REVIEW COMMENTS FOR PRELIMINARY DRAFT VOLUME 1 OF 2 REMEDIAL INVESTIGATION REPORT FIREFIGHTER TRAINING AREA, LIGHTER AMPHIBIOUS RESUPPLY CARGO (LARC) 60 MAINTENANCE AREA, AND AUTO CRAFT ARE FORT STORY VA

9/26/1995

U.S. ARMY TRANSPORTATION CENTER FORT EUSTIS VA

File: 6C.10

REVIEW COMMENTS

DOCUMENT:	*Preliminary Draft, Volume I of II, Remedial Investigation Report, Fort Story, Virginia* Document: S0405+S0406		
PREPARED BY:	Malcolm Pirnie	DATE OF DOCUMENT:	August 1995
PROJECT:	Fire Training Area LARC 60 Maintenance Area Auto Craft Shop	1383 NUMBER:	STOS930001 STOS930004 STOS930006
REVIEWED BY:	Dan Musel, Fort Eustis	DATE OF REVIEW:	26 Sept. 1995

NO.	SECTION	PAGE	PARA.	COMMENTS
1				Remove the Malcolm Pirnie 100 year logo from all the pages.
2				Put a clear or heavy stock paper between the cover letter or first page with ink and the binder cover. The ink for the cover page sticks to the binder cover.
3	Executive Summary			The Executive Summary is way too long. Remove the figures and limit the summary to one page per site.
4	Es.2	ES-2	4th bullet	Fire Training Area 4th bullet: Change the designation of the 'Solvent Plume Area.' 'Solvent Plume' seems to be a little harsh.
5	Figures			Include building numbers on all figures.
6	Es.3	ES-4	4th bullet	PCE was also detected in the Northern area. 1,1-DCA was detected only once (SW04-10) and 1,1,1-TCA was detected at two locations (SW04-10 and SW04-11), please reword 'detected at several locations.' To me, 'several locations' indicates more than two.
7	Es.3	ES-4	6th bullet	Which one, total or dissolved metals, should be compared to the EPA and Virginia screening criteria?
8	Table ES-2			LARC 60 Area: TPH was also detected in the groundwater. See page 4-29.
9	Es.3	ES-5	3rd bullet	Fate and Transport, 3rd bullet: Remove the statement; 'additional groundwater sampling should show a decrease over time of PCE and its degradation products.' Restate; 'PCE and its degradation products have shown to decrease over time.' I don't want to leave the door open for us to take additional groundwater samples to prove it will decrease. May want to use the new buzz word 'natural attenuation.'
10	Es.4	ES-6	1st bullet	State the values are below EPA soil screening values. This statement is buried in the last bullet for Nature and Extent on page ES-7.
11	Es.4	ES-6	3rd bullet	After looking at the table on page 4-21 which compares the range of detections to the EPA screening value, there appears to be no metal contamination at the sites. Please clarify why it was stated 'the lateral extent of metal contamination was not defined.'
12	Es.4	ES-6	6th bullet	What rational was used to come up with the conclusion the vertical extent of contamination is limited to above 39.5

NO.	SECTION	PAGE	PARA.	COMMENTS
				feet? According to Table 4-12 and 4-13, there were no VOCs, SOCs and TPH detected in the two deep wells (6MW-2 and 6MW-3D) and one DPT sample (GW06-017). Some limited metals were detected in 6MW-2. Please clarify. The vertical extent should be above 15 feet.
13	Es.4	ES-6	7th bullet	There is no indication of free product in Section 4.4.4. Please provide the rational for the determination of free product. Why wasn't there higher detections of waste oils and chlorinated solvents in the monitoring wells near the Former UST? If there is free product in a well, then the well should not be sampled. Enclosed is a letter from Environmental Technology dated February 20, 1995. The letter conveys the results of the site work done by the USCOE, Norfolk District. PCE and TCE was detected in one groundwater sample at 2,700 and 8,800 µg/L respectively. Also enclosed is an April 28, 1995, letter from Earth Tech indicating there was no free product. Please clarify this so called 'free product.' If you need any additional information on this issue, please let me know.
14	Es.5	ES-8	1st bullet	State the values are below EPA soil screening values. This statement is buried in the last bullet for Nature and Extent on page ES-9.
15	Es.5	ES-8	3rd bullet	The screening value for chloroform is 0.15 µg/L, however; the detection limit was 5 µg/L. Is it possible to achieve a detection limit lower then 0.15 µg/L? When evaluating non-detects, is half the detection limit used? If this is true, then chloroform would then be a COPC. Please clarify.
16	1.2.3	1-9		USACE, Norfolk District Groundwater Sampling: See comment number 12.
17	Table 2-2			Table was separated by two pages of text (pages 3-2 and 3-3). Remove these two pages.
18	2.3.1	2-14		Soils 1st and 2nd bullets: Figure 2-6 and table 2-3 indicates there was 22 soil borings not the 21 indicated in the text. There was 8 soil borings in the vicinity of the FTA. Please clarify.
19	Table 2-3			DPT Groundwater Samples: According to the text on page 2-14 and Table 2-4, the total number of DPT groundwater samples should be 24 not 23. Please clarify why there is only 23 DPT groundwater sampling points listed on Table 2-3 and on Figure 2-5. S and GC numbers don't match those on page 4-14.
20	2.3.2	2-16		Soil 2nd bullet: According to Figure 2-8 and the total number of borings being 23, 7 soil borings were advanced near the OWS. Please clarify.
21	Table 2-6			According to Table 4-13, Savannah Laboratory did not analyze GW06-18 for SVOCs and TPH Heavy.
22	3.1	3-1	1	The reference to the Fort Story map being in Section 8 must be a typo because Section 8 is the Recommendations. Please clarify.
23	3.1.5	3-9	2	There is no Table 3-3 which represents a summary of the

NO.	SECTION	PAGE	PARA.	COMMENTS
				water elevations and well construction details. Please add this Table to the report.
24	3.1.5	3-9	4	Need to determine if the Columbia Aquifer below Fort Story will be used as a drinking water source. This statement will carry over into the baseline risk assessment.
25	4.1.2	4-2		Page 4-16 is placed after page 4-2.
26	4.1.3	4-3		Enclosed is a letter from VDEQ with preliminary ARARs. Please review this letter and make any additions to the ARARs list.
27	4.1.3	4-3		TBC Criteria: The most recent EPA Region III Risk -based Concentration Tables should be used (March 1995). These tables were published quarterly. I heard EPA was going to start publishing them semi-annually instead of quarterly.
28	Table 4-1			VDEQ will compare detected compounds to the 'Soil Screening Levels - Transfers From Soil to Air and Groundwater' values. These values are in the most recent (March 1995) EPA tables. Please add these values to the tables and make the comparison.
29	4.2	4-4	3	Should we be concerned about the amount of chloroform detected in the tap water at Fort Story. The EPA screening limit is 0.15 µg/l and you detected 65 and 15 µg/l. Could the chloroform at the Auto Craft Shop be from the tap water rinse even though the report states differently?
30	4.3.1	4-5	2	Soil values should also be compared to EPA's "Residential Soil" and "Soil Screening Levels Transfer from Soil to Air and Groundwater" values. The future land use of the FTA is industrial, however; VDEQ will want us to make the comparison. Hopefully, none of our soil values will be above the Residential values.
31	Table 4-5			Add EPA's RBC values for "Residential Soil" and "Soil Screening Levels Transfer from Soil to Air and Groundwater" to the tables. VDEQ will compare the detected values to these EPA values.
32	4.3.2	4-9	2	Why was the sediment samples compared to the EPA's Industrial soil values. Sediments values should be compared to the EPA BTAG values. Please make the necessary corrections. Enclosed is a letter and the EPA BTAG Screening Levels.
33	4.3.3	4-11	1	Indicate in this paragraph or on Table 4-7 which wells were the ones screened at the deep interval. Do this also for the DPT sample points.
34		4-16		Page 4-34 was inserted after page 4-16. Please move page 4-34 to its correct location.
35	4.3.3	4-19	1	Solvent Plume Area, 3rd sentence: Acetone was detected in 4MW-4 (at 28 µg/l) but the measured value was two orders of magnitude ***"less"*** than the screening criteria (3,700 µg/l). Add the word "less."
36	Table 4-9			Add EPA's RBC values for "Residential Soil" and "Soil Screening Levels Transfer from Soil to Air and Groundwater" to the tables. VDEQ will compare the detected values to

NO.	SECTION	PAGE	PARA.	COMMENTS
				these EPA values.
37	4.4.1	4-22	4	Former UST Area: See comment number 13.
38	4.4.2	4-24	2	Why was the sediment samples compared to the EPA's Industrial soil values? Sediments values should be compared to the EPA BTAG values. Please make the necessary corrections. Enclosed is a letter and the EPA BTAG Screening Levels.
39	4.4.4	4-28	1	Indicate in this paragraph or on Table 4-12 which wells were the ones screened at the deep interval. Do this also for the DPT sample points.
40	4.4.4	4-29	1	PCE concentration for MW-117 should be 8.5 µg/l not 8.4 µg/l.
41	Figure 4-4			Petroleum Related Compounds, MW-117: TPH as Diesel fuel should be 3.0 mg/L not 2.7 mg/L.
42	4.4.4	4-33		Page 5-9 was inserted after page 4-33. Please move page 5-9 to its correct location.
43	4.4.4	4-36	1	Environmental Technology detected PCE at 2,700 µg/L which is within the range of 1 to 10 percent of the aqueous solubility. This would indicate a DNAPL. Please clarify this so called 'free product.' ETI also indicated in their letter that there was no free product. Should we include ETI's results in this report? I think VDEQ will request their sampling results.
44	Table 4-14			Soil values should also be compared to EPA's "Residential Soil" and "Soil Screening Levels Transfer from Soil to Air and Groundwater" values. The future land use of the Auto Craft Area is unknown. VDEQ will want us to make the comparison. Hopefully, none of our soil values will be above the Residential values.
45	Table 4-14			SB-07-001: Is the detection limit for TPH "<100 and <340" or should it be "<10 and <34?" Please clarify
46	4.5.2	4-42		Indicate in this paragraph or on Table 4-15 which wells were the ones screened at the deep interval. Do this also for the DPT sampling points.
47	Table 4-15			See comment number 15.
48	4.5.2	4-44	table	Distribution of Sample Testing by Lab Table: According to Table 2-8 and Table 4-16, only 5 samples were analyzed "On-site" and "Off-site and On-site" for TPH Light. Please make the corrections.
49	Table 4-16			The screening value for Vinyl chloride is 0.019 µg/L, however; the detection limit was 10 and 50 µg/L. Is it possible to achieve a detection limit lower then 0.019 µg/L? When evaluating non-detects, is half the detection limit used? If this is true, then Vinyl chloride would then be a COPC. Please clarify.
50	5.3	5-8	4th bullet	See comment number 43 about ETI's detection of PCE. Do we have a DNAPL or not?
51	5-9			Page 6-15 was inserted after page 5-9. Please move page 6-15 to its correct location.

DEQ Tracking Number
PC90-1092

Environmental Technology
of North America, Inc.
A HazWaste Company

February 20, 1995

Mr. Donald W. Dow, Jr.
U.S. Army Corps of Engineers
Southern Virginia Area Office
P.O. Drawer B
Fort Eustis, Virginia 23604

RE: Contract DACA65-94-D-0067
Delivery Order 0013
Additional Data for Building 1081, Fort Story, Virginia
ETI Job No. 1395-V13

Dear Mr. Dow:

Environmental Technology of North America, Inc. (ETI) is pleased to provide additional data to help determine the extent of waste oil contamination at Fort Story's Building 1081. We have investigated the area where excavated soils are thought to have been used as backfill in the excavation created after the removal of a 10,000-gallon waste oil tank. ETI used Direct Push Technology (DPT), a quick and accurate sampling method, to collect continuous soil samples at four locations around the inside perimeter of the backfilled area and at one location in the center of the backfilled area (see Attachment 1). Each continuous soil sample was screened with a photoionization detector (PID) and a sample was collected from the backfill material exhibiting the highest PID reading per the state's request (Attachment 2). Samples were sent to an off-site Missouri River District U.S. Army Corps of Engineers (COE)-approved laboratory for total petroleum hydrocarbon (TPH) analysis. A composite sample from the five borings was collected and analyzed for TPH and disposal parameters. A composite of four grab samples from the soil stockpile was collected and analyzed for TPH and disposal parameters.

