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NSA MID SOUTH
5090.3a

TECHNICAL MEMORANDUM REGARDING THE VOLUNTARY CORRECTIVE ACTION FOR
REMOVAL OF SOIL AT SOLID WASTE MANAGEMENT UNIT 19 FORMER UNDERGROUND
STORAGE TANK 1648 MILLINGTON SUPPACT TN

10/20/2003
ENSAFE INC



TECHNICAL MEMORANDUM

To: Distribution
From: Phil Atkinson, EnSafe Inc.
Re: SWMU 19 VCA Report
NSA Mid-South, Millington, Tennessee
Date: October 20, 2003 (Revision 0)

Distribution:
Jim Reed, SOUTHDIV
Tonya Barker/Rob Williamson, NSA Mid-South
Jennifer Herndon, USEPA
Roger Donovan, TDEC
Jack Carmichael, USGS
EnSafe Project Team

Summary

This Voluntary Corrective Action (VCA) Report documents removal of soil primarily contaminated with petroleum at SWMU 19 — former UST 1648 at NSA Mid-South’s former Navy Exchange Service Station (Figure 1). The excavation and disposals were conducted in accordance with all applicable federal, state, and local laws and regulations. The primary references for this report are the *Voluntary Corrective Action Work Plan-SWMU 19* (EnSafe, May 1999) and the *Comprehensive RCRA Facility Investigation Work Plan* (E/A&H, 1994).

Based on the analytical results for confirmation samples from the excavation and because the goals of the voluntary corrective action (VCA) have primarily been met, EnSafe recommends no further action for this site.

To find specific details about the project, please refer to the following lookup table.

For Details On	Refer To
Goals/Objectives of the VCA	Page 1
Cleanup Levels	Page 2/Table 1
Removal Activities	Page 3
Sampling Results	Page 5
Soil Disposal	Page 7
Conclusions/Recommendations	Page 7

Goals/Objectives of the VCA

The overall goal was to remove and dispose of any petroleum-related contaminated soil from this site, specifically where the TDEC site cleanup level of 1,000 milligrams per kilogram (mg/kg) total petroleum hydrocarbons (TPH) was exceeded in surface-soil samples and areas where metals exceeded acceptable risk levels. As requested by the Public Works Department (PWD) Environmental Division, soil in which TPH exceeded 100 mg/kg was removed to a depth of 5 feet below ground surface (bgs); soil in which TPH exceeded 500 mg/kg was removed below the 5-foot interval, where possible.

Primary VCA Objectives

- Excavate all soil in which petroleum contamination exceeds 100 mg/kg in the 0- to 5-foot interval and 500 mg/kg below the 5-foot interval.
- Confirm that petroleum and metal concentrations in soil are less than the action levels.

