DEPARTMENT OF THE ARMY

OFFICE OF ASSISTANT CHIEF OF STAFF FOR INSTALLATION MANAGEMENT
U.S. ARMY FORT MONMOUTH
P.O. 148
OCEANPORT, NEW JERSEY 07757

September 12, 2016

Ms. Linda Range
New Jersey Department of Environmental Protection
Case Manager
Bureau of Southern Field Operations
401 East State Street, 5th Floor
PO Box 407
Trenton, NJ 08625

Re: Summary Remedial Investigation Addendum Report for FTMM-55 Building 290
Fort Monmouth, NJ
PI G000000032

Attachments:

A. Previous FTMM-55 Correspondence (see list below)
B. Layout of Parcel 50 including FTMM-55 Sample Locations Figure
C. Previous Reports (see list below)
D. FTMM-55 Underground Storage Tanks Summary
E. EPH and TPH Concentrations in Soil at FTMM-55 Figure
F. Soil Sample Results- Comparison to NJDEP Standards
G. 2016 Soil Boring Logs

Previous Correspondence (provided in Attachment A):

1. NJDEP letter to the Army dated August 29, 2000, re: *UST Closure Approval/NFA, Fort Monmouth Main Post, Monmouth County*
2. NJDEP letter to the Army dated January 10, 2003, re: *UST Closure Approval/NFA, Fort Monmouth Main Post, Monmouth County*
3. NJDEP letter to the Army dated August 14, 2007, re: *M-18 Landfill, Ft. Monmouth, NJ*
4. NJDEP letter to the Army dated July 3, 2014, re: *Final Baseline Groundwater Sampling Report (August 2013), Remedial Investigation/Feasibility Study/Decision Documents, Fort Monmouth, Oceanport, Monmouth County, PI G000000032*
5. NJDEP letter to the Army dated November 16, 2015, re: *Underground Storage Tanks within Parcels 49 and 50, Fort Monmouth NJ*
6. Army's letter to the NJDEP dated November 23, 2015, re: *State of NJDEP Comments on the Final Environmental Condition of Property Supplemental Phase II Site Investigation Work Plan Addendum for Parcels 34, 50, 51, 52, 66, 80 and 83 dated February 2015 Fort Monmouth, Oceanport, Monmouth County, PI # G000000032*
7. NJDEP letter to the Army dated December 22, 2015, re: *Revision 1 – Final Environmental Condition of Property Supplemental Phase II Site Investigation Work Plan Addendum for Parcels 34, 50, 51, 52, 66/97, 80, and 83 dated November 2015, Fort Monmouth, Oceanport, Monmouth County, PI G000000032*

Previous Reports (provided in Attachment C):

1. *Underground Storage Tank Closure and Site Investigation Report, Building 290,* Weston, October 1993
2. *Site/Remedial Investigation Report, Building 290*, SMC Environmental Services Group, July 1999
3. *Underground Storage Tank Closure and Site Investigation Report, Building 290*; Volume 1 of 3, ATC Associates, May 2000
4. *Underground Storage Tank Closure and Site Investigation Report, Building 290B,* Versar, May 2001
5. Appendix M of *Final August 2013 Baseline Groundwater Sampling Report*, Parsons, March 2014

Dear Ms. Range:

The U.S. Army Fort Monmouth (FTMM) has reviewed and summarized relevant information concerning environmental investigations for the Installation Restoration Program (IRP) Site FTMM-55 Building 290 Underground Storage Tanks (USTs). Correspondence 2, 3, and 5 (**Attachment A**) from the New Jersey Department of Environmental Protection (NJDEP) documents regulatory approval of No Further Action (NFA) for three of the four USTs associated with FTMM-55 (i.e., UST IDs EC290B, 290B, and 290C). Correspondence 4 (**Attachment A**) from NJDEP approves of discontinuation of groundwater monitoring at FTMM-55 in July 2014. Correspondence 5 (**Attachment A**) from NJDEP acknowledges the need for further soil sampling at UST 290A to delineate potential contamination. Correspondence 7 (**Attachment A**) from NJDEP approves the proposed additional soil sampling at UST 290A under the November 2015 Revision 1 Final Environmental Condition of Property (ECP), S*upplemental Phase II Site Investigation* Work Plan Addendum (WPA). The results of the additional soil sampling conducted in March 2016 are summarized below.

This Summary Remedial Investigation Addendum Report (SRIAR) provides an overview of information for this site, including results of the 2016 investigation at UST 290A, and documentation of NJDEP's NFA approval for the remainder of FTMM-55.

The Army requests NJDEP's approval of NFA for UST 290A (Registration ID 81533-64) and FTMM-55 groundwater, as well as concurrence that all identified environmental issues have been adequately addressed for FTMM-55.

1.0 SITE DESCRIPTION

FTMM-55 (Building 290) was a former military vehicle repair and maintenance facility that included four USTs and a gasoline dispenser island. The site formerly served as a military motor pool (Shaw Environmental, Inc., 2008). Building 290 was demolished in 2000. Four USTs and a gasoline dispenser island were removed from the south, east, and west sides of former Building 290 and soil and groundwater investigations have been performed as summarized in Section 2.0 below. The UST excavations have been backfilled and graded. FTMM-55 is one of three IRP sites (in addition to FTMM-54 and FTMM-61) that comprise Environmental Condition of Property (ECP) Parcel 50. The additional sampling of FTMM-55 UST290A was performed under Parcel 50.

The location and layout of FTMM-55 located within Parcel 50 is presented in **Attachment B**. FTMM-55 is located in the north-central portion of the Main Post (MP), north of Sherrill Avenue and south of Parkers Creek. FTMM-55 is associated with former Building 290, which was surrounded by Buildings 295, 291, 292, and 293. FTMM-55 is immediately south of the FTMM-18 landfill. The ground surface topography is flat, with elevations of less than 20 feet above mean sea level. FTMM-55 is unoccupied and consists of landscaped vegetation and maintained lawn area.

Additional information concerning the FTMM-55 background and environmental setting is provided in the various reports in **Attachment C**.