Following collection of all soil samples, a clean, dedicated ground water sampling probe was used to collect a ground water sample from the boring in the center of the backfilled tank pit. The sample was collected using a Teflon® bailer. The ground water sample was analyzed for TPH, benzene, toluene, ethyl benzene and xylenes (BTEX), perchloroethylene (PCE), and PCE breakdown components. The use of DPT methodology generated no well cuttings, which would have required additional sampling and costly disposal. Due to access problems (deep sand), DPT proved to be the most effective tool to complete the work.

The field investigation was conducted on January 26, 1995. Soil borings were advanced using the DPT rig and a 4-foot corer that collects the cores in an acetate sleeve. By observing the cores in the acetate sleeve, it was possible to differentiate between the backfill material (coarse white

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sand) and the native material (medium tan sand). PID readings were taken by slitting the sleeve lengthwise and moving the PID probe down the length of the core. The results for the PID screening are presented in Attachment 3.

The ground water sampling depth was selected based on observation of saturated soils in the soil cores between 10.5 feet and 12 feet below ground surface. The ground water sample was collected from the interval between 11.2 feet to 12.2 feet below ground surface at soil sampling location 5.

Analytical Results

Soil samples collected from the backfill material were analyzed for TPH volatiles and semivolatiles using United States Environmental Protection Agency (EPA) Method 5030/8015-Modified and Method 3550/8015-Modified. The composite soil samples were analyzed for TPH volatiles and semivolatiles and for the following disposal parameters:

Parameter	Method
BTEX	EPA Method 8020
IRC	Method SW 846 7.1 - 7.3
TCLP/RCRA Metals	EPA Method 1310
PCBs	EPA Method 8080
EOX (Total Organic Halides)	Dohrman
Paint Filter	EPA Method 9095

The ground water sample was analyzed for the following parameters:

Parameter	Method
TPH Volatiles	EPA Method 5030/8015
TPH Semivolatiles	EPA Method 3510/8015
BTEX	EPA Method 8020
PCE and breakdown components	EPA Method 8010

A copy of the laboratory report with the chain-of-custody form is included as Attachment 4. The analytical results are summarized in the Tables 2 and 3, which appear in Attachment 2.

Recommendations

Based on the visual inspection of the continuous soil cores, the soil removed from the tank pit (approximately 50 cubic yards) was not used as backfill. It was placed on two layers of polyethylene sheeting adjacent to the excavated tank pit and left uncovered. A composite sample of the excavated soil, which was collected at the time of excavation (September 28, 1992) by members of the Environmental Restoration Company (ERC), contained 12,173 milligrams per kilogram (mg/kg) TPH.

Concentrations of TPH in three samples collected from the bottom of the excavated tank pit by ERC on September 28, 1992, ranged from 62,823 mg/kg TPH to 36,353 mg/kg TPH.

ETI recommends:

- Removal and proper disposal of the soil stockpile;
- Excavation and proper disposal of all saturated soils in and around the tank pit;
- Staging of all unsaturated backfill material for reuse as backfill following excavation of the saturated soils; and
- Backfilling the excavation with clean backfill in accordance with the Contract.

At this time, there is not adequate information to determine the potential volume of saturated soil that will require removal. Therefore, there are two options:

1. Begin excavation of the saturated soil and continue excavation until the limits of the saturated soil are reached; or
2. Use the DPT rig to delineate the extent of saturated soils prior to excavation to obtain a volume estimate prior to beginning excavation.

The ground water sample analysis indicated elevated concentrations of TPH, PCE, and PCE breakdown products. Because another investigation is underway through the Baltimore District of the COE addressing chlorinated contaminants and TPH in the ground water, ETI recommends no action regarding these contaminants, pending completion of the Baltimore study.

If you have any questions concerning this report or the recommendations made, please contact me at (804) 358-5400.

Sincerely,

Dale E. Wright
Project Manager
DPT Program Manager

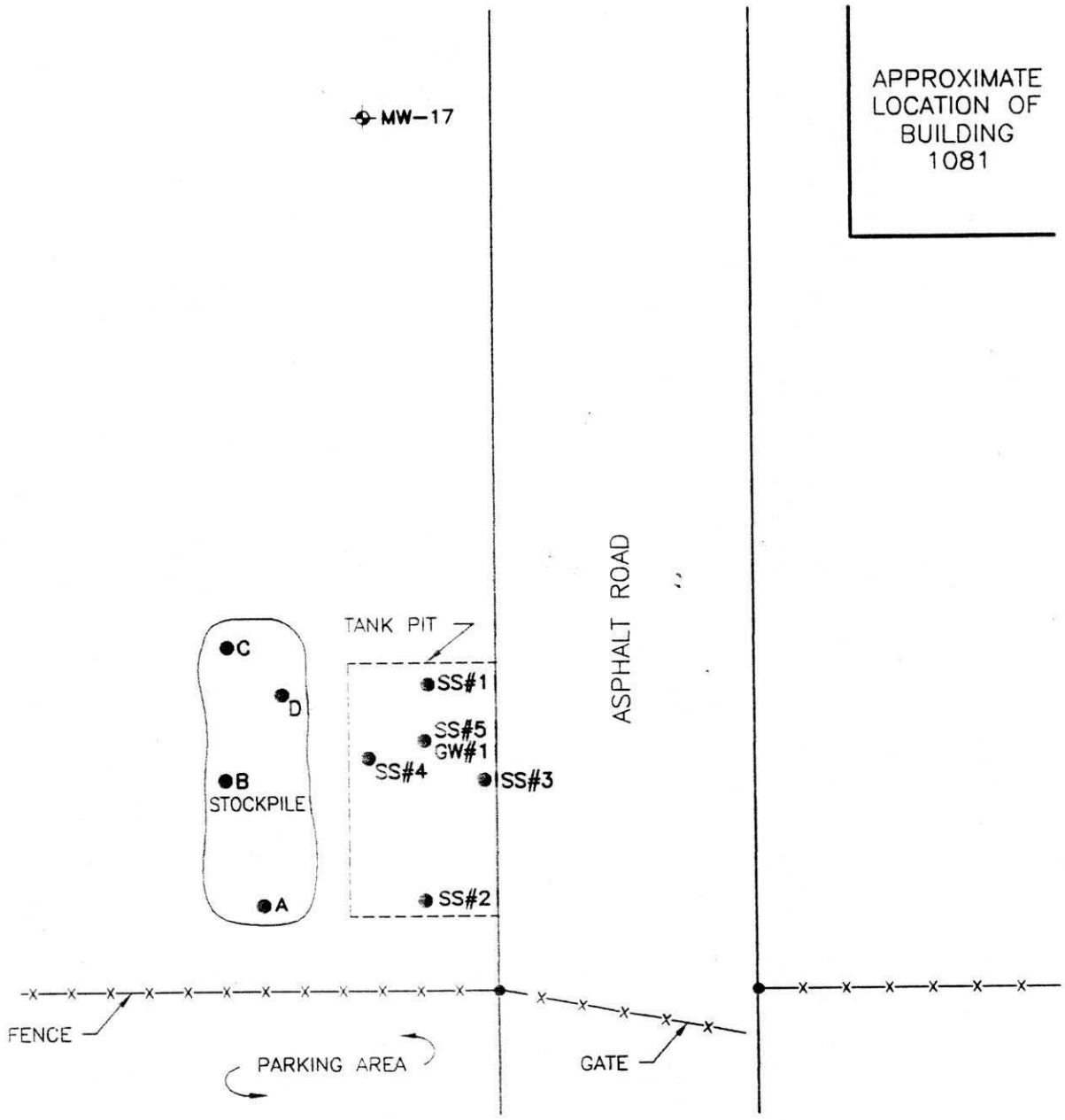
DEW/mtr
ed:vs

Attachments

I:\WP\COE\FTSTORY\DOW.V13

Attachment 1

Sample Locations



LEGEND

MW-17 — MONITORING WELL LOCATION AND DESIGNATION

SS#2 — SOIL SAMPLE LOCATION AND DESIGNATION

GRAPHIC SCALE

20 0 20 40

1" = 20'

PROJECT: FORT STORY, VIRGINIA BEACH, VIRGINIA		Environmental Technology of North America, Inc.		
PROJECT MANAGER: D.E.W.	PROJECT NO.: 1395-V13	FIGURE TITLE: SAMPLE LOCATIONS AT OLD TANK PIT NEAR BUILDING 1081		
DRAWN BY: C.B.W.	REVIEWED BY: B.F.H.	DATE: 2/20/95	SCALE: AS SHOWN	FIGURE NO.: 1

CADD FILE: FOR13958.DWG

Attachment 2

Letter from VDEQ

COMMONWEALTH of VIRGINIA

PETER W. SCHMIDT
DIRECTOR

DEPARTMENT OF ENVIRONMENTAL QUALITY

FRANCIS L. DANIEL
REGIONAL DIRECTOR

TIDEWATER REGIONAL OFFICE
287 INDEPENDENCE BOULEVARD
PEMBROKE TWO, SUITE 310
VIRGINIA BEACH, VIRGINIA 23462
(804) 552-1840
FAX (804) 552-1849 TDD # - RICHMOND (804) 762-4021

December 21, 1994

Commander
U.S. Army Transportation Center
Directorate of Public Works
Attn: ATZR-EHE, Stephen A. McCall
Chief, Environmental and Natural
Resources Division
Fort Eustis, Virginia 23604-5332

re: Facility/Location: Fort Story, Building 1081, 10,000 Gallon Waste Oil Underground Storage Tank (UST)
DEQ Tracking Number: PC 90-1092

Dear Sir:

Thank you for providing the Department of Environmental Quality (DEQ) with an Initial Abatement Measures and Site Check (IAM/SC) report for the former 10,000 gallon waste oil UST and the results of tank tightness testing for two 10,000 gallon heating oil USTs located at the above referenced site. The DEQ required no further action at this site in a letter dated August 15, 1994. However, based on the information presented in the IAM/SC report and the observation of stockpiled soil adjacent to the former waste oil UST we are re-opening this case and requesting additional assessments. According to the IAM/SC, petroleum contaminated soil containing very high levels of total petroleum hydrocarbons (up to 62,823 mg/kg) was placed back in the waste oil UST excavation pit. Please provide the following additional site check information to this office by February 27, 1995.

1. Perform five borings (hand auger borings are sufficient) in the backfill of the former waste oil tank location. One boring should be completed in the center of the backfill; the other four should be completed around the inside perimeter of the backfilled area. Collect at least one soil sample (where the heaviest contamination is noted) from each boring and analyze each sample for TPH.

2. Install a temporary monitoring well in the center boring location. Collect a ground water sample for analysis of TPH, BTEX, PCE and PCE breakdown components.

3. Collect a composite soil sample from the stockpiled soil. The soil sample should be analyzed for TPH and any parameters required by the Solid Waste Management Regulations, Disposal Criteria.

Once we have evaluated the additional site check information, you will be contacted if further assessments or remediation are required. The DEQ will not be requiring further assessments related to the two 10,000 gallon heating oil USTs.

If you have questions regarding this matter, please contact me at (804) 552-1157.

