Technical Report Volume 4 Underground Storage Tank Closures UST Nos. 0022 - 0024 Fort Devens, Massachusetts

ATEC File: 37.07.91.00451 Contract No. DAK31-91-D-0015



Prepared for:

United States Army Directorate of Contracting Building 227 Fort Devens, Massachusetts

Attn: Mr. Steven Dijack, Contracting Officer

December 17, 1993

UST 73/23 ATE



(617) 878-6200 FAX (617) 871-6781

Solid & Hazardous Waste Site Assessments Remedial Design & Construction Underground Tank Management Asbestos Surveys & Analysis Hydrogeologic Investigations & Monitoring Analytical Testing / Chemistry Industrial Hygiene / Hazard Communication Environmental Audits & Permitting Exploratory Drilling & Monitoring Wells

December 17, 1993

Mr. Steven Dijack, Contracting Officer United States Army Directorate of Contracting Building 227 Fort Devens, Massachusetts 01433-5340

RE: **Technical Report** Underground Storage Tank Closures UST Nos. 0022 - 0024 Fort Devens, Massachusetts ATEC File: 37.07.91.00451

Mr. Dijack:

Attached is Volume 4 of the Technical Report by ATEC Associates, Inc. (ATEC), detailing the closure of three underground storage tanks (UST) referenced as UST Nos. 0022, 0023, and 0024, located at Fort Devens, Massachusetts (the site). The Technical Report covers work conducted under Contract No. DAKF31-91-D-0015 as part of Removal of Underground Storage Tanks in the New England Area, US Army Project No. EQ-19027-9P.

ATEC appreciates the opportunity to be of service in this matter. If you have any questions or comments, please do not hesitate to contact our office.

Sincerely, ATEC Associates, Inc.

Kevin C. Trombly Environmental Scientist

Ronald A. Lawson Assistant Vice President & District Manager

James B. O'Brien

Division Manager

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UNDERGROUND STORAGE TANK INDEX (Volume 4)

UST No. SIZE (gal) PRODUCT LOCATION	
0022 1,000 Number 2 Fuel Oil Building 1427, Fort Devens	s, MA
0023 1,000 Number 2 Fuel Oil Building 1429, Fort Devens	s, MA
0024 1,000 Number 2 Fuel Oil Building 1435, Fort Devens	s, MA

TECHNICAL REPORT Volume 4 UST Nos. 0022 - 0024

United States Army Fort Devens, Massachusetts ATEC Project No. 37.07.91.00451

2.0 INTRODUCTION

This volume (Volume 4) of the Technical Report details the removal of three underground storage tanks (USTs) referenced as UST Nos. 0022 - 0024 for the United States Army, located at various buildings, Fort Devens, Massachusetts (the site). The Technical report covers work conducted under Contract No. DAKF31-91-D-0015 as part of Removal of Underground Storage Tanks in the New England Area, United States Army Project No. EQ-19027-9P.

The basic Project Work Scope included:

- Excavation and removal of 69 USTs at various buildings located at Fort Devens, Massachusetts.
- Remedial excavation and disposal of contaminated soil.
- Hydrogeological services to include installation of monitoring wells, sampling and analysis of soil/groundwater, and determination of groundwater flow direction.
- Backfilling and surface restoration of excavations.
- Preparation of a Technical Report to include assimilation of information gathered, major findings and conclusions.

1

2.0 UST No. 0022

2.1 POST REMOVAL REPORT

2.1.1 Introduction

This Post-Removal Report details the results of the closure of one 1,000-gallon, single wall, steel, number 2 fuel oil underground storage tank (UST) referenced as UST No. 0022, located at property known as Building 1427, Fort Devens, Massachusetts (the site). The purpose of the closure was to excavate and remove the UST and evaluate the potential for the presence of oil and hazardous material at the site. The closure of this UST was conducted on January 8, 1992.

The basic Project Work Scope included:

- Procurement/administration of all federal, state and local permits, manifests, regulations, etc., associated with UST system closure.
- Excavating, venting, cleaning, transporting, and disposing of one 1,000-gallon UST by appropriately licensed contractors/facilities.
- Disposal of residual UST materials at a licensed facility.
- Field screening and analysis of soil in the excavations by Photoionization Detector (PID) and field analyzed with a portable Non-Dispersive Infrared (NDIR) analyzer, to identify evidence of the release of oil and hazardous materials from the UST, if any.
- Laboratory analysis of soil sampled from the UST excavation by a USEPA certified laboratory for Total Petroleum Hydrocarbons (TPH) (USEPA Method

2

418.1).

• Preparation of a Technical Report, to include assimilation of information gathered, major findings, and conclusions.

2.1.2 Subsurface Storage Tank Excavation and Removal

On January 8, 1992, one 1,000-gallon, subsurface, number 2 fuel oil storage tank was excavated and removed from the site. The UST was located approximately near the northwest corner of Building 1427 (see Figure 2.1, UST Location Plan). Cold Spring Brook is located approximately 30 feet northwest of the former UST No. 0022. Site topography is relatively level.

The tank was covered by approximately 2 feet of soil. From grade level to a depth of approximately 5.5 feet below grade, soil types encountered consisted primarily of brown, fine sand with trace coarse gravel and cobbles. From a depth of approximately 5.5 to 6 feet below grade, soil consisted primarily of medium grey sand. The bottom of the excavation was approximately 6 feet below grade. Groundwater was encountered within the excavation at a depth of approximately 6 feet below grade.

The associated piping was drained and tank connections were removed. UST No. 0022 was estimated to contain approximately 764 gallons of number 2 fuel oil and residuals. Approximately 759 gallons of fuel oil were removed from the tank on January 6, 1992 and transported to a licensed Treatment Storage Disposal Facility (TSDF) (Beede Waste Oil Corporation, Plaistow, New Hampshire).

Tank openings were then capped and the tank was removed from the excavation. Upon excavation and removal, the tank was observed to be in fair condition with no perforations or severe corrosion. Following venting of the tank, an access way was cut in the end of the tank to allow entry for cleaning. It was then entered and wiped/vacuumed clean of any residual materials. Approximately 5 gallons of residuals were drummed on January 8, 1992 for transportation at a later date. Drummed material was transported to Cyn Environmental Services, Inc., Stoughton, MA. See Section 2.10 for copies of the appropriate hazardous waste manifests.

The scrap tank was disposed at Tombarello & Sons, a licensed Massachusetts tank yard, located in Lawrence, MA, on January 24, 1992. A copy of the disposal receipt is included in Section 2.11, Permits and Certifications. A copy of the Commonwealth of Massachusetts Department of Public Safety Division of Fire Prevention Tank Removal Permit is also included in Section 2.11.

2.1.3 Sampling and Analysis Plan

Ten soil samples were obtained from the excavation for field screening with a Photoionization Detector (PID) and field analyzed with a Non-Dispersive Infrared (NDIR) analyzer. The PID field screening for Total Organic Vapors (TOVs) was conducted with an HNu photoionizer utilizing the jar headspace screening procedures outlined in the Hazardous Materials Containment Plan. The NDIR field screening for Total Petroleum Hydrocarbons (TPH) was conducted with a Horiba OCMA 220, utilizing the procedures outlined in the Hazardous Materials Containment Plan.

Eight of the samples (SS-1 to SS-8) were obtained from the excavation sidewalls at a depth of approximately 3 to 4 feet below grade. Two of the samples (SS-9 and SS-10) were obtained from the excavation bottom at a depth of 6 feet below grade.

Two composite soil samples (Stock-1 and Stock-2) were obtained from stockpiled soils for PID and NDIR field screening. One soil sample (Spill Contain-1) was obtained from with the spill containment manway surrounding the fill pipe for PID and NDIR field screening. Three soil samples (LSS-1, LSS-2, and LSS-3) were obtained from the excavation for laboratory analysis. Soil Sample LSS-1 was obtained from the south sidewall of the excavation at a depth of approximately 1.5 feet below the feed and return lines associated with UST No. 0022. Soil sample LSS-2 was obtained from the excavation bottom at a depth of approximately 6.5 feet below grade. One soil sample (LSS-3) was obtained from soil within the spill containment manway surrounding the fill pipe. These samples were analyzed for TPH utilizing USEPA Method 418.1.

One groundwater sample (LWS-1) was obtained from the excavation for laboratory analysis for TPH utilizing USEPA Method 418.1.

Sampling locations are depicted on the Sampling Schematic attached as Figure 2.2. The appropriate chain of custodies are included in Section 2.10, Chain of Custody Forms.

2.1.4 Analytical Results

The results from analysis with the PID and the NDIR analyzer of the ten soil samples obtained from the excavation, the two composite samples obtained from stockpiled soil, and the one soil sample associated with the spill containment are as follows:

SAMPLE NUMBER	PID (ppm TOV)	NDIR (ppm TPH)
SS-1	0.0	8.6
SS-2	0.0	10.2
SS-3	0.0	5.6
SS-4	0.0	7.8
SS-5	0.0	5.9
SS-6	0.0	8.2
SS-7	0.0	6.4

TABLE 2.1 - PID AND NDIR RESULTS

SS-8	0.0	6.0
SS-9	1.0	7.3
SS-10	0.5	10.2
Stock-1	0.6	5.8
Stock-2	0.5	7.7
Spill Contain - 1	0.0	6.3

Laboratory analysis of the two soil samples obtained from the excavation revealed TPH concentrations of <10 ppm for LSS-1 and 25 ppm for LSS-2. Laboratory analysis of the soil sample (Spill Contain-1) obtained from the spill containment manway area revealed a TPH concentration of 11 ppm. Laboratory analysis of the groundwater sample (LWS-1) obtained from the excavation revealed a TPH concentration of <1ppm.

A copy of the laboratory results has been included in Section 2.9, Laboratory Analytical Results.

2.1.5 Conclusions and Recommendations

ATEC's conclusions are as follows:

Upon excavation and removal, the tank was observed to be in good condition with no perforations or severe corrosion.

Groundwater was encountered within the excavation at a depth of approximately 6 feet below grade.

Visual contamination of soils was not observed within the excavation.

Ten soil samples were obtained from the excavation for field screening and field analysis utilizing a PID and NDIR analysis respectively. PID readings revealed TOV concentrations ranging from 0.0 ppm to 1.0 ppm. NDIR results revealed TPH concentrations ranging from 5.6 ppm to 10.2 ppm. One sample was obtained from the spill containment manway (Spill Contain-1) for PID and NDIR analysis. PID screening revealed a TOV concentration of 0.0. NDIR analysis revealed a TPH concentration of 6.3 ppm.

Two soil samples (Stock-1 and Stock-2) were obtained from stockpiled soils for PID field screening and NDIR analysis. PID screening revealed TOV concentrations of 0.6 ppm and 0.5 ppm. NDIR analysis revealed TPH concentrations of 5.8 ppm and 7.7 ppm.

Two soil samples were obtained from the excavation for laboratory analysis for TPH utilizing USEPA Method 418.1. Analytical results for LSS-1 obtained from the southwest sidewall of the excavation revealed a TPH concentration of <10 ppm. Analytical results for LSS-2 obtained from the excavation bottom revealed a TPH concentration of 25 ppm.

One soil sample (LSS-3) was obtained from soil within the spill containment manway surrounding the fill pipe. Analytical results for LSS-3 revealed a TPH concentration of 11 ppm.

Laboratory analysis of groundwater sample LWS-1 revealed a TPH concentration of <1 ppm.

ATEC's recommendations are as follows:

Utilize excavated soils as backfill as specified in Section 4.1 of the Contract.

No further investigation.

2.2 SITE REMEDIATION AND CONTAMINATED SOIL DISPOSAL

2.2.1 Site Remediation

Due to the low TPH concentrations detected in the excavation and its removed soils, site remediation of UST No. 0022 was not performed.

2.2.2 Soil Stratigraphy

Contract specifications did not require soil stratigraphy to be performed on UST No. 0022.

2.2.3 Contaminated Soil Disposal

Prior to disposal, contaminated soil was laboratory analyzed for disposal classification purposes. One composite soil sample (Stock-22) was obtained from the stockpiled soil associated with the removal of the UST Nos. 0022. Laboratory analyses of Stock-22 included VOCs, Semi-volatile Organic Vapors, 13 Metals by Toxicity Characteristic Leachate Procedure (TCLP), Polychlorinated Biphenyls (PCBs), Reactive Sulfide, Reactive Cyanide, Flashpoint, and Corrosivity for characterization and disposal purposes. Laboratory analytical results revealed a pH of 6.7 and concentrations of 0.04 ppm Copper and 0.08 ppm Zinc. All other analytical results were below their respective Method Reporting Limits (MRL).

Approximately 31 tons of petroleum hydrocarbon contaminated soil was removed and stockpiled during the excavation of UST No. 0022. The estimated volume of removed soil was calculated from field drawings produced during the removal of UST No. 0022. Contaminated soil was disposed for recycling at Trimount Bituminous Products Company of Shrewsbury, Massachusetts on July 17, 1992.

2.3 HYDROGEOLOGICAL SERVICES

Hydrogeological services were not conducted relative to UST No. 0022.

2.4 BACKFILL

The excavation was backfilled with approximately 69 tons of clean fill material on June 30, 1992, as estimated through field drawings. Backfilling was conducted with the approval of the Contracting Officer's Representative and the DEP.

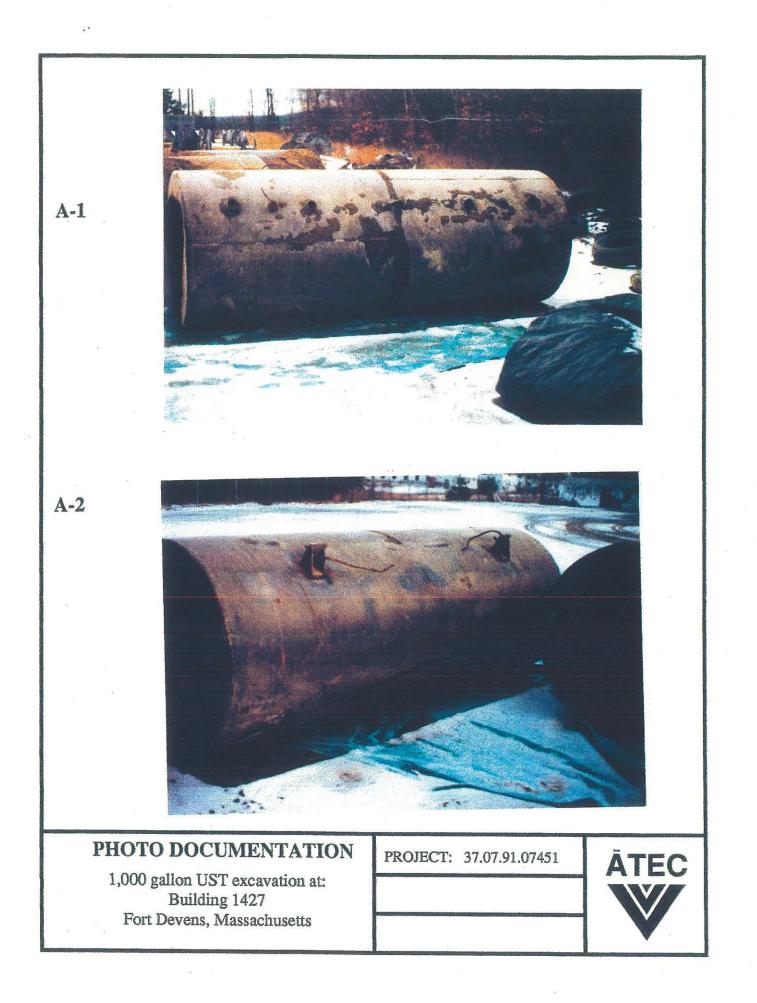
2.5 SITE RESTORATION

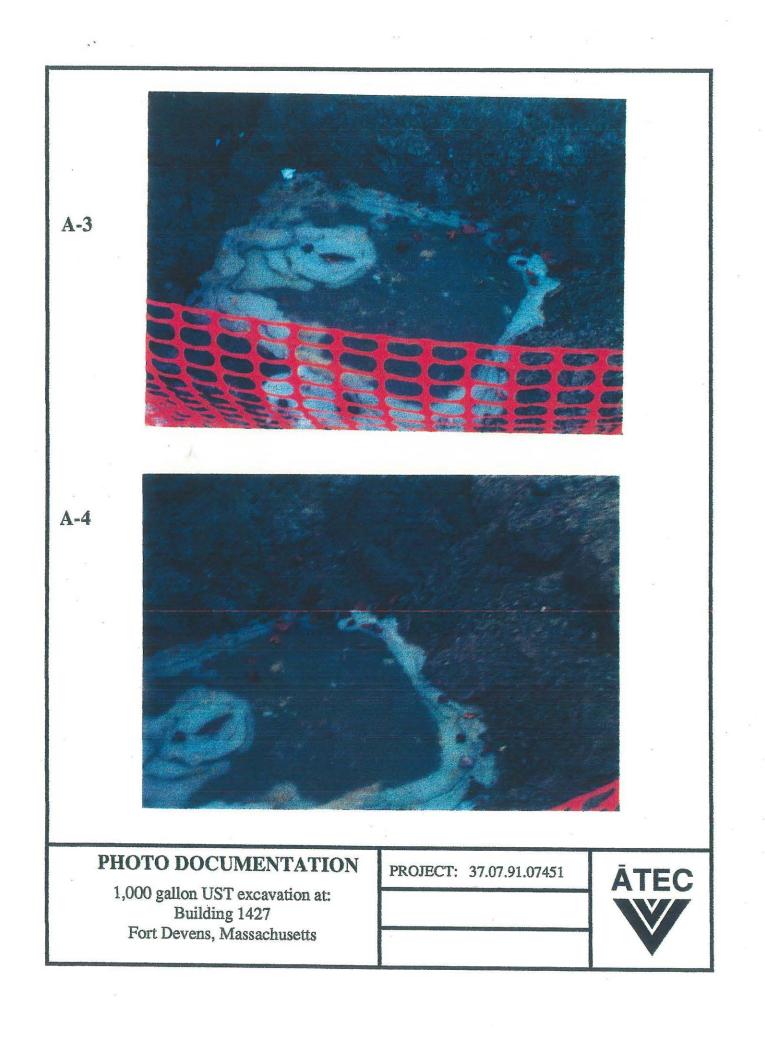
Following backfill, approximately 68 square feet of loam was distributed over the excavated area.