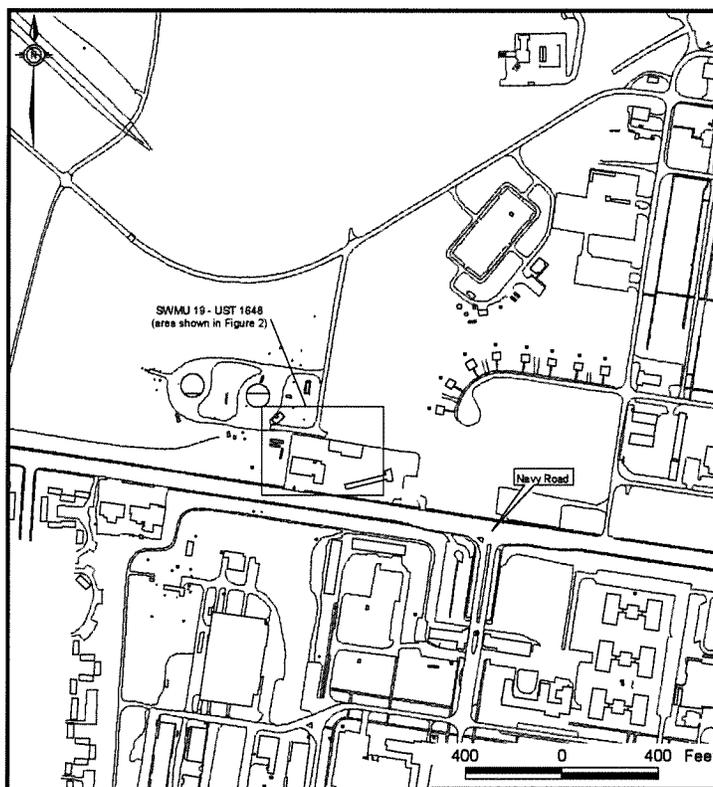


Figure 1 — Site Vicinity Map

- Properly dispose of excavated soil and return removal areas to pre-removal conditions.

Applicable Cleanup Levels

TPH

Because no preliminary remediation goals (PRGs) or soil screening levels (SSLs) have been established for TPH, TDEC soil cleanup values¹ were used for comparison. TDEC has established three cleanup concentrations for TPH depending on soil permeability and aquifer classification: 100 mg/kg, 500 mg/kg, and 1,000 mg/kg (TDEC 1998).

¹From the memorandum *Policy Statement for Petroleum Contaminated Sites* (TDEC, 1997).

Removal Activities

The Building N-757 slab was removed in mid-June 2003, followed by excavation of the UST 1648 area (Figure 3). EnSafe Ops, LLC (OPS) excavated, transported, and disposed of soil. EnSafe Inc. sampled soil and oversaw the removal and stockpiled onsite.

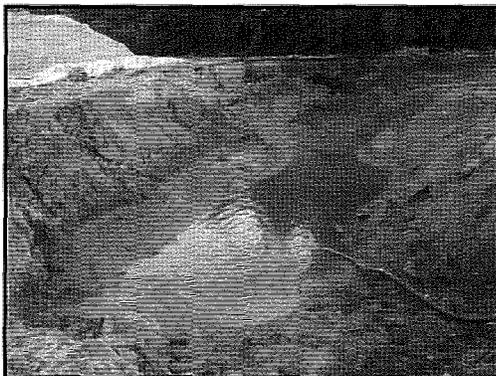
The excavation began with removal of a 5' square by 2' deep area centered on sampling location 049S0004, as required by the *Voluntary Corrective Action Work Plan Petroleum-Contaminated Soil Removal, Various Sites* (EnSafe, June 1999). Following this removal, soils exceeding the cleanup level, as determined by the TPH analyzer, were removed. The excavation continued horizontally in all directions at an average depth of 9' bgs.

As the excavation continued east beneath the former automotive maintenance garage, two hydraulic lift pits were encountered. The pits, consisting of an approximate 20-gallon hydraulic oil tank and piping housed in a wood enclosure with sand backfill, were removed during the excavation. The sand and wood were stained with petroleum and were placed on the contaminated stockpile. Residual hydraulic oil in the tanks was cleaned with oil absorbent rags, placed into a 55-gallon drum, and properly disposed of on October 16, 2003.



Petroleum-contaminated soil was removed using a track hoe.

Two underground utilities limited the excavation to the west and east: a 6" diameter north-south water line and a 12" diameter sanitary sewer main running south-southwest to north-northeast. The more significantly contaminated soil (approximately 1,500 mg/kg) was removed from near the former UST pit. However, an area of soil exceeding the NSA Mid-South PWD's requested cleanup level (approximately 400 to 700 mg/kg) was not removed because it was too close to the sanitary sewer. The underground utilities and sampling results are shown on Figure 3.



Trapped water was pumped from the excavation and disposed of through the oil/water separator onsite.