Sincerely,

Amy T. Webster
Geologist Senior
Ground Water Section

cc: DEQ-TRO-OE
file ref. PC 90-1092

Attachment 3

Tables

TABLE 1
PID Screening Results

Location	Sample Depth (ft)	PID Measurement (ppm)	Soil Type
SS-1*	0 to 5	<.5	Coarse white sand
	5 to 8	1.0 to 1.2	Coarse white sand
	8 to 9	12	Coarse white sand
	9 to 10.5	25	Medium tan sand
	10.5 to 12	42	Medium tan sand
SS-2**	0 to 6	<.5	Coarse white sand
	6 to 7	.6	Coarse white sand
	7 to 8	1.1	Coarse white sand
	8 to 9	9.0	Coarse white sand
	9 to 9.5	21.2	Coarse white sand
	9.5 to 12	70.1	Medium tan sand
SS-3***	0 to 6	<.5	Coarse white sand
	6 to 7	1.1	Coarse white sand
	7 to 7.5	12.7	Coarse white sand
	7.5 to 9	10.1	Medium tan sand
	9 to 11	19.2	Medium tan sand
	11 to 12	43.2	Medium tan sand
SS-4****	0 to 2	<.5	Coarse white sand
	2 to 3.5	.5	Coarse white sand
	3.5 to 4	.6	Medium tan sand
	4 to 6	<.5	Medium tan sand
	6 to 7	1.0	Medium tan sand
	7 to 8	1.3	Medium tan sand
	8 to 10	27.7	Medium tan sand
	10 to 12	53.3	Medium tan sand
SS-5*****	0 to 6	<.5	Coarse white sand
	6 to 7	1.7	Coarse white sand
	7 to 7.8	5.6	Coarse white sand
	7.8 to 9	22.4	Medium tan sand

*Soil sample #1 collected from backfill at the 8' to 9'interval.
**Soil sample #2 collected from backfill from the 8.5' to 9.5' interval.
***Soil sample #3 collected from backfill from the 6.5' to 7.5' interval.
****Soil Sample #4 collected from backfill from the 2.5' to 3.5' interval.
*****Soil sample #5 collected from backfill from the 7.0' to 7.8' interval.

TABLE 2

Analytical results from soil samples by sample location

	SS–1*	SS–2	SS–3	SS–4	SS–5	Comp. SS1–5	Comp. Soil Sk	Detection Limit & Units
Organic constituents								
Total Recoverable Petroleum Hydro–carbons: Diesel	600	1550	BDL	BDL	40.7		329	10 mg/kg 0.1 mg/kg 50 mg/kg
Total Recoverable Petroleum Hydro–carbons: Gas	10	12	BDL	BDL	11		BDL	2.5 mg/kg 5 mg/kg 0.1 mg/kg
Benzene						BDL	BDL	100 ug/kg 2 ug/kg
Toulene						140	18	100 ug/kg 2 ug/kg
Ethylbenzene						100	BDL	100 ug/kg 2 ug/kg
M & P Xylene						130	5	200 ug/kg 4 ug/kg
O Xylene						190	3	100 ug/kg 2 ug/kg
Total Xylene						320	8	300 ug/kg 6 ug/kg
Polychlorinated Biphenyls						BDL	BDL	0.33 ug/kg 3.3 ug/kg
H2S						BDL	BDL	0.125 mg/kg
CN						BDL	BDL	0.125 mg/kg
Inorganic constituents (TCLP Metals)								
Arsenic						BDL	BDL	0.1 mg/L
Barium						1.10	0.679	0.01 mg/L
Cadmium						BDL	BDL	0.01 mg/L
Chromium						BDL	BDL	0.01 mg/L
Lead						BDL	BDL	0.05 mg/L
Mercury						BDL	BDL	0.0005 mg/L
Selenium						BDL	BDL	0.01 mg/L
Wet chemistry results								
Corrosivity						7.48	7.24	pH units
Extractable Organic Halogens						0.21	0.27	0.1 mg/kg
Ignitability						>70	>70	Deg. C
Paint Filter						Pass	Pass	Pass/Fail

*SS–1, 2, 3, 4, 5 are soil samples collected at locations shown on Figure 1

Comp. SS 1–5 is a composite sample from soil sample locations 1–5

Comp. Soil Sk is a composite sample from the soil stock pile

TABLE 3
Analytical Results from Water Samples

	GW–1*	Trip Blank	Field Blank	Detection Limit & Units
Organic constituents Total Recoverable Petroleum Hydro–carbons	180			40 mg/L
Total Recoverable Petroleum Hydro–carbons: Gas	180	BDL	BDL	100 mg/L 0.10 mg/L
Benzene	BLD			1000 ug/L
Toulene	11,000			1000 ug/L
Ethylbenzene	1200			1000 ug/L
M & P Xylene	3700			2000 ug/L
O Xylene	3500			1000 ug/L
Total Xylene	7200			3000 ug/L
1,1–Dichlorethene	BDL			250 ug/L
Tetrachloroethylene	2700			250 ug/L
Trichloroethene	8800			250 ug/L
Vinyl Chloride	BDL			250 ug/L
cis 1,2–Dichloroethene	5200			250 ug/L
trans–1,2–Dichloroethene	BDL			250 ug/L

*GW–1 groundwater sample collected near the center of the tank pit

Attachment 4

Laboratory Report and Chain-of-Custody Form

Bionomics Laboratory, Inc.

ATLANTA • COLUMBIA • ORLANDO • RICHMOND

4310 E. ANDERSON ROAD, ORLANDO, FLORIDA 32812 (407) 851-2560 FAX (407) 856-0886

FL DEP COAP # 870223G · FL DHRS DW # 83331, ENV # E83012 · NC DEM ENV # 327

SC DHEC # 96012 · VA DCLS DW # 00042

US ARMY CORPS OF ENGINEERS
2229 TOMLYNN ST.
RICHMOND, VA 23230

Attn: DALE WRIGHT

Purchase Order: M52605
Invoice Number:

Order #: B5-02-276
Date: 02/15/95 15:49
Work ID: 1395-V10 MODIFIED P95-042
Date Received: 02/13/95
Date Completed: 02/15/95

Client Code: US_ARMY_CORP

SAMPLE IDENTIFICATION

Sample Number	Sample Description
01	SOIL STOCKPILE COMP
02	TRIP BLANK

Mark Rusler
Certified By
MARK RUSLER, CHEMIST

QUALIFIERS

(Q): Qualifiers
B: Found in associated blank as well as sample
J: Estimated value, less than calibration limit
O: Estimated value, greater than calibration limit
U: Analyzed for, but not detected
BDL: Below Detection Limit

TEST RESULTS BY SAMPLE

Sample Description: SOIL STOCKPILE COMP Lab No: 01A
Test Description: TRPH DIESEL- EPA 3550/8015 Method: 3550/8015 Test Code: TRPH_D
Collected: 02/10/95 14:00

PARAMETER	RESULT	LIMIT	Q
Total Recoverable Pet. Hydro	329	50	

Notes and Definitions for this Report:

EXTRACTED 02/15/95
DATE RUN 02/15/95
ANALYST TY
INSTRUMENT 3400
CONC FACTOR 5
UNITS mg/Kg
COLUMN DB-5MS

Sample Description: SOIL STOCKPILE COMP Lab No: 01A
Test Description: TRPH GAS - CA MOD. METHOD Method: CALIFORNIA Test Code: TRPH_G
Collected: 02/10/95 14:00

PARAMETER	RESULT	LIMIT	Q
Total Rec.Petroleum Hydro: Gas	BDL	5	U

Notes and Definitions for this Report:

DATE RUN 02/14/95
ANALYST AM
INSTRUMENT 3700
CONC FACTOR 1
UNITS mg/Kg
COLUMN DB-624

Sample Description: TRIP BLANK Lab No: 02A
Test Description: TRPH GAS - CA MOD. METHOD Method: CALIFORNIA Test Code: TRPH_G

PARAMETER	RESULT	LIMIT	Q
Total Rec.Petroleum Hydro: Gas	BDL	5	U

Notes and Definitions for this Report:

TEST RESULTS BY SAMPLE

Sample Description: TRIP BLANK Lab No: 02A
Test Description: TRPH GAS - CA MOD. METHOD Method: CALIFORNIA Test Code: TRPH_G

DATE RUN 02/14/95
ANALYST AM
INSTRUMENT 3700
CONC FACTOR 1
UNITS mg/Kg
COLUMN DB-624

CASE NARRATIVE

THE TPH DIESEL DID NOT SHOW A DISTINCT DIESEL PATTERN.
THE VALUE REPORTED IS AN AREA COUNT IN THE DIESEL RANGE.
WE FEEL THIS IS DUE TO LOW MOLECULAR WEIGHT OILS.
THIS SAMPLE ALSO SHOWS A HIGH CONCENTRATION OF HIGH MOLECULAR WEIGHT OIL.

Bionomics Laboratory, Inc.

Atlanta Division

2264 Northwest Parkway, Suite F • Marietta, GA 30067
(404) 984-8070 • Fax (404) 988-0491

FL. HRS E87194 FL. HRS SDW 87368 SC. DHEC #98006
FL DEP CQAP#890201G

ENVIRONMENTAL TECHNOLOGY, INC
c/o BIONOMICS
2227 TOMLYNN STREET
RICHMOND, VA 23230
Attn: DALE WRIGHT

Order #: A5-01-108
Date: 02/06/95 17:54
Work ID: #1395-V10 FT.STORY, BLDG.1081
Date Received: 01/28/95
Date Completed: 02/06/95

Purchase Order: M52605
Invoice Number: not set

Client Code: ETI_RICH_DW

SAMPLE IDENTIFICATION

Sample Number	Sample Description
01	SS1 / N END OF TANK PIT
02	SS2 / S END OF TANK PIT
03	SS3 / E END OF TANK PIT
04	SS4 / W SIDE OF TANK PIT
05	SS5 / CENTER OF TANK PIT
06	COMPOSITE SOIL 1,2,3,4,5
07	COMPOSITE SOIL-STOCKPILE

Richard Alt

Certified By
RICHARD ALT, DIRECTOR

QUALIFIERS

(Q): Qualifiers
B: Found in associated blank as well as sample
J: Estimated value, less than calibration limit
O: Estimated value, greater than calibration limit
U: Analyzed for, but not detected
BDL: Below Detection Limit

Order # A5-01-108
02/06/95 17:54

TEST RESULTS BY SAMPLE

Sample: 06A COMPOSITE SOIL 1,2,3,4,5 Collected: 01/26/95

Test Description	Result	Limit	Units	Analyzed	By
CORROSIVITY	7.48		pH UNITS	01/30/95	WMH
EXTRACTABLE ORG. HALOGENS	0.21	0.10	mg/kg	02/01/95	ETC
IGNITABILITY-PENSKY MARTEN	>70		Degrees Cent.	02/01/95	WMH
PAINT FILTER	PASS		PASS/FAIL	01/30/95	WMH

Sample: 07A COMPOSITE SOIL-STOCKPILE Collected: 01/26/95

Test Description	Result	Limit	Units	Analyzed	By
CORROSIVITY	7.24		pH UNITS	01/30/95	WMH
EXTRACTABLE ORG. HALOGENS	0.27	0.10	mg/kg	02/01/95	ETC
IGNITABILITY-PENSKY MARTEN	>70		Degrees Cent.	02/01/95	WMH
PAINT FILTER	PASS		PASS/FAIL	01/30/95	WMH

TEST RESULTS BY SAMPLE

Sample Description: SS1 / N END OF TANK PIT Lab No: 01A
Test Description: TRPH 3550: IN SOLIDS Method: CALIFORNIA Test Code: TRPH_D
Collected: 01/26/95 11:00

PARAMETER	RESULT	LIMIT	Q
Total Recoverable Pet. Hydro	600	10.0	

Notes and Definitions for this Report:

EXTRACTED 02/01/95
DATE RUN 02/02/95
ANALYST ETC
INSTRUMENT GCETC
CONC FACTOR 1
UNITS mg/kg
COLUMN DB 5

Sample Description: SS1 / N END OF TANK PIT Lab No: 01A
Test Description: TRPH 5030: GAS IN SOLIDS Method: CALIFORNIA Test Code: TRPH_G
Collected: 01/26/95 11:00

PARAMETER	RESULT	LIMIT	Q
Total Rec.Petroleum Hydro: Gas	10	2.5	

Notes and Definitions for this Report:

DATE RUN 02/03/95
ANALYST PC
INSTRUMENT GC1
CONC FACTOR 25
UNITS mg/kg
COLUMN DB 624

Sample Description: SS2 / S END OF TANK PIT Lab No: 02A
Test Description: TRPH 3550: IN SOLIDS Method: CALIFORNIA Test Code: TRPH_D
Collected: 01/26/95 11:55