2.6 PHOTOGRAPHIC DOCUMENTATION

The following photographs are of the removed UST from the excavation and a post removal view of the excavation.

- A-1: One side of the tank removed from the site.
- A-2: Opposite side of the tank removed from the site.
- A-3: Excavation as viewed from west, facing east.
- A-4: Excavation as viewed from east, facing west.





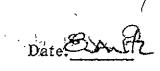
2.7 OCMA 220 DATA SHEETS

The following information was organized from the data collected from the Non-Dispersive Infrared analyzer.

OCMA	Data	Sheet	
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Operator Name: Rie

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EBI Project Number:_

<u>Calibration</u>

<u>Calibration</u>	1 3	Destination	0			22
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Zero Calibration	[1	1	1	1	<u> </u>
		•				Span Check: Z5. 7

<u>Testing</u>

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	178.7	172.81					1.2	1.7	-
	R7.4	175.21]	1			- 1	10.0	10.0
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<u> </u>	178.2	172.21		1	1	•	3	1.3]
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SPILLOW	79.9	173.6				<u> </u>	10.0	100	- 1
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2.8 LABORATORY ANALYTICAL RESULTS

The following laboratory analytical reports were organized and provided by Environmental Science Services Inc (ESS). Results are included for:

- LSS-1, LSS-2, and LSS-3: Soil samples obtained from original excavation and the vicinity of the spill containment manway. Laboratory analysis included TPH analysis.
- LWS-1: Groundwater sample obtained from excavation bottom for TPH laboratory analysis.



ERTIFICATE OF ANALYSIS

Client: ATEC Environmental Consultants					
Client Project ID: U.S. Army-Ft. Devens	ESS Project ID: 921516				
Client Sample ID: Stock-22	ESS Sample ID: 921516-02				
Date Sample Received: 6/10/92	Date Reported: 6/26/92				

Parameter	Results	Units	MRL	Method
pH (Corrosivity)	6.7	s.u.	N/A	9045
Flashpoint	No Flash	°F	200	1010
Polychlorinated Biphenyls	ND	mg/Kg	Attached	8080
Reactive Cyanide	ND	mg/Kg	2	7.3.3.2
Reactive Sulfide	ND	mg/Kg	2	7.3.4.1
Semivolatile Organics	ND	ug/Kg	Attached	8270
Volatile Organics	ND	ug/Kg	Attached	8240
Toxicity Characteristic Leaching Metals	Procedure			1311
Copper Zinc	0.04 0.08	mg/L mg/L	Attached Attached	6010 6010

ND = Not Detected above Method Reporting Limit (MRL)

Approved by: Dávid Dickinson Laboratory Director

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532 Attack: A case. Providence 3 and 9 (1997).

Date: 26/10-092 008



ERTIFICATE OF ANALYSIS

POLYCHLORINATED BIPHENYLS Method 8080

Client: ATEC Environmental Consultants				
Client Project ID: U.S. Army-Ft. Devens	ESS Project ID: 921516			
Client Sample ID: Stock-22	ESS Sample ID: 921516-02			
Date Sample Received: 6/10/92	Date Reported: 6/26/92			

Parameter	Result (mg/Kg)	MRL
Arochlor 1016	ND	1
Arochlor 1221	ND	1
Arochlor 1232	ND	1
Arochlor 1242	ND	1
Arochlor 1248	ND	1
Arochlor 1254	. ND	1
Arochlor 1260	ND	1

ND = Not Detected above Method Reporting Limit (MRL)

Surrogate Recovery Data	<pre>% Recovery</pre>	QC Limit
Dibutylchlorendate	83%	50 - 150%

Approved by: Dávid Dickinson Laboratory Director

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Date: Sta June G2

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ERTIFICATE OF ANALYSIS

ACID EXTRACTABLES EPA 8270

ESS Project ID: 921516
ESS Sample ID: 921516-02
Date Reported: 6/26/92

Parameter	Result (ug/Kg)	MRL*	
2-Chlorophenol	ND	1,650	
2-Nitrophenol	ND	1,650	
Phenol	ND	1,650	
2,4-Dimethylphenol	ND	1,650	
2,4-Dichlorophenol	ND	1,650	
2,4-Dinitrophenol	ND	8,250	
Pentachlorophenol	ND	8,250	
4-Nitrophenol	ND	8,250	
2,4,6-Trichlorophenol	ND	1,650	
2,4,5-Trichlorophenol	ND	8,250	
2-Methylphenol	ND	1,650	
4-Methylphenol	ND	1,650	
4-Chloro-3-Methylphenol	ND	1,650	
4,6-Dinitro-2-Methylphenol	ND	8,250	

* Sample diluted due to matrix interference.

ND = Not Detected above Method Reporting Limit (MRL)

Approved by: / David Dickinson Laboratory Director

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ERTIFICATE OF ANALYSIS

BASE NEUTRAL EXTRACTABLES EPA 8270

Client: ATEC Environmental C	onsultants		
Client Project ID: U.S. Army	-Ft. Devens	ESS Project ID:	921516
Client Sample ID: Stock-22		ESS Sample ID:	921516-02
Date Sample Received: 6/10/9	2	Date Reported:	6/26/92
Parameter	Result (ug/K	d)	MRL*
Acenaphthylene	ND		1,650
1,2,4-Trichlorobenzene	ND		1,650
Hexachlorobenzene	ND		1,650
Bis(2-chloroethyl)ether	ND		1,650
2-Chloropaphthalepo	ND		1 650

Hexachlorobenzene	ND	1,650
Bis(2-chloroethyl)ether	ND	1,650
2-Chloronaphthalene	ND	1,650
1,2-Dichlorobenzene	ND	1,650
1,3-Dichlorobenzene	ND	1,650
1,4-Dichlorobenzene	ND	1,650
3,3-Dichlorobenzidine	ND	3,300
2,4-Dinitrotoluene	ND	1,650
2,6-Dinitrotoluene	ND	1,650
Fluoranthene	ND	1,650
4-Chlorophenyl phenyl ether	ND	1,650
Bis(2-chloroisopropyl) ether	ND	1,650
Bis(2-chloroethoxy) methane	ND	1,650
Hexachlorobutadiene	ND	1,650
Hexachlorocyclopentadiene	ND	1,650
Isophorone	ND	1,650
Naphthalene	ND	1,650
Nitrobenzene	ND	1,650
N-nitrosodiphenylamine	ND	1,650
N-nitrosodi-n-propylamine	ND	1,650
Bis(2-ethylhexyl)phthalate	ND	1,650
Di-n-butylphthalate	ND	1,650
Di-n-octylphthalate	ND	1,650
Diethyl phthalate	ND	1,650
Dimethyl phthalate	ND.	1,650
Benzo(a)anthracene	ND	1,650

* Sample diluted due to matrix interference. ND = Not Detected above Method Reporting Limit (MRL)

Approved by: David Dickinson

Laboratory Director

Date: It Januar

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Parameter

In Response To The Future

ERTIFICATE OF ANALYSIS

BASE NEUTRAL EXTRACTABLES cont. EPA 8270

Client: ATEC Environmental Consultants				
Client Project ID: U.S. Army-Ft. Devens	ESS Project ID: 921516			
Client Sample ID: Stock-22 ESS Sample ID: 921516-02				
Date Sample Received: 6/10/92	Date Reported: 6/26/92			

Result (ug/Kg)

Repare (ag/Rg)	
ND	1,650
ND ·	1,650
ND	8,250
ND	1,650
ND	1,650
ND	1,650
ND	8,250
	1,650
	1,650
	8,250
ND	1,650
	ND ND ND ND ND ND ND ND ND ND ND ND ND N

* Sample diluted due to matrix inteference. ND = Not Detected above Method Reporting Limit (MRL)

Approved by: Dávid Dickinson 1

Laboratory Director

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ERTIFICATE OF ANALYSIS

TCL VOLATILE ORGANICS Method 8240

Client: ATEC Environmental Co	nsultants	· · · · ·	-
Client Project ID: U.S. Army-	Ft. Devens	ESS Project ID:	921516
Client Sample ID: Stock-22		ESS Sample ID:	921516-02
Date Sample Received: 6/10/92		Date Reported:	6/26/92
Parameter	Result (ug/	′Kg)	MRL
Methylene Chloride	ND		1,000
1,1-Dichloroethane	ND		1,000
Chloroform	ND		1,000
Carbon Tetrachloride	ND		1,000
1,2-Dichloropropane	ND		1,000
Dibromochloromethane	ND		1,000
1,1,2-Trichloroethane	ND		1,000
Tetrachloroethene	ND		1,000
Chlorobenzene	ND		1,000
1,2-Dichloroethane	ND		1,000
1,1,1-Trichloroethane	ND		1,000
Bromodichloromethane	ND		1,000
Trans-1,3-Dichloropropene	ND		1,000
Bromoform	ND		1,000
1,1,2,2-Tetrachloroethane	ND		1,000
Benzene	ND		1,000
Toluene	ND		1,000
Ethyl Benzene	ND		1,000
Chloromethane	ND		1,000
Bromomethane	ND		1,000
Vinyl Chloride	ND		1,000
Chloroethane	ND		1,000
1,1-Dichloroethene	ND		1,000
1,2-Dichloroethene (Total)	ND		1,000
Trichloroethene	ND		1,000
Acetone	ND		1,000
Carbon Disulfide	ND		1,000
2-Butanone	ND		1,000
Cis-1,3-Dichloropropene	ND		1,000
4-Methyl-2-Pentanone	ND		1,000
2-Hexanone	ND		1,000
Styrene	ND		1,000
Xylenes (Total)	ND		1,000

ND = Not Detected_above Method Reporting Limit (MRL)

Approved by: David Dickinson Laboratory Director

vironmental Science Services

572 Months March Physics Physics

Date: ______ 013



CERTIFICATE OF ANALASIA

TOXICITY CHARACTERISTICS LEACHING PROCEDURE (TCLP)

METALS

EPA METHOD 1311

Client: ATEC Environmental Consultants	Date Sampled: 6/8/92
Client Project ID: U.S. Army-Ft. Devens	Date TCLP Performed: 6/18/92
Client Sample ID: Stock-22	Date Leachate Extracted: 6/19/92
ESS Sample ID: 921516-02	Date Extract Analyzed: 6/22/92

	Act	Actual		Adjusted*	
Target Analyte	Sample Result (mg/L)	Method Reporting Limit	Sample Result (mg/L)	Method Reporting Limit	
Antimony	ND	0.2	ND	0.3	
Arsenic	ND	0.2	ND	0.2	
Cadmium	ND	0.02	ND	0.02	
Chromium	ND	0.05	ND	0.05	
Lead	ND	0.1	ND	0.2	
Mercury	ND	0.002	ND	0.003	
Selenium	ND	0.3	ND	0.3	
Silver	ND	0.05	ND	0.05	
Copper	0.04	0.02	0.04	0.02	
Nickel	ND	0.04	ND	0.05	
Zinc	0.07	0.02	0.08	0.03	
Beryllium	ND	0.01	ND	0.02	
Thallium	ND	0.05	ND	0.06	

* Actual sample result adjusted for matrix bias. Refer to matrix spike analysis summary form.

ND = Not Detected above Method Reporting Limit (MRL)

Approved by: David Dickinson

Laboratory Director

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MMM

In Response To The Future

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ERTIFICATE OF ANALYSIS

Date: 1/16/92 Job: 73 Account: 95659 Received: 1/09/92

Project: DEVENS-TANK 22

ATEC ENVIRONMENTAL CO. 62 Accord Park Drive Norwell, MA 02061

n: Mr. Mark Baldi

mple mber	Method Number	Parameter	Result	Unit	Sample Description
	EPA-160.3 EPA-418.1	Total Solids TPH/IR (Dry Wt.)	95 <10	% mg∕kg	LSS-1
	EPA-160.3 EPA-418.1	Total Solids TPH/IR (Dry Wt.)	83 25	% mg∕kg	LSS-2
	EPA-160.3 EPA-418.1	Total Solids TPH/IR (Dry Wt.)	95 11	% mg∕kg	LSS-3
07304	EPA-418.1	TPH/IR	<1	mg/L	LWS-1

David Dickinson

Laboratory Manager

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2.9 CHAIN OF CUSTODY FORMS

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The following chain of custody forms were produced for the soil samples which were laboratory analyzed.

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GRAIN OF COSTOUT RECORD

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2.9 CHAIN OF CUSTODY FORMS

The following chain of custody forms were produced for the soil samples which were laboratory analyzed.

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STOCK-19	6/8/92	10.304	\mathbf{X}	X	1	X				\mathbf{X}		3		X	X		\mathbf{X}	(ĺΧ	\mathbf{X}	\mathbf{X}	र् .	1	0 06.	· · · · · · · · · · · · · · · · · · ·	,
(<u>CK-22</u>		10: 4.5A	- x	X		X				X		3		Х	X		\times		\mathbf{X}	X	X	X	i	. 147		
STOCK-23		11:00A	X	X		X				X		3		Х	X		X		X	X	X	X		147		₩ Mini
STOCK-24 STOCK-25		11:151	X	X		X				X		3		Х	X		X		X	X	Х	X	s /	. 143		
STOCK-25		11:30A	К	X		X				X		3		Х	Х		\boldsymbol{X}		X	X	X	X		160		
STOCK-26		11:45	ΙX.	X		X				X		3		Х	X		\boldsymbol{X}		X	X	Х	X	Bldg	.166	6	Cons Cons Division of ATE 32 Accord Park Norwell, MA 02 (517) 878-6200
)			Environmental Consultants Division of ATEC Associates, Inc. 62 Accord Park Drive Norwell, MA 02061 (617) 878-6200
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2.10 HAZARDOUS WASTE MANIFEST

UST No. 0022 was estimated to contain approximately 764 gallons of No. 2 fuel oil and residuals. Approximately 759 gallons of fuel oil were removed from the tank on January 6, 1992 and transported to a licensed Treatment Storage Disposal Facility (T.S.D.F.) (Beede Waste Oil Corporation). Approximately 5 gallons of residuals were removed and placed in a 55-gallon drum on January 8, 1992. The 5-gallons of No. 2 fuel oil tank residuals were transported to Cyn Environmental Services, Inc., Stoughton, MA.

The following Hazardous Waste Manifests were generated from tank materials.

COMMONWEALTH OF MASSACHU DEPARTMENT OF ENVIRONMENTAL P DIVISION OF HAZARDOUS WA One Winter Street	PROTE STE					
Boston, Massachusetts 0210	18					
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4. Generator's Phone (508) 796-3002 24HR 508-79(-2 5. Transporter 1 Company Name 6. US EPA ID Number	· <i>·</i> //	C.State	# <i>公元M E</i> (rans:10:13年の	1447		ы Сл
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Plaistow, NII 03865 N-H D 018958140		PHOF acilit	Y SPhone C			√
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proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for tra according to applicable international and national government regulations	ansport by h	ignway				
If I am a large quantity generator, I certify that I have a program in place to reduce the volume and toxicity of waste ge	nerated to th	ne degree liha	ve determined to bi	e economically	practicable	→
and that I have selected the practicable method of treatment, storage, or disposal currently available to me which min ment; OR, if I am a small quantity generator, I have made a good faith effort to minimize my waste generation and sele	imizes the p	resent and fut	ure threat to huma	n health and tr	ne environ-	
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	1-800-424-9300 OR Lincoln Environm	ental 1-000-659-33	153 ERG# 27 Attache	<u>ن</u> م
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2.11 PERMITS AND CERTIFICATIONS

The following permit was obtained for the proper closure of a UST. Following the permit there is a disposal receipt for the steel UST.