During the removal, trapped water entered the excavation, possibly from the former slab's sand backfill, the former UST 1648 pea gravel backfill, and/or rainwater. A water sample was collected and submitted to A&L Analytical Laboratories in Memphis for benzene, toluene, ethylbenzene, and xylene (BTEX),

Soil Disposal

Approximately 830 cubic yards of soil were removed from the excavation. This soil was placed on plastic and covered with it, then bermed with straw bails on-site for temporary storage. When removal was complete, the excavation was backfilled with clean soil and graded with 1-foot of crushed limestone.

On June 25, 2003, EnSafe personnel collected one 5-part composite sample from the soil stockpile and submitted it to STL-Savannah for BTEX, PCBs, TCLP cadmium, chromium, and lead, and extractable organic halogen analysis. Laboratory results accompanied the application submitted to TDEC's Division of Solid Waste Management and Allied Waste. On September 2 and 3, 2003, the soil and the empty hydraulic lift tanks were transported to Allied Waste in Millington, Tennessee for disposal. The laboratory reports are included in Attachment A.



Upon completion of the soil removal, the stockpile was covered with plastic, and the excavation was backfilled with clean fill material.

Conclusions and Recommendations

Based on the analytical results for confirmation samples from the excavation where former UST 1648 was located, the objectives of the VCA were primarily met. Soil analytical results for metals were below the reference concentrations and industrial and residential preliminary remediation goals. TPH concentrations were below the TDEC cleanup criteria on the bottom and all sides of the excavation. However, the cleanup level requested by NSA Mid-South's PWD was not met for a section of the east sidewall. This soil, in which TPH was measured at approximately 400 to 700 mg/kg, was not removed because it was so close to an underground 12" sanitary sewer main. However, the most heavily stained soil was removed from its location near the former UST. Because soils exceeding the TDEC cleanup level were apparently removed, EnSafe recommends no further action for this facility.

Appendix A
Laboratory Reports

Analytical Report

For: Mr. John Stedman
EnSafe, Inc.
5724 Summer Trees Drive
Memphis, TN 38134
CC:

Order Number:S384885
SDG Number:MEM193
Client Project ID:0146-001-09-000-00
Project:NSA Mid-South Public Works/MEM193
Report Date:07/07/2003
Sampled By:Client
Sample Received Date:06/26/2003



Linda A. Wolfe, Project Manager
lwolfe@stl-inc.com

The test results in this report meet all NELAP requirements for parameters for which accreditation is required or available. Any exceptions to NELAP requirements are noted in this report. Pursuant to NELAP, this report may not be reproduced, except in full, without the written approval of the laboratory.

Sample Summary

Order: S384885
Date Received: 06/26/2003

Client: EnSafe, Inc.
Project: NSA Mid-South Public Works/MEM193

Client Sample ID	Lab Sample ID	Matrix	Date Sampled
019V062503	S384885*1	Solid	06/25/2003 13:40
019SEXCA10	S384885*2	Solid	06/25/2003 11:30
Method Blank	S384885*3	Solid	
TCLP Extraction Fluid Blank	S384885*6	Liquid	

Analytical Data Report

Lab Sample ID	Description	Matrix	Date Received	Date Sampled	SDG#
84885-1	019V062503	Solid	06/26/03	06/25/03 13:40	MEM193

Lab Sample IDs

Parameter	Units	84885-1
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Volatiles by GC/MS (8260)

Benzene	ug/kg dw	6.2U
Toluene	ug/kg dw	6.2U
Ethylbenzene	ug/kg dw	6.2U
Xylenes, Total	ug/kg dw	12U
Surrogate - Toluene-d8 *	%	76 %
Surrogate - 4-Bromofluorobenzene *	%	87 %
Surrogate - Dibromofluoromethane *	%	84 %
Percent Solids		81
Dilution Factor		1
Prep Date		07/01/03
Analysis Date		07/01/03
Batch ID		1L0701
Initial Volume		5.00
Final Volume		5.00

PCB's (8082)