PARAMETER	RESULT	LIMIT	Q
Total Recoverable Pet. Hydro	1550	10.0	

TEST RESULTS BY SAMPLE

Sample Description: SS2 / S END OF TANK PIT Lab No: 02A
Test Description: TRPH 3550: IN SOLIDS Method: CALIFORNIA Test Code: TRPH_D
Collected: 01/26/95 11:55

Notes and Definitions for this Report:

EXTRACTED 02/01/95
DATE RUN 02/02/95
ANALYST EIC
INSTRUMENT GCETC
CONC FACTOR 1
UNITS mg/kg
COLUMN DB 5

Sample Description: SS2 / S END OF TANK PIT Lab No: 02A
Test Description: TRPH 5030: GAS IN SOLIDS Method: CALIFORNIA Test Code: TRPH_G
Collected: 01/26/95 11:55

PARAMETER	RESULT	LIMIT	Q
Total Rec.Petroleum Hydro: Gas	12	5	

Notes and Definitions for this Report:

DATE RUN 02/03/95
ANALYST PC
INSTRUMENT GC1
CONC FACTOR 50
UNITS mg/kg
COLUMN DB 624

Sample Description: SS3 / E END OF TANK PIT Lab No: 03A
Test Description: TRPH 3550: IN SOLIDS Method: CALIFORNIA Test Code: TRPH_D
Collected: 01/26/95 12:55

PARAMETER	RESULT	LIMIT	Q
Total Recovereble Pet. Hydro	BDL	0.10	U

Notes and Definitions for this Report:

EXTRACTED 02/01/95
DATE RUN 02/02/95
ANALYST EIC
INSTRUMENT GCETC

TEST RESULTS BY SAMPLE

Sample Description: SS3 / E END OF TANK PIT Lab No: 03A
Test Description: TRPH 3550: IN SOLIDS Method: CALIFORNIA Test Code: TRPH_D
Collected: 01/26/95 12:55

CONC FACTOR 1
UNITS mg/kg
COLUMN DB 5

Sample Description: SS3 / E END OF TANK PIT Lab No: 03A
Test Description: TRPH 5030: GAS IN SOLIDS Method: CALIFORNIA Test Code: TRPH_G
Collected: 01/26/95 12:55

PARAMETER	RESULT	LIMIT	Q
Total Rec.Petroleum Hydro: Gas	BDL	0.1	U

Notes and Definitions for this Report:

DATE RUN 02/02/95
ANALYST PC
INSTRUMENT GC1
CONC FACTOR 1
UNITS mg/kg
COLUMN DB 624

Sample Description: SS4 / W SIDE OF TANK PIT Lab No: 04A
Test Description: TRPH 3550: IN SOLIDS Method: CALIFORNIA Test Code: TRPH_D
Collected: 01/26/95 13:40

PARAMETER	RESULT	LIMIT	Q
Total Recoverable Pet. Hydro	BDL	10.0	U

Notes and Definitions for this Report:

EXTRACTED 02/01/95
DATE RUN 02/02/95
ANALYST ETC
INSTRUMENT GCETC
CONC FACTOR 1
UNITS mg/kg
COLUMN DB 5

Order # AS-01-108 Page 6
02/06/95 17:54 TEST RESULTS BY SAMPLE

Sample Description: SS4 / W SIDE OF TANK PIT Lab No: 04A
Test Description: TRPH 5030: GAS IN SOLIDS Method: CALIFORNIA Test Code: TRPH_G
Collected: 01/26/95 13:40

PARAMETER	RESULT	LIMIT	Q
Total Rec.Petroleum Hydro: Gas	BDL	0.1	U

Notes and Definitions for this Report:

DATE RUN 02/02/95
ANALYST PC
INSTRUMENT GC1
CONC FACTOR 1
UNITS mg/kg
COLUMN DB 624

Sample Description: SS5 / CENTER OF TANK PIT Lab No: 05A
Test Description: TRPH 3550: IN SOLIDS Method: CALIFORNIA Test Code: TRPH_D
Collected: 01/26/95 14:15

PARAMETER	RESULT	LIMIT	Q
Total Recoverable Pet. Hydro	40.7	10.0	

Notes and Definitions for this Report:

EXTRACTED 02/01/95
DATE RUN 02/02/95
ANALYST ETC
INSTRUMENT GCETC
CONC FACTOR 1
UNITS mg/kg
COLUMN DB 5

Sample Description: SS5 / CENTER OF TANK PIT Lab No: 05A
Test Description: TRPH 5030: GAS IN SOLIDS Method: CALIFORNIA Test Code: TRPH_G
Collected: 01/26/95 14:15

PARAMETER	RESULT	LIMIT	Q
Total Rec.Petroleum Hydro: Gas	11	5	

Order # A5-01-108 Page 7
02/06/95 17:54 TEST RESULTS BY SAMPLE

Sample Description: SS5 / CENTER OF TANK PIT Lab No: 05A
Test Description: TRPH 5030: GAS IN SOLIDS Method: CALIFORNIA Test Code: TRPH_G
Collected: 01/26/95 14:15

Notes and Definitions for this Report:

DATE RUN 02/03/95
ANALYST PC
INSTRUMENT GC1
CONC FACTOR 50
UNITS mg/kg
COLUMN DB 624

Sample Description: COMPOSITE SOIL 1,2,3,4,5 Lab No: 06A
Test Description: BTEX IN SOLIDS Method: EPA 602/8020 Test Code: BTEXS
Collected: 01/26/95

PARAMETER	RESULT	LIMIT	Q
Benzene	801	100	U
Toluene	140	100	
Ethylbenzene	100	100	
M & P Xylene	130	200	J
O Xylene	190	100	
Total Xylene	320	300	

SURROGATE	%RECOVERY	LIMITS
Fluorobenzene	77	75 - 150
1,4-Dichlorobutane	132	75 - 150
4-Bromochlorobenzene	273 Q	75 - 150

Notes and Definitions for this Report:

DATE RUN 02/03/95
ANALYST PC
INSTRUMENT GC1
CONC FACTOR 50
UNITS ug/kg
COLUMN DB 624

Sample Description: COMPOSITE SOIL 1,2,3,4,5 Lab No: 06A
Test Description: POLYCHLORINATED BIPHENYLS Method: EPA 8080 Test Code: PCB
Collected: 01/26/95

PARAMETER	RESULT	LIMIT	Q

Sample Description: COMPOSITE SOIL 1,2,3,4,5 Lab No: 06A
Test Description: POLYCHLORINATED BIPHENYLS Method: EPA 8080 Test Code: PCB
Collected: 01/26/95

Aroclor 1016 12674-11-2	BDL	0.33	U
Aroclor 1221 11104-28-2	BDL	0.33	U
Aroclor 1232 11141-16-5	BDL	0.33	U
Aroclor 1242 53469-21-9	BDL	0.33	U
Aroclor 1248 12672-29-6	BDL	0.33	U
Aroclor 1254 11097-69-1	BDL	0.33	U
Aroclor 1260 11096-82-5	BDL	0.33	U

SURROGATE	%RECOVERY	LIMITS
Dibutyl Chlorendate	140	5 - 150
TMX	101	5 - 150

Notes and Definitions for this Report:

EXTRACTED 01/31/95
DATE RUN 01/31/95
ANALYST ZBS
INSTRUMENT GC3
FILE ID
CONC FACTOR 1
UNITS ug/kg
COLUMN DB 608

Sample Description: COMPOSITE SOIL 1,2,3,4,5 Lab No: 06A
Test Description: REACTIVITY Method: SW-846 8.3 Test Code: REACTI
Collected: 01/26/95

PARAMETER	RESULT	LIMIT	ANALYST
H2S	BDL	0.125	ETC
CN	BDL	0.125	ETC

Notes and Definitions for this Report:

DATE RUN 02/06/95
UNITS mg/kg

TEST RESULTS BY SAMPLE

Sample Description: COMPOSITE SOIL 1,2,3,4,5 Lab No: 06A
Test Description: REACTIVITY Method: SW-846 8.3 Test Code: REACTI
Collected: 01/26/95

Sample Description: COMPOSITE SOIL 1,2,3,4,5 Lab No: 06A
Test Description: TCLP METALS Method: 6010/7000 Test Code: TCLP_M
Collected: 01/26/95

PARAMETER	RESULT	MS_RECOVERY
Arsenic	<0.100	N/A
Barium	1.10	N/A
Cadmium	<0.010	N/A
Chromium	<0.010	N/A
Lead	<0.050	N/A
Mercury	<0.0005	N/A
Selenium	<0.100	N/A
Silver	<0.010	N/A

Notes and Definitions for this Report:

DATE RUN 02/06/95
UNITS mg/L

Sample Description: COMPOSITE SOIL-STOCKPILE Lab No: 07A
Test Description: BTEX IN SOLIDS Method: EPA 602/8020 Test Code: BTEXS
Collected: 01/26/95 14:45

PARAMETER	RESULT	LIMIT	Q
Benzene	BDL	2	U
Toluene	18	2	
Ethylbenzene	BDL	2	U
M & P Xylene	5	4	
O Xylene	3	2	
Total Xylene	8	6	

SURROGATE	%RECOVERY	LIMITS
Fluorobenzene	168 Q	75 - 150
1,4-Dichlorobutane	169 Q	75 - 150
p-Bromochlorobenzene	46 Q	75 - 150

Notes and Definitions for this Report:

DATE RUN 02/03/95

Order # A5-01-108 Page 10
02/06/95 17:54 TEST RESULTS BY SAMPLE

Sample Description: COMPOSITE SOIL-STOCKPILE Lab No: 07A
Test Description: BTEX IN SOLIDS Method: EPA 602/8020 Test Code: BTEXS
Collected: 01/26/95 14:45

ANALYST PC
INSTRUMENT GC1
CONC FACTOR 1
UNITS ug/kg
COLUMN DB 624

Sample Description: COMPOSITE SOIL-STOCKPILE Lab No: 07A
Test Description: POLYCHLORINATED BIPHENYLS Method: EPA 8080 Test Code: PCB
Collected: 01/26/95 14:45

PARAMETER	RESULT	LIMIT	Q
Aroclor 1016 12674-11-2	BDL	3.30	U
Aroclor 1221 11104-28-2	BDL	3.30	U
Aroclor 1232 11141-16-5	BDL	3.30	U
Aroclor 1242 53469-21-9	BDL	3.30	U
Aroclor 1248 12672-29-6	BDL	3.30	U
Aroclor 1254 11097-69-1	BDL	3.30	U
Aroclor 1260 11096-82-5	BDL	3.30	U

SURROGATE	%RECOVERY	LIMITS
Dibutyl Chlorendate	113	5 - 150
TMX	93	5 - 150

Notes and Definitions for this Report:

EXTRACTED 01/31/95
DATE RUN 02/01/95
ANALYST ZBS
INSTRUMENT GC3
FILE ID
CONC FACTOR 10
UNITS ug/kg
COLUMN DB 608

Order # A5-01-108 Page 11
02/06/95 17:54 TEST RESULTS BY SAMPLE

Sample Description: COMPOSITE SOIL-STOCKPILE Lab No: 07A
Test Description: REACTIVITY Method: SW-846 8.3 Test Code: REACTI
Collected: 01/26/95 14:45

PARAMETER	RESULT	LIMIT	ANALYST
H2S	BDL	0.125	ETC
CN	BDL	0.125	ETC

Notes and Definitions for this Report:

DATE RUN 02/06/95
UNITS mg/kg

Sample Description: COMPOSITE SOIL-STOCKPILE Lab No: 07A
Test Description: TCLP METALS Method: 6010/7000 Test Code: TCLP_M
Collected: 01/26/95 14:45

PARAMETER	RESULT	MS_RECOVERY
Arsenic	<0.100	N/A
Barium	0.679	N/A
Cadmium	<0.010	N/A
Chromium	<0.010	N/A
Lead	<0.050	N/A
Mercury	<0.0005	N/A
Selenium	<0.100	N/A
Silver	<0.010	N/A

