Bank	06C-020119	0.5	16.96	0.40	0.64	4.16	0.22	0.83	34.30	----	34.30
2+00	Center	06C-020118	0.5	8.46	0.23	0.36	1.92	0.15	0.48	15.50	----	15.50
2+00	South Bank	06C-020120	0.5	30.33	0.63	0.85	6.92	0.35	1.30	34.10	----	34.10
2+25	North Bank	09A-020123	0.5	18.87	0.43	0.65	4.50	0.26	1.01	38.50	----	38.50
2+25	Center	09A-020122	0.5	18.80	0.44	0.64	4.69	0.25	0.86	26.20	----	26.20
2+25	South Bank	09A-020124	0.5	25.86	0.59	0.82	6.46	0.35	1.33	33.40	----	33.40
2+50	North Bank	09A-020126	0.5	5.38	0.17	0.46	0.73	----	0.73	12.40	----	12.40
2+50	Center	09A-020125	0.5	31.12	0.67	1.02	8.28	0.39	1.21	55.80	----	55.80
2+50	South Bank	09A-020127	0.5	29.00	0.58	0.78	7.22	0.33	1.24	45.20	----	45.20
2+75	North Bank	09A-020129	0.5	12.72	0.28	0.46	4.02	0.18	0.63	26.20	----	26.20
2+75	Center	09A-020128	0.5	7.59	0.23	0.42	2.24	0.16	0.60	13.40	5.08	16.20
2+75	South Bank	09A-020130	0.5	21.72	0.50	0.82	5.66	0.29	0.99	18.28	9.69	31.60
3+00	North Bank	09A-020132	0.5	35.48	0.67	0.91	8.62	0.35	1.13	47.80	----	47.80
3+00	Center	09A-020131	0.5	13.54	0.30	0.46	3.66	0.19	0.73	18.60	----	18.60
3+00	South Bank	09A-020133	0.5	9.67	0.27	0.40	2.94	0.18	0.58	18.50	----	18.50



**Table 3: Summary of Radiological Data – Lodi Brook Surface Water**

Laboratory Sample ID	Laboratory Results								
	Th-232 (pCi/L)			Ra-226 (pCi/L)			U-238 (pCi/L)		
	Result	Error	MDA	Result	Error	MDA	Result	Error	MDA
06C-020007 <sup>1</sup>	0.07	0.09	0.12	0.17	0.07	0.06	4.99	1.11	0.13
06C-020008 <sup>2</sup>	0.02	0.06	0.14	0.14	0.10	0.10	8.36	3.42	1.26
06C-020009 <sup>2</sup>	0.14	0.16	0.27	-0.1	0.30	0.36	1.94	0.57	0.29
06C-020010 <sup>2</sup>	0.18	0.15	0.21	0.49	0.15	0.11	2.25	0.59	0.17
06C-020023 <sup>2</sup>	0.28	0.17	0.19	0.82	0.35	0.32	3.16	0.72	0.19
06C-020024 <sup>2</sup>	0.05	0.11	0.23	0.34	0.13	0.10	3.52	0.86	0.24
06C-020041 <sup>2</sup>	0.21	0.18	0.28	-0.05	0.08	0.11	3.55	0.87	0.34
09A-020093 <sup>2</sup>	2.61	0.65	0.18	2.21	0.19	0.05	52.89	9.56	0.14
06C-020121 <sup>3</sup>	0.02	0.21	0.45	0.45	0.14	0.12	3.39	0.89	0.19

<sup>1</sup>Sample collected prior to the start of intrusive activities at the West Howcroft Swale and Lodi Brook.

<sup>2</sup>Sample collected at the end of the day, during intrusive activities at the West Howcroft Swale or Lodi Brook.

<sup>3</sup>Sample collected at the completion of intrusive activities at the West Howcroft Swale and Lodi Brook.