Aroclor-1016	ug/kg dw	41U
Aroclor-1221	ug/kg dw	83U
Aroclor-1232	ug/kg dw	41U
Aroclor-1242	ug/kg dw	41U
Aroclor-1248	ug/kg dw	41U
Aroclor-1254	ug/kg dw	41U
Aroclor-1260	ug/kg dw	41U
Surrogate - TCX *	%	60 %
Surrogate - DCB *	%	48 %
Percent Solids		81
Dilution Factor		1
Prep Date		06/30/03
Analysis Date		07/01/03
Batch ID		06300
Initial Volume		30.0
Final Volume		10.0

Analytical Data Report

Lab Sample ID	Description	Matrix	Date Received	Date Sampled	SDG#
84885-1	019V062503	Solid	06/26/03	06/25/03 13:40	MEM193

Parameter	Units	Lab Sample IDs
		84885-1

Metals in TCLP Extract (6010)

Cadmium (TCLP)	mg/l	0.10U
Chromium (TCLP)	mg/l	0.20U
Lead (TCLP)	mg/l	0.20U
Percent Solids		81
Dilution Factor		1
Prep Date		06/27/03
Analysis Date		07/01/03
Batch ID		0627P
Initial Volume		5
Final Volume		50

Extractable Organic Halogens (600/4-84-008(D))

Extractable Organic Halogens	mg/kg dw	12U
Percent Solids		81
Dilution Factor		1
Prep Date		06/27/03
Analysis Date		06/27/03
Batch ID		0627Z
Initial Volume		10
Final Volume		10

Analytical Data Report

Lab Sample ID	Description	Matrix	Date Received	Date Sampled	SDG#
84885-2	019SEXCA10	Solid	06/26/03	06/25/03 11:30	MEM193

Lab Sample IDs

Parameter	Units	84885-2
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Metals (6010)

Antimony	mg/kg dw	2.6U
Arsenic	mg/kg dw	8.7
Barium	mg/kg dw	110
Beryllium	mg/kg dw	0.52U
Cadmium	mg/kg dw	0.64U
Chromium	mg/kg dw	12
Cobalt	mg/kg dw	6.7
Copper	mg/kg dw	16
Nickel	mg/kg dw	19
Lead	mg/kg dw	8.6
Selenium	mg/kg dw	1.3U
Silver	mg/kg dw	1.3U
Tin	mg/kg dw	6.4U
Thallium	mg/kg dw	1.3U
Vanadium	mg/kg dw	20
Zinc	mg/kg dw	51
Percent Solids		76
Dilution Factor		1
Prep Date		06/26/03
Analysis Date		06/29/03
Batch ID		0626A
Initial Volume		1.02
Final Volume		100

Mercury (7471)

Mercury	mg/kg dw	0.022U
Percent Solids		76
Dilution Factor		1
Prep Date		06/30/03
Analysis Date		07/01/03
Batch ID		0630T
Initial Volume		1.19
Final Volume		50

Analytical Data Report

Lab Sample ID	Description	Matrix	Date Received	Date Sampled	SDG#
84885-3	Method Blank	Solid	06/26/03		MEM193
84885-4	Lab Control Standard % Recovery	Solid	06/26/03		MEM193
84885-5	LCS Accuracy Control Limit (%R)	Solid	06/26/03		MEM193

Parameter	Units	Lab Sample IDs		
		84885-3	84885-4	84885-5

Metals in TCLP Extract (6010)

Cadmium (TCLP)	mg/l	0.10U	106 %	75-125 %
Chromium (TCLP)	mg/l	0.20U	108 %	75-125 %
Lead (TCLP)	mg/l	0.20U	105 %	75-125 %
Dilution Factor		1	1	
Prep Date		06/27/03	06/27/03	
Analysis Date		07/01/03	07/01/03	
Batch ID		0627P	0627P	
Initial Volume		5		
Final Volume		50		