Notes and Definitions for this Report:

DATE RUN 02/06/95
UNITS mg/L

Order # A5-01-108
02/06/95 17:54

Page 12

REGULAR TEST RESULTS BY TEST

CORROSIVITY Minimum: Maximum:
Method: STD. MTH 203

Samp	Sample Description	Result	Units	Limit	Prepared	Analyzed	By
06A	COMPOSITE SOIL 1,2,3,4,5	7.48	pH UNITS			01/30/95	WMH
07A	COMPOSITE SOIL-STOCKPILE	7.24	pH UNITS			01/30/95	WMH

EXTRACTABLE ORG. HALOGENS Minimum: 0.005 Maximum:
Method: DOHRMAN

Samp	Sample Description	Result	Units	Limit	Prepared	Analyzed	By
06A	COMPOSITE SOIL 1,2,3,4,5	0.21	mg/kg	0.10		02/01/95	ETC
07A	COMPOSITE SOIL-STOCKPILE	0.27	mg/kg	0.10		02/01/95	ETC

IGNITABILITY-PENSKY MARTEN Minimum: Maximum:
Method:

Samp	Sample Description	Result	Units	Limit	Prepared	Analyzed	By
06A	COMPOSITE SOIL 1,2,3,4,5	>70	Degrees Cent.			02/01/95	WMH
07A	COMPOSITE SOIL-STOCKPILE	>70	Degrees Cent.			02/01/95	WMH

PAINT FILTER Minimum: Maximum:
Method: 9095

Samp	Sample Description	Result	Units	Limit	Prepared	Analyzed	By
06A	COMPOSITE SOIL 1,2,3,4,5	PASS	PASS/FAIL			01/30/95	WMH
07A	COMPOSITE SOIL-STOCKPILE	PASS	PASS/FAIL			01/30/95	WMH

BIONOMICS LABORATORY, INC.

Richmond Division
2227 Tomlynn Street
Richmond, VA 23230
804-358-3145

VDH #00042
WVDEP #161
FAX: (804) 358-2657

Lab Use Only
W.O.# A50408
page 1 of 1 Date Due: 2/6/95

Bionomics Prof Mgr: Kristen DeLano

DER or IRIS format requested: yes ☐

Bio Richmond JD# R95-030

CHAIN OF CUSTODY RECORD

Client Name: US Army Corps of Engineers

Address: Fort Story bldg, 1081

Rep/Proj. Manager: Dale Wright Phone #: 804-358-5400

Project ID: 1395-V10 P.O.#: M52605

Collected by: B. Hammond

Sample ID	Date	Time	Comp/Grab	Sample Location	# of containers	Parameter Analysis: TPH Volatiles & Semis 5030/8015M 3550/8015M	BTEX 8020	TRC 5W-846 7.1-7.3	TCLP/RCRA Metals 1310	PCB's 8080	EDB Dibromoethane	Paint Filter 9095	Remarks
Soil Sample 1	1/26	11:00	Grab	North end of tank pit	1	✓							
Soil Sample 2		11:55		South end of tanks pit	1	✓							
Soil Sample 3		12:55		East side of tank pit BFH	1	✓							5 day TAT
~~Soil Sample 3-dup~~		12:55											
Soil Sample 4		13:40		West side of tank pit	1	✓							ARMY CORPS PROJECT
Soil Sample 5	↓	14:15	↓	Center of tank Pit	1	✓							
Composite soil 1,2,3,4,5		(see chain)	Comp	composite from 1,2,3,4,5	2		✓	✓	✓	✓	✓	✓	
Composite soil from stockpile		14:15	Comp	Soil Stock pile	2		✓	✓	✓	✓	✓	✓	

CUSTODY TRANSFERS:

	Relinquished by:	Received by:	Date:	Time:
1.	Brian Hammond	Kristen A. DeLano	1-27-95	9:45
2.	Kristen A DeLano	FedEx #873772496	1-27-95	16:30
3.		Carter J. Hunter	1/28/95	0815

Delivered Directly to Lab ☐ Shipped ☒

Method of Shipment: FedEx ☒ UPS ☐ Other:

Received in cooler: yes ☒ no ☐ Temp °C 2° pH checked in lab: yes ☐ no ☐

Lab Recipient: Brian Hammond Date: 1/28/95 Time: 0815

Laboratory Remarks:

Bionomics Laboratory, Inc.

Atlanta Division

2264 Northwest Parkway, Suite F • Marietta, GA 30067
(404) 984-8070 • Fax (404) 988-0491

FL. HRS E87194 FL. HRS SDW 87368 SC. DHEC #98006
FL DEP CQAP#890201G

ENVIRONMENTAL TECHNOLOGY, INC
c/o BIONOMICS
2227 TOMLYNN STREET
RICHMOND, VA 23230
Attn: DALE WRIGHT

Order #: A5-01-109
Date: 02/06/95 11:12
Work ID: #1395-V10 FT.STORY BLDG.1081
Date Received: 01/28/95
Date Completed: 02/06/95

Purchase Order: M52605
Invoice Number: not set

Client Code: ETI_RICH_DW

SAMPLE IDENTIFICATION

Sample Number	Sample Description
01	GW-1 / CENTER OF TANK PIT
02	TRIP BLANK
03	FIELD BLANK

Richard Alt

Certified By
RICHARD ALT, DIRECTOR

QUALIFIERS

(Q): Qualifiers
B: Found in associated blank as well as sample
J: Estimated value, less than calibration limit
O: Estimated value, greater than calibration limit
U: Analyzed for, but not detected
BDL: Below Detection Limit

Order # A5-01-109
02/06/95 11:12

TEST RESULTS BY SAMPLE

Sample: 01A GW-1 / CENTER OF TANK PIT Collected: 01/26/95

Test Description	Result	Limit	Units	Analyzed	By
1,1-DICHLOROETHENE	BDL	250	µg/L	02/03/95	DMB
TETRACHLOROETHYLENE	2700	250	µg/L	02/03/95	DMB
TRICHLOROETHENE	8800	250	µg/L	02/03/95	DMB
VINYL CHLORIDE	BDL	250	µg/L	02/03/95	DMB
cis 1,2-DICHLOROETHENE	5200	250	µg/L	02/03/95	DMB
trans-1,2-DICHLOROETHENE	BDL	250	µg/L	02/03/95	DMB

Order # AS-01-109 Page 3
02/06/95 11:12 TEST RESULTS BY SAMPLE

Sample Description: GW-1 / CENTER OF TANK PIT Lab No: 01A
Test Description: BTEX IN LIQUID 602/8020 Method: EPA 602/8020 Test Code: BTEX
Collected: 01/26/95 15:15

PARAMETER	RESULT	LIMIT	Q
Benzene	BDL	1000	U
Toluene	11,000	1000	
Ethylbenzene	1200	1000	
M & P Xylene	3700	2000	
O Xylene	3500	1000	
Total Xylene	7200	3000	

SURROGATE	%RECOVERY	LIMITS
Fluorobenzene	84	75 - 150
1,4-Dichlorobutane	108	75 - 150
4-Bromochlorobenzene	207 Q	75 - 150

Notes and Definitions for this Report:

DATE RUN 02/02/95
ANALYST PC
INSTRUMENT GC1
CONC FACTOR 1000
UNITS µg/L
COLUMN DB 624

Sample Description: GW-1 / CENTER OF TANK PIT Lab No: 01A
Test Description: TRPH 3510: IN WATER Method: CALIFORNIA Test Code: TPH_WD
Collected: 01/26/95 15:15

PARAMETER	RESULT	LIMIT	Q
Total Recoverable Pet. Hydro	180	40	

Notes and Definitions for this Report:

EXTRACTED 01/30/95
DATE RUN 02/03/95
ANALYST JB
INSTRUMENT GC4
CONC FACTOR 400
UNITS mg/L
COLUMN DB 5

Order # AS-01-109 Page 4
02/06/95 11:12 TEST RESULTS BY SAMPLE

Sample Description: GW-1 / CENTER OF TANK PIT Lab No: 01A
Test Description: TRPH 5030 GAS IN WATER Method: CALIFORNIA Test Code: TPH_GW
Collected: 01/26/95 15:15

PARAMETER	RESULT	LIMIT	Q
Total Rec.Petroleum Hydro: Gas	180	100	

Notes and Definitions for this Report:

DATE RUN 02/03/95
ANALYST PC
INSTRUMENT GC1
CONC FACTOR 1000
UNITS mg/L
COLUMN DB 624

Sample Description: TRIP BLANK Lab No: 02A
Test Description: TRPH 5030 GAS IN WATER Method: CALIFORNIA Test Code: TPH_GW

PARAMETER	RESULT	LIMIT	Q
Total Rec.Petroleum Hydro: Gas	BDL	0.10	U

Notes and Definitions for this Report:

DATE RUN 02/02/95
ANALYST PC
INSTRUMENT GC1
CONC FACTOR 1
UNITS mg/L
COLUMN DB 624

Sample Description: FIELD BLANK Lab No: 03A
Test Description: TRPH 5030 GAS IN WATER Method: CALIFORNIA Test Code: TPH_GW
Collected: 01/26/95 14:30

PARAMETER	RESULT	LIMIT	Q
Total Rec.Petroleum Hydro: Gas	BDL	0.10	U

Notes and Definitions for this Report:

Order # AS-01-109 Page 5
02/06/95 11:12 TEST RESULTS BY SAMPLE

Sample Description: FIELD BLANK Lab No: 03A
Test Description: TRPH 5030 GAS IN WATER Method: CALIFORNIA Test Code: TPH_GW
Collected: 01/26/95 14:30

DATE RUN 02/02/95
ANALYST PC
INSTRUMENT GC1
CONC FACTOR 1
UNITS mg/L
COLUMN DB 624

1,1-DICHLOROETHENE Minimum: 1.0 Maximum:
Method: EPA 8260

Samp	Sample Description	Result	Units	Limit	Prepared	Analyzed	By
01A	GW-1 / CENTER OF TANK PIT	BDL	µg/L	250		02/03/95	DMB

TETRACHLOROETHYLENE Minimum: Maximum:
Method: EPA 8260

Samp	Sample Description	Result	Units	Limit	Prepared	Analyzed	By
01A	GW-1 / CENTER OF TANK PIT	2700	µg/L	250		02/03/95	DMB

TRICHLOROETHENE Minimum: Maximum:
Method: EPA 8260

Samp	Sample Description	Result	Units	Limit	Prepared	Analyzed	By
01A	GW-1 / CENTER OF TANK PIT	8800	µg/L	250		02/03/95	DMB

VINYL CHLORIDE Minimum: Maximum:
Method: EPA 8260

Samp	Sample Description	Result	Units	Limit	Prepared	Analyzed	By
01A	GW-1 / CENTER OF TANK PIT	BDL	µg/L	250		02/03/95	DMB

cis 1,2-DICHLOROETHENE Minimum: 1.0 Maximum:
Method: EPA 8260

Samp	Sample Description	Result	Units	Limit	Prepared	Analyzed	By
01A	GW-1 / CENTER OF TANK PIT	5200	µg/L	250		02/03/95	DMB

trans-1,2-DICHLOROETHENE Minimum: 1.0 Maximum:
Method: EPA 8260

Samp	Sample Description	Result	Units	Limit	Prepared	Analyzed	By
01A	GW-1 / CENTER OF TANK PIT	BDL	µg/L	250		02/03/95	DMB

Bionomics Proj Mgr: Kristen Delano

DER or NRS format requested: yes ☐

Bio-Richmond ID# R95-029

BIONOMICS LABORATORY, INC.