**Table 4: Summary of Radiological Data - Air Monitoring**

Sample			Alpha Activity Analysis					Maximum Public Exposure <sup>3,4</sup> (mrem)
Number	Howcroft Swale Location	Collection Date	Gross Result (uCi/ml)	MDC (uCi/ml)	% of DAC as a Function of the Result <sup>1</sup>	% of Effluent Concentration Limit as a Function of the Result <sup>2</sup>	% of Effluent Concentration Limit as a Function of the MDC <sup>2</sup>	
25002	North bank	02/24/2000	2.13E-14	5.08E-14	2.1%	1,772%	4,233%	1.15958904
25003	Pre-TCRA	02/25/2000	2.13E-15	1.02E-14	0.2%	177%	847%	0.23196347
25004	Station 1 + 50	02/28/2000	7.97E-15	3.81E-14	0.8%	664%	3,174%	0.8696347
25005	South bank	02/29/2000	3.99E-15	9.54E-15	0.4%	333%	795%	n/a
25006	Swale	02/29/2000	1.50E-14	1.01E-14	1.5%	1,248%	838%	0.34178082
25007	North side	03/01/2000	1.03E-14	1.03E-14	1.0%	854%	854%	0.23401826
25008	South side	03/01/2000	4.48E-15	9.18E-15	0.4%	374%	765%	n/a
25009	North bank	03/02/2000	3.10E-15	1.11E-14	0.3%	258%	926%	0.25365297
25010	South bank	03/02/2000	3.54E-15	1.01E-14	0.4%	295%	844%	n/a
25011	North bank	03/03/2000	3.72E-15	1.07E-14	0.4%	310%	888%	0.243379
25012	South bank	03/03/2000	6.40E-15	9.83E-15	0.6%	533%	819%	n/a
25013	South bank	03/06/2000	2.78E-14	9.27E-15	2.8%	2,317%	772%	n/a
25014	North bank	03/06/2000	4.46E-14	9.78E-15	4.5%	3,716%	815%	1.01803653
25015	Loading	03/08/2000	3.50E-15	1.26E-14	0.4%	292%	1,046%	0.28652968
25016	Main	03/09/2000	4.53E-14	1.47E-14	4.5%	3,771%	1,228%	1.03310502
							<b>TOTAL</b>	<b>5.6716895</b>

Notes:

- (1) The DAC for Th-232 is 1.0 E-12 uCi/ml. DAC values are listed in 10 CFR 20 Appendix B, Table 1, Column 3 and are used to evaluate occupational exposures.
- (2) The Effluent Concentration Limit for Th-232 is 1.2E-15 uCi/ml. It is derived from 20% of the 10 CFR 20, Appendix B, Table 2, Column 1 value for Th-232 and is equivalent to an annual exposure of 10 mrem to a member of the public.
- (3) The MDC value is used in the calculations, when it exceeds the sample result.
- (4) Assumptions:
  - a. 10 days of field operations.
  - b. All activity is from Th-232.
  - c. During two sampler operations, the most conservative value is calculated.
  - d. Nearest receptor was continuously present in the work area.
  - e. Although sampling was performed during the work shift only, airborne conditions were assumed to persist over a 24-hour period.
  - f. Off-site background air concentrations were not subtracted from the results.

**Table 5: Summary of Environmental Data - Buried Drums (Soil)**

Analyte	Sample ID Sample Location Matrix Sample Date	09A-020069 On Bank Soil 3/8/2000	09A-020091 In Swale Soil 3/9/2000
	Units		
Benzene	ug/kg	1200000	----
Ethylbenzene	ug/kg	1600000	----
Toluene	ug/kg	2200000	----
N-Nitrosodi-n-Propylamine	ug/kg	----	2300
TPH	mg/kg	----	46
Aluminum	mg/kg	15.3	6280
Antimony	mg/kg	0.175	2.55
Arsenic	mg/kg	0.564	61
Barium	mg/kg	1.05	197
Beryllium	mg/kg	0.0327	1.04
Cadmium	mg/kg	0.0323	1.45
Calcium	mg/kg	200	25400
Chromium	mg/kg	0.987	481
Cobalt	mg/kg	0.044	3.44
Copper	mg/kg	44.2	93.9
Iron	mg/kg	208	9610
Lead	mg/kg	48	207
Magnesium	mg/kg	17.3	2110
Manganese	mg/kg	1.73	372
Mercury	mg/kg	1.65	0.451
Nickel	mg/kg	0.469	13.3
Potassium	mg/kg	17	492
Selenium	mg/kg	0.738	8.66
Silver	mg/kg	0.0846	1.37
Sodium	mg/kg	99.9	1380
Thallium	mg/kg	0.318	1.66
Vanadium	mg/kg	0.0336	18.7
Zinc	mg/kg	6.65	270

**Table 6: Summary of Environmental Data - Buried Drums (Water)**

<b>Analyte</b>	<b>Sample ID Sample Location Matrix Sample Date</b>	<b>9A-020092 In Swale Water 3/9/2000</b>
	<b>Units</b>	
Aluminum	ug/l	13400
Antimony	ug/l	2.88
Arsenic	ug/l	90.4
Barium	ug/l	333
Beryllium	ug/l	1.03
Cadmium	ug/l	4.59
Calcium	ug/l	180000
Chromium	ug/l	650
Cobalt	ug/l	9.16
Copper	ug/l	182
Iron	ug/l	64800
Lead	ug/l	460
Magnesium	ug/l	21700
Manganese	ug/l	5190
Mercury	ug/l	0.2
Nickel	ug/l	37.1
Potassium	ug/l	3880
Selenium	ug/l	2.04
Silver	ug/l	0.303
Sodium	ug/l	33900
Thallium	ug/l	4.32
Vanadium	ug/l	31.5
Zinc	ug/l	581
TPH	mg/l	400