Metals (6010)

Antimony	mg/kg dw	2.0U	105 %	75-125 %
Arsenic	mg/kg dw	1.0U	104 %	75-125 %
Barium	mg/kg dw	1.0U	102 %	75-125 %
Beryllium	mg/kg dw	0.40U	106 %	75-125 %
Cadmium	mg/kg dw	0.50U	108 %	75-125 %
Chromium	mg/kg dw	1.0U	104 %	75-125 %
Cobalt	mg/kg dw	1.0U	108 %	75-125 %
Copper	mg/kg dw	2.0U	108 %	75-125 %
Nickel	mg/kg dw	4.0U	110 %	75-125 %
Lead	mg/kg dw	0.50U	104 %	75-125 %
Selenium	mg/kg dw	1.0U	100 %	75-125 %
Silver	mg/kg dw	1.0U	100 %	75-125 %
Tin	mg/kg dw	5.0U	106 %	75-125 %
Thallium	mg/kg dw	1.0U	108 %	75-125 %
Vanadium	mg/kg dw	1.0U	104 %	75-125 %
Zinc	mg/kg dw	2.0U	107 %	75-125 %
Dilution Factor		1	1	
Prep Date		06/26/03	06/26/03	
Analysis Date		06/29/03	06/29/03	
Batch ID		0626A	0626A	
Initial Volume		1		
Final Volume		100		

Analytical Data Report

Lab Sample ID	Description	Matrix	Date Received	Date Sampled	SDG#
84885-3	Method Blank	Solid	06/26/03		MEM193
84885-4	Lab Control Standard % Recovery	Solid	06/26/03		MEM193
84885-5	LCS Accuracy Control Limit (%R)	Solid	06/26/03		MEM193

Parameter	Units	Lab Sample IDs		
		84885-3	84885-4	84885-5

Mercury (7471)

Mercury	mg/kg dw	0.020U	95 %	80-120 %
Dilution Factor		1	1	
Prep Date		06/30/03	06/30/03	
Analysis Date		07/01/03	07/01/03	
Batch ID		0630T	0630T	
Initial Volume		1		
Final Volume		50		

Extractable Organic Halogens (600/4-84-008(D))

Extractable Organic Halogens	mg/kg dw	10U	84 %	60-140 %
Dilution Factor		1	1	
Prep Date		06/27/03	06/27/03	
Analysis Date		06/27/03	06/27/03	
Batch ID		0627Z	0627Z	
Initial Volume		10		
Final Volume		10		

Analytical Data Report

Lab Sample ID	Description	Matrix	Date Received	Date Sampled	SDG#
84885-6	TCLP Extraction Fluid Blank	Liquid	06/26/03		MEM193

Parameter	Units	Lab Sample IDs
		84885-6

Metals in TCLP Extract (6010)

Cadmium (TCLP)	mg/l	0.10U
Chromium (TCLP)	mg/l	0.20U
Lead (TCLP)	mg/l	0.20U
Dilution Factor		1
Prep Date		06/27/03
Analysis Date		07/01/03
Batch ID		0627P
Initial Volume		5
Final Volume		50

These test results meet all the requirements of NELAC. All questions regarding this test report should be directed to the STL Project Manager who signed this test report.

SW-846, Test Methods for Evaluating Solid Waste, Third Edition, September 1986, and Updates I, II, IIA, IIB, and III.

U = Indicates compound was analyzed for but not detected.



A&L Analytical Laboratories, Inc.