2.0 UNDERGROUND STORAGE TANKS

A summary table of the FTMM-55 USTs and their status is provided in **Attachment D**. The four USTs identified at FTMM-55 have been removed and three of the USTs were previously approved for NFA by NJDEP; documentation of this approval is provided in Correspondence 2, 3, and 5 (**Attachment A**). The following are the USTs that were previously removed from the FTMM-55 area (and are shown on **Attachment B**) :

- one 550-gallon fiberglass waste oil UST (NJDEP Registration No. 81533-193; also known as UST 290C), removed in December 1991;
- two 2,000-gallon steel gasoline USTs (NJDEP Registration Nos. 81533-224 and 81533-225; also known as UST 290B and UST EC290B), removed in December 1993; and
- one 2,000-gallon fiberglass No. 2 diesel fuel UST (NJDEP Registration No. 81533-64; also known as UST 290A), removed in September 1994.

In addition, a former gasoline dispenser island associated with the Building 290 UST operations was removed in March 1994. Excavation of stained soil was conducted during removal of the two gasoline USTs, one No. 2 diesel fuel UST, and the former gasoline dispenser island. The areas where USTs were removed have been filled and graded.

The removal of the waste oil tank designated as UST 290C and associated post-excavation confirmation soil samples were documented in *Underground Storage Tank Closure and Site Investigation Report, Building 290* (Weston 1993; see Report 1 of **Attachment C**). NJDEP approval for NFA was received in a letter dated November 16, 2015 for UST 290C (Correspondence 5 of **Attachment A**).

Following removal of the two gasoline tanks (UST 290B and UST EC290B) and excavation of potentially contaminated soil, post-excavation confirmation soil samples were collected and analyzed (Versar, 2001; see Report 4 of **Attachment C**). NJDEP approval of NFA for UST 290B and UST EC290B was received in a letter dated January 10, 2003 (Correspondence 2 of **Attachment A**). In the comment letter dated August 14, 2007 (Correspondence 3 of **Attachment A**), NJDEP reiterated that no further investigation was required for the soil associated with these USTs.

Excavation of potentially contaminated soil and evaluation of post-excavation confirmation soil samples at a former gasoline dispenser island associated with Building 290 was documented in *Site/Remedial Investigation Report, Building 290, Fort Monmouth, New Jersey* (SMC

Environmental Services Group, 1999; see Report 2 of **Attachment C**). In the comment letter dated August 14, 2007 (Correspondence 3 of **Attachment A**), NJDEP indicated that no further investigation of soil was required for this area.

Following removal of the diesel tank designated as UST 290A in 1994 and excavation of potentially contaminated soil, post-excavation confirmation soil samples were collected and analyzed (ATC Associates, 2000; see Report 3 of **Attachment C**). Closure of this UST was approved by NJDEP in an August 29, 2000 letter (Correspondence 1 of **Attachment A**); however, total petroleum hydrocarbon (TPH) concentrations exceeding the Residential Direct Contact Soil Cleanup Criterion in two post-excavation soil samples (Area A and Area B) were identified by NJDEP (August 14, 2007 letter; Correspondence 3 of **Attachment A**). A third area to be investigated at UST 209A was Area F which was identified in the NJDEP letter dated June 16, 2015 referenced in Correspondence 6 of **Attachment A**.

Therefore, additional samples were collected in March 2016 to delineate the extent of TPH/extractable petroleum hydrocarbon (EPH) concentrations in soil at three areas (A, B, and F) for UST 290A in accordance with the NJDEP approved Revision 1 November 2015 EPC WPA (Correspondence 7 of **Attachment A**). Two borings (PAR-50-SB-01, PAR-50-SB-06) were advanced in Area A, one boring (PAR-50-SB-04) was advanced in Area B; and three borings (PAR-50-SB-02, PAR-50-SB-03, PAR-50-SB-05) were advanced in Area F (**Attachments B and E**). Two samples per boring were submitted for laboratory analyses: one at 5.5 to 6 feet below ground surface (bgs) (i.e., the same depth interval at which the 1994 TPH exceedances occurred in adjacent samples 290-A and 290-B); and another below any field evidence of contamination to delineate the vertical extent based on field evidence (visual, olfactory, photo ionization detector [PID] screening).

Since the time of the 1991 to 1994 UST investigations, revisions to the analytical requirements for the investigation of petroleum hydrocarbons were made by NJDEP, notably the use of the EPH analysis which replaced the TPH analysis in September 2010. The EPH method focuses on the non-volatile products, such as diesel fuel and No. 2 fuel oil. However, the quality and abundance of the TPH data previously developed at FTMM-55 using Environmental Protection Agency (EPA) Method 418.1 are believed to accurately characterize the diesel fuel at the site for the purpose of site closure.

A summary of the previous and current UST 290A soil sample analytical results is provided in **Attachment F**, and includes a comparison of the results to the current NJDEP Residential Direct Contact Soil Remediation Standards (RDCSRS) and Impact to Ground Water Soil Screening Levels. EPH concentrations detected in the 2016 soil samples ranged from 3.1 to 423 milligrams per kilogram (mg/kg). Based on 2016 sample results, EPH concentrations at UST 290A are less than the NJDEP residential criterion of 5,100 mg/kg. The 2016 data indicate that the TPH exceedances detected in 1994 have naturally attenuated to concentrations below the current RDCSRS criterion for EPH. Therefore, anNFA determination is requested for UST 290A (NJDEP Registration No. 81533-64).

3.0 GEOLOGY AND HYDROGEOLOGY

The soil at FTMM-55 consists of top soil to a depth of approximately six inches bgs. Deeper soil to at least 15 feet bgs is composed primarily of sand with some silt (see **Attachment G**). Versar

(2003) describes the soil in the area of Building 290 as Udorthents (soils that are moderately well drained to excessively drained soils that have been disturbed by cutting or filling as well as areas that are covered by buildings and pavement). The soils in this area have been altered by excavation or fill activities; the filled areas contain soils that consist of loamy material that is more than 20 inches thick. Some areas have concrete, asphalt, metal and glass remnants in the fill material.

At FTMM-55, the groundwater depth in monitoring well 290MW01 was 7.84 feet below the top of the casing in August 2013 (Parsons, 2014; see Report 5 of **Attachment C**). Groundwater is expected to flow north-northwest toward Parkers Creek in the vicinity of FTMM-55 based on wells proximal to the site (Parsons, 2014 see Report 5 of **Attachment C**).