**Table 7: Summary of Radiological Data - Soil Waste Stockpile**

Laboratory Sample ID	Laboratory Results								
	Th-232 (pCi/g)			Ra-226 (pCi/g)			U-238 (pCi/g)		
	Result	Error	MDA	Result	Error	MDA	Result	Error	MDA
09A-020151	30.58	0.48	0.55	6.55	0.25	0.7	6.8	5.45 J	17.3
09A-020152	61.31	0.89	0.86	14.19	0.41	1.19	11.62	5.87 J	28.2
09A-020153	47.85	0.66	0.67	10.97	0.34	0.86	4.01	6.60 J	16.7
09A-020154	69.16	0.96	0.88	19.31	0.50	1.05	4.72	8.67 J	31.4
09A-020155	54.47	0.78	0.76	12.46	0.38	0.94	4.10	7.37 J	18.9
09A-020156	62.02	0.86	0.81	13.67	0.40	1.00	13.41	8.51 J	19.7
09A-020157	52.63	0.74	0.72	10.04	0.34	0.93	4.78	8.87 J	29.2
09A-020158	60.16	0.82	0.79	13.49	0.40	0.95	18.25	12.81 J	42.3
09A-020159	59.45	0.81	0.79	13.48	0.39	0.99	11.03	1.83 J	23.2
09A-020160	61.97	0.79	0.84	13.02	0.41	1.07	8.42	12.78 J	21.0
09A-020161	55.52	0.80	0.76	11.39	0.37	1.02	18.83	5.26 J	37.7
09A-020162	47.62	0.68	0.66	9.89	0.31	0.85	8.79	4.56 J	21.8
09A-020163	101.75	1.27	1.01	24.03	0.60	1.30	14.75	7.05 J	36.4
09A-020164	94.62	1.24	1.00	21.16	0.55	1.26	19.46	6.55 J	40.9
09A-020165	78.61	1.06	0.91	18.82	0.50	1.13	30.57	6.12 J	42.7
09A-020166	129.20	1.63	1.20	27.71	0.71	1.54	33.05	9.14 J	59.6
09A-020167	43.14	0.62	0.66	8.86	0.32	0.84	6.65	3.09 J	29.7
09A-020168	55.46	0.76	0.76	10.13	0.37	1.04	9.35	5.41 J	20.8
09A-020169	56.74	0.82	0.79	10.70	0.39	1.05	32.60	1.54 J	38.8
09A-020170	49.74	0.72	0.70	10.51	0.34	0.91	7.83	3.78 J	25.7
09A-020171	51.16	0.72	0.76	11.04	0.35	1.04	17.49	4.18 J	29.6
09A-020172	49.62	0.71	0.67	8.25	0.32	0.94	24.74	4.64	14.6
09A-020173	61.37	0.86	0.80	11.36	0.39	1.04	16.51	3.61 J	26.7
09A-020174	83.01	1.05	0.92	16.12	0.49	1.27	29.42	5.75 J	44.2
09A-020175	88.17	1.11	0.95	17.00	0.50	1.34	13.35	13.75 J	45.9

MDA – Minimum Detectable Activity

J - Estimated

**Table 8: Summary of Environmental Data - Soil Waste Stockpile**

<b>Analyte</b>	<b>Sample ID Sample Location Matrix Sample Date</b>	<b>020178 Soil Stockpile Soil 9/12/2000</b>	<b>020179 Soil Stockpile Soil 9/12/2000</b>	<b>020180 Soil Stockpile Soil 9/12/2000</b>	<b>020181 Soil Stockpile Soil 9/12/2000</b>
	<b>Units</b>				
alpha-Chlordane	ug/kg	19	51	36	26
Endrin	ug/kg	U	U	U	U
gamma-Chlordane	ug/kg	14	21	15	28
Heptachlor	ug/kg	U	U	U	U
Heptachlor Epoxide	ug/kg	3.8 J	2.1 J	4.1 J	28

**Table 8: Summary of Environmental Data - Soil Waste Stockpile (continued)**

Analyte	Sample ID Sample Location Matrix Sample Date	020182 Soil Stockpile Soil 9/12/2000
Units		
1,1,1-Trichloroethane	ug/kg	U
1,1,2,2-Tetrachloroethane	ug/kg	U
1,1,2-Trichloroethane	ug/kg	U
1,1-Dichloroethane	ug/kg	U
1,1-Dichloroethene	ug/kg	U
1,2,4-Trichlorobenzene	ug/kg	U
1,2-Dichlorobenzene	ug/kg	U
1,2-Dichloroethane	ug/kg	U
1,2-Dichloropropane	ug/kg	U
1,3-Dichlorobenzene	ug/kg	U
1,4-Dichlorobenzene	ug/kg	U
2,2'-oxybis(1-Chloropropane)	ug/kg	U
2,4,5-Trichlorophenol	ug/kg	U
2,4,6-Trichlorophenol	ug/kg	U
2,4-Dichlorophenol	ug/kg	U
2,4-Dimethylphenol	ug/kg	U
2,4-Dinitrophenol	ug/kg	U
2,4-Dinitrotoluene	ug/kg	U
2,6-Dinitrotoluene	ug/kg	U
2-Butanone	ug/kg	U
2-Chloronaphthalene	ug/kg	U
2-Chlorophenol	ug/kg	U
2-Hexanone	ug/kg	U
2-Methylnaphthalene	ug/kg	280 J
2-Methylnaphthalene	ug/kg	U
2-Methylphenol	ug/kg	U
2-Nitroaniline	ug/kg	U
2-Nitrophenol	ug/kg	U
3,3'-Dichlorobenzidine	ug/kg	U
3-Nitroaniline	ug/kg	U
4,4'-DDD	ug/kg	U
4,4'-DDE	ug/kg	U
4,4'-DDT	ug/kg	U
4,6-Dinitro-2-methylphenol	ug/kg	U
4-Bromophenyl-phenylether	ug/kg	U
4-Chloro-3-methylphenol	ug/kg	U
4-Chloroaniline	ug/kg	U
4-Chlorophenyl-phenylether	ug/kg	U