The Common wealth of Alassachusetts DEPARTMENT OF PUBLIC SAFETY DIVISION OF FIRE PREVENTION PERMIT FOR REMOVAL AND TRANSPORTATION TO APPROVED TANK YARD Intercommental Associates Junc. Name of consportation State clearly type of Inter gas used in steel tank: Dry 1C.9 Name and address of tontractor Gisposing tank size C. Accountes C.2 Accounter C.2 Accountes C.2 Accountes C.2 Accountes C.2 Ac	*	ــــ. 	ء مع مد شد مد مد مد مد مد مد مد م من شد مد مد مد مد مد مد مد	राज्य प्रयास्य केले कर
This permit will expire 31 Jan 1992	DEPARTMENT FOR REMOVAL AN In accordance with the provisection 38A this permit is Name: <u>Atec Envi</u> Full name of To transport under State clearly type of inert gas used in steel storage tank	OF PUBLIC S PER ND TRANSPORTAT visions of Chap granted to ronmental As person, firm of erground steel to Approv steel tank!	AFETY DIVISION OF FIRE AFETY DIVISION OF FIRE NON TO APPROVED TANK YARD DIEF 148, G.L. as provided in sociates Inc. or Corporation storage tank(s) red tank yarda 1.4901 Dry 10.9 method Iress of contractor	PREVENTION VIIIIII
	This permit will expire31,	disposing ta Location tò be transport	nik <u>ATEC. Associates (2)</u> which tank will ed <u>1490'l</u> Approved tank yard# <u>Comparis</u> (<u>1990'l</u> bignature of official grant	fireà Chiel

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Tank 22 Bldg 1427

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EGETER DE DISROSAN OF UNDERGROU	ND SUBBL SUORGO DANK
AME AND ADDRESS OF OF PPROVED TANK YARD PPROVED TANK YARD NO. 1 'ank Yard Ledger 502 CMR 3.03(4) certify under penalty of law I have per elivered to this "approved tank yard" by and accepted egulation 502 CMR 3.00 Provisions for Ap valid permit was issued by LOCAL Hea his tank to this yard. ame and official title of approved tank	NDV-SWEEL STORAGE TANK OMBARELLO & SONS NON ST. MASS. 01841 9 0 1 Number: 220227 sonally examined the underground steel storage tank firm, corporation or partnership <u>776</u> same in conformance with Massachusett's Fire Prevention proving Underground Steel Storage Tank dismantling yards. d of Fire Department FDID# <u>774</u> to transport yard owner or owners authorized representative: <u>171E</u> <u>DATE SIGNED</u>
his signed receipt of disposal must be r DID# $/ 2 / 2$ pursuant to 502 CMR ORM F.P. 291 (rev. 9/88)	(OVER) MASSACHUSETTS STATE FIRE MARSHAL'S OFFICE
DIMENSIONS Width Length	Tank Removed From Building 1427 (no. street)
k 1 X - 10	Fort Devens, with
k 2 X	(city or town)
k 3 X	Fire Department
k 4 X	Permit # (if applicable)
k 5 X (feet) (feet)	

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2.12 UST CLOSURE CHECKLIST

The following closure checklist was produced by ATEC Associates Inc., to ensure quality control of the proper abandonment of a UST.

LODO and NO 2 Ford	-fam fam	4 2 2 -	12/09 1767	For T Venens	
DEFINABLE FEATURE	DATE	TIME	MEASUREMENTS		NOTES
		1			
Calibrate PID & LEL/O2 meters	1/16/72	9'60			Site Topography: rel. level. wetland
					20'NWIN of UST, Flowing NINE
Drain & flush piping & pumps	114/97	9:30			20'NWIN of UST, Flowing NINE Repold access Antion to E Lin
Excavate to top of tank	115 101	45			Depth to tank: 2'
Vent tank note LEL/O2 levels & times			LEL	 O2	
		T1: 10: 15	1 7	7 0	
*****		T2: // · cr	2	~ /	in-t w/Dy Ice
	*	T3: 1. ····	Ś	ž	
		T4: 11 45	0	20.9	
		T5: 12'00	0	70.7	
		T6:	()	20.2	
		T7:	, n	70.7	
		T8:	***	******	
		T9:			
		T10:			
		T11:	}		
		T12:			
Pump & clean tank:	46/93	11:00	<u>759</u> gal. liquid 5	- 1 - 71.4	Tank Dimensions: $4' \times 10.5' L$
Note quantities liquid (gal) & sludge (lbs)	1/9/97	7 0	$\leq 5^{-1}$ lbs. sludge	fantition and the second s	
				~~~~~	
Remove all tank connections, and cap openings	3. 8/7-	7 11-			
Excavate soils to free tank	15/91	1000		****	
			******	~~~~~	
Segregate stained soils: Note PID readings	1/9/72	0 14	PID (ppm)	NDIR (ppm)	nore Visite contaminated
(if>10 ppm NDIR also)			$\sim$	1, 3	Spill Confain-1
			C.6	5-7	Jack - 1
			0.5	<del>?</del> . <del>?</del>	-tack ;
		1	ļ		spill containment carls service ate
	1.	•	*		studied a Nend man states le

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US1 OSURE O/C CHECK LIST			4	
DEFINABLE FEATURE	DATE	TIME	MEASUREMENTS	NOTES
Remove tank, piping, pumps, and hardware.	1/5 34	10:00	Photographic Descriptions:	Soil Description -515-
Photograph excavation; note descriptions.			Photo 1: 1.	trace course gravel cobbler fin
Sketch Schematic			Photo 2: 1 and	trace course grand cobbler (1) 550 and grey sand to grand 100 - N will exposed line silly sand of course grand
			Photo 3: we we N Gie S	W - N wall exposed line silly sand of
			Photo 4: CHERRY IN CALL F	nouse general
<			Photo 5: Byram Core M	Depth to Groundwater/Conditions: 6' 3,457
			Photo 6:	Depth to Groundwater/Conditions: (' ) ust tagged and to 6'e
Place tank at safe distance from excavation	1.197			Depth of Excavation: 1/ name /
Secure tanks transport off-site	·····	10:45	transport to contractor yol @ D	
Obtain 10 soil samples from			PID (ppm) NDIR (ppm)	Sample locations: <u>5.0.4.01</u> Informance
excavation walls/bottom: Note PID/NDIR			SS1: 0 9, U	5 w ~ 11
readings and sample locations.			SS2: 0 /0, Z	Carrow 11
			SS3: 70 5.4	Vs and
			SS4: 0 7.9	the second second
			SS5: 0 5, 9	
			SS6: 0 7, Z	N. M. P.
			SS7: D 6.4	E wall
			SS8: 0 (,0	E world
			SS9: 1.0 7.3	Cottom & Calas grada)
			SS10: 0.5 /0.2	a trans I is helper and to
Obtain 2 soil samples & 1 water samples	1/8/11	10:15		Sample Locations:
for laboratory analysis. Note sample locations.				LSS1:= 7.77
				LSS2: 5510
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~				LWS1:
				2553. spill containment & labor per
				forter P. Chema

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UST_CLOSURE O/C CHECK LIST				
DEFINABLE FEATURE	DATE	TIME	MEASUREMENTS	NOTES
				د م.ا tons of backfill
Backfill excavation (if clean):				Backfill description: 35.1 cy yolive 501/+
Note amount & type of backfill				1.9 cy sand
Close open excavation (if applicable)				
Restore surface and rope off				
Remove rubbish/debris				
Transport hazardous material off-site:				Amount Classification
Note amount/classification				
Make copies of manifests, permits,			<u></u>	
and disposal receipts.				

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2.13 INSTALLATION

The installation of a replacement UST No. 0022 was not performed.

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3.1 POST REMOVAL REPORT

3.1.1 Introduction

This Post-Removal Report details the results of the closure of one 1,000-gallon, single wall, steel, underground storage tank (UST) referenced as UST No. 0023, located at property known as Building 1429, Fort Devens, Massachusetts (the site). The purpose of the closure was to excavate the UST and to evaluate the potential for the presence of oil and hazardous material at the site. The closure of this UST was conducted on January 8, 1992.

The basic Project Work Scope included:

- Procurement/administration of all federal, state and local permits, manifests, regulations, etc., associated with UST system closure.
- Excavating, venting, cleaning, transporting, and disposing of one 1,000-gallon UST by appropriately licensed contractors/facilities.
- Disposal of residual UST materials at a licensed facility.
- Field screening and analysis of soil in the excavations by a Photoionization Detector (PID) and with a portable Non-Dispersive Infrared (NDIR) analyzer, to identify evidence of the release of oil and hazardous materials from the UST, if any.
- Laboratory analysis of soil sampled from the UST excavation by a USEPA certified laboratory for Total Petroleum Hydrocarbons (TPH) (USEPA Method 418.1).

 Preparation of a Technical Report, to include assimilation of information gathered, major findings, and conclusions.

3.1.2 Subsurface Storage Tank Excavation and Removal

On January 8, 1992, one 1,000-gallon, subsurface, number 2 fuel oil, storage tank was excavated and removed from the site. The UST was located near the northwest corner of Building 1429 (see Figure 3.1 - UST Location Plan). Topography at the site appeared level. Approximately 60 feet south of the former UST location, topography slopes slightly downgradient to the south.

The tank was covered by approximately 2.5 feet of soil. Soil required to free the tank was visibly contaminated, particularily in the vicinity of the UST fill pipe. This soil was segregated from other stockpiled soils. Soil within the excavation consisted primarily of light brown, fine sand. The bottom of the excavation was located at a depth of approximately 6.5 feet below grade. Groundwater was not encountered within the excavation.

The associated piping was drained and tank connections were removed. UST No. 0023 was estimated to contain approximately 368 gallons of No. 2 fuel oil and residuals. Approximately 348 gallons of fuel oil were removed on January 6, 1992 and transported to a licensed Treatment Storage Disposal Facility T.S.D.F. (Beede Waste Oil Corporation, Plaistow, New Hamphire). Tank openings were then capped and the tank was removed from the excavation. Upon excavation and removal, the tank was observed to be in good condition with no perforations or severe corrosion. A copy of the Commonwealth of Massachusetts Tank Removal Permit is included in Section 3.11, Permits and Certifications.

Following venting of the tank, an access way was cut in the end of the tank to allow entry for cleaning. The tank was then entered and vacuumed/wiped clean of any residual material. Approximately 20 gallons of No. 2 fuel oil and tank residuals were removed from the tank and drummed on January 8, 1992. Drummed material was transported to a licensed T.S.D.F. on June 5, 1992 (Cyn Environmental Services, Inc., Stoughton, MA). See section 3.10 for copies of the appropriate hazardous waste manifests.

The scrap tank was disposed at Tombarello & Sons, a licensed Massachusetts tank yard, located in Lawrence, MA, on January 24, 1992. A copy of the disposal receipt is included in Section 3.11, Permits and Certifications.

3.1.3 Sampling and Analysis Plan

Ten soil samples were obtained from the excavation for field screening and analysis with a Photoionization Detector (PID) and a Non-Dispersive Infrared (NDIR) analyzer. PID field screening for Total Organic Vapors (TOVs) was conducted with an HNu photoionizer utilizing the jar headspace screening procedures outlined in the Hazardous Materials Containment Plan. NDIR field analysis of Total Petroleum Hydrocarbons (TPH) was conducted with a Horiba OCMA 220, utilizing the procedures outlined in the Hazardous Materials Containment Plan.

Eight of the samples (SS-1 to SS-8) were obtained from the excavation sidewalls at a depth of approximately 2 to 4 feet below grade. Two of the samples (SS-9 and SS-10) were obtained from the excavation bottom at a depth of approximately 6.5 feet below grade.

Two composite soil samples (Stock-1 and Stock-2) were obtained from stockpiled soils for PID and NDIR field screening. Stockpile soil sample Stock-1 was obtained from visibly uncontaminated areas of stockpiled soil. Stock-2 was obtained from visibly contaminated areas of stockpiled soil. One soil sample (Fill-1) was obtained from the visibly contaminated and segregated soil in the vicinity of the fill pipe.

Two soil samples (LSS-1 and LSS-2) were obtained from the excavation for TPH laboratory analysis. Soil sample LSS-1 was obtained at depth of 3 feet below grade from the southeast wall of the excavation in the vicinity of the former fill pipe. Soil sample LSS-2 was obtained from the bottom of the excavation at a depth of 6.5 feet below grade. One composite, soil sample (LSS-3) was obtained from stockpiled soils required to free the tank. Laboratory TPH analysis was performed utilizing USEPA Method 418.1.

One stockpiled soil sample (Stock-23) was obtained for characterization and disposal purposes on June 8, 1992. Laboratory analysis included Volatile Organic Compounds (VOCs), Semi-volatile Organic Compounds, 13 Metals by Toxicity Leachate Characteristic Procedure (TCLP), Polychlorinated Biphenyls (PCBs), Reactive Sulfide, Reactive Cyanide, Flashpoint, and Corrosivity (pH).

Sampling locations are depicted on the Sampling Schematic attached as Figure 3.2. The appropriate chain of custodies are included in Section 3.9, Chain of Custody Forms.

3.1.4 Analytical Results

PID screening for TOV and NDIR analysis of ten soil samples obtained from the excavation, the two composite samples obtained from stockpiled soil, and the one soil sample obtained from the vicinity of the former fill pipe are as follows:

SAMPLE NUMBER	PID (ppm TOV)	NDIR (ppm TPH)
SS-1	1.0	17.6
SS-2	7.4	27.4
SS-3	2.9	36.4
SS-4	1.2	16.8
SS-5	1.8	20.2
SS-6	3.8	28.7
SS-7	0.2	15.4
SS-8	0.6	19.5
SS-9	29.0	2,460.0
SS-10	14.8	134.8
Stock-1	22.0	3,744.0
Stock-2	29.0	3,472.3
Fill-1	38.0	8,007.3

TABLE 3.1 - PID AND NDIR RESULTS

Laboratory analysis of the two soil samples obtained from the excavation revealed TPH concentrations of 26 ppm for LSS-1 and 3,740 ppm for LSS-2. Laboratory analysis of the one soil sample (LSS-3) obtained from the stockpiled soils revealed a TPH concentration of 4,990 ppm (See Section 3.8, Laboratory Analytical Results).

3.1.5 Conclusions and Recommendations

ATEC's conclusions are as follows:

Upon excavation and removal, the tank was observed to be in good condition with no perforations or severe corrosion.

Groundwater was not encountered within the excavation.

Excavated soils required to free the tank appeared to be uncontaminated. Soil staining was noted in the vicinity of the fill pipe. This soil was segregated and seperately stockpiled. Soil within the excavation was not visibly contaminated.

Ten soil samples were obtained from the excavation for field screening and analysis utilizing a PID and NDIR analysis respectively. PID readings revealed TOV concentrations ranging from 0.2 ppm to 29.0 ppm. NDIR results revealed TPH concentrations ranging from 15.4 ppm to 2,460.0 ppm.

Two soil samples were obtained from the excavation for laboratory analysis for TPH utilizing USEPA Method 418.1. Analytical results of LSS-1 obtained from the southwest wall of the excavation revealed a TPH concentration of 26.0 ppm. Analytical results of LSS-2 obtained from the excavation bottom revealed a TPH concentration of 3,740 ppm.

Laboratory analysis of the one soil sample (LSS-3) obtained from the stockpiled soils revealed a TPH concentration of 4,990 ppm (See Section 3.8, Laboratory Analytical Results).

Two composite stockpile soil samples (Stock-1 and Stock-2) were obtained from excavated stockpiled soils required to free the tank for PID and NDIR screening. PID results revealed TOV concentrations of 22.0 ppm and 29.0 ppm for Stock-1 and Stock-2, respectiviely. NDIR results revealed TPH concentrations of 3,744.0 ppm and 3,472.3 ppm for Stock-1 and Stock-2, respectively.

One soil sample (Fill-1) was obtained from the vicinity of the fill pipe for NDIR analysis and PID screening. PID results revealed a TOV concentration of 38.0 ppm. NDIR analysis revealed a TPH concentration of 8,007.3 ppm.

ATEC's recommendations are as follows:

Conduct remedial excavation until background levels of <100 ppm TPH by laboratory analysis is attained. Field screening of soil should be conducted during excavation utilizing a PID until background levels of <1ppm are attained prior to obtaining samples for laboratory analysis.

Advance soil borings and install groundwater monitoring wells to determine the vertical and horizontal extent of contamination. Continuous split spoon sampling and analysis will be conducted utilizing field analysis techniques, i.e. PID and NDIR analysis, and laboratory analysis to document soil contamination levels as specified in the Hazardous Waste Containment Plan.

Additionally excavated soils and stockpiled soils should be laboratory analyzed for TPH, VOCs, PCBs, 13 TCLP Metals, Flashpoint, Sulfide Reactivity, Cyanide Reactivity, and Corrosivity for disposal classification.

Appropriately dispose of additionally excavated and stockpiled soil off-site.

3.2 SITE REMEDIATION AND CONTAMINATED SOIL DISPOSAL

3.2.1 Site Remediation

Following review of field screening and laboratory analytical results, additional excavation to remove contaminated soil and reach background levels by PID (<1 ppm) was conducted per order of the Contracting Officer's Representative and David Salvadore of the Massachusetts Department of Environmental Protection (DEP). Approximately 257.63 tons of contaminated soil were removed from the excavation floor and sidewalls during remedial excavation on July 29, 1992. The estimated volume of removed soil was calculated from field drawings produced during the removal and remediation of UST No.

0023 (see Remedial Excavation Plan, Figure 3.3).