4.0 GROUNDWATER QUALITY

Two monitoring wells (290MW01 and 290MW02) were installed in 1994 after removal of the four USTs. From June 1997 through November 2004, the two FTMM-55 monitoring wells were sampled quarterly for volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), pesticides, polychlorinated biphenyls (PCBs), and metals. From January 2005 through April 2006, FTMM-55 monitioring wells were sampled for VOCs and metals only because SVOCs, pesticides, and PCBs were not determined to be contaminants of concern based on the June 1997 through November 2004 sampling and analyses. In August 2006, monitoring well 290MW02 was damaged and sampling was discontinued at this location. Groundwater sampling for VOCs and metals continued in monitoring well 290MW01 from August 2006 through August 2011. Groundwater sampling was conducted in August 2013 to re-establish baseline Site groundwater conditions following temporary suspension of groundwater sampling in late 2011 since FTMM closed in September 15, 2011.

Exceedances of NJDEP criteria for lead and arsenic in groundwater were historically identified and attributed to background concentrations (see Report 5 of **Attachment C** and NJDEP approval in Correspondence 4 of **Attachment A**). Groundwater sampling for lead only was conducted in August 2013 to re-establish baseline groundwater conditions. Although lead exceeded its NJDEP Ground Water Quality Standard (GWQS), the concentration is attributable to background conditions (see Report 5 of **Attachment C** and NJDEP acceptance of this conclusion in Correspondence 4 of **Attachment A**). VOCs were not detected in monitoring well 290MW01 in exceedance of NJDEP GWQS within the last four rounds of sampling (i.e., November 2010 to August 2011; see Report 5 of **Attachment C**). Following review of the *Final August 2013 Baseline Groundwater Sampling Report* (Parsons, 2014), NJDEP accepted the recommendation to discontinue groundwater sampling at FTMM-55 in a letter dated July 3, 2014 (Correspondence 4 of **Attachment A**). Therefore, an NFA determination is requested for groundwater at FTMM-55.

5.0 SUMMARY

EPH concentrations in the soil samples collected in March 2016 associated with former UST 290A were below the NJDEP RDCSRS. Therefore, we request: 1) an NFA determination for UST 290A (81533-64); and 2) NJDEP's concurrence that a comprehensive NFA determination for all affected media at FTMM-55. Parcel 50 also includes IRP sites FTMM-54 and FTMM-61.

comprehensive NFA for FTMM-54 in a letter dated May 4, 2016. Site FTMM-61 within Parcel 50 will be further addressed under separate cover.

The technical Point of Contact for this matter is Cris Grill; she can be reached at (617) 449-1583 or by email at Cris.Grill@parsons.com. Should you have any questions or require additional information, please contact me by phone at (732) 380-7064 or by email at william.r.colvin18.civ@mail.mil.

Sincerely,

William R. Colvin, PMP, CHMM, PG
BRAC Environmental Coordinator

cc: Linda Range (3 hard copies)
Delight Balducci, HQDA ACSIM (CD)
Joseph Pearson, Calibre (CD)
James Moore, USACE (CD)
James Kelly, USACE (CD)
Cris Grill, Parsons (CD)

REFERENCES CITED:

ATC Associates, 2000. *Underground Storage Tank Closure and Site Investigation Report, Building 290*. May.

NJDEP, 2010. *Health Based and Ecological Screening Criteria for Petroleum Hydrocarbons Frequency Asked Questions*. Version 4.0, August 9.

Parsons, 2015. *Environmental Condition of Property Supplemental Phase II Site Investigation Work Plan Addendum for Parcels 34, 50, 51, 52, 66, 80 and 83*. Final, Revision No. 1, November.

Shaw Environmental, Inc., 2008. *Site Investigation Report, Fort Monmouth*. Final, July 21.

SMC Environmental Services Group, 1999. *Site/Remedial Investigation Report, Building 290*. July.

Versar, 2001. *Underground Storage Tank Closure and Site Investigation Report, Building 290B*. May.

Versar, 2003. *Remedial Investigation Report M-18 Landfill Site.* October 1.

Weston, 1993. *Underground Storage Tank Closure and Site Investigation Report, Building 290*. October.

New Jersey Department of Environmental Protection
Site Remediation Program

Report Certifications for RCRA GPRA 2020, CERCLA, and Federal Facility Sites

These certifications are to be used for reports submitted for RCRA GPRA 2020, CERCLA, and Federal Facility Sites. The Department has developed guidance for report certifications for RCRA GPRA 2020, CERCLA, and Federal Facility Sites under traditional oversight. The "Person Responsible for Conducting the Remediation Information and Certification" is required to be submitted with each report. For those sites that are required or opt to use a Licensed Site Remediation Professional (LSRP) the report must also be certified by the LSRP using the "Licensed Site Remediation Professional Information and Statement". For additional guidance regarding the requirement for LSRPs at RCRA GPRA 2020, CERCLA and Federal Facility Sites see http://www.nj.gov/dep/srp/srra/training/matrix/quick_ref/rcra_cercla_fed_facility_sites.pdf.

Document: "Summary Remedial Investigation Addendum Report for FTMM-55 Building 290"

PERSON RESPONSIBLE FOR CONDUCTING THE REMEDIATION INFORMATION AND CERTIFICATION

Full Legal Name of the Person Responsible for Conducting the Remediation: William R. Colvin
Representative First Name: William Representative Last Name: Colvin
Title: BRAC Environmental Coordinator
Phone Number: (732) 380-7064 Ext: Fax:
Mailing Address: P.O. Box 148
City/Town: Oceanport State: NJ Zip Code: 07757
Email Address: william.r.colvin18.civ@mail.mil

This certification shall be signed by the person responsible for conducting the remediation who is submitting this notification in accordance with Administrative Requirements for the Remediation of Contaminated Sites rule at N.J.A.C. 7:26C-1.5(a).

I certify under penalty of law that I have personally examined and am familiar with the information submitted herein, including all attached documents, and that based on my inquiry of those individuals immediately responsible for obtaining the information, to the best of my knowledge, I believe that the submitted information is true, accurate and complete. I am aware that there are significant civil penalties for knowingly submitting false, inaccurate or incomplete information and that I am committing a crime of the fourth degree if I make a written false statement which I do not believe to be true. I am also aware that if I knowingly direct or authorize the violation of any statute, I am personally liable for the penalties.