**Table 8: Summary of Environmental Data - Soil Waste Stockpile (continued)**

Analyte	Sample ID Sample Location Matrix Sample Date	020182 Soil Stockpile Soil 9/12/2000
	Units	
4-Methyl-2-Pentanone	ug/kg	U
4-Methylphenol	ug/kg	U
4-Nitroaniline	ug/kg	U
4-Nitrophenol	ug/kg	U
Acenaphthene	ug/kg	U
Acenaphthylene	ug/kg	U
Acetone	ug/kg	3 JB
Aldrin	ug/kg	U
alpha-BHC	ug/kg	U
alpha-Chlordane	ug/kg	U
Anthracene	ug/kg	U
Aroclor-1016	ug/kg	U
Aroclor-1221	ug/kg	U
Aroclor-1232	ug/kg	U
Aroclor-1242	ug/kg	U
Aroclor-1248	ug/kg	U
Aroclor-1254	ug/kg	U
Aroclor-1260	ug/kg	U
Benzene	ug/kg	U
Benzo(a)anthracene	ug/kg	U
Benzo(a)pyrene	ug/kg	U
Benzo(b)fluoranthene	ug/kg	U
Benzo(g,h,i)perylene	ug/kg	U
Benzo(k)fluoranthene	ug/kg	U
Benzoic acid	ug/kg	U
Benzyl alcohol	ug/kg	U
beta-BHC	ug/kg	U
bis(2-Chloroethoxy)methane	ug/kg	U
bis(2-Chloroethyl)ether	ug/kg	U
bis(2-Ethylhexyl)phthalate	ug/kg	U
Bromodichloromethane	ug/kg	U
Bromoform	ug/kg	U
Bromomethane	ug/kg	U
Butylbenzylphthalate	ug/kg	U
Carbazole	ug/kg	U
Carbon Disulfide	ug/kg	U
Carbon Tetrachloride	ug/kg	U
Chlorobenzene	ug/kg	U



**Table 8: Summary of Environmental Data - Soil Waste Stockpile (continued)**

Analyte	Sample ID Sample Location Matrix Sample Date	020182 Soil Stockpile Soil 9/12/2000
Units		
Chloroethane	ug/kg	U
Chloroform	ug/kg	U
Chloromethane	ug/kg	U
Chrysene	ug/kg	U
cis-1,2-Dichloroethene	ug/kg	U
cis-1,3-Dichloropropene	ug/kg	U
delta-BHC	ug/kg	U
Di-n-butylphthalate	ug/kg	U
Di-n-octylphthalate	ug/kg	U
Dibenzo(a,h)anthracene	ug/kg	U
Dibenzofuran	ug/kg	U
Dibromochloromethane	ug/kg	U
Dieldrin	ug/kg	U
Diethylphthalate	ug/kg	U
Dimethylphthalate	ug/kg	U
Endosulfan I	ug/kg	U
Endosulfan II	ug/kg	U
Endosulfan Sulfate	ug/kg	U
Endrin	ug/kg	U
Endrin Aldehyde	ug/kg	U
Endrin Ketone	ug/kg	U
Ethylbenzene	ug/kg	U
Fluoranthene	ug/kg	U
Fluorene	ug/kg	U
gamma-BHC (Lindane)	ug/kg	U
gamma-Chlordane	ug/kg	U
Heptachlor	ug/kg	U
Heptachlor Epoxide	ug/kg	U
Hexachlorobenzene	ug/kg	U
Hexachlorobutadiene	ug/kg	U
Hexachlorocyclopentadiene	ug/kg	U
Hexachloroethane	ug/kg	U
Indeno(1,2,3-cd)pyrene	ug/kg	U
Isophorone	ug/kg	U
Methoxychlor	ug/kg	U
Methylene Chloride	ug/kg	9
N-Nitroso-di-n-propylamine	ug/kg	U
N-Nitrosodiphenylamine (1)	ug/kg	U