Six soil samples (RS-1 to RS-6) were initially obtained from the post-remedial excavation associated with UST No. 0023 for PID field screening. RS-1 to RS-4 were obtained from the sidewalls at a depth of approximately 3.5 feet below grade. RS-5 and RS-6 were obtained from the excavation bottom at a depth of approximately 6.5 feet below grade. PID results revealed TOV concentrations ranging from 0.0 ppm to 0.2 ppm in samples RS-1 to RS-4. PID results revealed TOV concentrations of 10.0 ppm and 130.0 ppm in RS-5 and RS-6, respectively.

Due to elevated TPH levels, further soil removal was conducted along the excavation bottom. Two soil samples (RS-5A and RS-6A) were obtained after further remediation for PID screening revealing TOV concentrations of 3.5 ppm and 60.0 ppm for RS-5A and RS-6A, respectively. The excavation was advanced to a depth of 14.5 feet below grade, where two samples (RS-5B and RS-6B) were obtained for PID screening revealing TOV concentrations of 1.0 ppm and 2.5 ppm for RS-5B and RS-6B, respectively. A Remedial Excavation Plan is attached as Figure 3.3. Remedial excavation PID screening results are listed in Table 3.2 as follows:

SAMPLE NUMBER	PID TOV ppm	LOCATION		
LRS-1	0.0	North Sidewall		
LRS-2	0.2	East Sidewall		
LRS-3	0.0	South Sidewall		
LRS-4	0.0	West Sidewall		
LRS-5	10.0	Excavation Bottom		
LRS-6	130.0	Excavation Bottom		
LRS-5A	3.5	Excavation Bottom		
LRS-6A	60.0	Excavation Bottom		

TABLE 3.2 - PID AND NDIR RESULTS

LRS-5B	1.0	Excavation Bottom
LRS-6B	2.5	Excavation Bottom

Six soil samples (LRS-1 through LRS-6) were obtained for TPH laboratory analysis. Soil samples LRS-1 and LRS-6 were additionally laboratory analyzed for VOCs. Results of laboratory analysis are depicted in Table 3.3 as follows:

SAMPLE NUMBER	TPH (ppm)	VOA (ppb)	LOCATION
LRS-1	N.D.	N.D.	North Sidewall
LRS-2	264.0	NA	East Sidewall
LRS-3	N.D.	NA	South Sidewall
LRS-4	N.D.	NA	West Sidewall
LRS-5	64.0	NA	Excavation Bottom
LRS-6	N.D.	Methylene Chloride: 10	Excavation Bottom

TABLE 3.3 - LABORATORY ANALYSIS

LRS = Laboratory Remediation Sample N.A.= Not Applicable N.D.=None Detected

Laboratory Analytical Results have been provided in Section 3.8.

3.2.2 Soil Stratigraphy

Soil stratigraphy in the vicinity of the former UST No. 0022 consisted of a layer of topsoil from grade to a depth of 1.5 feet below grade. A layer of fine to coarse sand was located from 1.5 to 15 feet below grade (see Figure 3.4 - Soil Stratigraphy).

3.2.3 Contaminated Soil Disposal

Approximately 148.7 tons of contaminated soil was removed and stockpiled during removal and remediation of the excavation, as estimated through field drawings. Contaminated soil was disposed for recycling at Trimount Bituminous Products Company, Shrewsbury, MA on September 21, 1992.

3.3 HYDROGEOLOGICAL SERVICES

Hydrogeological services were not performed relative to UST No. 0023.

3.4 BACKFILL

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The excavation of UST No. 0023 was backfilled with approximately 288 tons of imported, uncontaminated fill material, as estimated through field drawings. Backfilling was conducted with the approval of the Contracting Officer's Representative and the DEP.

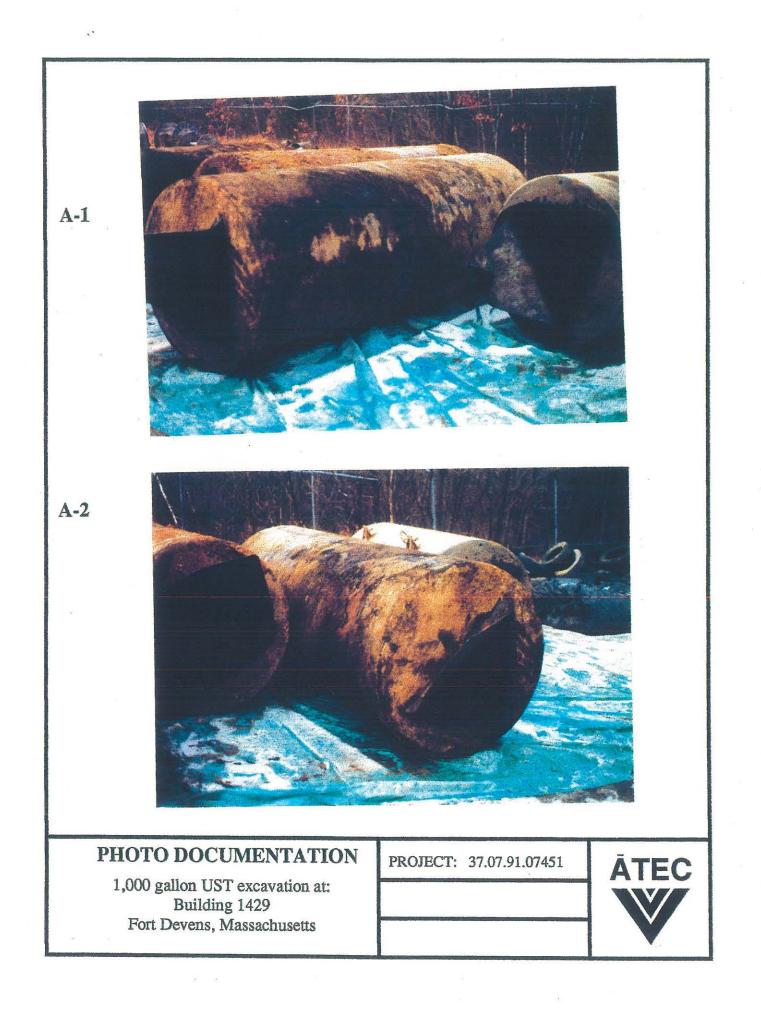
3.5 SITE RESTORATION

Following the backfill of the excavation, approximately 232.5 square feet of loam was distributed over the excavated area. This estimate was also derived from field drawings.

3.6 PHOTOGRAPHIC DOCUMENTATION

The following photographs are of the removed UST, from the excavation and a post removal view of the excavation.

- A-1: One side of tank removed from the site.
- A-2: Opposite side of the tank removed from the site.
- A-3: Excavation as viewed from south, facing north.
- A-4: Excavation as viewed from north, facing south.



A-3 A-4 PHOTO DOCUMENTATION PROJECT: 37.07.91.07451 **ĀTEC** 1,000 gallon UST excavation at: Building 1429 Fort Devens, Massachusetts

3.7 OCMA 220 DATA SHEETS

The following information was organized from the data collected from the Non-Dispersive Infrared analyzer.

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OCMA Data Sheet

Operator Name: KieldGon Date This Th EBI Project Number: 37.07.451 Tark# 23 Calibration First Reading Third Reading Second Reading Initial Final Initial Final Initial Final OR Z Zero Calibration · 0.0 -0.5 OO0-0 \cap \cap Span Calibration Zero Calibration Span Check: 25.8 Testing ABRE = 1 IML Weight First Approach Second Approach Readings Sample 7 Sample ID# -Gross Tare F-113 F-113 Sample Second Third First STOCK -73.5 37.2 7910 17,5 Anl. 37.9 37.4 310X C 2 55 7 80.3 72.5 48.z 48.8 48.3 0/.475.1 . • ·Z 2 84.4 76.3 Z 4 4 ____ 3 80-1 12.0 4 . 4 ----4 79.3 1: 1 2 2 ____ ľ 80-1 1.0 Ż ____ 81 Com . 2 75.1 ح -----3 4.1 . . 70.0 . Z (ര 7.2. - Sec. 1. 86.20 74.9 37 32.7 32.8 ر ' ·81.7· 74 .7 7 Fill 32.0 72 ~ 5 ml 2 -0 104-8 65-1 1 .

3.8 LABORATORY ANALYTICAL RESULTS

The following laboratory analytical reports were organized and provided by Environmental Science Services Inc (ESS). Results are included for:

- LSS-1, LSS-2, and LSS-3: Soil samples obtained from original excavation.
 Laboratory analyzed for TPH.
- LRS-1 to LRS-6: Soil samples obtained from post-remedial excavation for TPH laboratory analysis. LRS-1 and LRS-6 additionally analyzed for VOCs.
- Stock-23: Soil sample obtained from stockpiled soil for disposal classification.
 Laboratory analyzed for VOCs, Semi-volatiles, 13 TCLP Metals, PCBs, Reactive Sulfide, Reactive Cyanide, Flashpoint, and Corrosivity (pH).

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RTIFICATE OF ANALYSIS

Date: 1/15/92 Job: 75 Account: 95659 Received: 1/09/92

ATEC ENVIRONMENTAL CO. 62 Accord Park Drive Norwell, MA 02061

Project: DEVENS TANK 23

n: Mr. Mark Baldi

mple mber	Method Number	Parameter	Result	Unit 	Sample Description
	EPA-160.3 EPA-418.1	Total Solids TPH/IR (Dry Wt.)	91 26	% mg∕kg	LSS-1
	EPA-160.3 EPA-418.1	Total Solids TPH/IR (Dry Wt.)	89 3740	∛ mg∕kg	LSS-2
	EPA-160.3 EPA-418.1	Total Solids TPH/IR (Dry Wt.)	91 4990	% mg∕kg	LSS-3

David Dickipson Laboratory Manager

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POLYCHLORINATED BIPHENYLS Method 8080

Client: ATEC Environmental Consultants				
Client Project ID: U.S. Army-Ft. Devens	ESS Project ID: 921516			
Client Sample ID: Stock-23	ESS Sample ID: 921516-03			
Date Sample Received: 6/10/92	Date Reported: 6/26/92			

Parameter	Result (mg/Kg)	MRL
Arochlor 1016	ND	1
Arochlor 122	. ND	1
Arochlor 1232	ND	1
Arochlor 1242	ND	1
Arochlor 1248	ND	1
Arochlor 1254	ND	1
Arochlor 1260	ND	1

ND = Not Detected above Method Reporting Limit (MRL)

Surrogate Recovery D	Data %	Recovery	QC	Li	mit
Dibutylchlorendate		75%	50	-	150%

Approved by: David Dickinson Laboratory Director 1

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ACID EXTRACTABLES EPA 8270

Client: ATEC Environmental Consultants				
Client Project ID: U.S. Army-Ft. Devens	ESS Project ID: 921516			
Client Sample ID: Stock-23	ESS Sample ID: 921516-03			
Date Sample Received: 6/10/92	Date Reported: 6/26/92			

Parameter	Result (ug/Kg)	MRL
2-Chlorophenol	ND	330
2-Nitrophenol	ND	330
Phenol	ND	330
2,4-Dimethylphenol	ND	330
2,4-Dichlorophenol	ND	330
2,4-Dinitrophenol Pentachlorophenol	ND ND ND	1,650 1,650
4-Nitrophenol	ND	1,650
2,4,6-Trichlorophenol	ND	330
2,4,5-Trichlorophenol	ND	1,650
2-Methylphenol	ND	330
4-Methylphenol	ND	330
4-Chloro-3-Methylphenol	ND	330
4,6-Dinitro-2-Methylphenol	ND	1,650

ND = Not Detected above Method Reporting Limit (MRL)

Approved by: David Dickinson Laboratory Director

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Date: <u>26 June 92</u> 017

ERTIFICATE OF ANALYSIS

BASE NEUTRAL EXTRACTABLES EPA 8270

Client: ATEC Environmental Con	nsultants		
Client Project ID: U.S. Army-	Ft. Devens	ESS Project ID:	921516
Client Sample ID: Stock-23		ESS Sample ID:	921516-03
Date Sample Received: 6/10/92		Date Reported:	6/26/92
Parameter	Result (ug/1	Kg)	MRL
Acenaphthylene	ND	1	330
1,2,4-Trichlorobenzene	ND		330
Hexachlorobenzene	ND		330
Bis(2-chloroethyl)ether	ND		330
2-Chloronaphthalene	ND		330
1,2-Dichlorobenzene	ND		330
1,3-Dichlorobenzene	ND		330
1,4-Dichlorobenzene	ND		330
3,3-Dichlorobenzidine	ND		660
2,4-Dinitrotoluene	ND		330
2,6-Dinitrotoluene	ND		330
Fluoranthene	5,470		330
4-Chlorophenyl phenyl ether	ND		330
Bis(2-chloroisopropyl) ether	ND		330
Bis(2-chloroethoxy) methane	ND		330
Hexachlorobutadiene	ND		330
Hexachlorocyclopentadiene	ND		330
Isophorone	ND		330
Naphthalene	ND		330
Nitrobenzene	ND		330
N-nitrosodiphenylamine	ND		330
N-nitrosodi-n-propylamine	ND		330
Bis(2-ethylhexyl)phthalate	ND		330
Di-n-butylphthalate	1,610		330
Di-n-octylphthalate	ND		330
Diethyl phthalate	ND		330
Dimethyl phthalate	ND		330
Benzo(a)anthracene	ND		330

ND = Not Detected above Method Reporting Limit (MRL)

Approved by:

/ David Dickinson Laboratory Director

Date: 292 013

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BASE NEUTRAL EXTRACTABLES cont. EPA 8270

Client: ATEC Environmental Consultants	
Client Project ID: U.S. Army-Ft. Devens	ESS Project ID: 921516
Client Sample ID: Stock-23	ESS Sample ID: 921516-03
Date Sample Received: 6/10/92	Date Reported: 6/26/92

Parameter	Result (ug/Kg)	MRL
Benzo(a)pyrene	ND	330
Benzo(b)fluoranthene	1,590	330
Benzo(k)fluoranthene	ND	330
Chrysene	ND	330
Acenaphthene	ND	330
Anthracene	533	330
Benzo(ghi)perylene	ND	330
Fluorene	3,060	330
Phenanthrene	793	330
Dibenzo(a,h)anthracene	ND	330
Indeno(1,2,3-cd)pyrene	ND	330
Pyrene	6,990	330
Hexachloroethane	ND	330
4-Bromophenyl-phenylether	ND	330
Benzyl Alcohol	ND	330
Benzoic Acid	ND	1,650
Bis(2-Chloroethoxy)methane	ND	330
4-Chloroaniline	ND	330
2-Methylnaphthalene	ND	330
2-Nitroaniline	ND	1,650
3-Nitroaniline	ND	330
Dibenzofuran	ND	330
4-Nitroaniline	ND	1,650
Butylbenzylphthalate	ND	330

ND = Not Detected above Method Reporting Limit (MRL)

Approved by: David Dickinson Laboratory Director

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TOXICITY CHARACTERISTICS LEACHING PROCEDURE (TCLP)

METALS

EPA METHOD 1311

Client: ATEC Environmental Consultants Client Project ID: U.S. Army-Ft. Devens Client Sample ID: Stock-23

ESS Sample ID: 921516-03

Date Sampled: 6/8/92 Date TCLP Performed: 6/18/92 Date Leachate Extracted: 6/19/92 Date Extract Analyzed: 6/22/92

	Act	ual	Adjı	usted*
Target Analyte	Sample Result (mg/L)	Method Reporting Limit	Sample Result (mg/L)	Method Reporting Limit
Antimony	ND	0.2	ND	0.3
Arsenic	ND	0.2	ND	0.2
Cadmium	ND	0.02	ND	0.02
Chromium	ND	0.05	ND	0.05
Lead	ND	0.1	ND	0.2
Mercury	ND	0.002	ND	0.003
Selenium	ND	0.3	ND	0.3
Silver	ND	0.05	ND	0.05
Copper	0.08	0.02	0.08	0.02
Nickel	ND	0.04	ND	0.05
Zinc	0.12	0.02	0.14	0.03
Beryllium	ND	0.01	ND	0.02
Thallium	ND	0.05	ND	0.06

* Actual sample result adjusted for matrix bias. Refer to matrix spike analysis summary form.