Signature: William R Colvin Date: 9/12/2016

Name/Title: William R. Colvin / BRAC Environmental Coordinator

ATTACHMENT A

Previous FTMM-55 Correspondence

1. NJDEP letter to the Army dated August 29, 2000, re: *UST Closure Approval/NFA, Fort Monmouth Main Post, Monmouth County*
2. NJDEP letter to the Army dated January 10, 2003, re: *UST Closure Approval/NFA, Fort Monmouth Main Post, Monmouth County*
3. NJDEP letter to the Army dated August 14, 2007, re: *M-18 Landfill, Ft. Monmouth, NJ*
4. NJDEP letter to the Army dated July 3, 2014, re: *Final Baseline Groundwater Sampling Report (August 2013), Remedial Investigation/Feasibility Study/Decision Documents, Fort Monmouth, Oceanport, Monmouth County, PI G000000032*
5. NJDEP letter to the Army dated November 16, 2015, re: *Underground Storage Tanks within Parcels 49 and 50, Fort Monmouth NJ*
6. Army's letter to the NJDEP dated November 23, 2015, re: *State of NJDEP Comments on the Final Environmental Condition of Property Supplemental Phase II Site Investigation Work Plan Addendum for Parcels 34, 50, 51, 52, 66, 80 and 83 dated February 2015 Fort Monmouth, Oceanport, Monmouth County. PI # G000000032*
7. NJDEP letter to the Army dated December 22, 2015, re: *Revision 1 – Final Environmental Condition of Property Supplemental Phase II Site Investigation Work Plan Addendum for Parcels 34, 50, 51, 52, 66/97, 80, and 83 dated November 2015, Fort Monmouth, Oceanport, Monmouth County, PI G000000032*

State of New Jersey

Department of Environmental Protection

Christine Todd Whitman
Governor

Robert C. Shinn, Jr.
Commissioner

Mr. Dinkerrai Desai
DEPARTMENT OF THE ARMY
HEADQUARTERS, U.S. ARMY COMMUNICATIONS-ELECTRONIC COMMAND
FORT MONMOUTH, NJ 07703-5000

AUG 2 9 2000

Re: UST Closure Approval/NFA
Fort Monmouth Main Post
Monmouth County

Dear Mr. Desai:

The NJDEP is in receipt of seventeen (17) UST closure reports dated June 1, 2000. The Army has requested to receive No Further Action approval letters for each of these reports. This letter approves the NFA requests for the following 17 UST located on the Main Post of the Fort Monmouth site:

NJDEP Req. #	Bldg. #	NJDEP Req. #	Bldg. #
0090010—06	80	0081533—226	707
0090010—17	166	0081533—119	745
0081533—5	207A	0081533—160	1076
0081533—211	207B	0081533—161	1076
0081533—57	282	0081533—168	1108
0081533—64	290	00192486—1	2000
0081533—68	295	0081515—62	2700.4
0081533—108	689A	00192486—30	3050
0081533—109	689B		

The NJDEP has determined that the Army has performed the remedial actions in a manner consistent or in excess of the regulatory requirements, specifically the Technical Requirements For Site Remediation (N.J.A.C. 7:26E et seq.). Soils with contamination in excess of the NJDEP residential cleanup criteria have been excavated and the Army has taken great care to provide documentation which assures us that all sources of contamination have been remediated.

The NJDEP has one comment in that we request that future reports provide ground water flow direction indications on the well location maps.

If you should have any questions or comments, please do not hesitate to contact me at (609) 633-7232 or via E-mail.

Sincerely,

Ian R. Curtis, Case Manager
Bureau of Case Management
ICURTIS@DEP.STATE.NJ.US

State of New Jersey
Department of Environmental Protection

James E. McGreevey
Governor

Bradley M. Campbell
Commissioner

Mr. Dinkerrai Desai
DEPARTMENT OF THE ARMY
HEADQUARTERS, U.S. ARMY COMMUNICATIONS-ELECTRONIC COMMAND
FORT MONMOUTH, NJ 07703-5000

JAN 10 2003

Re: UST Closure Approval/NFA
Fort Monmouth Main Post
Monmouth County

Dear Mr. Desai:

The NJDEP is in receipt of sixty-eight (68) underground storage tank (UST) closure reports dated between July 17, 2001 and May 15, 2002. The Army has requested to receive No Further Action (NFA) approval letters for each of these reports. This letter approves the NFA requests for the following 68 UST that are located on the Main Post of the Fort Monmouth site:

Submittal Date	Building No.	NJDEP Reg. #	Residential
07/17/2001	104	90010-75	NO
07/17/2001	699A	81533-112	NO
07/17/2001	800A	81533-127	NO
07/17/2001	875	81533-234	NO
07/17/2001	949	81533-203	NO
07/17/2001	1220A	81533-184	NO
07/17/2001	2000B	192486-38	NO
01/02/2002	257	81533-200	NO
01/02/2002	283C	81533-229	NO
01/02/2002	290B	81533-224	NO
01/02/2002	290B	81533-225	NO
01/02/2002	491	90010-71	NO
01/02/2002	605	81533-85	NO
01/02/2002	678	81533-105	NO
01/02/2002	699	81533-236	NO
01/02/2002	699	81533-238	NO
01/02/2002	699	81533-237	NO
01/02/2002	699	81533-235	NO
01/02/2002	801B	81533-129	NO
01/02/2002	804A	81533-130	NO
01/02/2002	2337	81515-65	NO
01/02/2002	2562A	81515-41	NO
01/02/2002	2707	81515-50	NO
01/02/2002	2707	81515-49	NO
01/02/2002	2707	81515-51	NO
01/02/2002	2707	81515-47	NO
01/02/2002	2707	81515-48	NO

Submittal Date	Building No.	NJDEP Reg. #	Residential
02/13/2002	2044	192486-24	NO
02/13/2002	2044	192486-32	NO
02/13/2002	2044	192486-33	NO
02/26/2002	208B	81533-210	YES
03/05/2002	246	N/A	YES
03/05/2002	261B	N/A	YES
05/15/2002	106	90010-74	NO
05/15/2002	164	90010-15	NO
05/15/2002	173	90010-19	NO
05/15/2002	200	81533-2	NO
05/15/2002	208A	81533-6	YES
05/15/2002	233	81533-21	YES
05/15/2002	237	81533-25	YES
05/15/2002	271	81533-55	YES
05/15/2002	277	90010-24	NO
05/15/2002	296B	81533-217	NO
05/15/2002	296B	81533-223	NO
05/15/2002	296B	81533-221	NO
05/15/2002	296B	81533-220	NO
05/15/2002	296B	81533-222	NO
05/15/2002	296B	81533-218	NO
05/15/2002	296B	81533-216	NO
05/15/2002	296B	81533-215	NO
05/15/2002	296B	81533-214	NO
05/15/2002	296B	81533-213	NO
05/15/2002	296B	81533-219	NO
05/15/2002	426	90010-40	NO
05/15/2002	482	90010-54	NO
05/15/2002	600 A	81533-83	NO
05/15/2002	600 B	81533-212	NO
05/15/2002	611	81533-87	NO
05/15/2002	615	81533-89	NO
05/15/2002	618	81533-91	NO
05/15/2002	619	81533-92	NO
05/15/2002	621	81533-94	NO
05/15/2002	634	N/A	NO
05/15/2002	638	N/A	NO
05/15/2002	639-2	N/A	NO
05/15/2002	640	N/A	NO
05/15/2002	641	N/A	NO
05/15/2002	644	N/A	NO
05/15/2002	664	N/A	NO
05/15/2002	666	N/A	NO
05/15/2002	686	81533-107	NO
05/15/2002	697	81533-194	NO
05/15/2002	697	81533-195	NO