**Table 8: Summary of Environmental Data - Soil Waste Stockpile (continued)**

<b>Analyte</b>	<b>Sample ID Sample Location Matrix Sample Date</b>	<b>020182 Soil Stockpile Soil 9/12/2000</b>
<b>Units</b>		
Naphthalene	ug/kg	U
Nitrobenzene	ug/kg	U
Pentachlorophenol	ug/kg	U
Phenanthrene	ug/kg	U
Phenol	ug/kg	U
Pyrene	ug/kg	U
Styrene	ug/kg	U
Tetrachloroethene	ug/kg	U
Toluene	ug/kg	U
Toxaphene	ug/kg	U
trans-1,2-Dichloroethene	ug/kg	U
trans-1,3-Dichloropropene	ug/kg	U
Trichloroethene	ug/kg	U
Vinyl Acetate	ug/kg	U
Vinyl Chloride	ug/kg	U
Xylene (total)	ug/kg	U

**Table 8: Summary of Environmental Data - Soil Waste Stockpile (continued)**

Analyte	Sample ID	09A-020177
	Sample Location	Water
	Matrix	6/27/2000
	Sample Date	
	Units	
Arsenic	ug/L	108.00
Barium	ug/L	354.00 N
Cadmium	ug/L	1.80 B
Chromium	ug/L	23.00
Lead	ug/L	6.50
Mercury	ug/L	1.00 U
Selenium	ug/L	4.30 B
Silver	ug/L	0.30 U
Zinc	ug/L	244.00
Paint Filter	----	0.00
2,4-D	ug/L	U
Silvex	ug/L	U
Technical Chlordane	ug/L	U
Toxaphene	ug/L	U
Endrin	ug/L	U
Heptachlor	ug/L	U
Heptachlor Epoxide	ug/L	U
gamma-BHC (Lindane)	ug/L	U
Methoxychlor	ug/L	U
1,4-Dichlorobenzene	ug/L	U
Hexachloroethane	ug/L	U
Nitrobenzene	ug/L	U
Hexachlorobutadiene	ug/L	U
2,4,6-Trichlorophenol	ug/L	U
2,4,5-Trichlorophenol	ug/L	U
2,4-Dinitrotoluene	ug/L	U
Hexachlorobenzene	ug/L	U
Pentachlorophenol	ug/L	U
2-Methylphenol	ug/L	U
4-Methylphenol	ug/L	U
Pyridine	ug/L	U
Benzene	ug/L	U
Carbon Tetrachloride	ug/L	U
Chlorobenzene	ug/L	U
Chloroform	ug/L	0.40 JT
2-Butanone	ug/L	U
Tetrachloroethene	ug/L	U

**Table 8: Summary of Environmental Data - Soil Waste Stockpile (continued)**

<b>Analyte</b>	<b>Sample ID Sample Location Matrix Sample Date</b>	<b>09A-020177  Water 6/27/2000</b>
<b>Units</b>		
Trichloroethene	Ug/L	U
Vinyl Chloride	Ug/L	U
1,2-Dichloroethane	Ug/L	U
1,1-Dichloroethene	Ug/L	U