Richmond Division
2227 Tomlynn Street
Richmond, VA 23230
804-358-3145

VDH #00042
WVDEP #161
FAX: (804) 358-2657

CHAIN OF CUSTODY RECORD

Lab Use Only:
W.O.# 450109
page 1 of 1 Date Due: 2/6/95

Client Name: US Army Corps of Engineers
Address: Fort Story bldg. 1081
Rep/Proj Manager: Dale Wright Phone #: 804-358-5400
Project ID: 1345-V10 P.O.#: M526055
Collected by: B. Hammond

Sample ID	Date	Time	Comp/Grab	Sample Location	# of containers	TPH 5030/8015 & 3510/8015 M	BTEX 5020	PCE & PCE Breakdown components 8260	5030/8015 MA	Remarks:
GW-1	1/26	1515	Grab	Center of tank pit	7	✓	✓	✓	* ✓	5 day TAT
trip blanks									✓	
Field blanks	1/26	1430	Grab							ARMY CORPS PROJECT
										* AS PER CLIENT REQUEST ON 1/30/95. LMH

CUSTODY TRANSFERS:

	Relinquished by:	Received by:	Date:	Time:
1.	Brian Hammond	Kristen A. Delano	1-27-95	9:45
2.	Kristen Delano	FedEx # 093772496	1-27-95	18:30
3.		Celia Hunter	1/28/95	0912

Delivered Directly to Lab ☐ Shipped ☒
Method of Shipment: FedEx ☒ UPS ☐ Other:
Received: in cooler yes ☒ no ☐ Temp °C 2 pH checked in lab: yes ☐ no ☐
Lab Recipient: Barbara Kramer Date: 1/30/95 Time: 0815

Laboratory Remarks:

2229 Tomlynn S Suite 100, Richmond, Virginia 23230

April 28, 1995

Mr. Donald W. Dow, Jr.
U.S. Army Corps of Engineers
Southern Virginia Area Office
P.O. Drawer B
Fort Eustis, Virginia 23604

Subject: Contract DACA65-94-D-0067
Delivery Order 0013
Additional Data for Building 1081, Fort Story, Virginia
ETRS Job No. 1395-V13

Telephone
804 • 358 • 5400
Emergency
800 • 228 • 7745
Facsimile
804 • 358 • 6868

Dear Mr. Dow:

This is in response to correspondence from Ms. Amy Webster, Virginia Department of Environmental Quality (VDEQ), to Mr. Stephen A. McCall, U.S. Army Transportation Center, dated March 29, 1995. EARTH TECH Remediation Services, formerly Environmental Technology of North America, Inc., is pleased to provide the following information as requested.

The initial request for additional information was made in a December 21, 1994, letter from the VDEQ to Mr. McCall. That request was based on an Initial Abatement Measures and Site Check Report produced by the Environmental Restoration Company (ERC). The ERC report contained factual errors, as described below, which led to the VDEQ's request for additional information and clarification.

The ERC report indicated that a 10,000-gallon underground storage tank (UST) was removed from the site, resulting in an excavation approximately 9.5 feet deep. Observed contamination resulted in the excavation of an additional 3 feet of soil from the sides and bottom of the pit. According to the report, the excavation was then backfilled with the contaminated soil.

Based on this information, the VDEQ requested that the backfill be sampled because, according to the report and the letter dated December 21, 1995, ". . . petroleum-contaminated soil containing very high levels of total petroleum hydrocarbons (up to 62,823 mg/kg) was placed back in the waste oil UST excavation pit." In particular, the December 21, 1995, letter specified that five borings were to be performed in the backfill, one in the center and four around the inside perimeter of the backfilled area. Samples from each boring exhibiting the highest photoionization detector (PID) reading were to be submitted for laboratory analysis.

Upon mobilization to the site and performance of the field activities, EARTH TECH personnel made the following observations:

- The excavated pit had been backfilled with clean sand, lithologically different from the native material;

- The depth of the excavation did not extend beyond 9.5 feet; and

- Soil from the original excavation activities at the site was stockpiled adjacent to the excavation, and was not placed in the excavation.

As directed by the VDEQ and the U.S. Army Corps of Engineers, soil samples were collected only from the backfill material. The soil borings were extended below the bottom of the original excavation to determine the depth to the water table and to collect the requested water sample. Field observations of the underlying native soil indicated higher PID readings than those in the backfill material, but showed no evidence of fuel-saturated soils or free product. In accordance with the VDEQ's request for sampling and analysis of the backfill material and EARTH TECH's approved scope of work for the project, the native material below the excavation was not sampled. Based on the field observations of the remaining contaminated material at the site, additional excavation of material from the pit does appear warranted.

Regarding the suggestion that one to two additional borings be performed within the backfill area to a depth of 15 feet, field observations made during EARTH TECH's investigation indicate that the water table is at approximately 11.5 feet below grade, making borings to this depth unnecessary. Since a remedial investigation involving soil and ground water sampling and analysis is currently being conducted in the immediate area of the former UST excavation, EARTH TECH does not feel that additional site investigation activities focused on a portion of a larger site are justified. EARTH TECH agrees with the VDEQ that it would be prudent to await the results of the remedial study and pursue an overall, risk-based remedial action.

If you have any questions concerning EARTH TECH's response, please contact me at (804) 358-5858.

Very truly yours,
EARTH TECH

Brian F. Hammond

Brian F. Hammond
Environmental Scientist

BFH/mtr
ed:mtr

cc: D. Doumlele

I:\WP\COE\FTSTORY\1081-RPT.REV

File 46

COMMONWEALTH of VIRGINIA

DEPARTMENT OF ENVIRONMENTAL QUALITY

Peter W. Schmidt
Director

August 7, 1995

P. O. Box 10009
Richmond, Virginia 23240-0009
(804) 762-4000

Commander
US Army Transportation Center
ATZF-PWE (Musel)
Building 1407, Room 111
Fort Eustis, Virginia 23604-5332

Dear Mr. Musel:

Thank you for the opportunity to participate in the Technical Review Committee (TRC) meeting on July 27, 1995. The TRC discussion and the visit to the Installation Restoration Program (IRP) sites were very helpful. Concerning the study of Lake Eustis by the US Army Center for Health Promotion and Preventive Medicine, I am very interested in receiving the report when it is finalized. With respect to the monitoring program with for Bailey's Creek, I would like an outline of that program with some general information (target species, sample collection locations, frequency of collection, target analytes) as it is completed. I am available to provide technical assistance during the study development or implementation phases.

At the TRC meeting, I indicated that I would be providing some information concerning Applicable or Relevant and Appropriate Requirements (ARARs). Attached are some of the ARARs which should be recognized as the remedial activities progress at Fort Eustis. As remedial activities continue other ARARs may be identified.

Thank you for the invitation to the TRC meeting and if you have any comments please contact me at (804) 762-4192.

Sincerely,

Durwood H. Willis
Project Officer
Office of Federal Facilities
Restoration and Superfund Program

cc: Robert Stroud, EPA Region III
Erica Dameron, DEQ
Larry McBride, DEQ

Commonwealth of Virginia ARARs

This is a preliminary identification of Commonwealth of Virginia ARARs. Following a review and discussion of proposed remedial alternatives for a given site, state ARARs and To Be Considered Materials (TBCs) can be more specifically identified.

The material below includes state statutes and regulations that may serve as state ARARs (along with corresponding federal statutes and regulations for informational purposes). The information includes the citation for each source and a short explanation of each item indicating how it may be pertinent with regard to a proposed remedy.

1. Virginia State Water Control Law, Code of Virginia Sections 62.1-44.2 et seq.; Virginia Water Regulations entitled "Water Quality Standards" (VR 680-21-00); "Virginia Pollutant Discharge Elimination System (VPDES) and Virginia Pollution Abatement (VPA) Permit Program" (VR 680-14-01); and "Virginia Water Protection Permit" regulations (VR 680-15-01). Federal: the Water Pollution Control Act, 33 U.S.C. 1251; and the Safe Drinking Water Act, 42 U.S.C. 300(f).

Groundwater underlying the site should be remediated in accordance with CERCLA guidelines. Cleanup levels for potential drinking water sources are typically based on MCLs. In the absence of MCLs, other health-based standards or criteria from the Virginia and/or federal regulations, or best professional judgment based on risk assessment, may be employed. Where groundwater that is a potential drinking water source discharges to surface water, the cleanup level at that discharge point would be the more stringent level between the MCL (or acceptable risk-based level) and a discharge limit based on the state or federal surface water standard or criteria for the protection of aquatic life.

The Virginia Standards for Surface Water (VR 680-21-01.14) should be listed as a Chemical-Specific ARAR along with the National Primary Drinking Water Regulations and the federal Ambient Water Quality Criteria. These standards and criteria will serve as ARARs and TBCs for purposes of developing soil and groundwater cleanup levels. Soil cleanup levels will be developed by using the more stringent concentration level resulting from the following analyses: (1) risk assessment taking into account all potential soil exposure pathways; (2) soil modeling to determine the concentration of contaminants that can remain in the soil such that water in equilibrium with the soil will not result in contaminant concentrations in the groundwater greater than MCLs; and, (3) soil modeling to determine the concentrations of contaminants that can remain in the soil such that water in equilibrium with the soil will not lead to a natural discharge to surface water resulting in an in-stream contaminant concentration greater than its surface water standard.

The Virginia Pollution Discharge Elimination System Regulations (VR 680-14-01) should be referenced along with the National Pollutant Discharge Elimination System Requirements. Any treated groundwater, decontamination water or other wastewater to be discharged to surface waters must meet effluent discharge limits established by the Water Division, Virginia Department of Environmental Quality. These limits are established on a case-by-case determination. Site-specific limits may be established following receipt of initial design and estimated discharge rates of the treatment unit.

The Virginia Water Protection Permit Regulations (VR 680-15-02) delineate the procedures and requirements to be followed in connection with activities such as dredging, filling or discharging any pollutant into, or adjacent to, surface waters, or any activity which impacts the physical, chemical or biological properties of surface waters. (The definition of surface waters includes wetlands.) The standards are typically required in addition to the U.S. Army Corps of Engineers § 404 permit, and are established in coordination with requirements of the Chesapeake Bay Preservation Act administered by local permitting boards or requirements of the Virginia Marine Resources Commission.

2. Virginia Waste Management Act, Code of Virginia Sections 10.1-1400 et seq.; Virginia Hazardous Waste Management Regulations (VHWMR) (VR 672-10-1); Virginia Solid Waste Management Regulations (VSWMR) (VR 672-20-10); Virginia Regulations for the Transportation of Hazardous Materials (VR 672-30-1). Federal: the Resource Conservation and Recovery Act (RCRA), 42 U.S.C. 6901, and the applicable regulations contained in Title 40 of the Code of Federal Regulations; and the U.S. Department of Transportation Rules for Transportation of Hazardous Materials, 49 CFR Parts 107, 171.1-172.558.

If the remedial response contemplated involves storage, treatment or disposal of a VHWMR/RCRA hazardous waste, various VHWMR/RCRA requirements may need to be complied with as specified in VHWMR and/or the applicable 40 CFR Parts. Because Virginia administers an authorized state RCRA program, the Virginia Hazardous Waste Management Regulations (VHWMR) will serve as the governing ARAR in place of the RCRA regulations contained in the 40 CFR Parts, except for the Land Disposal Restrictions of 40 CFR Part 268. (At this time, Virginia does not have authorization for administering the LDR's.)

Some sample VHWMR Part X Sections corresponding to RCRA regulations of 40 CFR Part 264 are listed below:

	VHWMR §	40 CFR Part 264
Releases from Solid Waste Management Units	10.5	Subpart F
Closure and Post-Closure	10.6	Subpart G
Use and Management of Containers	10.8	Subpart I
Tank Systems	10.9	Subpart J
Surface Impoundments	10.10	Subpart N
Waste Piles	10.11	Subpart L
Land Treatment	10.12	Subpart M
Landfills	10.13	Subpart N

The transportation of hazardous waste must be conducted in compliance with VHWMR Parts VI and VII and the Virginia Regulations for the Transportation of Hazardous Materials.

The disposal of any soil, debris, sludge or any other solid waste from a site must be done in compliance with VSWMR.

3. Virginia Air Pollution Control Law, Code of Virginia Sections 10.1-1300 et seq.; Virginia Regulations for the Control and Abatement of Air Pollution (VR 120-01).
Federal: the Clean Air Act, 42 U.S.C. 7401; and 40 CFR Subchapter C.