Submittal Date	Building No.	NJDEP Reg. #	Residential
05/15/2002	697	81533-196	NO
05/15/2002	876B	81533-139	NO
05/15/2002	886	81533-140	NO
05/15/2002	905	81533-145	NO
05/15/2002	1102	81533-162	NO
05/15/2002	1104	81533-164	NO
05/15/2002	2067	192486-37	NO
05/15/2002	2534	81515-24	NO
05/15/2002	2603	81515-60	NO
05/15/2002	2700 2,6	81515-61	NO

The NJDEP has determined that the Army has performed the remedial actions in a manner consistent with the regulatory requirements, specifically the Technical Requirements For Site Remediation (N.J.A.C. 7:26E et seq.). Soils with contamination in excess of the NJDEP residential cleanup criteria have been excavated and the Army has taken great care to provide documentation that assures us that all sources of contamination have been remediated.

If you should have any questions or comments, please do not hesitate to contact me at (609) 633-7232 or via E-mail.

Sincerely,

Ian R. Curtis, Case Manager
Bureau of Case Management
ICURTIS@DEP.STATE.NJ.US

FTMMTH116IRC.DOC

State of New Jersey
DEPARTMENT OF ENVIRONMENTAL PROTECTION
Division of Remediation Management & Response
P.O. Box 413
Trenton, New Jersey 08625-0413

JON S. CORZINE
Governor

LISA P. JACKSON
Commissioner

AUG 1 4 2007

Mr. Joseph Fallon, CHMM
Directorate of Public Works
ATTN: IMNE-MON-PWE
167 Riverside Ave.
Fort Monmouth, NJ 07703-5101

RE: M-18 Landfill, Fort Monmouth, NJ

Dear Mr. Fallon:

The NJDEP Division of Remediation Management & Response (DRMR) has completed its review of the following reports on the M-18 Landfill at Fort Monmouth:

- Remedial Investigation Report, M-18 Landfill Site, dated October 1, 2003
- Remedial Investigation Report for Near Surface Soils, M-18 Landfill Site, dated March 17, 2004
- Remedial Investigation Report and Sediment Quality Evaluation, M-18 Landfill Site, dated February 23, 2004

NJDEP's comments are attached. NJDEP cannot make any No Further Action (NFA) determinations for soil, ground water, or sediments at the M-18 Landfill at this time, based upon the reports. Our comments describe the additional investigations or actions that would be needed before NFAs could be considered.

You or your staff may contact me at 609-633-0766 with any questions on the enclosed comments, or any other site remediation matters at Fort Monmouth.

Sincerely,

Larry Quinn

Larry Quinn, P.E., CHMM, Case Manager
Bureau of Design & Construction

Attachment

NJDEP COMMENTS ON M-18 LANDFILL SITE REPORTS
FORT MONMOUTH SITE

The comments below address the following reports on the M-18 Landfill Site:

- **Remedial Investigation Report, M-18 Landfill Site, dated October 1, 2003**
- **Remedial Investigation Report for Near Surface Soils, M-18 Landfill Site, dated March 17, 2004**
- **Remedial Investigation Report and Sediment Quality Evaluation, M-18 Landfill Site, dated February 23, 2004**

General

1. The Army should submit a comprehensive investigation workplan for NJDEP review and approval, prior to initiating any of the additional sampling requested below, to ensure complete agreement on all details prior to sampling. After sampling activities are completed, a supplemental remedial investigation (RI) report should be submitted.

2. To reiterate a comment provided on the M-12 and M-14 Landfills, NJDEP requests that the Army review, and re-visit if appropriate, the delineation of all landfill areas at Fort Monmouth, including M-18. There are no indications that test pitting was ever conducted to verify the limits of fill areas, which were created based upon geophysical surveys.

Surface Soils - Landfill

1. Surface soil sampling results indicate that semi-volatile organic compounds (SVOCs) and metals exceed the NJDEP Residential Direct Contact Soil Cleanup Criteria (RDCSCC) in the 0-12 inch surface soil interval in two distinct portions of the M-18 Landfill (Area SVOC-1 and Area Metals-1). Therefore, these surface soils pose a potential direct contact threat, and remedial action is required to minimize or eliminate the direct contact threat. Depending upon the location and extent of the soils that exceed the RDCSCC, targeted soil excavations may be feasible. At a minimum, engineering controls such as additional soil cover, fencing, and warning signs may be required, in conjunction with a deed notice.

Soil – UST Removals

1. Building 296 – Eleven USTs . Since no soil contamination in excess of the New Jersey RDCSCC remains in this area, no further investigation of soils is required.

2. Building 290 – Two gasoline USTs. Since no soil contamination in excess of the New Jersey RDCSCC remains in this area, no further investigation of soils is required.

3. Building 290 – One 2,000 gallon diesel fuel UST. Two post-excavation samples contained total petroleum hydrocarbons (TPHC) in excess of the RDCSCC (samples A and B at 16,200 and 11,900 ppm), both at a depth of 5.5 to 6 feet. No further excavation was conducted to address those spots. Additional excavations should be considered. If the Army proposes to leave the contaminated soils in place, a deed notice must be filed to document the contamination, including location.

4. Building 290 – Suspected Former Gasoline Pump Island. Since no soil contamination in excess of the New Jersey RDCSCC remains in this area, no further investigation of soils is required.