B (inorganics) – Value Between Method Detection Limit and Reporting Limit

B (organics) – Found in Associated Blank

J – Estimated

JB – Found in Blank, is an Estimated Value

JT – Temperature at receipt exceeded control limits

N - Spiked sample recovery not within control limits

U

–

**Undetected**

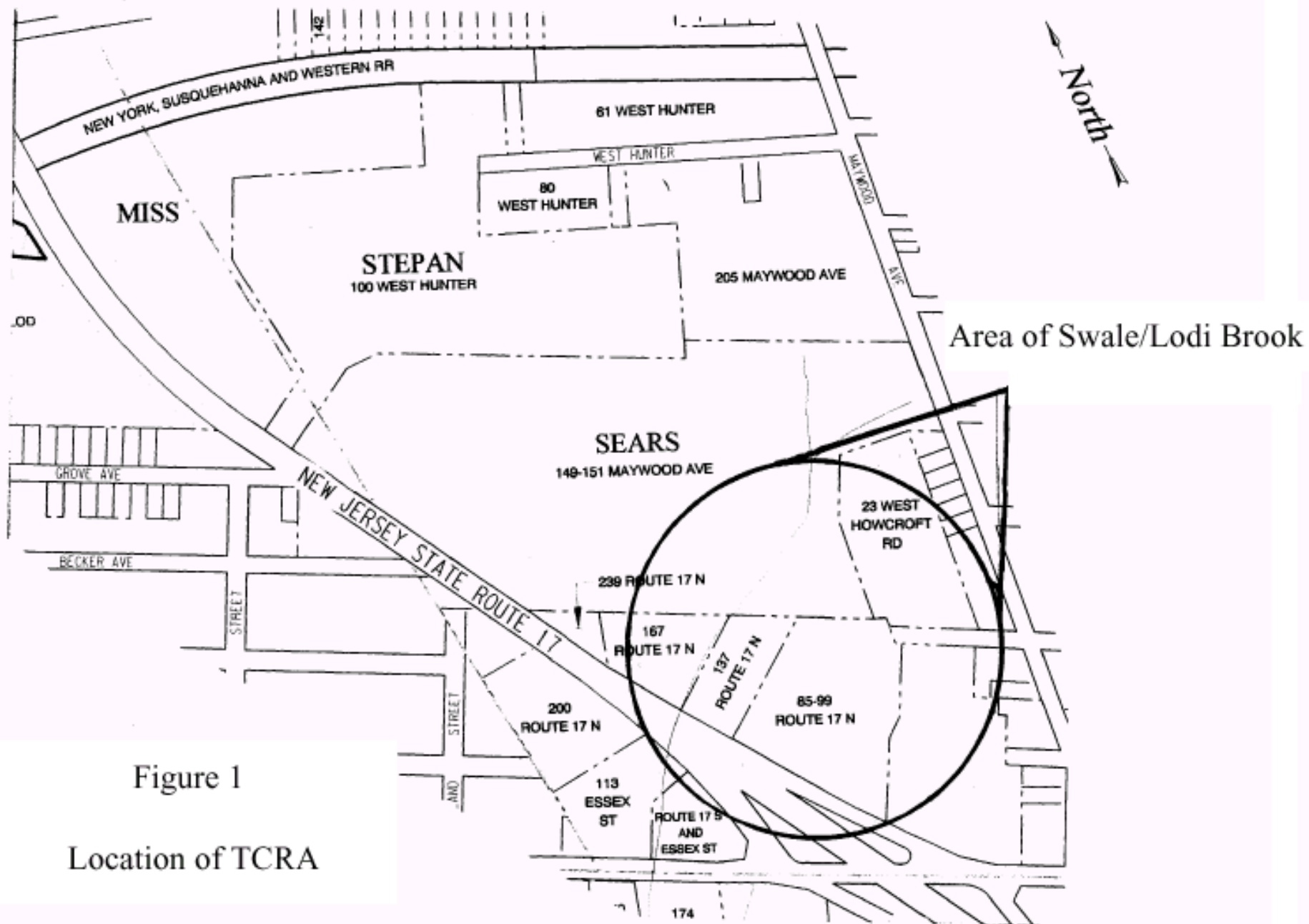


Figure 1

Location of TCRA

## **Appendix A - Design Change Notification 0001**

# STONE & WEBSTER ENGINEERING

## DESIGN CHANGE NOTIFICATION

PROJECT FUSRAP MAYWOOD SUPERFUND SITE	PROJ. NO. DACW41-99-D-9001	DESIGN CHANGE NO. 0001
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TO <u>Mr. Daniel Lee, Resident Engineer</u>	DEPT. <u>USACE</u>	LOCATION <u>Maywood, NJ</u>	DATE <u>03/01/00</u>
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RE:  DRAWING NO. TCRA-4 FOR SWALE/ LODI BROOK TITLE LIMITS OF SITE WORK  
 SPEC NO. \_\_\_\_\_ PAGE \_\_\_\_\_  
 OTHER. \_\_\_\_\_ ANTICIPATED REVISION DATE OF FORMAL DOCUMENTS \_\_\_\_\_

ENGINEERING "HOLD" PLACED ON CONSTRUCTION ACTIVITIES IN AREA DEFINED HEREIN PENDING RECEIPT OF FORMALLY REVISED DOCUMENT(S) AND/OR REVISED DCN, PE SIGNATURE NOT REQUIRED.  
 RELEASED FOR CONSTRUCTION ON BASIS OF MODIFICATION(S) PRESCRIBED BY THIS DCN.

APPLICABLE DOCUMENTS WILL BE REVISED BY:

<input type="checkbox"/> HOME OFFICE	<input checked="" type="checkbox"/> SITE (Project Engineer to assign Open Engineering Item No.) _____
<input type="checkbox"/> AS-BUILT DRAWING BY RESIDENT ENGINEER'S STAFF	<input type="checkbox"/> OTHER _____

PROPOSED CHANGE	REASON FOR CHANGE
<p style="text-align: center;"><b>DESCRIPTION</b></p> <p>The existing southwest slopes will not be backfilled to the Required proposed 2:1 slope as indicated in the design drawing TCRA-4 using the unsuitable cut material from the northeast Slopes. Southwest slopes will only be scraped off loose material. USACE COR Mr. Daniel Lee agreed to this change which will Not impact the existing shape and or decrease size of the Swale</p>	<p style="text-align: center;"><b>REASON FOR CHANGE</b></p> <p><input type="checkbox"/> FIELD CHANGE REQUEST (FCR No.) _____  <input type="checkbox"/> REQUIRED MODIFICATIONS TO DESIGN OR SPECIFICATION  <input type="checkbox"/> DISPOSITION OF NONCONFORMING ITEM  <input type="checkbox"/> CHANGES IN REGULATORY OR OTHER REQUIREMENTS  <input checked="" type="checkbox"/> OPERATIONAL EXPERIENCE  <input type="checkbox"/> OTHER _____</p>