ND = Not Detected above Method Reporting Limit (MRL)

Approved by: Dávid Dickinson

Laboratory Director

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ERTIFICATE OF ANALYSIS

TOTAL PETROLEUM HYDROCARBON-IR Method 418.1

Client: ATEC Environmental Consultants

Client Project ID: UST #23-Bldg 1429

Date Samples Received: 9/8/92

ESS Project ID: 922379

Date Reported: 9/25/92

Client ID	Lab ID	Results	Units	MRL	% Solids
LRS-1	922379-01	ND	mg/Kg	10	96%
LRS-2	922379-02	264	mg/Kg	11	93
LRS-3	922379-03	ND	mg/Kg	11	91
LRS-4	922379-04	ND	mg/Kg	11	93
LRS-5	922379-05	б4	mg/Kg	11	93
LRS-6	922379-06	ND	mg/Kg	11	95

ND = Not Detected above Method Reporting Limit (MRL)

Approved by:_ David Dickinson Laboratory Director



ERTIFICATE OF ANALYSIS

TCL VOLATILE ORGANICS Method 8260

Client: ATEC Environmental Con	nsultants		
Client Project ID: UST #23-Blo	dg 1429	ESS Project ID:	922379
Client Sample ID: LRS-1		ESS Sample ID:	922379-01
Date Sample Received: 9/8/92		Date Reported:	9/25/92
Parameter	Result (ug/)	Kg)	MRL
Methylene Chloride	ND		5
1,1-Dichloroethane	ND		5
Chloroform	ND		5
Carbon Tetrachloride	ND		5
1,2-Dichloropropane	ND		
Dibromochloromethane	ND		5
1,1,2-Trichloroethane	ND		5 5 5 5 5 5 5 5 5 5 5 5
Tetrachloroethene	ND		5
Chlorobenzene	ND		5
1,2-Dichloroethane	ND		5
1,1,1-Trichloroethane	ND		5
Bromodichloromethane	ND		5
Trans-1,3-Dichloropropene	ND		5
Bromoform	ND		5 5 5 5 5 5
1,1,2,2-Tetrachloroethane	ND		5
Benzene	ND		5
Toluene	ND		5
Ethyl Benzene	ND		5
Chloromethane	ND		10
Bromomethane	ND		10
Vinyl Chloride	ND		10 -
Chloroethane	ND		10
1,1-Dichloroethene	ND		5
1,2-Dichloroethene (Total)	ND		5
Trichloroethene	ND		5
Acetone	ND		10
Carbon Disulfide	ND		5
2-Butanone	ND		10
Cis-1,3-Dichloropropene	ND		5
4-Methyl-2-Pentanone	ND		10
2-Hexanone	ND		10
Styrene	ND		5
Xylenes (Total)	ND		10

ND = Not Detected above Method Reporting Limit (MRL)

Approved by:

· David Dickinson

Laboratory Director

Date: 75. Sep 754

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TCL VOLATILE ORGANICS Method 8260

Client: ATEC Environmental Co	nsultants		
Client Project ID: UST #23-Bl	dg 1429	ESS Project ID:	922379
Client Sample ID: LRS-6		ESS Sample ID:	922379-06
Date Sample Received: 9/8/92		Date Reported:	9/25/92
Parameter	Result (ug/Kg)	MRL
Methylene Chloride	10		5
1,1-Dichloroethane	ND		
Chloroform	ND		5
Carbon Tetrachloride	ND		5 5 5
1,2-Dichloropropane	ND		5
Dibromochloromethane	ND		
1,1,2-Trichloroethane	ND		5 5 5
Tetrachloroethene	ND		5
Chlorobenzene	ND		5
1,2-Dichloroethane	ND		5
1,1,1-Trichloroethane	ND		5 5
Bromodichloromethane	ND		5
Trans-1,3-Dichloropropene	ND		5
Bromoform	ND		5
1,1,2,2-Tetrachloroethane	ND		5
Benzene	ND		5 5 5
Toluene	ND		5
Ethyl Benzene	ND		5
Chloromethane	ND		10
Bromomethane	ND		10
Vinyl Chloride	ND		10
Chloroethane	ND		10
1,1-Dichloroethene	ND		5
1,2-Dichloroethene (Total)	ND		5
Trichloroethene	ND		5
Acetone	ND		10
Carbon Disulfide	ND		5
2-Butanone	ND		10
Cis-1,3-Dichloropropene	ND		5
4-Methyl-2-Pentanone	ND		10
2-Hexanone	ND		10
Styrene	ND		5
Xylenes (Total)	ND		10

ND = Not Detected above Method Reporting Limit (MRL)

Approved by:

-David Dickinson

Laboratory Director

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ERTIFICATE OF ANALYSIS

Client: ATEC Environmental Consultants	
Client Project ID: U.S. Army-Ft. Devens	ESS Project ID: 921516
Client Sample ID: Stock-23	ESS Sample ID: 921516-03
Date Sample Received: 6/10/92	Date Reported: 6/26/92

Parameter	Results	Units	MRL	Method
pH (Corrosivity)	4.0	S.U.	N/A	9045
Flashpoint	No Flash	°F	200	1010
Polychlorinated Biphenyls	ND	mg/Kg	Attached	8080
Reactive Cyanide	ND	mg/Kg	2	7.3.3.2
Reactive Sulfide	ND	mg/Kg	2	7.3.4.1
Semivolatile Organics Fluoranthene Di-n-butylphthalate Benzo(b)fluoranthene Anthracene Fluorene Phenanthrene Pyrene	5,470 1,610 1,590 533 3,060 793 6,990	ug/Kg ug/Kg ug/Kg ug/Kg ug/Kg ug/Kg ug/Kg	Attached Attached Attached	8270 8270 8270 8270 8270 8270 8270 8270
Volatile Organics	ND	ug/Kg	Attached	8240
Toxicity Characteristic Leaching Metals	Procedure			1311
Copper Zinc	0.08 0.14	mg/L mg/L	Attached Attached	6010 6010

ND = Not Detected above Method Reporting Limit (MRL)

Approved by: David Dickinson Laboratory Director

vironmental Science Services

532 Arwells Avenue, Providence, Rhode based (2000) and the control of the control

Date:_ <u> 92</u>

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ERTIFICATE OF ANALYSIS

VOA SOIL SURROGATE RECOVERY

Client: ATE	C Environmental Consultants	Client Project ID:	UST #23 Bldg 1429
Date Sample	Analyzed: 9/18/92	ESS Project ID:	922379
SAMPLE ID	1,2 DICHLOROETHANE-D4	TOLUENE-D8	BFB
	(70-121%)*	(81-117%)*	(74-121%)*
VS0918B1	94%	102%	100%
922379-01	96	94	100
922379-06	88	91	92

* Acceptance criteria

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Approved by: David Dickinson Laboratory Director

ap the L Date:___

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	In R	esponse To The Future	
ERTIFICATE OF ANALYSIS TCL V	VOLATILE ORGANICS Method 8260	3	
Client: ATEC Environmental Com	nsultants		•
Client Project ID: UST #23 Blo	dg 1429 E	SS Project ID:	922379
Client Sample ID: Method Blan	-	SS Sample ID:	VS0918B1
-		-	
Date Sample Received: N/A	Di	ate Reported:	9/25/92
Parameter	Result (ug/Kg)		MRL
Methylene Chloride	ND		5
1,1-Dichloroethane	ND		
Chloroform	ND		5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5
Carbon Tetrachloride	ND		5
1,2-Dichloropropane	ND		5
Dibromochloromethane	ND		5
1,1,2-Trichloroethane	ND		5
Tetrachloroethene	ND		5
Chlorobenzene	ND		5
1,2-Dichloroethane	ND		5
1,1,1-Trichloroethane	ND		5
Bromodichloromethane	ND		5
Trans-1,3-Dichloropropene	ND		5
Bromoform	ND		5
1,1,2,2-Tetrachloroethane	ND		5 5 5
Benzene	ND		
Toluene	ND		5
Ethyl Benzene	ND		5
Chloromethane	ND		10
Bromomethane	ND		10
Vinyl Chloride	ND		10
Chloroethane	ND		10
1,1-Dichloroethene	ND		5
1,2-Dichloroethene (Total)	ND		5 5
Trichloroethene	ND		
Acetone Carbon Disulfide	ND ND		10 5
2-Butanone	ND ND		10
Cis-1,3-Dichloropropene	ND		5
4-Methyl-2-Pentanone	ND		10
2-Hexanone	ND. ND		10
Styrene	ND		5
Xylenes (Total)	ND		10
	_		-

Date: 25 Santic

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ND = Not Detected above Method Reporting Limit (MRL) N/A = Not Applicable

Approved by:

David Dickinson Laboratory Director

vironmental Science Services

3.9 CHAIN OF CUSTODY FORMS

The following chain of custody forms were produced for the soil samples which were laboratory analyzed.

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STOCK-26		11:45	·X	X		X				X		3		X	$\left \right\rangle$		X		X	X	X	X		r. 166		617) 878-6200 (617)	9 0
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3.10 HAZARDOUS WASTE MANIFEST

UST No. 0023 was estimated to contain approximately 368 gallons of No. 2 fuel oil. Approximately 348 gallons of fuel oil were removed on January 6, 1992, and transported to a licensed Transportation and Storage Disposal Facility (TSDF) (Beede Waste Oil Corporation). Approximately 20 gallons of No. 2 fuel oil and tank residuals were removed from the tank and placed in a 55-gallon drum on January 8, 1992. Tank residuals were transported to a licensed Cyn Environmental Services, Inc., Stoughton, MA, on June 5, 1992.

The following Hazardous Waste Manifests were generated from residual tank materials.

COMMONWEALTH OF MASSACH DEPARTMENT OF ENVIRONMENTAL DIVISION OF HAZARDOUS W One Winter Street	PROTEC					
Boston, Massachusetts 02	108					,
se print or type. (Form designed for use on elite (12-pitch) typewriter.)			1			(
	Manifest cument No.	2. Page 1	Information is not require			
	1000	Lange and the second	anifest Docum			
	1000	MA	R35363			MA
AFZD-DEQ BOX 10 Fur Devens, Mr. 01433	_	B:State G	en ID 🔬 🎣 者	14. 20. 10. 10.	27 (A) 27 (A) 28 (A)	ור
4. Generator's Phone (SO8) 796-3002 24HR 508-796- 5. Transporter 1 Company Name 6. US EPA ID Number	27/1_	ED GRANT	<u> インバヒ</u> ans IDル デー	470-324695 C44(2)X4	\$∂\$ ² - 3 ⁴	ш б
Beede Waste Oil Corp. NHID 01895814		1. S. W. W. W.	44/21/71	advariant in the		ω
7. Transporter 2 Company Name 8. US EPA ID Number	•	DAranspo	orter's Phone (rans-ID:	60000	225761	ក ឃ
		1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	TRANSFER ST	6 - S & A &		
9. Designated Facility Name and Site Address 10. US EPA ID Number	,		inter s Phone (\sim
Beede Waste Oil Corp.			acility s ID		quired de	С0РҮ>1
Kelley Road PO Box 127 Plaistow, NH 03865 N-H 01895814	ملله	PHOFacility		限创体制	教育的支持	J J
11. US DOT Description (Including Proper Shipping Name, Hazard Class, and ID Number)	12. Cont	ainers	13. 003 Total	14.82 Unit	Waste No.	Ļ
	No.	Туре	Quantity	Wt/Vol		
WASTE PETROLEUM OILS N.O.S. COMBUSTIBLE LIGHTD NA1270	1		2200	G	MA 012	
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c.ll Additional Descriptions for Metenals Ested Above include physical state and hazard code. In the	(Secure-Ma	K Handlin	g Codes for W	istes Listed	Above: As a	0
				C. Sugar		ÐE
	法运行的					ST.
		56.0232			隆 谷 [18]	IN.
15. Special Handling Instructions and Additional Information			н. 			AT
To be Recycled			Recyc	1		ΙΟΙ
16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately des			recyc	те		N N
proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition fo according to applicable international and national government regulations.	r transport by hi	ighway				ΤA
If I am a large quantity generator, I certify that I have a program in place to reduce the volume and toxicity of waste	generated to th	e degree l have	determined to be	economically	practicable	н гп
and that I have selected the practicable method of treatment, storage, or disposal currently available to me which r ment: OR, if I am a small quantity generator, I have made a good faith effort to minimize my waste generation and s	ninimizes the pr ielect the best v	vaste managen	re inreat to huma sent method that	is available to	me and that t	í.
can alford.	/s	1			Date	
Printed/Typed Name Signature	K.Br			Month	Day Year	
17. Transporter 1 Acknowledgement of Receipt of Materials				$-\mu$	Date Date	
Printed/Typed Name Signaturg	10 10	1	1	Month		
18. Transporter 2 Acknowledgement of Receipt of Materials		frand	z -	011	014512	•
Printed/Typed Name Signature			<u> </u>] Month	Date Day Year	
19. Discrepancy Indication Space						
20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manife	st except as	noted in Item	19.			
					Date	

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	A COMMONIVE	UF-600 **** ALTHOEMASSACI	IUSETTS'	$1 \rightarrow \mathcal{O}$
76	DEPARTMENT OF	ENVIRONMENTAL	PROTECTION 1100	ISK.
١	DIVISION	DF HAZARDOUS W	ASTE, (IV	· · · · · /
	DEP	, Massachusetts 021	108	······································
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	3. Gonerator's Name and Malling Address. 508-796-3002-	the state of the state of the		
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14	ANTREACT TO STA 796-300.2		Blues a.s	
41		US EPAID Humber		
	Lincoln Environmental, Inc.	RI II DI 91 81 21 11 91 USEPAIR Number		
	2. Initiabulture 2. Consecutivity institute			301 - Maral Ma
	9. Designated Facility Namo and Site Address.	0. US EPAID Number		
OENERATOR .	CYN Envinonmental Services		i le a chai mai quide,	
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		1	12. Containar 15.	14
	11. US DOT Description (Including Fraper Shipping Name, Hazard Cla	FS, Bhd (D Number)	No. Type Quently	Unh Wt/Vol
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	15. Special Handing Instructions and Additional information In	Case Of Emergency	24 Hour Contact Chew	irec .
	LOAA-454-2000 OV FUIDOUL CUALCOURCE	tal 1-000-659-335	53 ERG# 27 Attached	
1 }	18. GENERATOR'S CERTIFICATION: Unarby Sections Unartice Contents of Una Comp	ignment are fully and accurately des	CHOAG ADONE DY	
	proper shipping nemb and set stranding, packed, marked, And Isbaid, and and proper shipping nemb and set stranding packed, marked, And Isbaid, and and proveling to applicable informational and national government regulations.	in all respects in proper condition for	transport by highway	
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i i	18. Transporter 2 Acknowledgement of Receipt of Motorials	- Mindally	Ashter-	. Date
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171	20. Factory Owner or Operator: Certification of receipt of hazardous m	sterials covaied by this menile	st except se noted in item 19.	
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3.11 PERMITS AND CERTIFICATIONS

The following permit was obtained for the proper closure of a UST. Following the permit there is a disposal receipt for the steel UST.

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CHERTER CONTRACTOR CON The Commonwealth of Massachusetts DEPARTMENT OF PUBLIC SAFETY DIVISION OF FIRE PREVENTION - 1 12 1-136 x 11 Theme 82 8,46 H.A.L. FOR REMOVAL AND TRANSPORTATION TO APPROVED TANK YARD DIG BAFE NUMBER In accordance with the provisions of chapter 148, 0, 1, as provided in Section 38A this permit is granted to Et en es in in in es es es Name: <u>Ater Environmental Associates Inc.</u> Full name of person, firm or Corporation To transport underground steel storage tank(s) to Approved tank yards 149 fiff bele, mananementer . . State clearly type of inert gas used in steel storage tank steel tank! Du method FDID# 1791 Name and address of contractor disposing tank ATE.C. Asso. Location to which tank will 62 Accord Park Dr. Norveli inter îν/Α Fee paid \$ be transported yard This permit will expire 31 JAN 1992 Ignature of official granting (Head of Fire Dept.) 110 ŧ 1 7

Tank 23 31dg 1429

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us tank to this yard.	L Head of Fire Departme	ent FDID# $\angle Z \angle Z \angle Z$ to trans	yards. port
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SIGNATURE		 DATE SIGNED	
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3.12 UST CLOSURE CHECKLIST

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The following closure checklist was produced by ATEC Associates Inc., to ensure quality control of the proper abandonment of a UST.

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DATE	TIME	MEASUREMENTS		NOTES
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				time approx but sigt 5 adi
119/92	12.30			t. Commission
119 192	12:45	Į		Depth to tank: 2.5
		l I FI	 	
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	T12:	<u>}</u>		
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1/ 8/72		105. Sludge		
1/9/97	12:30	<u>{</u>		
		[		
1/8/92	12.45	Į		
1/0/32		PID (ppm)	NDIR (ppm)	visibly an Amain fed acres d
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UST-CLOSURE O/C CHECK LIST				
				NOTES
DEFINABLE FEATURE	<u> </u>	TIME	MEASUREMENTS	NOTES
Remove tank, piping, pumps, and hardware.	1/9/92	1:00	Photographic Descriptions:	Soil Description: I. a. h. & brown fine Same
Photograph excavation; note descriptions.			Photo 1: 7 ~ 4	1.3 <u>51-11-1</u>
Sketch Schematic		1	Photo 2: tmh	
			Photo 3: excar S. Pare M	
			Photo 4: excan N face 5	
			Photo 5:	Depth to Groundwater/Conditions: 1/14
	•		Photo 6:	
e tank at safe distance from excavation	1/1- (4)			Depth of Excavation: 6.5
e tank at sale distance from excavation	1/9/11	1:00		
Secure tanks transport off-site	1/4/23	3.00		
Obtain 10 soil samples from	118.42	1:30	PID (ppm) NDIR (ppm)	Sample locations:
excavation walls/bottom: Note PID/NDIR			SS1: /, o	5 wall
readings and sample locations.			SS2: 7.4	5
			SS3: 7.9	hs wall
			SS4: 1.2	to will
			SS5: 1.8	Al world
			SS6: 3.9	N. all
			SS7: 0.2	E worth a
			SS8: 0.6	e with
			SS9: 29,0	Bottow
			SS10: 14.8	Bottom
······································				
	1/8/97	1.30		Sample Locations:
for laboratory analysis. Note sample locations.	1			LSS1: 059 closest to fill area
				LSS2: - 159
				LWS1:
				1553: composite stack ale

UST_CLOSURE Q/C CHECK LIST					~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
DEFINABLE FEATURE	DATE	TIME	MEASUREMENTS	NOTES	
				tons of backf	<u>ill</u>
Backfill excavation (if clean):				Backfill description:	
Note amount & type of backfill					
					·····
Close open excavation (if applicable)					
		<u></u>			
ore surface and rope off					
		_			
Remove rubbish/debris	'				~~~~~~
	/			Amount	Classification
Transport hazardous material off-site:				Allouit	
Note amount/classification	/				
Make copies of manifests, permits,					
and disposal receipts.					
	/				

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3.13 INSTALLATION

The installation of a replacement UST No. 0023 was not performed.