Surface Water and Sediments

1. A Baseline Ecological Evaluation (BEE) must be performed to determine whether receptors, especially within Parkers Creek, have been impacted by contaminants from the M-18 Landfill.

2. Due to the presence of measurable VOCs in surface water samples, additional surface water samples should be collected along Parkers Creek. At a minimum, sampling locations should be as follows: one immediately upstream of the landfill, one immediately downstream, and at least two alongside the landfill. Analytes should be TCL+30 and TAL metals. It is recommended that passive diffusion bags (PDB) be used to collect the samples for VOC analysis. The PDBs can be deployed in the sediments, to monitor shallow ground water discharging to Parkers Creek.

3. Sediment samples were analyzed for PCBs only. Based upon a review of all sampling data associated with the M-18 Landfill, additional sediment samples should be collected in conjunction with the aforementioned surface water sampling, and analyzed for full Target Compound List +30 (TCL+30) and Target Analyte List (TAL) metals.

4. In addition, the Army must evaluate/investigate any Army property upgradient of the M-18 Landfill that could be sources of the VOCs in Parkers Creek.

Ground Water

1. NJDEP agrees that the ground water classification at the M-18 Landfill is Class III-A, which necessitates that Class II-A ground water quality standards be utilized. The ground water model created for the M-18 Landfill and all model inputs are

acceptable. However, NFA for ground water cannot be issued at this time, due to the concerns and deficiencies discussed below.

2. One upgradient background well must be installed and sampled, to provide data for remedial decision-making. The background well should be near the landfill, but in an area that is clearly not impacted by the landfill. Samples from the background wells can be analyzed for TAL Metals only.

3. For reasons unknown to NJDEP, no monitoring wells were installed in the eastern portion of the M-18 Landfill. At least 2 wells should be installed and analyzed for TCL+30 and TAL metals.

4. Since the existing wells may not have been sampled since 2001, an additional round of samples from all wells is required for remedial decision-making. Analyses should be for TCL volatiles, MTBE (methyl tertiary butyl ether), TBA (tert-butyl alcohol), TCL semi-volatiles, and TAL metals.

5. The Army must submit a map that shows the former locations of all USTs and the existing M-18 monitoring wells. The Army must justify the location of monitoring wells in relation to the USTs and demonstrate that ground water contamination was delineated, and also document whether gasoline stored was leaded or unleaded.

6. The Army must document whether there was a pump island associated with any of the removed gasoline USTs. If a pump island(s) was/were present, then a ground water sample is required at the pump island location pursuant to N.J.A.C. 7:26E-4.4 (f)3 and a figure pursuant to N.J.A.C. 7:26E-4.2(d)1 must show the location of any pump islands.

7. Paper copies of all sampling documentation (such as ground water field parameters and low-flow sampling sheets) must be submitted in summary tables in reports.

State of New Jersey

CHRIS CHRISTIE
Governor

KIM GUADAGNO
Lt. Governor

DEPARTMENT OF ENVIRONMENTAL PROTECTION
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BOB MARTIN
Commissioner

July 3, 2014

Wanda Green
BRAC Environmental Coordinator
OACSIM – U.S. Army Fort Monmouth
PO Box 148
Oceanport, NJ 07757

Re: Final Baseline Groundwater Sampling Report (August 2013)
Remedial Investigation/Feasibility Study/Decision Documents
Fort Monmouth
Oceanport, Monmouth County
PI G000000032

Dear Ms. Green:

The New Jersey Department of Environmental Protection (Department) has completed review of the referenced report, dated March 2014, received on April 7, 2014. The report was prepared by Parsons Government Services Inc. (Parsons), in support of the Remedial Investigation (RI), Feasibility Study (FS), and Decision Documents project at Fort Monmouth.

A baseline ground water sampling event was conducted at 21 "sites" at the Fort Monmouth property in August 2013. The purpose of the sampling event was to re-establish baseline conditions following suspension of ground water sampling in late 2011, as well as to evaluate Fort Monmouth's long-term ground water sampling program, and the current analytical conditions of the ground water at each site. Sampling methodologies used included low-flow and passive diffusion bag samplers (PDBS). At four sites (FTMM-14, 18, 59, 68), only PDBS sampling was conducted. At three sites (FTMM-05, 22, 58) both low-flow and PDBS samples were obtained for comparison purposes. Fourteen (14) sites were only sampled using low-flow. The report states that PDBS concentrations were consistently biased somewhat low compared to the low-flow concentrations. The report concludes, however, that the PDBS results were still similar to the low-flow results and are considered representative of ground water conditions at the sites. Based on this conclusion, the report states that for future ground water sampling, PDBS will be used for all sites where volatile organic compounds (VOCs) are the sole contaminants of concern. Comments are presented below.

Section 3.1; Table 6; Appendices & associated Tables - *The "background concentrations" submitted in the 1995 Weston report were not accepted by the Department as representative of background conditions for Fort Monmouth. The study was not performed in accordance with Departmental protocol and is not a consideration in our evaluations/determinations. As indicated in Section 3.1, background concentrations are evaluated on a site by site basis.*

FTMM-02 Landfill

Historic sampling at this parcel indicated levels of VOCs above the Ground Water Quality Standard (GWQS); metals were previously determined to be reflective of naturally occurring conditions. The August 2013 sampling of wells using low-flow confirmed the continued exceedance of the GWQS for VOCs. The report recommends VOC sampling of wells M2MW03, M2MW11, M2MW21, M2MW22 and M2MW24 for two additional rounds using PDBS. Well M2MW10 will be monitored as a downgradient sentinel well. Although the proposal is acceptable, for wells in which the saturated screen length exceeds 10 feet, the deployment of multiple PDBS will be required. At any point where a decision is made to terminate ground water sampling at this site, confirmatory sampling using low-flow due to PDBS biasing low as compared to low-flow results at the Fort Monmouth site will be required.

FTMM-03 Landfill

Historic sampling at this parcel revealed GWQS exceedances of vinyl chloride and metals. The August 2013 sampling of wells using low-flow confirmed the continued exceedance of the GWQS for vinyl chloride in well 3MW07. Well 3MW02 was not sampled due to low water column and silty conditions, however, Table 4 of Appendix B recommends sampling of 3MW02 for VOCs and metals. The report attributes the presence of vinyl chloride to leaching of PVC piping from well 3MW07. A temporary well point investigation was conducted in 2009 to delineate the vinyl chloride, the results were non-detect, and abandonment of 3MW07 is recommended. The recommendations are acceptable. However, a figure presenting the locations and sampling results from the 2009 temporary well point investigation must be provided to the Department.