EXHIBITS ATTACHED  NO  YES - IF YES, CHECK APPLICABLE BOX(ES)

COPIES OF MARKED-UP AREA OF DRAWING(S)  
 FIELD CHANGE REQUEST (FCR No. \_\_\_\_\_)  OTHER (Describe) \_\_\_\_\_

COMMENTS \_\_\_\_\_ SCHEDULED ERECTED/PLACEMENT DATE(S) \_\_\_\_\_

ORIGINATOR \_\_\_\_\_ DATE \_\_\_\_\_

DISTRIBUTION (Check as applicable and fill in name. Indicate with an asterisk (\*) personnel who are to perform a QA review.)

<input checked="" type="checkbox"/> Project Manager <u>Jay Green</u>	<input type="checkbox"/> Health and Safety _____	<input type="checkbox"/> Chemical _____
<input checked="" type="checkbox"/> Project Engineer <u>Richard Skryness</u>	<input type="checkbox"/> Construction _____	<input type="checkbox"/> Regulatory _____
<input type="checkbox"/> Architectural _____	<input type="checkbox"/> Electrical _____	<input type="checkbox"/> Structural _____
<input type="checkbox"/> CAD _____	<input type="checkbox"/> Environmental _____	<input type="checkbox"/> Science (Specify) _____
<input type="checkbox"/> Building _____	<input type="checkbox"/> I&C _____	<input type="checkbox"/> POAE _____
<input type="checkbox"/> Mechanical _____	<input type="checkbox"/> Security _____	<input checked="" type="checkbox"/> Project Supt <u>Thomas Farrell</u>
<input type="checkbox"/> Process _____	<input type="checkbox"/> Estimating _____	<input type="checkbox"/> Vendor Supt _____
<input type="checkbox"/> Civil _____	<input checked="" type="checkbox"/> Quality Assurance <u>*Akram Aziz</u>	<input type="checkbox"/> Site Manager _____

**NOTE: Personnel indicated with an asterisk (\*) are to perform a QA review and inform Originator of any comments, or approve and sign, as applicable, by \_\_\_\_\_ (date).**

LEAD DISCIPLINE ENGINEER OR DESIGNEE (Signature)	DATE	PROJECT ENGR OR DESIGNEE (Signature)	DATE
		<u>Richard Skryness</u>	<u>03/01/00</u>

QA REVIEWER (if indicated above)	PROJECT MANAGER (After acceptance of all reviews)
<input type="checkbox"/> COMMENTS (Attached) <input checked="" type="checkbox"/> NO COMMENTS	
<u>[Signature]</u>	<u>[Signature]</u>
SIGNATURE	SIGNATURE
<u>3/1/00</u>	<u>3/1/00</u>
DATE	DATE

FIELD EVALUATION

IMPLEMENT RECOMMENDED DISPOSITION  DEFER RECOMMENDED DISPOSITION

[Signature] March 3, 2000  
RESIDENT ENGINEER (signature) DATE

## **Appendix B - Accident / Incident Reports**



CONTRACT No.: DACW41-99-D-9001

**MAYWOOD FUSRAP SUPERFUND SITE  
ACCIDENT/INCIDENT REPORT**

DATE OF ACCIDENT/INCIDENT: 3/1/00

TASK NO.:2

TIME OF ACCIDENT/INCIDENT: 1:30 PM

DATE OF REPORT: 3/2/00

LOCATION: Howcroft Swale Station 5+00

EMPLOYER: Franklin Environmental services

INJURED: None

FOREMAN: N/A

SUPERVISOR: John McKenney

STONE & WEBSTER COORDINATING SUPERVISOR: T Farrell/C. McKinney

WITNESSES: JohnMcKenney/Clyde McKinney

WHAT HAPPENED: During excavation of the swale, a 5-gallon can of an oily liquid was uncovered. The buried can was partially covered, and when the excavator hit it, the contents spilled on to the soil and into the swale. A sheen developed on the water surface and was contained by the temporary dam which had been installed. No release of material to Lodi Brook occurred. Excavation stopped, the can was checked for contaminants with a PID. No VOC's were detected. Clean up of the contaminated soil and water surface was performed with all contaminated material placed in a salvage drum. A sample was collected and was sent off site for analysis. The waste material will remain in the storage drum until the analysis is completed. The waste will then be properly disposed of.

EXTENT OF INJURY/DAMAGE N/A

BASIC FACTS BROUGHT OUT IN INVESTIGATION: Care needs to be taken when performing excavation to watch out for hidden containers.

RECOMMENDATIONS TO PREVENT RECURRENCE: Additional care in excavating and the installation of oil containment booms in the swale to collect future spills if they occur.