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4.1 POST REMOVAL REPORT

4.1.1 Introduction

This Post Removal Report details the results of the closure of one 1,000-gallon, single wall, steel, underground storage tank (UST) referenced as UST No. 0024, located at property known as Building 1435, Fort Devens, Massachusetts (the site). The purpose of the closure was to excavate the UST and evaluate the potential for the presence of oil and hazardous material at the site. The closure of this UST was conducted on January 9, and 10, 1992.

The basic Project Work Scope included:

- Procurement/administration of all federal, state and local permits, manifests, regulations, etc., associated with UST system closure.
- Excavating, venting, cleaning, transporting, and disposing of one 1,000-gallon UST by appropriately licensed contractors/facilities.
- Disposal of residual UST materials at a licensed facility.
- Field screening and analysis of soil in the excavations by a Photoionization Detector (PID) and field analyzed with a portable Non-Dispersive Infrared (NDIR) analyzer, to identify evidence of the release of oil and hazardous materials from the UST, if any.

- Laboratory analysis of soil sampled from the UST excavation by a USEPA certified laboratory for Total Petroleum Hydrocarbons (TPH) (USEPA Method 418.1).
- Preparation of a Technical Report to include assimilation of information gathered, major findings, and conclusions.

4.1.2 Subsurface Storage Tank Excavation and Removal

On January 9, and 10, 1992, one 1,000-gallon, subsurface, number 2 fuel oil storage tank was excavated and removed from the site. The UST was located adjacent to the southwest side of Building 1435 (see UST Location Plan, Figure 4.1). Site topography is relatively level. Surface cover at the site consisted of topsoil.

The tank was covered by approximately 1.5 feet of soil. The bottom of the excavation was approximately 5.5 feet below grade. Soils in the excavation consisted primarily of light to medium brown, fine sand with a trace of gravel. Soil staining was observed in soils in the vicinity of the fill neck. Soil within the excavation was also visibly contaminated. Groundwater was not encountered within the excavation.

The associated piping was drained and tank connections were removed. UST No. 0024 was estimated to contain approximately 34 gallons of No. 2 fuel oil and residual materials. Approximately 14 gallons of fuel oil were removed on January 6, 1992, and tranported to a licensed Treatment Storage Disposal Facility (Beede Waste Oil Corporation, Plaistow, New Hampshire) for disposal. Approximately 20 gallons of residuals were removed and drummed on January 9, 1992 for transportation at a later date. Drummed material was transported to Cyn Environmental, Stoughton, MA, on June 5, 1992. Appropriate hazardous waste manifests are included in Section 4.10.

Tank openings were then capped and the tank was removed from the excavation. Upon excavation and removal, the tank was observed to be in slightly corroded with perforations. However, moderate corrosion was noted. Following venting of the tank, an access way was cut in the end of the tank to allow entry for cleaning. The tank was then entered and vacuumed/wiped clean of any residual materials.

The scrap tank was disposed at Tombarello & Sons, a licensed Massachusetts tank yard, located in Lawrence, MA, on January 24, 1992. A copy of the disposal receipt is included Section 4.11, Permits and Certificates.

4.1.3 Sampling and Analysis Plan

Ten soil samples were obtained from the excavation for field screening with a Photoionization Detector (PID) and field analyzed with a Non-Dispersive Infrared (NDIR) analyzer. The PID field screening for Total Organic Vapors (TOVs) was conducted with an HNu photoionizer utilizing the jar headspace screening protocol outlined in the Hazardous Materials Containment Plan. The NDIR field screening for Total Petroleum Hydrocarbons (TPH) was conducted with a Horiba OCMA 220, utilizing the procedures outlined in the Hazardous Materials Containment Plan.

Eight of the samples (SS-1 to SS-8) were obtained from the excavation sidewalls at a depth of approximately 2 to 3 feet below grade. Two of the samples (SS-9 and SS-10) were obtained from the bottom of the excavation at a depth of approximately 5.5 feet below grade. Two composite soil samples (Stock-1 and Stock-2) were obtained from stockpiled soils for PID and NDIR field screening.

Two soil samples (LSS-1 and LSS-2) were obtained from the excavation for laboratory analysis. Soil sample LSS-1 was obtained from the west sidewall of the excavation in the vicinity of the fill pipe. Soil sample LSS-2 was obtained from the bottom of the excavation at a depth of approximately 5.5 below grade. One composite soil sample

(LSS-3) was obtained from stockpiled soils required to free the tank. These samples were TPH laboratory analyzed. Sampling locations are depicted on the Sampling Schematic, attached as Figure 4.2. The appropriate chain of custodies are included in Section 4.9, Chain of Custody Forms.

4.1.4 Analytical Results

The results from analysis with the PID and the NDIR analyzer of the ten soil samples obtained from the excavation and the two composite samples obtained from stockpiled soil are as follows in Table 4.1:

SAMPLE NUMBER	PID (ppm TOV)	NDIR (ppmTPH)
SS-1	1.4	77.9
SS-2	4.5	408.4
SS-3	5.3	992.7
SS-4	3.2	1,090.5
SS-5	7.5	986.7
SS-6	6.0	489.7
SS-7	1.2	128.1
SS-8	2.3	111.0
SS-9	200.0	3,838.8
SS-10	10.2	3,000.5
Stock-1	12.0	3,500.8
Stock-2	5.2	2,279.8

TABLE 4.1 - PID AND NDIR RESULTS

Laboratory analytical results of the two soil samples were obtained from the excavation revealed TPH concentrations of 4,430 ppm in LSS-1 and 3,380 ppm in LSS-2. Laboratory analysis of the soil sample LSS-3 obtained from the stockpiled soils revealed

a TPH concentration of 4,350 ppm. A copy of the laboratory results has been included in Section 4.8.

4.1.5 Conclusions and Recommendations

ATEC's conclusions are as follows:

Upon excavation and removal, the tank was observed to be in fair condition with no perforations. Moderate corrosion was noted.

Groundwater was encountered within the excavation.

Excavated soils required to free the tank appeared contaminated. Within the excavation, soils were also visibly contaminated.

Ten soil samples were obtained from the excavation for field screening and field analysis utilizing a PID and NDIR analysis respectively. PID readings revealed TOV concentrations ranging from 1.2 ppm to 200 ppm. NDIR results revealed TPH concentrations ranging from 77.9 ppm to 3,838.8 ppm.

Two soil samples were obtained from the excavation for TPH laboratory analysis utilizing USEPA Method 418.1. Analytical results for LSS-1 obtained from the northwest wall of the excavation revealed a TPH concentration of 4,430 ppm. Analytical results for LSS-2 obtained from the excavation bottom revealed a TPH concentration of 3,380 ppm.

One composite stockpile soil sample (LSS-3) was obtained from stockpiled soils and was laboratory analyzed for TPH. Laboratory analytical results revealed a TPH concentration of 4,350 ppm.

Two composite soil samples (Stock-1 and Stock-2) were obtained from stockpiled soils for PID and NDIR screening. PID screening revealed TOV concentrations of 12.0 ppm and 5.2 ppm in Stock-1 and stock-2, respectively. NDIR analysis revealed TPH concentrations of 3,500.8 ppm and 2,279.8 in Stock-1 and Stock-2, respectively.

ATEC's recommendations are as follows:

Conduct remedial excavation of the until background levels of <100 ppm TPH by laboratory analysis are attained. Field screening of soil should be conducted during excavation utilizing a PID until background levels of <1 ppm are attained prior to obtaining samples for laboratory analysis.

Advance soil borings and install groundwater monitoring wells to determine the vertical and horizontal extent of contamination. Continuous split spoon sampling and analysis will be conducted utilizing field analysis techniques, i.e. PID and NDIR analysis, and laboratory analysis to document soil contamination levels as specified in the Hazardous Waste Containment Plan.

Additionally excavated and stockpiled soils should be laboratory analyzed for TPH, Volatile Organic Compounds (VOCs), Polychlorinated Biphenyls (PCBs), 13 Metals by Toxicity Leachate Characteristics Procedure (TCLP), Flashpoint, Corrosivity (pH), Sulfide Reactivity, and Cyanide Reactivity for disposal classification.

4.2 SITE REMEDIATION AND CONTAMINATED SOIL DISPOSAL

4.2.1 Site Remediation

Following review of field screening and laboratory analytical results, additional excavation to remove contaminated soil and reach background levels by PID (<1 ppm) was conducted per order of the Contracting Officer's Representative and David Salvadore of

the Massachusetts Department of Environmental Protection (DEP). Approximately 2,527 tons of contaminated soil were removed from the excavation floor and sidewalls during remedial excavation on July 17, 1992. The estimated volume of soil removed was calculated from field drawings produced during the removal and remediation of UST No. 0024 (see Remedial Excavation Plan, Figure 4.3).

Four soil samples (RSS-1 to RSS-4) were obtained from the post-remedial excavation associated with UST No. 0024 for PID field screening. RSS-1 to RSS-3 were obtained from the sidewalls at a depth of approximately 8 feet below grade. RSS-4 was obtained from the excavation bottom at a depth of approximately 10 feet below grade. PID results revealed TOV concentrations ranging from 0.8 ppm to 50.0 ppm. NDIR analysis revealed TPH concentrations ranging from 23.8 ppm to 30.9 ppm (see Table 4.2).

SAMPLE NUMBER	PID (ppm TOVs)	NDIR (ppm TPH)	LOCATION
RSS-1	0.8	23.8	North sidewall
RSS-2	30.0	30.9	East sidewall
RSS-3	0.8	23.9	East sidewall
RSS-9	50.0	13.2	Excavation Bottom

TABLE 4.2 - PID AND NDIR RESULTS

Three soil samples (LRS-1 through LRS-3) were obtained for TPH laboratory analysis. Soil sample (LRS-1) was also laboratory analyzed for VOCs and 13 TCLP Metals. See Table 4.3, and Section 4.8, Laboratory Analytical Results.

SAMPLE NUMBER	TPH (ppm)	VOCs (ppb)	13 TCPL METALS (ppm)	LOCATI ON
LRS-1	78.0	97.0 ethyl benzene, 40.0 xylene	0.87 zinc, 0.13 copper	Bottom
LRS-2	1,330.0	N.A.	N.A.	Bottom
LRS-3	15.0	N.A.	N.A.	Bottom

TABLE 4.3 - LABORATORY ANALYSIS

LRS = Laboratory Remediation Sample N.A.= Not Applicable

See Section 4.8 - Laboratory Analytical Results.

4.2.2 Soil Stratigraphy

From grade level to approximately 1 foot below grade, the soil in the excavation consisted primarily of dark-brown, loamy topsoil. From 1 foot, to approximately three feet below grade, soil in the excavation consisted primarily of rust-brown, fine sand. From three to 6.5 feet below grade surface, soil within the excavation consisted of light-brown, fine sand with trace gravel (see Figure 4.4 - Soil Stratigraphy)

4.2.3 Contaminated Soil Disposal

Approximately 168 tons of number 2 fuel oil contaminated soil were removed and stockpiled during UST removal and remediation of the excavation, as estimated through field drawings (see Remedial Excavation Plan, Figure 4.3). Contaminated soil was disposed for recycling at Trimount Bituminous Products Company, Shrewsbury, Massachusetts.

4.3 HYDROGEOLOGICAL SERVICES

Hydrogeological services were not conducted relative to UST No. 0024.

4.4 BACKFILL

The excavation was lined with polyethylene plastic sheeting and backfilled with approximately 180 tons of uncontaminated fill material, as estimated through field drawings. Backfilling was conducted with the approval of the Contracting Officer's Representative.

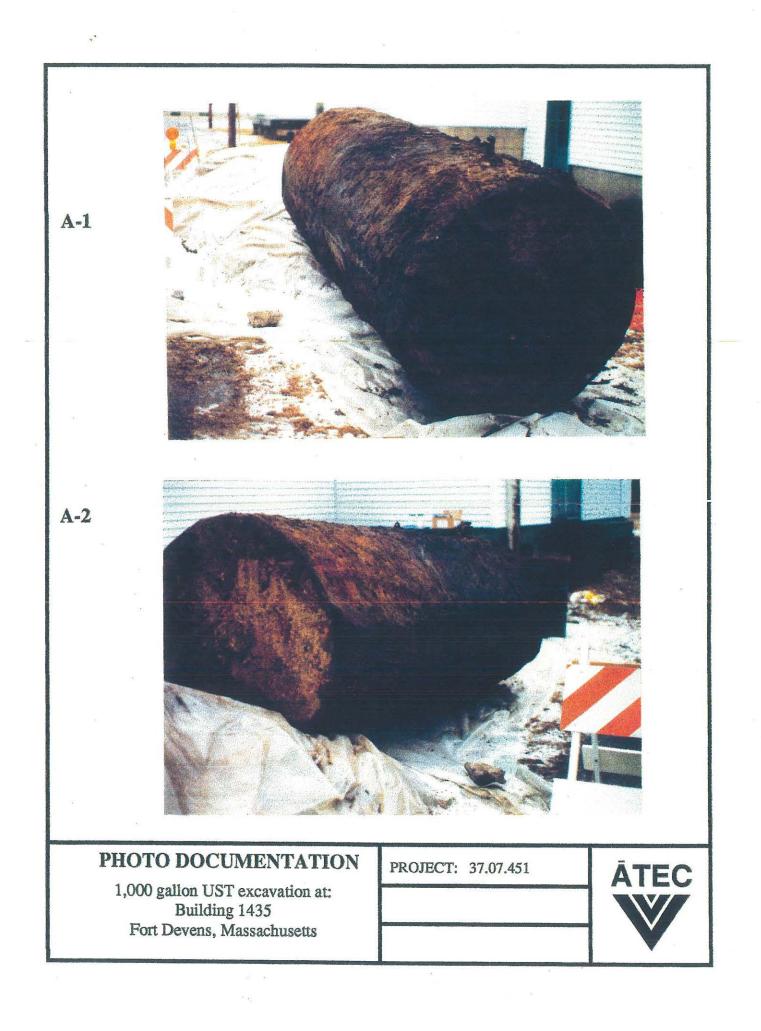
4.5 SITE RESTORATION

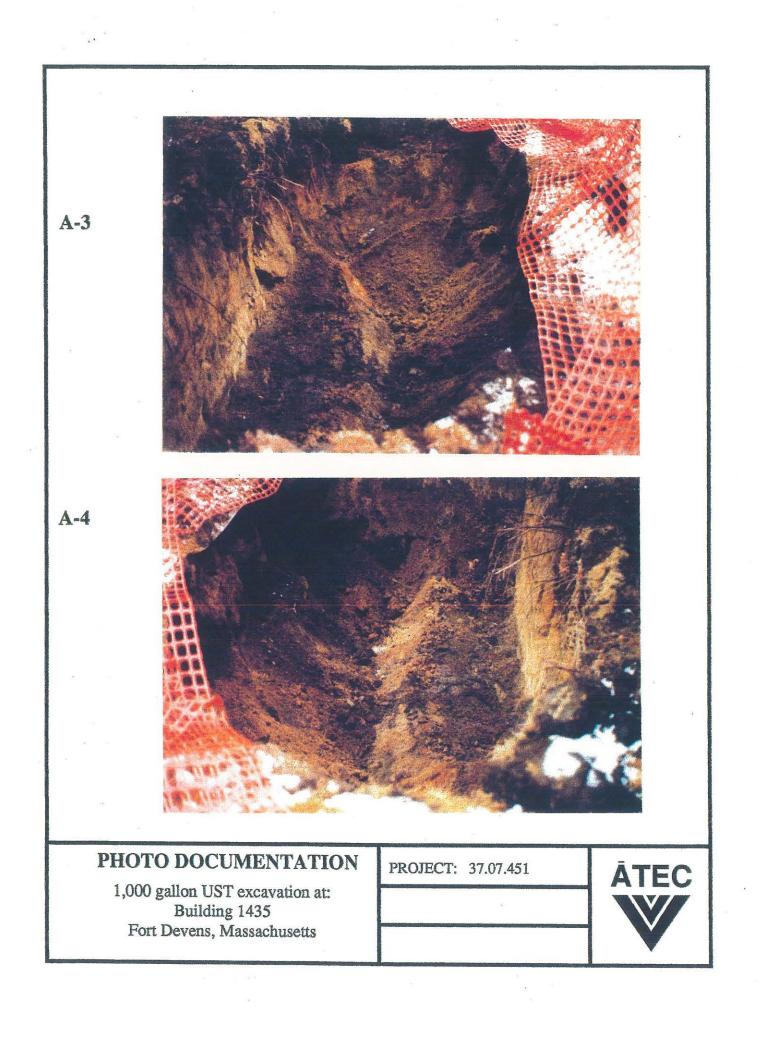
Following backfill of the excavation, approximately 196 square feet of loam was distributed over the excavated area. This estimate was also determined through field drawings.