Any emission from the disturbance of soil at a site, or treatment of soil or water, must meet the Virginia air emission standards for toxic pollutants, particulates and volatile organic compounds.

4. Virginia Erosion and Sediment Control Law, Code of Virginia Sections 10.1-560 et seq., and the Virginia Erosion and Sediment Control Regulations (VR 625-02-00).

Before engaging in any land-disturbing activity, as defined in the statute, an erosion and sediment control plan must be submitted for review by the soil and water conservation district or locality and the plan must be approved by the plan-approving authority.

5. Virginia Board of Game and Inland Fisheries, Code of Virginia Sections 29.1-100 et seq.; Virginia Endangered Species Act, Code of Virginia Sections 29.1-563 et seq.. Federal: the Endangered Species Act, 16 U.S.C. 1531.

Biological assessments should be conducted and submitted to VDEQ for review by the Virginia Board of Game and Inland Fisheries to determine whether endangered species or their habitats are threatened by the site. Certain species of fish and wildlife are identified as being threatened and are entitled to special preservation and protection measures under these statutes.

6. Virginia Wetlands Act, Code of Virginia §§ 62.1-13.1 et seq.; Virginia Wetlands Regulations (VR 450-01-0051); federal Water Pollution Control Act, 33 U.S.C. § 1344(f) (2) (commonly referred to as § 404 of the Clean Water Act); 33 CFR Part 323.2(c) and (e); and federal Executive Order 11990 related to wetlands management.

Any activity to take place in, or impact on, a tidal wetland must meet the provisions of the Virginia Wetlands Act and regulations as applicable. (The Virginia Water Protection Permit regulations cited above is also applicable to activities impacting wetlands, as well as the Chesapeake Bay Preservation Act which is referenced below.)

7. Chesapeake Bay Preservation Act, Code of Va. § 10.1-2100 et seq.; Chesapeake Bay Preservation Area Designation and Management Regulations (CBPA Regulations) (VR 173-02-01).

Require that certain locally designated tidal and nontidal wetlands, as well as other sensitive land areas, be subject to limitations regarding land-disturbing activities, removal of vegetation, use of impervious cover, erosion and sediment control, stormwater management, and other aspects of land use that may have effects on water quality.

8. Virginia Stormwater Management Act, Code of Va. § 10.1-603.1 et seq.; Virginia Stormwater Management Regulations (VR 215-

02-00), and local stormwater management programs.

All land-disturbing activities must be in compliance with local stormwater management programs, where they exist. (The adoption of a program by a locality is optional, but if locality adopts, must meet state requirements.) In the absence of a local program, if impervious surface is to be created by remedy, then state requirements may be relevant and appropriate.

9. Coastal Management Plan, City of _____; Federal: Coastal Zone Management Act, 16 U.S.C. 1451 et seq.; National Oceanic and Atmospheric Administration (NOAA) Regulations on Federal Consistency With Approved State Coastal Zone Management Programs, 40 CFR Part 930.

Activities within a Coastal Management Zone must be in compliance with local requirements.

10. Virginia Historic Resources Law, Code of Va. § 10.1-2200-2214; Virginia Antiquities Act, Code of Va. § 10.1-2300-2306.

Activities impacting resources governed by these statutes must comply with state requirements.

11. Federal Executive Order 11988 related to floodplain management.

Any activity located in a floodplain must comply with the provisions of this Executive Order. The Order requires that federal activities in floodplains must reduce the risk of flood loss, minimize the impact of floods on human safety, health and welfare, and preserve the natural and beneficial values served by floodplains.

As stated above, this list is only a preliminary identification of potential state ARARs. As site-specific information is presented and various remedial alternative are considered, more specific ARARs will be established in conjunction with the appropriate federal or state regulatory division.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION III
841 Chestnut Building
Philadelphia, Pennsylvania 19107

Office of Superfund
Robert Thomson, P.E.
Mail Code 3HW71

Direct Dial (215) 597-1110
FAX (215) 597-9890

Date: February 1, 1995

Mr. Daniel S. Musel
U.S. Army Transportation Center
Directorate of Engineering and Housing
Attention: ATZF-PWE
Building 1407
Fort Eustis, VA 23604-5332

Re: Fort Eustis, Va.
Forwarding of new ecological screening levels

Dear Mr. Musel:

Enclosed please find a copy of the new draft BTAG Screening Levels for use in ecological risk screening. The draft BTAG Screening Levels (BSLs) are to now be utilized for ecological risk screening, replacing the previous use of NOAA screening levels. Please note, if a BTAG sediment screening level value for a fauna exposure is not listed for a particular contaminant, then the first default value to be used in ecological sediment screening for that particular contaminant is the BTAG soil screening value for fauna exposure. If neither a BTAG soil or sediment screening value is listed for a particular contaminant, then the default value to be utilized for ecological sediment screening reverts back to the Region III *Selecting Exposure Routes and Contaminants of Concern by Risk-Based Screening* (COCRBS) Tables, where the residential soil screening value is to be used for ecological risk screening for the particular contaminant.

The same sequence of determining default values should be followed if a BTAG soil screening level value for a fauna exposure is not listed for a particular contaminant, i.e. then the first default value to be used in ecological soil screening is the BTAG sediment screening value for fauna exposure and so on.

If you have any questions concerning the use of the draft BTAG Screening Levels, please feel free to call me at the telephone number listed above,

Sincerely,

Robert Thomson

Robert Thomson, PE
VA/WV Superfund Federal Facilities (3HW71)

cc: Bob Stroud (USEPA, 3HW71)

Region III BTAG Screening Levels

(all values in ppb, unless otherwise noted)

Interim Draft Date: 01/19/95

Contaminant	Aquatic				Soil		Sediment (data for Effects Range-Low, unless otherwise noted)		BCF
	Marine		Fresh						
	Flora	Fauna	Flora	Fauna	Flora	Fauna	Flora	Fauna	
INORGANICS									
Aluminum			460.0 (a)*	200.0 (a)*					231(F)*
Ammonia	39.0 (a)*	17.0 (c)*		17.0 (c)*					
Antimony		500.0 (p,c)		30.0 (p,c)	480.0				
Arsenic (total)				874.0 (c)	5,000.0			8,200.0	
As^{+3}	19.0 (c)	36.0 (c)		190.0 (c)				57.0 (AET)	3(I), 4(F)
As^{+5}	13.0 (c)		48.0 (a)						3(I), 3(F)
Barium				10,000.0 (a)		440,000.0			17,000(Pl); 900(I),8(F)
Beryllium			100,000.0 (a)	5.3 (c)	20.0				19(F), 100(I,Pl)
Boron		12,000.0 (a)	75,000.0 (c)*	53,000.0 (c)	0.5				4(Pl); 198(F)
Cadmium		9.3 (c)	1.1 (c)*	0.15 (c)*	2.5 mg/kg		676 (TEL)		10,000(I); 4,900(F)
Chromium (total)					20.0	7.5	5.0	260,000.0 mg/kg(AET)	1,000,000(I); 1,00
Cr^{+3}		10,300.0 (a)		210.0 (c)*				81,000.0	192(I)
Cr^{+6}		50.0 (c)	2.0 (c)	1.0 (c)				< 81,000.0	3.4(F); 192(I)
Cobalt					100.0*	165.0 mg/m^3; 1,500.0 mg/kg			40(F)
Copper		2.9 (a)		6.5 (a)*		40.0		34,000	51.20(23.53)(Pl)
Cyanide		1.0 (a)		5.2 (c)					

a - acute, c - chronic, p - proposed, * - value is dependant on hardness and/or pH, F - fish, I - invertebrate, Pl - plant, AET - Apparent Effect Threshold, TEL - Threshold Effects Level

Region III BTAG Screening Levels

(all values in ppb, unless otherwise noted)

Interim Draft Date: 01/19/95

Contaminant	Aquatic				Soil		Sediment (data for Effects Range-Low, unless otherwise noted)		BCF
	Marine		Fresh						
	Flora	Fauna	Flora	Fauna	Flora	Fauna	Flora	Fauna	
Fluorides			2,000.0 (a)	2,700.0 (a)					significant bioaccumulation is noted in aquatic species
Iron				320.0 (c)	100,000.0				
Lead	5.1 (c)*			1.0 (c)*	12.5	10.0		46,700	17.5(1)*; 726(I
Manganese	200.0 (c)*	10.0 (c)*				330,000.0			35(F); 300(Pl)
Mercury		0.025 (c)*		0.012 (c)*		58.0		150.0	23,661(I); 7,000(F)
Nickel		8.3 (c)*		14.77 (c)*	2,500.0			20,900.0	40,000(Pl)*; 100(F)*
Phosphorus		0.1 (c)		2.4 (a)					2,000(F)
Selenium		3.0 (c)	522.0 (a)	3.0 (c)		260.0			28,870(I); 470(F)
Silver	1.9 (a)	0.0001 (c)	1.9 (a)	0.0001 (c)	0.0098			733 (TEL)	34,000(Pl); 150(F)
Strontium						120,000.0			
Thallium		20.0 (c)		40.0 (c)	1.0				130(F); 18(I)
Tin						890.0			high bioaccumulation has be noted but no value available
Uranium						2,300.0			
Vanadium		< 10.0 mg/kg		< 10.0 mg/kg		58,000.0			
Zinc	86.0 (c)	86.0 (c)	110.0 (c)*	110.0 (h,c)*		4,800.0		150,000.0	50,000(Pl)*; 100,000(I)*; 2,000(F)*

a - acute, c - chronic, p - proposed, * - value is dependant on hardness and/or pH, F - fish, I - invertebrate, Pl - plant, AET - Apparent Effect Threshold, TEL - Threshold Effects Level

Region III BTAG Screening Levels

(all values in ppb, unless otherwise noted)

Interim Draft Date: 01/19/95

Contaminant	Aquatic				Soil		Sediment (data for Effects Range-Low, unless otherwise noted)		BCF
	Marine		Fresh						
	Flora	Fauna	Flora	Fauna	Flora	Fauna	Flora	Fauna	
CHLORINATED DIOXINS & PCBS									
2,3,7,8 TCDD				< 0.00001 (c)					
Polychlorinated Biphenyls (PCBs)		0.03 (c)	0.1 (a)	0.014 (c)		0.04 ppm		22.7	340,000(1); 270,000
SEMI VOLATILES									
Benzidine				2,500.0 (a)					
Benzoic Acid								650.0 (AET)	
Benzyl Alcohol								57.0 (AET)	
4-Chloroaniline		29,700.0 (a)							
Dibenzofuran								540.0 (AET)	
1,2-Diphenylhydrazine				270.0 (a)					
2-Hexanone				428,000.0 (a)					
Isophorone		12,900.0 (a)		117,000.0 (a)					
Methyl Ethyl Ketone (MEK)				3,220,000.0 (a)					significant bioaccumulation expected
Methyl Isobutyl Ketone (MIBK)				460,000.0 (a)		100,000.0			5(estimated)

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Region III BTAG Screening Levels

(all values in ppb, unless otherwise noted)

Interim Draft Date: 01/19/95

Contaminant	Aquatic				Soil		Sediment (data for Effects Range-Low, unless otherwise noted)		BCF
	Marine		Fresh						
	Flora	Fauna	Flora	Fauna	Flora	Fauna	Flora	Fauna	
SEMI VOLATILE - NITROAROMATICS									
2,4-Dinitrotoluene		370.0 (c)		230.0 (c)					
Nitrobenzene		6,680.0 (a)		27,000.0 (a)					
N-Nitrosodiphenylamine		3.3 X 10^6 (a)		5,850.0 (a)				28.0 (AET)	
SEMI VOLATILE - ORGANOHALIDES									
Aldrin		1.3 (a)		3.0 (a)		100.0			
Bromochloromethane						3.0 X 10^6			7(estimated)
Bromodichloromethane						450.0 mg/kg			1.37
Chlordane		0.004 (c)		0.0043 (a)		< 100.0			
Chloroform				1,240.0		8,000.0			1.4(F)
2-Chloronaphthalene		7.5 (a)		1,600.0 (a)					
DDD		0.68 (a)		0.6 (a)		< 100.0			47,900(I); 6,210(Pl 52,500(F)
DDE		14.0 (a)		1,050.0 (a)		< 100.0		2.2	59,000(I); 10,000(Pl), 81,000(F)
DDT	5,000.0 (a)	0.001 (c)	5,000.0 (a)	0.001 (c)		4.0		0.008 mg/kg	100,000(F); 690,000(I); 21,580(Pl)
1,2-Dibromo-3-Chloropropane									11(estimated)
Dieldrin		0.0019 (c)		0.0019 (c)		< 100.0			6,000(F)