INVESTIGATED BY: Clyde McKinney

CONTRACT No.: DACW41-99-D-9001

**MAYWOOD FUSRAP SUPERFUND SITE  
ACCIDENT/INCIDENT REPORT**

DATE OF ACCIDENT/INCIDENT: 3/3/00

TASK NO.: 2

TIME OF ACCIDENT/INCIDENT: 1:30 PM

DATE OF REPORT: 3/3/00

LOCATION: Howcroft Swale Station 2+25

EMPLOYER: Franklin Environmental Services

INJURED: None

FOREMAN: N/A

SUPERVISOR: John McKenney

STONE & WEBSTER COORDINATING SUPERVISOR: T Farrell/C. McKinney

WITNESSES: JohnMcKenney

WHAT HAPPENED: During fine grade excavation of the swale invert a 55 gallon drum of an unknown liquid was uncovered. The buried drum was hit while removing the last 3" of material to obtain the required invert elevation. The drum appeared to be partially crushed and had holes from which liquid was leaking. Excavation stopped. The can was checked for contaminants with a PID, no VOC's were detected.

After review of the situation, a hazardous work permit was initiated; workers were briefed and the necessary PPE,tools and equipment were assembled.

The drum was placed in an overpack drum in the swale, the overpack drum was covered and the removed from the swale. Soil immediately surrounding the buried drum was also removed and placed in a second overpack drum. Both overpack drums were moved away from the edge of the swale.

A sample will be collected and sent off site for analysis. The waste material will remain in the storage drum until the analysis is completed. Then the waste will be properly disposed of.

EXTENT OF INJURY/DAMAGE N/A

BASIC FACTS BROUGHT OUT IN INVESTIGATION: Care needs to be taken when performing excavation to watch out for hidden containers.

RECOMMENDATIONS TO PREVENT RECURRENCE: Additional care in excavating and the installation of oil containment booms in the swale to collect future spills if they occur.

CONTRACT No.: DACW41-99-D-9001

J.O. # 10041.0206

## MAYWOOD FUSRAP SUPERFUND SITE ACCIDENT/INCIDENT REPORT

DATE OF ACCIDENT/INCIDENT: 3/8/00

TASK NO.: 2

TIME OF ACCIDENT/INCIDENT: 13:30 PM

DATE OF REPORT: 3/8/00

LOCATION: Howcroft Avenue Drainage Swale: 60 feet North of the Baseline @ Station 1 + 75

EMPLOYER: Franklin Environmental Services

INJURED: No one

FOREMAN: N/A

SUPERVISOR: John McKenney

STONE & WEBSTER COORDINATING SUPERVISOR(S): T Farrell / C. McKinney

WITNESSES: John McKenney / Shawn Andrews

**WHAT HAPPENED:** A buried and crushed 55 gallon drum was uncovered by a tracked machine that was loading stockpiled waste into transport containers at the swale. While moving across the area North of the swale, the track of the loader passed over the drum causing the drum to be uncovered and material to spill out. Equipment operation was stopped along with other work activities in the area.

All personnel moved out of the area pending further investigation. After review of the situation, the SSHO & the SEC industrial hygiene / radiation technician donned Level C PPE and approached the drum with radiological & hazardous atmospheric monitoring equipment. Nothing was detectable outside of > 6" of the drum. The material that came from the drum was an amber colored viscous liquid with the consistency of honey. Solids were present within the drum and appeared to be an oxidized form of the viscous liquid, samples will confirm.

The hazardous work permit (# 005: rev I) was revised for the current conditions, the workers were briefed on the details of the permit, the necessary PPE, tools and equipment were assembled, and Franklin workers contained the drum and cleaned up the spilled material.

The drum was over-packed and staged on poly sheeting along with the spilled material and the soil it contaminated. This was all covered with additional poly & secured with sand bags. Samples of the liquid & contaminated soil were collected for analysis. The drum and other material will be properly stored until sample results are received and based on analysis data the material will be disposed of appropriately.

EXTENT OF INJURY / DAMAGE: N/A

BASIC FACTS BROUGHT OUT IN INVESTIGATION: Care needs to be taken when performing excavation to watch out for hidden containers.

RECOMMENDATIONS TO PREVENT RECURRENCE: Proceed cautiously when excavating soil, especially where other buried containers have been uncovered.

INVESTIGATED BY: Shawn Andrews, SSHO



## **APPENDIX C**

### **As-Built Survey and Photos**



**Photo C-1**  
**View of the culvert at the terminus of West Howcroft Road.**



**Photo C-2**  
**View of the West Howcroft Swale looking  
East towards West Howcroft Road.**





**Photo C-3**  
**View of West Howcroft Swale looking West**  
**towards 137 NJ Route 17 and Lodi Brook.**



**Photo C-4**  
**View of Lodi Brook looking Northeast from NJ Route 17.**