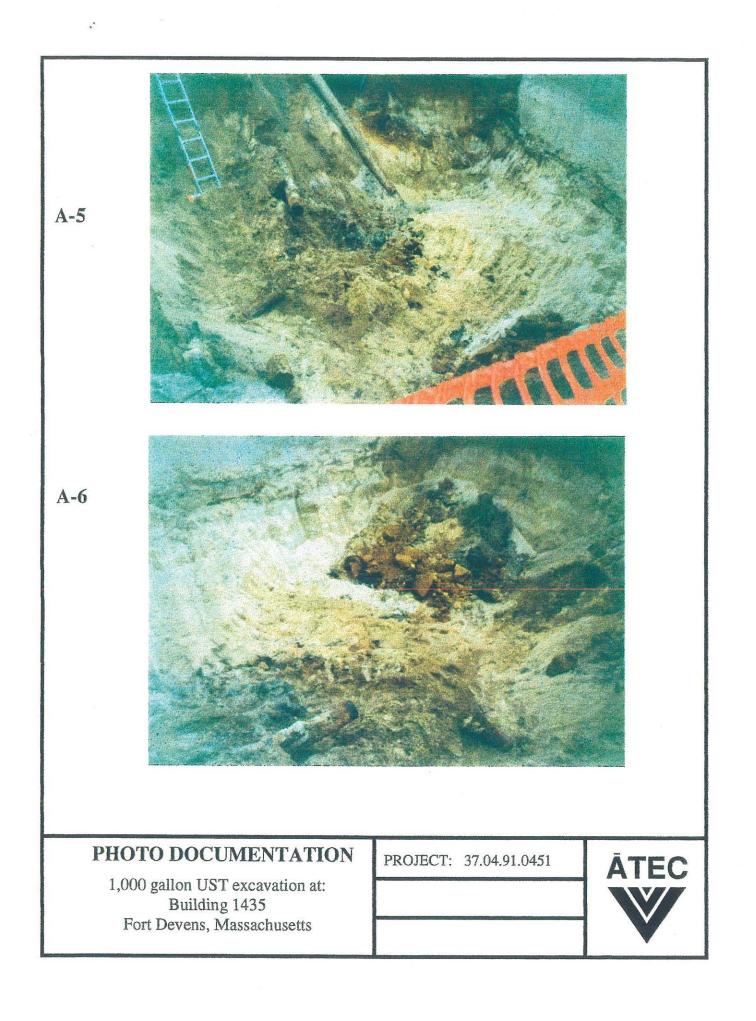
4.6 PHOTOGRAPHIC DOCUMENTATION

The following photographs are of the removed UST from the excavation and a post removal view of the excavation.

- A-1: One side of removed tank.
- A-2: Opposite side of removed tank.
- A-3: Excavation as viewed from northwest, facing southeast.
- A-4 Excavation as viewed from the southeast, facing northwest.
- A-5 Remedial excavation as viewed from the east, facing west.
- A-6 Remedial excavation as viewed from the south facing north.







4.7 OCMA 220 DATA SHEETS

The following information was organized from the data collected from the Non-Dispersive Infrared analyzer.

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OCMA Dat	a Sheet						
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179.9					1		1.8	L1
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120.2	174,21	1		1		11.2	11.2	11
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179.9	173,51	1		1	l .	156.2		34.61
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8:00-12:00

TPH SOIL ANALYSES BY NON-DISPERSIVE INFRARED ANALYZER - MODIFIED EPA STANDARD TEST METHOD 418.1

PROJECT NAME, NUMBER, TANK: U.S. ARMY - FORT DEVENS 37.07.91.451 UST 0024

DATE: Jul 24, 1992 OPERATOR: Charles Langenhagen

CALIBRATION DATA

TYPE	FIRST REA	ADING	SECOND RE	ADING	THIRD REA	ADING	SPAN
CALIBRATION		FINAL		FINAL	INITIAL	FINAL	CHECK
ZERO:	5.7	0.0	-1.1	0.0	-0,4	0.0	27.6
SPAN:	34.2	40.0	45.8	40.0	40.9	40.0	
ZERO;	6.1	0.0	-7.0	0,0	-0.2	0,0	

ANALYTICAL DATA

SAMPLE	WEIGH	T (g)	1st DILUTIC	<u> DN RATIO (ml)</u>	2nd DILUTIC	<u>ON RATIO (ml)</u>	INSTRUME	NT RESULTS	(ppm)	_ CONCENTRATION
NUMBER	GROSS	TARE	<u>F-113</u>	SAMPLE	<u>F-113</u>	SAMPLE	1st	2nd	<u>3rd</u>	mg/l
SS-1A	81.7	74.8	17.5	3.0			0,5	0.8		23.8
SS-2A	80.1	74.8	17,5	3.0			0.7	0.8		
SS-3A	80.3	74.3	17.5	3.0			1.0	0.7		23.9
<u>SS-4A</u>	80,8	74.6	17.5	3.0			0.4	0.4		13.2

TPH SOIL ANALYSES BY NON-DISPERSIVE INFRARED ANALYZER - MODIFIED EPA STANDARD TEST METHOD 418.1

PROJECT NAME, NUMBER, TANK: U.S. ARMY - FORT DEVENS 37.07.91.451 UST 0024 DATE: Jul 24, 1992 OPERATOR: Charles Langenhagen

ALIBRATION DATA

TYPE	FIRST REA	ADING	SECOND RE	EADING	THIRD REA	ADING	SPAN
CALIBRATION			INITIAL	FINAL		FINAL	CHECK
ZERO:	-5,7	0.0	-1.1	0.0	-0.4	0.0	27.6
SPAN:	34.2	40.0	45.8	40.0	40.9	40.0	
ZERO:	6.1	0.0	-7.0	0.0	-0.2	0.0	

ANALYTICAL DATA

SAMPLE	<u> </u>	<u>T (g)</u>	1st DILUTIC	<u>N RATIO (ml)</u>	2nd DILUTIC	<u> NRATIO (ml)</u>	INSTRUME	NT RESULTS	(ppm)	_ CONCENTRATION
NUMBER	GROSS	TARE	F-113	SAMPLE	<u>F-113</u>	SAMPLE	1st	<u>2nd</u>	<u>3rd</u>	mg/l
RSS-2	82.4	74.7	17.5	3.0			17.0	17.9		476.6
RSS-3	80.2	74.4	17.5	3.0			0.5	0.5		17.7

4.8 LABORATORY ANALYTICAL RESULTS

The following laboratory analytical reports were organized and provided by Environmental Science Services, Inc. (ESS). Results are included for:

- LSS-1, LSS-2, and LSS-3: Soil samples obtained from original excavation and stockpile. Laboratory analyzed for TPH.
- RRS-1 and RRS-2: Soil samples obtained from post-remedial excavation. Laboratory analyzed for TPH, 13 TCLP Metals, and BTEX.
- Stock-24: Soil sample obtained from stockpiled soil for disposal classification. Laboratory analyzed for VOCs, Semi-volatiles, 13 TCLP Metals, PCBs, Reactive Sulfide, Reactive Cyanide, Flashpoint and Corrosivity (pH).



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CERTIFICATE OF ANALYSIS

Client: ATEC Environmental Consultants						
Client Project ID: U.S. Army-Ft. Devens	ESS Project ID: 921516					
Client Sample ID: Stock-24	ESS Sample ID: 921516-04					
Date Sample Received: 6/10/92	Date Reported: 6/26/92					

Parameter	Results	Units	MRL	Method
pH (Corrosivity)	4.9	S.U.	N/A	9045
Flashpoint	No Flash	°F	200	1010
Polychlorinated Biphenyls	ND	mg/Kg	Attached	8080
Reactive Cyanide	ND	mg/Kg	2	7.3.3.2
Reactive Sulfide	ND	mg/Kg	2	7.3.4.1
Semivolatile Organics	ND	ug/Kg	Attached	8270
Volatile Organics	ND	ug/Kg	Attached	8240
Toxicity Characteristic Leaching Metals	Procedure			1311
Lead Copper Zinc	0.3 0.03 0.20	mg/L mg/L mg/L	Attached Attached Attached	6010 6010 6010

ND = Not Detected above Method Reporting Limit (MRL)

Approved by: David Dickinson Laboratory Director

e 92 Date:

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Environmental Science Services

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CERTIFICATE OF ANALYSIS

Date: 1/17/92 Job: 101 Account: 95659 Received: 1/13/92

O: ATEC ENVIRONMENTAL CO. 62 Accord Park Drive Norwell, MA 02061

Project: TANK 24

ttn: Mr. Mark Baldi

Sample Number	Method Number	Parameter	Result	Unit 	Sample Description
2010101	EPA-160.3 EPA-418.1	Total Solids TPH/IR (Dry Wt.)	83 4430	% mg/kg	LSS-1
2010102	EPA-160.3 EPA-418.1	Total Solids TPH/IR (Dry Wt.)	84 3380	% mg/kg	LSS-2
2010103	EPA-160.3 EPA-418.1	Total Solids TPH/IR (Dry Wt.)	89 4350	% mg/kg	LSS-3

David Dickinson

Laboratory Manager

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Environmental Science Services

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532 Atwells Avenue: Providence, Rhode Island (02009) (101) 421-0398 (Fax: (101) 421-57))

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POLYCHLORINATED BIPHENYLS Method 8080

Client: ATEC Environmental Consultants					
Client Project ID: U.S. Army-Ft. Devens	ESS Project ID: 921516				
Client Sample ID: Stock-24	ESS Sample ID: 921516-04				
Date Sample Received: 6/10/92	Date Reported: 6/26/92				

Parameter	Result (mg/Kg)	MRL
Arochlor 1016	ND	1 .
Arochlor 1221	ND	1
Arochlor 1232	ND	1
Arochlor 1242	ND	1
Arochlor 1248	ND	1
Arochlor 1254	ND	1
Arochlor 1260	ND	1

ND = Not Detected above Method Reporting Limit (MRL)

Surrogate Recovery Data	% Recovery	QC	Li	mit
Dibutylchlorendate	81%	50	_	150%

Approved by: David Dickinson Laboratory Director

Date: 26 June 72

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532 Atwells Avenue, Providence, Rhode Island 02009 (401) 421-0398 Eax. (401) 421-5731

191 Post Road West, Westport, Connecticut (1988) (203) 121-2753 Eax. (203) (351-353) (203)



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ACID EXTRACTABLES EPA 8270

Client: ATEC Environmental Consultants					
Client Project ID: U.S. Army-Ft. Devens	ESS Project ID: 921516				
Client Sample ID: Stock-24	ESS Sample ID: 921516-04				
Date Sample Received: 6/10/92	Date Reported: 6/26/92				

Parameter	Result (ug/Kg)	MRL*
2-Chlorophenol 2-Nitrophenol Phenol 2,4-Dimethylphenol 2,4-Dichlorophenol 2,4-Dinitrophenol Pentachlorophenol 4-Nitrophenol 2,4,6-Trichlorophenol 2,4,5-Trichlorophenol 2-Methylphenol	ND ND ND ND ND ND ND ND ND ND ND ND ND N	1,650 1,650 1,650 1,650 1,650 8,250 8,250 8,250 1,650 8,250 1,650
4-Methylphenol 4-Chloro-3-Methylphenol 4,6-Dinitro-2-Methylphenol	ND ND ND	1,650 1,650 8,250

* Sample diluted due to matrix interference.

ND = Not Detected above Method Reporting Limit (MRL)

Approved by: David Dickinson Laboratory Director

Date: 26 June 9.2

Environmental Science Services

532 Atwells Avenue, Providence, Rhode Island 02909 (401) 421-0398 Fax, (401) 421-57 it

191 Post Road West, Westport, Connecticut 06880 (203) 221-2753 Fax. (203) 454-4970

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CERTIFICATE OF ANALASIS

BASE NEUTRAL EXTRACTABLES EPA 8270

Client: ATEC Environmental Consultants	
Client Project ID: U.S. Army-Ft. Devens	ESS Project ID: 921516
Client Sample ID: Stock-24	ESS Sample ID: 921516-04
Date Sample Received: 6/10/92	Date Reported: 6/26/92

Parameter	Result (ug/Kg)	MRL*
Acenaphthylene	ND	1,650
1,2,4-Trichlorobenzene	ND	1,650
Hexachlorobenzene	ND	1,650
Bis(2-chloroethyl)ether	ND	1,650
2-Chloronaphthalene	ND	1,650
1,2-Dichlorobenzene	ND	1,650
1,3-Dichlorobenzene	ND	1,650
1,4-Dichlorobenzene	ND	1,650
3,3-Dichlorobenzidine	ND	3,300
2,4-Dinitrotoluene	ND	1,650
2,6-Dinitrotoluene	ND	1,650
Fluoranthene	ND	1,650
4-Chlorophenyl phenyl ether	ND	1,650
Bis(2-chloroisopropyl) ether	ND	1,650
Bis(2-chloroethoxy) methane	ND	1,650
Hexachlorobutadiene	ND	1,650
Hexachlorocyclopentadiene	ND	1,650
Isophorone	ND	1,650
Naphthalene	ND	1,650
Nitrobenzene	ND	1,650
N-nitrosodiphenylamine	ND	1,650
N-nitrosodi-n-propylamine	ND	1,650
Bis(2-ethylhexyl)phthalate	ND	1,650
Di-n-butylphthalate	ND	1,650
Di-n-octylphthalate	ND	1,650
Diethyl phthalate	ND	1,650
Dimethyl phthalate	ND	1,650
Benzo(a)anthracene	ND	1,650

* Sample diluted due to matrix interference. ND = Not Detected above Method Reporting Limit (MRL) Approved by: Dávid Dickinson Laboratory Director

Date: 26 June 92

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BASE NEUTRAL EXTRACTABLES cont. EPA 8270

Client: ATEC Environmental Consultants			
Client Project ID: U.S. Army-Ft. Devens	ESS Project ID: 921516		
Client Sample ID: Stock-24	ESS Sample ID: 921516-04		
Date Sample Received: 6/10/92	Date Reported: 6/26/92		

Parameter	Result (ug/Kg)	MRL*
Benzo(a)pyrene	ND	1,650
Benzo(b)fluoranthene	ND	1,650
Benzo(k)fluoranthene	ND	1,650
Chrysene	ND	1,650
Acenaphthene	ND	1,650
Anthracene	ND	1,650
Benzo(ghi)perylene	ND	1,650
Fluorene	ND	1,650
Phenanthrene	ND	1,650
Dibenzo(a,h)anthracene	ND	1,650
Indeno(1,2,3-cd)pyrene	ND	1,650
Pyrene	ND .	1,650
Hexachloroethane	ND	1,650
4-Bromophenyl-phenylether	ND	1,650
Benzyl Alcohol	ND	1,650
Benzoic Acid	ND	8,250
Bis(2-Chloroethoxy)methane	ND	1,650
4-Chloroaniline	ND	1,650
2-Methylnaphthalene	ND	1,650
2-Nitroaniline	ND	8,250
3-Nitroaniline	ND	1,650
Dibenzofuran	ND	1,650
4-Nitroaniline	ND	8,250
Butylbenzylphthalate	ND	1,650

* Sample diluted due to matrix inteference. ND = Not Detected above Method Reporting Limit (MRL)

Approved by: David Dickinson Laboratory Director

Date: .26 / 2.

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Parameter

TCL VOLATILE ORGANICS Method 8240

Client: ATEC Environmental Consultants	
Client Project ID: U.S. Army-Ft. Devens	ESS Project ID: 921516
Client Sample ID: Stock-24	ESS Sample ID: 921516-04
Date Sample Received: 6/10/92	Date Reported: 6/26/92

Result $(\eta \alpha/K\alpha)$

Parameter	Result (ug/kg)	MRL
Methylene Chloride	ND	1,000
1,1-Dichloroethane	ND	1,000
Chloroform	ND	1,000
Carbon Tetrachloride	ND	1,000
1,2-Dichloropropane	ND	1,000
Dibromochloromethane	ND	1,000
1,1,2-Trichloroethane	ND	1,000
Tetrachloroethene	ND	1,000
Chlorobenzene	ND	1,000
1,2-Dichloroethane	ND	1,000
1,1,1-Trichloroethane	ND	1,000
Bromodichloromethane	ND	1,000
Trans-1,3-Dichloropropene	ND	1,000
Bromoform	ND	1,000
1,1,2,2-Tetrachloroethane	ND	1,000
Benzene	ND	1,000
Toluene	ND	1,000
Ethyl Benzene	ND	1,000
Chloromethane	ND	1,000
Bromomethane	ND	1,000
Vinyl Chloride	ND	1,000
Chloroethane	ND	1,000
1,1-Dichloroethene	ND	1,000
1,2-Dichloroethene (Total)	ND	1,000
Trichloroethene	ND	1,000
Acetone	ND	1,000
Carbon Disulfide	ND	1,000
2-Butanone	ND	1,000
Cis-1,3-Dichloropropene	ND	1,000
4-Methyl-2-Pentanone	ND	1,000
2-Hexanone	ND	1,000
Styrene	ND	1,000
Xylenes (Total)	ND	1,000

ND = Not Detected above Method Reporting Limit (MRL)

Approved by:

Dávid Dickinson Laboratory Director <u>' 61</u>

<u>, 292</u> $\frac{2}{6}$ Date:

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Environmental Science Services

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TOXICITY CHARACTERISTICS LEACHING PROCEDURE (TCLP)

METALS

EPA METHOD 1311

Client: ATEC Environmental Consultants Date Sampled: 6/8/92 Client Project ID: U.S. Army-Ft. Devens Date TCLP Performed: 6/18/92 Client Sample ID: Stock-24 Date Leachate Extracted: 6/19/92 ESS Sample ID: 921516-04 Date Extract Analyzed: 6/22/92

•	Act	ual	Adjı	usted*
Target Analyte	Sample Result (mg/L)	Method Reporting Limit	Sample Result (mg/L)	Method Reporting Limit
Antimony	ND	0.2	ND	0.3
Arsenic	ND	0.2	ND	0.2
Cadmium	ND	0.02	ND	0.02
Chromium	ND	0.05	ND	0.05
Lead	0.2	0.1	0.3	0.2
Mercury	ND	0.002	. ND	0.003
Selenium	ND	0.3	ND	0.3
Silver	ND	0.05	ND	0.05
Copper	0.03	0.02	0.03	0.02
Nickel	ND	0.04	ND	0.05
Zinc	0.18	0.02	0.20	0.03
Beryllium	ND	0.01	ND	0.02
Thallium	ND	0.05	ND	0.06

* Actual sample result adjusted for matrix bias. Refer to matrix spike analysis summary form.