2790 Whitten Rd. Memphis, TN 38133 • Phone (901) 213-2400 • Fax (901) 213-2440



ENSAFE
ATTN: JOHN STEDMAN
5724 SUMMER TREES
MEMPHIS, TN 38134

Report Number: 03-169-0217
Account Number: 1388
Report Date: 19-Jun-03
Received Date: 18-Jun-03
Matrix: Aq

Volatile Organics by GC/MS

SW846, Method 8260B

Lab Number 59990
Sample ID: 019GEXCA01
Units: mg/L

Date/Time Analyzed: 12-Jun-03 09:00
Analyst: K. Shaddox
Site ID: HECO

<u>Compound</u>	<u>Result</u>	<u>QL</u>	<u>Compound</u>	<u>Result</u>	<u>QL</u>
Chloromethane	BQL	0.005	cis-1,3-Dichloropropene	BQL	0.005
Vinyl Chloride	BQL	0.005	1,1,2-Trichloroethane	BQL	0.005
Bromomethane	BQL	0.005	Tetrachloroethene	BQL	0.005
Chloroethane	BQL	0.005	Styrene	BQL	0.005
1,1-Dichloroethene	BQL	0.005	Dibromochloromethane	BQL	0.005
Methylene Chloride	BQL	0.005	1,1,2,2-Tetrachloroethane	BQL	0.005
2-Butanone	BQL	0.005	Chlorobenzene	BQL	0.005
trans-1,2-Dichloroethene	BQL	0.005	Ethylbenzene	BQL	0.005
cis-1,2-Dichloroethene	BQL	0.005	Bromoform	BQL	0.005
1,1-Dichloroethane	BQL	0.005	Bromodichloromethane	BQL	0.005
2-Hexanone	BQL	0.005	4-Methyl-2-Pentanone	BQL	0.005
Chloroform	BQL	0.005	trans-1,3-Dichloropropene	BQL	0.005
1,1,1-Trichloroethane	BQL	0.005	Toluene	BQL	0.005
Carbon Tetrachloride	BQL	0.005	Acetone	BQL	0.005
Carbon Disulfide	BQL	0.005	Xylene (Total)	BQL	0.015
Benzene	BQL	0.005	1,2-Dichloropropane	BQL	0.005
1,2-Dichloroethane	BQL	0.005	Vinyl Acetate	BQL	0.005
Trichloroethene	BQL	0.005	Naphthalene	BQL	0.005
sec-Butylbenzene	BQL	0.005	tert-Butylbenzene	BQL	0.005
1,2,3-Trichloropropane	BQL	0.005	Propylbenzene	BQL	0.005
1,2,4-Trimethylbenzene	BQL	0.005	Isopropylbenzene	BQL	0.005
1,3,5-Trimethylbenzene	BQL	0.005	n-Butylbenzene	BQL	0.005

<u>Surrogate</u>	<u>Recovery, %</u>
Dibromofluoromethane	110
Toluene-d8	108
4-Bromofluorobenzene	98

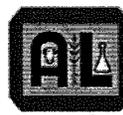
QL - Quantitation Limit
BQL - Below Quantitation Limit

Scott McKee
Technical Director



A&L Analytical Laboratories, Inc.

2790 Whitten Rd. Memphis, TN 38133 • Phone (901) 213-2400 • Fax (901) 213-2440



ENSAFE
ATTN: JOHN STEDMAN
5724 SUMMER TREES DRIVE
MEMPHIS, TN 38134

Report Number: 03-169-0217
Account Number: 1388
Report Date: 19-Jun-03
Sample Date: 18-Jun-03
Matrix: Aq

Report of Analysis

LAB ID: 59990

SAMPLE ID: 019GEXCA01

<u>COMPOUND</u>	<u>RESULT, mg/L</u>	<u>QL, mg/L</u>	<u>DATE/TIME ANALYZED</u>	<u>ANALYST</u>
GRO	< 0.1	0.1	19-Jun-03 12:00	K. Shaddox
EPH	21.6	1.9	19-Jun-03 12:00	B. Goldman

QL - Quantitation Limit
BQL - Below Quantitation Limit

LOW/HIGH RANGE ORGANICS PERFORMED ACCORDING TO USEPA, SW846, METHOD 8015B.

Scott Mckee
Technical Director

June 19, 2003

Date