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Region III BTAG Screening Levels

(all values in ppb, unless otherwise noted)

Interim Draft Date: 01/19/95

Contaminant	Aquatic				Soil		Sediment (data for Effects Range-Low, unless otherwise noted)		BCF
	Marine		Fresh						
	Flora	Fauna	Flora	Fauna	Flora	Fauna	Flora	Fauna	
Endosulfan		0.0087 (c)		0.056 (c)					
Endosulfan Alpha-		0.0087 (c)		0.056 (c)					
Endosulfan Beta-		0.0087 (c)		0.056 (c)					
Endrin		0.0023 (c)		0.0023 (c)		< 100.0			1,000(F)
Endrin Aldehyde									significant bioaccumulation expected
Heptachlor		0.0036 (c)		0.0038 (c)					
Heptachlor Epoxide		0.0036 (c)		0.0038 (c)		< 100.0			66,000(I); 14,400(F); 1,600(Pl)
Hexachlorobenzene		129.0 (c)		3.68 (p,c)				0.38 (AET)	1,800(I); 1,200(F)
Hexachlorobutadiene		32.0 (a)		9.3 (c)				11.0 (AET)	
Hexachlorocyclohexane		0.34 (a)		100.0 (a)					
Hexachlorocyclopentadiene		7.0 (a)		5.2 (c)					
Hexachloroethane		940.0 (a)		540.0 (c)					
Kepone		7.0 (a)		7.0 (a)					9,750(F);
Lindane		0.16 (a)		0.08 (c)		< 100.0			183(I); 1,613(F)
Methoxychlor		0.03 (c)		0.03 (c)		< 100.0			
Mirex		0.001 (c)		0.001 (c)					2,200(Pl); 2,580(F); 71,400(I)
Pentachlorobenzene		129.0 (c)		50.0 (c)		100.0			3,400(F)

a - acute, c - chronic, p - proposed, * - value is dependant on hardness and/or pH, F - fish, I - invertebrate, Pl - plant, AET - Apparent Effect Threshold, TEL - Threshold Effects Level

Region III BTAG Screening Levels

(all values in ppb, unless otherwise noted)

Interim Draft Date: 01/19/95

Contaminant	Aquatic				Soil		Sediment (data for Effects Range-Low, unless otherwise noted)		BCF
	Marine		Fresh						
	Flora	Fauna	Flora	Fauna	Flora	Fauna	Flora	Fauna	
1,2,4,5-Tetrachlorobenzene		129.0 (c)		50.0 (c)		100.0			
Toxaphene		0.0002 (c)		0.0002 (c)					
Tribromomethane		1,000.0 (a)				1,147.0 mg/kg			37.4(F estimate
2,4,6-Trichloroaniline		1,000.0 (a)		1,000.0 (a)					
SEMI-VOLATILE - ORGANOPHOSPHATES									
Chlorpyrifos		0.0056 (c)		0.041 (c)					
Malathion		0.1 (c)		0.1 (c)					
Parathion Mixture		0.013 (c)						31.0 (AET)	
SEMI-VOLATILE - PHENOLICS									
2-Chlorophenol				970.0 (a)		100.0			
2,4-Dichlorophenol				365.0 (c)		100.0			
2,6-Dichlorophenol						100.0			
2,4-Dimethyphenol				2,120.0 (a)		100.0		29.0 (AET)	151(F)
Dinitrophenol		4,850.0 (a)		150.0 (c)		100.0			
2-Methyl Phenol [0-Cresol]						100.0		63.0 (AET)	
4-Methyl Phenol [p-Cresol]						100.0		670.0 (AET)	
4-Nitrophenol		4,850.0 (a)		150.0 (c)		100.0			

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Region III BTAG Screening Levels

(all values in ppb, unless otherwise noted)

Interim Draft Date: 01/19/95

Contaminant	Aquatic				Soil		Sediment (data for Effects Range-Low, unless otherwise noted)		BCF
	Marine		Fresh						
	Flora	Fauna	Flora	Fauna	Flora	Fauna	Flora	Fauna	
Pentachlorophenol		7.9 (c)		13.0 (c)		100.0		360.0 (AET)	
Phenol		5,800.0(a); 100.0		79.0 (a)		100.0			200(Pl); 277(I); 1.9(F)
2,3,4,6-Tetrachlorophenol						100.0			
2,4,5-Trichlorophenol		11.0 (p,c)		63.0 (p,c)		100.0			
2,4,6-Trichlorophenol				970.0 (c)		100.0			
SEMI VOLATILE - PHTHALATES									
Butyl Benzyl Phthalate (BBP)		3.4 (c)		3.0 (c)			Range from 5.3 mg/kg (DEP) to 260.0 mg/kg (DBP)		663(F)
Di(2 Ethylhexyl) Phthalate (DEHP)		360.0 (p,c)		30.0 (c)					2,680(F); 50(I)
Diethyl Phthalate (DEP)		3.4 (c)		3.0 (c)					117(F)
Dimethyl Phthalate (DMP)		3.4 (c)		3.0 (c)					
Dioctyl Phthalate		3.4 (c)		3.0 (c)					
N-Butyl Phthalate (DBP)		3.4 (c)		3.0 (c)					
SEMI-VOLATILE - PAHS									
-Low Molecular Weight									
Acenaphthene		710.0 (c)		520.0 (c)		100.0		16.0	
Acenaphthylene		300.0 (a)				100.0		44.0	

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Contaminant	Aquatic				Soil		Sediment (data for Effects Range-Low, unless otherwise noted)		BCF
	Marine		Fresh						
	Flora	Fauna	Flora	Fauna	Flora	Fauna	Flora	Fauna	
Anthracene				0.1 (c)		100.0			16,800(F); 912(I)
Fluorene		300.0 (a)		430.0 (c)		100.0		19.0	short-term expected
Naphthalene		2,350.0 (a)		100.0 (c)		100.0		160.0	3.0(I,
Phenanthrene		4.6 (p,c)		6.3 (p,c)		100.0		240.0	
High Molecular Weight									
Benzo (a) Anthracene		8.13 (c)		6.3 (c)		100.0		261.0	134,248(I); 9,200(F)
Benzo (a) Pyrene		0.21 ng/ml (a)				20,000		430.0	930(F); 5,258(Pl), 132,248(I)
Chrysene		300.0 (a)				100.0		384.0	minimal to moderate bioaccumulation expected in aquatic organisms
Dibenzo (a,h) Anthracene		300.0 (a)				100.0		63.4	
Fluoranthene		16.0 (c)		3,980.0 (a)		100.0		600.0	bioaccumulation expected
Pyrene		300.0 (a)				100.0		665.0	970(I
Benzo (b) Fluoranthene		300.0 (a)				100.0		3,200.0 (AET)	
Benzo (k) Fluoranthene		300.0 (a)				100.0			
Benzo (g,h,i) Perylene		300.0 (a)				100.0		670.0 (AET)	
Creosote (mixture)				3,510.0 (a)					
Indeno (1,2,3-CD) Pyrene		300.0 (c)				100.0		600.0 (AET)	
2 Methylnaphthalene		300.0 (c)						70.0	

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Interim Draft Date: 01/19/95

Contaminant	Aquatic				Soil		Sediment (data for Effects Range-Low, unless otherwise noted)		BCF
	Marine		Fresh						
	Flora	Fauna	Flora	Fauna	Flora	Fauna	Flora	Fauna	
VOLATILE - AROMATIC / HALOGENATED									
Benzene	20,000.0 (c)	700.0 (c)	20,000.0 (c)	5,300.0 (a)		100.0			
Bis (2 Chloroethoxy) Methane		6,400.0(c)		11,000.0 (a)					
Carbon Tetrachloride		50,000.0 (a)		35,200.0 (a)		< 300.0			1.48(F)
Chlorobenzene	341,000.0 (a)	129.0 (c)	6,630.0 (a)	50.0 (c)		100.0			
Chlorodibromomethane		6,400.0 (c)		11,000.0 (a)					
Chloroform				1,240.0 (c)		< 300.0			
1,2 Dibromoethane				18,000.0 (a)					< 1(F)
Dibromomethane		6,400.0 (c)		11,000.0 (a)					
1,2-Dichlorobenzene		129.0 (c)		763.0 (c)		< 100.0		35.0 (AET)	560(F), 4.17(Pl)
1,3 Dichlorobenzene				2,300.0					740(F)
1,4-Dichlorobenzene		129.0 (c)		763.0 (c)		< 100.0		110.0 (AET)	720(F)
Dichlorobromomethane		6,400.0 (c)		11,000.0 (a)					
Dichlorodifluoromethane		6,400.0 (c)		11,000.0 (a)					
1,1-Dichloroethane		320,000.0 (a)		160,000.0 (a)		< 300.0			1.2(F)
1,2-Dichloroethane		113,000.0 (a)		218,000.0 (a)		870.0 mg/kg			0.3(F)
1,1 Dichloroethylene	712,000.0 (a)		798,000.0 (a)	74,000.0 (a)					no significant bioaccumulation

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Interim Draft Date: 01/19/95

Contaminant	Aquatic				Soil		Sediment (data for Effects Range-Low, unless otherwise noted)		BCF
	Marine		Fresh						
	Flora	Fauna	Flora	Fauna	Flora	Fauna	Flora	Fauna	
1,2-Dichloroethylene cis and trans		224,000.0 (a)		11,600.0 (a)		< 300.0			cis - 15; trans - 22
Dichloropropene		790.0 (a)		244.0 (c)		300.0			7(F)
1,3-Dinitrobenzene			1,200.0 (a)						
Ethylbenzene		430.0 (a)		32,000.0 (a)		100.0			37.5(F)
Ethylene Dichloride		113,000.0 (a)		20,000.0 (c)					
Methylene Chloride		6,400.0 (c)		11,000.0 (a)		< 300.0			5(estimated)
Pentachloroethane		281.0 (c)		1,100.0 (c)					
Propylene Dichloride		3,040.0 (c)		5,700.0 (c)		< 300.0			
Styrene						100.0			13.5(F)
Tetrachloroethane	6,230.0 (a)	9,020.0 (a)	146,000.0 (a)	9,320.0 (a)		< 300.0			1(F)
Tetrachloroethylene		450.0 (c)		840.0 (c)		< 300.0			49(F)
Toluene		1,050.0 (a)		3,700.0 (a)		100.0			26(I
Trichlorobenzene		129.0 (c)		50.0 (c)		< 100.0		40.0	2,800(F)
Trichloroethane		31,200.0 (a)		9,400.0 (c)		< 300.0			8.9(F)
Trichloroethylene		2,000.0 (a)		21,900.0 (c)		< 300.0			39(F)
Trichlorofluoromethane		6,400.0 (c)		11,000.0 (a)					

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Contaminant	Aquatic				Soil		Sediment (data for Effects Range-Low, unless otherwise noted)		BCF
	Marine		Fresh						
	Flora	Fauna	Flora	Fauna	Flora	Fauna	Flora	Fauna	
Vinyl Chloride		224,000.0 (a)		11,600.0 (a)		300.0			40(Pl); 10(F)
Xylene		13,500.0 (a), 6,000.0		13,000.0 (a); 6,000.0					6(I), 2.2(F)
VOLATILE - MISCELLANEOUS									
Acetone				9,000,000.0 (a)					0.69(F)
Acrolein		55.0 (a)		21.0 (c)					
Acrylonitrile				2,600.0 (c)					
Carbon Disulfide						10.0 mg/cu			

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