ND = Not Detected above Method Reporting Limit (MRL)

Approved by: Dávid Dickinson Laboratory Director

Environmental Science Services

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Date: 16 100-92

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Client: ATEC Environmental Consultants	
Client Project ID: Ft. Devens Remediation	ESS Project ID: 921907
Client Sample ID: RSS-1 (24)	ESS Sample ID: 921907-03
Date Sample Received: 7/24/92	Date Reported: 8/6/92

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Parameter	Results	Units	MRL	Method
Volatile Organics	ND	ug/Kg	Attached	8240
Total Petroleum Hydrocarbon-IR	ND	mg/Kg	10	418.1
Toxicity Characteristic Leaching N	Procedure			1311
Metals Zinc	0.11	mg/L	Attached	6010

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ND = Not Detected above Method Reporting Limit (MRL)

Approved by: Bavid Dickinson Laboratory Director

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Date: 61/1:92

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TCL VOLATILE ORGANICS Method 8240

Client: ATEC Environmental Consultants		
Client Project ID: Ft. Devens Remediation	ESS Project ID:	921907
Client Sample ID: RSS-1 (24)	ESS Sample ID:	921907-03
Date Sample Received: 7/24/92	Date Reported:	8/6/92

Parameter	Result (ug/Kg)	MRL
Benzene	ND	5
Toluene	ND	5
Ethyl Benzene	ND	5
Xylenes (Total)	ND	10

ND = Not Detected above Method Reporting Limit (MRL)

Approved by: David Dickinson Laboratory Director

Date:_

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Volatile Organics	ND	ug/Kg	Attached	d 8240
Parameter	Results	Units	MRL	Method
Date Sample Received: 7/24/92		Date Rep	oorted: (3/6/92
Client Sample ID: RSS-2 (24)		ESS Samp	ole ID: 9	921907-04
Client Project ID: Ft. Devens Re	emediation	ESS Proj	ect ID:	921907
Client: ATEC Environmental Consu	ltants			

Total Petroleum Hydrocarbon-IR 10,800 mg/Kg Toxicity Characteristic Leaching Procedure 1311 6010 Metals ND mg/L Attached

ND = Not Detected above Method Reporting Limit (MRL)

Approved by David Dickinson Laboratory Director

Date: 6/00

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532 Anordis Avenue, Providence, Rhode Island 02000 (401) 421-0398 Eox, (401) 421-5731



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TCL VOLATILE ORGANICS Method 8240

Client: ATEC Environmental Consultants	
Client Project ID: Ft. Devens Remediation	ESS Project ID: 921907
Client Sample ID: RSS-2 (24)	ESS Sample ID: 921907-04
Date Sample Received: 7/24/92	Date Reported: 8/6/92

Parameter	Result (ug/Kg)	MRL
Benzene	ND	5
Toluene	ND	5
Ethyl Benzene	ND ·	5
Xylenes (Total)	ND	10

ND = Not Detected above Method Reporting Limit (MRL)

Approved by: David Dickinson Laboratory Director

Date: 6/mg/12

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Environmental Science Services



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TOXICITY CHARACTERISTICS LEACHING PROCEDURE (TCLP)

METALS

EPA METHOD 1311

Client: ATEC Environmental Consultants / Date Sampled: 7/23/92

Client Project ID: Ft. Devens Remediation Date TCLP Performed: 7/27/92 Client Sample ID: RSS-1 (24) Date Leachate Extracted: 7/28/92 ESS Sample ID: 921907-03 Date Extract Analyzed: 7/29/92

	Act	ual	Adjı	usted*
Target Analyte	Sample Result (mg/L)	Method Reporting Limit	Sample Result (mg/L)	Method Reporting Limit
Antimony	ND	0.2	ND	0.4
Arsenic	ND	0.2	ND	0.2
Cadmium	ND	0.02	ND	0.03
Chromium	ND	0.05	ND	0.05
Lead	ND	0.1	ND	0.1
Mercury	ND	0.005	ND	0.005
Selenium	ND	0.3	ND	0.3
Silver	ND	0.05	ND	0.09
Copper	ND	0.02	ND	0.02
Nickel	ND	0.04	ND	0.04
Zinc	0.09	0.02	0.11	0.03
Beryllium	ND	0.02	ND	0.04
Thallium	ND	0.3	ND	0.6

* Actual sample result adjusted for matrix bias. Refer to matrix spike analysis summary form.

ND = Not Detected above Method Reporting Limit (MRL)

Approved by: Ðấ√iđ Dick. Laboratory Director

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TOXICITY CHARACTERISTICS LEACHING PROCEDURE (TCLP)

METALS

EPA METHOD 1311

Client: ATEC Environmental Consultants / Date Sampled: 7/23/92

Client Project ID: Ft. Devens Remediation Date TCLP Performed: 7/27/92Client Sample ID: RSS-2 (24)Date Leachate Extracted: 7/28/92ESS Sample ID: 921907-04Date Extract Analyzed: 7/29/92

	Act	ual	Adjı	usted*
Target Analyte	Sample Result (mg/L)	Method Reporting Limit	Sample Result (mg/L)	Method Reporting Limit
Antimony	ND	0.2	ND	0.4
Arsenic	ND	0.2	ND	0.2
Cadmium	ND	0.02	ND	0.03
Chromium	ND	0.05	ND	0.05
Lead	ND	0.1	ND	0.1
Mercury	ND	0.005	. ND	0.005
Selenium	ND	0.3	ND	0.3
Silver	ND	0.05	ND	0.09
Copper	ND	0.02	ND	0.02
Nickel	ND	0.04	ND	0.04
Zinc	ND	0.02	ND	0.03
Beryllium	ND	0.02	ND	0.04
Thallium	ND	0.3	ND	0.6

* Actual sample result adjusted for matrix bias. Refer to matrix spike analysis summary form.

ND = Not Detected above Method Reporting Limit (MRL)

Approved by a Dickinson Laboratory Director

Date: 6 1/4 - 1

Environmental Science Services

532 Arwells Avenue, Providence, Rhode Bland (2290) (401) 421/0398 Fax, (301) 421/5731



4.9 CHAIN OF CUSTODY FORMS

The following chain of custody forms were produced for the soil samples which were laboratory analyzed.

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4.10 HAZARDOUS WASTE MANIFEST

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UST No. 0024 was estimated to contain approximately 34 gallons of No. 2 fuel oil and residual materials. Approximately 14 gallons of fuel oil were removed on January 6, 1992, and tranported to a licensed Treatment Storage Disposal Facility (Beede Waste Oil Corporation, Plaistow, New Hampshire) for disposal. Approximately 20 gallons of residuals were removed and drummed on January 9, 1992 for transportation at a later date. Drummed material was transported to Cyn Environmental, Stoughton, MA, on June 5, 1992.

The following Hazardous Waste Manifest was generated from residual tank materials.

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se print or type. (Form designed for use on elite (12-pitcl				·	T			Ъ
	Generator US EPA II ムーマクノレーマ	DNO. 1.1. F. L. F. (1)	Manifest Document No.	2. Page 1		in the shade ed by Federa		
WASTE MANIFEST MI 3. Generator's Name and Mailing Address H0 5			FDGOO	1(anifest Docum			1
AFZ	D-DEQ D	24 10	10000	MASS	R35363	1		MA
4. Generator's Phone (508) 796-3002	Devens,	MA 12433	0711	B State G	in ID CAEMAR			п
4. Generator's Phone (300) 7/6-3002 5. Transporter 1 Company Name	<u> </u>	R 508-790 US EPA ID NUI	<u>— 2///</u> пber ·	rC State/Tr	ans Di Frie	64-6.34		យ ហ
Beede Waste Oil Corp.	. Nili	ID 018958	14011.	龙车府	日山内京	気気な	67 <u>1 2 6</u>	ш г
7. Transporter 2 Company Name	8.	US EPA ID Nu	nber .	SD R ranspo	rter's Phone ans ID	<u>113-33</u> 8	2-5761	ω D
9. Designated Facility Name and Site Address	10.	US EPA ID Nui	nber					
Beede Waste Oil Corp.	10.		, '		rter Phone U			
Kelley Road PO Box 12	7 1.			FGSState Fi	cifity,s)D	Not Re	quired at	СОРҮ>1
Plaistow, NH 03865		1 D 0189 58	140 12. Cont			382	197.6120	Ž
11. US DOT Description (Including Proper Shipping Na	me, Hazard Class, i	ind ID Number)	No.		13, 00, Total Quantity	Unit Wt/Vol	Weste No 3	
δ.		· .			,	-		
WASTE PETROLEUM OILS.	N.O.S.		1 :	TT .	22.50	G	MAOIE	
COMBUSTIBLE LIQUID NA	1270			┞╾┝╤┦─┶	2299	-		FA
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Additional Descriptions for Materials Listed Abover	nclude physical sta	te and hazard code h			Codes for W	astas Listed	Above	T O
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			All Carlos					r s
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15. Special Handling Instructions and Additional Inform	nation				*** •*			NAT
To be Recycled	,				· · · · · · · · · · · · · · · · · · ·	-		ΠO
16. GENERATOR'S'CERTIFICATION: I hereby declare that the cor	ntents of this consignm	ent are fully and accurate	ly described above b	y.	Recyc	le		N N
proper shipping name and are classified, packed, marked, an according to applicable international and national governmen	d labeled, and are in all							TA
If I am a large quantity generator, I certify that I have a progra	am in place to reduce th	e volume and toxicity of v	vaste generated to th	ne degree I have	determined to b	e economically	practicable	
and that I have selected the practicable method of treatment ment; OR, if I am a small quantity generator, I have made a ge	t, storage, or disposal c ood faith effort to minir	urrently available to me wi nize my waste generation	hich minimizes the p and select the best v	resent and lutur waste manager	e threat to huma sent method that	in health and th is available to	me and that !	
can afford.				1			Date	
Printed/TypedName		Signature	h K br			Month	10,6192	
17. Transporter 1 Acknowledgement of Receipt of	Materials		<i>iv - v</i>				Date	_
Printed/Typed Name	$\frac{1}{r}$	Signature	LIM	1	1	Month	Day Year	
18. Transporter 2 Acknowledgement of Receipt of	니 <u>, (</u> Materials	Ganer		frand	Jef-	017	0 4 7 2 Date	ŧ
Printed/Typed Name	18 1	Signature	•	6		Month	Day Year	1
19 Discreption Ladianian Service								-
19. Discrepancy Indication Space								
-								
20. Facility Owner or Operator: Certification of receipt	of hazardous mater	ials covered by this m	anifest except as	noted in Item	19.		•]
						1	Date	1

5 MINUUGH LIGHT CUTICS, SECTEVENS

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4.11 PERMITS AND CERTIFICATIONS

The following permit was obtained for the proper closure of a UST. Following the permit there is a disposal receipt for the steel UST.

The Commonwealth of Massachusetts DEPARTMENT OF PUBLIC SAFETY DIVISION OF FIRE PREVENTION 15 HUNSEH 42 8.46 K.4.L. -FOR REMOVAL AND TRANSPORTATION TO APPROVED TANK YARD DIG SAFE NUMBER In accordance with the provisions of Chapter 148, 3.1, as provided in Section 38A this permit is granted to 22020 BA this permit is granted to Name: <u>Ater Environmental Associates Inc.</u> Full name of person, firm or Corporation To transport underground steel storage tank(s) 181 B411 _ ma to Approved tank yards.] 4a State clearly type of inert gas used in steel storage tank steel tank: method FDID# 19919 Name and address of contractor disposing tank ATE C. Accord Park Dr. Norvell N/A Fee paid \$ Location to which tank will be transported vard# This permit will expire 31 Jan 1992 Ignature of official gr (Head of Fire Dept.) official granting 27.5 7 1 ļ

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Tank 24 Building 1435

SRECHIET OF DISPOSAL OF UNDERGROUND STEEL	ISTORAGE WANK
NAME AND ADDRESS JOHN C. TOMBARELLO OF 207 MARSTON SI. APPROVED TANK YARD LAWRENCE, MASS. OF APPROVED TANK YARD NO. 1 4 9 0 Tank Yard Ledger 502 CMR 3.03(4) Number:	
I certify under penalty of law I have personally exa delivered to this "approved tank yard" by firm, corr	mined the underground steel storage tank coration or partnership $\underline{A} + \underline{C} + \underline{C}$
The second s	MISSAINSPITS OFFICE TIRE MARSHALLS OFFICE.
DIMENSIONS	Tank Removed From
Width Length	Building 1435
Tank 1 48 x 10	(no. street) Fort Devens MA
Tank 2 X	(city or town)
Tank 3 X	Fire Department
Tank 4 X	Permit # (if applicable)
Tank 5 X (feet) (feet)	

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4.12 UST CLOSURE CHECKLIST

The following closure checklist was produced by ATEC Associates Inc., to ensure quality control of the proper abandonment of a UST.

UST-CLOSURE O/C CHECK LIST 1000 gal Alo, 2 A	UST NO	24 - 0	Ida 1435 F.	- Devens	
1000 gal No. 2 H	Jel		/		
DEFINABLE FEATURE	DATE	TIME	MEASUREMENTS		NOTES
Calibrate PID & LEL/O2 meters	1/9/92	8:30			Site Topography: legend
Drain & flush piping & pumps	1/9/92	9:30	[
Excavate to top of tank	1/9/92	9:00	[Depth to tank: 1,
Vent tank note LEL/O2 levels & times	1/10/52		LEL	O2	Volititus - actaine 1 a Lunke as inet allow Tee
		T1: //; c <ੋ	0-9%	11.5	Junke a just a Day Tee
		T2: · · · ·	يې ^ي مېرىن	- <u>-</u>	i _n
		T3: 77:20		2	
	1	T4: 11:11	4	<u>.</u>	
		T5: 19.20	6.5174	Z0.7.5	
		T6: 17:1-	2000	the state of the s	
······		T7:			
		T8:]
		T9:			
		T10:			
		T11:			
		T12:		-	
	1				
Pump & clean tank:	116200		gal. liquid +	20 cal	Tank Dimensions: 16.5
Note quantities liquid (gal) & sludge (lbs)	1.19/192-	12'00	lbs. sludge	······	
Remove all tank connections, and cap openings	1/9/92	10100		~~~~~~~~~~	
					· .
Excavate soils to free tank	1/9/92	10.00			

Segregate stained soils: Note PID readings	170 197	930	PID (ppm)	NDIR (ppm)	
(if >10 ppm NDIR also)			11.0		all
All soils required to			5.2		1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
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### 4.13 INSTALLATION

The installation of a replacement UST No. 0024 was not performed.

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# **ATEC Promises**

- To be totally responsive to our clients' wants and needs with a constant sense of urgency.
- To perform high quality services with technically superior personnel.
- To perform all assignments for a reasonable fee and within budget.
- To communicate with our clients frequently so there will be no surprises.
- To complete our assignments and deliver reports when promised.
- To review reports with our clients to be sure there are no misunderstandings.
- To deliver accurate invoices to our clients within seven (7) days after the completion of the assignment or as required by the clients.
- To follow up with the clients to be sure services completely satisfied their wants and needs.



(317) 577-1761

At ATEC, "Client satisfaction with a constant sense of urgency" is our goal. If you have concerns with an ATEC project or service that your local ATEC Representative has not resolved, please call 1-800-800-ATEC, a "hot line" to my office. We will do everything possible to satisfy your concerns. If you have received quality service, we would appreciate knowing that as well. Thank you for allowing us to work on your team.

Sincerely, hald Marm_

Gerald D. Mann President ATEC Associates, Inc.

Corporate Headquarters – Client Satisfaction Hot Line 1-800-800-ATEC (1-800-800-2832)