FTMM-04 Landfill

Historic sampling at this parcel revealed GWQS exceedances of various metals. The August 2013 sampling of wells using low-flow confirmed the continued exceedance of the GWQS for metals. The metals are attributed to background conditions, and cessation of ground water sampling is recommended. The recommendation is acceptable. Monitoring wells at this parcel shall be properly abandoned if they are no longer subject to sampling or gaging for water elevation data.

FTMM-05 Landfill

Historic sampling at this parcel revealed GWQS exceedances of PCE, TCE and vinyl chloride, which the August 2013 sampling, using low-flow and PDBS, confirmed. The report recommends annual VOC sampling of wells M5MW11, M5MW16, M5MW20 and M5MW23 using PDBS. The Department finds the proposal to be acceptable. At any point where a decision is made to terminate ground water sampling at this parcel, the Department will require confirmatory sampling using low-flow due to PDBS results at this parcel biased low compared to the low-flow results.

FTMM-08 Landfill

Historic sampling at this parcel revealed GWQS exceedances of pesticides, benzene, PCE and lead. The August 2013 sampling of wells using low-flow confirmed the exceedance of the GWQS for PCE and lead. The well with historic pesticide exceedances (697MW01) could not be located and was not sampled. The report recommends annual ground water sampling of well M8MW11 for VOCs and lead, M8MW12, 15, 16 and 24 for VOCs and M8MW17 and 21 for lead only. Monitoring well 697MW01 will be located and sampled for pesticides, lead and VOCs. The recommendation is acceptable.

FTMM-12 Landfill

Historic sampling at this parcel revealed GWQS exceedances of various metals, including arsenic and lead. Historic exceedances of metals except for lead are attributed to background quality. The August 2013 sampling was conducted for lead analysis only. Lead was not detected. The report recommends discontinuing ground water sampling at this parcel. The Department finds the recommendation to be acceptable. Monitoring wells at this parcel shall be properly abandoned if they are no longer subject to sampling or gaging for water elevation data.

FTMM-14 Landfill

Historic sampling at this parcel revealed no GWQS exceedances of VOCs. The August 2013 sampling of wells using PDBS confirmed that there was no exceedance of the GWQS. The report recommends discontinuing ground water sampling at this parcel. The Department finds the recommendation to be acceptable. Monitoring wells at this parcel shall be properly abandoned if they are no longer subject to sampling or gaging for water elevation data. The Department also notes that on Table 1, well M14MW19 is listed as having 10 feet of total screen length. However, the table also lists the saturated screen length as 13.35 feet. This discrepancy should be clarified.

FTMM-18 Landfill

Historic sampling at this parcel revealed GWQS exceedances of benzene and 1,2-DCA. The August 2013 sampling results of wells using PDBS showed the exceedance of the GWQS for 1,2-DCA in well M18MW22. Well M18MW23 could not be located and was not sampled. The report recommends annual ground water sampling using PDBS for M18MW22 and M18MW23 if it can be located. Every reasonable effort, such as reviewing the NJ State Plane Coordinates of the well, must be made to locate M18MW23. The use of M18MW22 as the sole monitoring well at this parcel will not be acceptable due to the vast difference in historical concentrations between M18MW22 and M18MW23. Historic 2011 benzene concentrations for M18MW23 were 775 ppb and 664 ppb while 2011 concentrations for M18MW22 were 1.81 ppb and 1.65 ppb. The Department cannot approve the use of PDBS sampling only for this parcel. Once M18MW23 is located, the Department can approve the use of both PDBS and low-flow sampling for comparison purposes.

FTMM-22 Former Wastewater Treatment Lime Pit

Historic sampling at this parcel revealed GWQS exceedances of TCE. The August 2013 sampling of wells using low-flow and PDBS confirmed the continued exceedance of the GWQS for TCE in ground water. The report recommends quarterly VOC sampling of wells CW1MW27, CW1MW29, CW1MW31 and CW1MW281 using PDBS. The Department finds the proposal to be acceptable. At any point where a decision is made to terminate ground water sampling at this parcel, the Department will require confirmatory sampling using low-flow due to PDBS results biasing low compared to low-flow results at the Fort Monmouth site.

FTMM-25 Landfill

Historic sampling at this parcel revealed GWQS exceedances of various metals. The August 2013 sampling of wells using low-flow confirmed the continued exceedance of the GWQS for metals. The metals are attributed to background conditions. The report recommends discontinuing ground water sampling at this parcel. The Department finds the recommendation to be acceptable. Monitoring wells at this parcel shall be properly abandoned if they are no longer subject to sampling or gaging for water elevation data.

FTMM-53 Building 699

Historic sampling at this parcel revealed GWQS exceedances of benzene, PCE, TCE, TBA, VOC TICs and lead. The August 2013 sampling of wells using low-flow showed the exceedance of the GWQS for benzene, xylenes, PCE, 1,2,4-Trimethylbenzene, 1,3,5-Trimethylbenzene and VOC TICs. The report recommends quarterly VOC sampling of wells 699MW01, 699MW04, 699MW06, 699MW09, 699MW16, 699RW03, 699RW05 and 699RW11 using PDBS. The Department finds the proposal to be acceptable. For wells in which the saturated screen length exceeds 10 feet, the deployment of multiple PDBS will be required. At any point where a

decision is made to terminate ground water sampling at this parcel, the Department will require confirmatory sampling using low-flow due to PDBS biasing low compared to low-flow at the Fort Monmouth site.

FTMM-54 Building 296

Historic sampling at this parcel revealed GWQS exceedances of benzene, lead and arsenic. The metals are attributed to background conditions. The August 2013 sampling of wells using low-flow showed an exceedance of the GWQS for benzene. The report recommends annual VOC sampling of wells 269MW04 and 296MW06 using PDBS. The Department finds the proposal to be acceptable. For wells in which the saturated screen length exceeds 10 feet, the deployment of multiple PDBS will be required. At any point where a decision is made to terminate ground water sampling at this parcel, the Department will require confirmatory sampling using low-flow due to PDBS biasing low compared to low-flow at the Fort Monmouth site.

FTMM-55 Building 290

Historic sampling at this parcel revealed GWQS exceedances of arsenic and lead. The August 2013 sampling of wells using low-flow confirmed the continued exceedance of the GWQS for lead. The metals are attributed to background conditions. The report recommends discontinuing ground water sampling at this parcel. The Department finds the recommendation to be acceptable. Monitoring wells at this parcel shall be properly abandoned if they are no longer subject to sampling or gaging for water elevation data.

FTMM-56 Building 80

Historic sampling at this parcel revealed GWQS exceedances of chlordane, arsenic, lead and cadmium. The August 2013 sampling of wells was conducted for lead only using low-flow. There were no exceedances of lead. The report recommends one additional sampling round of well 80MW02 for chlordane and 80MW05 for lead. The Department finds the recommendation for well 80MW02 to be acceptable. The Department disagrees with the recommendation to sample well 80MW05 for lead only. The last low-flow sampling event in August 2011 had lead, arsenic and cadmium exceeding both the GWQS and background concentrations. Well 80MW05 shall be sampled during the next round for TAL metals.

FTMM-57 Building 108

Historic sampling at this parcel revealed GWQS exceedances of lead. In the August 2013 sampling event, there were no exceedances of lead in ground water. The report recommends two additional sampling rounds of well 108MW04 for lead. The Department finds the recommendation acceptable.

FTMM-58 Building 2567

Historic sampling at this parcel revealed GWQS exceedances of TBA in wells 2567MW01 and 2567MW03. The August 2013 sampling results using low-flow and PDBS were below the GWQS for TBA. The report recommends two annual sampling events for TBA analyses of wells 2567MW01 and 2567MW03 using low-flow. The Department finds the proposal to be acceptable.

FTMM-59 Building 1122

Historic sampling at this parcel revealed no GWQS exceedances for VOCs. The August 2013 sampling results of wells using PDBS showed no exceedance of VOCs. The text of the report recommends VOC sampling of well 1122MW07 for one additional sampling round to confirm the 2013 results because August 2013 was the first time this well was sampled. The Department finds the proposal to be acceptable. The Department also notes that there is a discrepancy between the recommendation in the text and the recommendation in Table 7. Table 7 recommends that sampling at this parcel be discontinued. Table 7 shall be amended to indicate well 1122MW07 will be sampled for VOCs using PDBS methodology.

FTMM-61 Building 283

Historic sampling at this parcel revealed GWQS exceedances of metals, benzene and VOC TICs in 283MW02. The August 2013 sampling of wells using low-flow for VOCs and lead showed no exceedances. The report recommends VOC sampling of well 283MW02 for one additional sampling round using PDBS methodology to confirm the 2013 results. The Department finds the proposal to be conditionally acceptable. If the saturated screen length exceeds 10 feet, the deployment of multiple PDBS will be required. If a decision is made to terminate ground water sampling at this parcel based on PDBS results, the Department will require confirmatory sampling using low-flow due to PDBS biasing low compared to low-flow at the Fort Monmouth site.

FTMM-64 Building 812

Historic sampling at this parcel revealed GWQS exceedances of benzene, vinyl chloride and metals. The August 2013 sampling of wells using low-flow for VOCs and lead showed no exceedances. The report recommends VOC sampling of well 812MW04 for one additional sampling round using PDBS methodology to confirm the 2013 results (however Section 5.0 recommends sampling be continued on an annual basis). The Department finds the proposal to be conditionally acceptable. If the saturated screen length exceeds 10 feet, the deployment of multiple PDBS will be required. If a decision is made to terminate ground water sampling at this

parcel based on PDBS results, the Department will require confirmatory sampling using low-flow due to PDBS biasing low compared to low-flow at the Fort Monmouth site.

FTMM-66 Building 886

Historic sampling at this parcel revealed GWQS exceedances of benzene, VOC TICs, arsenic and lead. The August 2013 sampling results from wells using low-flow showed the exceedance of the GWQS for SVOC TICs. The report recommends that sampling at this parcel be discontinued. The Department finds the recommendation unacceptable. Total SVOC TICs exceeded the GWQS of 500 ppb in wells 886RW01 and 886RW06. Ground water monitoring of wells 886RW01, 886RW06 and 886RW08 shall continue for SVOC+TICs using low-flow methodology.

FTMM-68 Building 700

There are no historic sampling results for this parcel. The August 2013 sampling results of wells using PDBS showed the exceedance of the GWQS for PCE, TCE, cis-1,2-DCE and vinyl chloride in wells 565MW01 and 565MW01D. The report recommends quarterly ground water sampling for VOC+TICs using PDBS for these 2 wells. The Department agrees with the recommendation of quarterly sampling, however, has concerns regarding the use of PDBS for long-term monitoring at this parcel. Unlike the other Fort Monmouth parcels, there are no historical ground water sampling data for comparison with the PDBS results. The DEP's Field Sampling Procedures Manual states that "the intended application of Passive Diffusion Bag Samplers (PDBS) is for long-term monitoring of volatile organic compounds (VOCs) in ground water at well-characterized sites." The Department would find long-term sampling of the wells using PDBS acceptable if low-flow sampling is conducted concurrently once or twice for comparison.

Finally, each of the above comments speak only to the ground water findings and recommendations included in the referenced submittal, rather than to the ground water at the entire site.

Please contact this office if you have any questions.

Sincerely,

Linda S. Range

Linda S. Range

C: Joe Pearson, Calibre
Rick Harrison, FMERA
Julie Carver, Matrix
Frank Barricelli
Daryl Clark, BGWPA

State of New Jersey

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BOB MARTIN
Commissioner

November 16, 2015

John Occhipinti
BRAC Environmental Coordinator
OACSIM – U.S. Army Fort Monmouth
PO Box 148
Oceanport, NJ 07757

Re: *Underground Storage Tanks within Parcels 49 & 50*
Fort Monmouth
Oceanport, Monmouth County
PI G000000032

Dear Mr. Occhipinti:

The New Jersey Department of Environmental Protection (Department) has completed review of the referenced report, received February 3, 2015, prepared by the Department of the Army's Office of Assistant Chief of Staff for Installation Management to document the status of the various USTs within these parcels.

As indicated on pages 2 and 3 of the submittal, the majority of the USTs formerly present within the parcels have received a designation of no further action (NFA) from the Department. Those which had not, or which warrant additional comment, are discussed below.

UST 283A aka UST 283-58
Although no evidence of a discharge was reportedly noted during the May 1990 removal of the underground storage tank, and the specific location of the tank is currently "not known", unless sampling was/is performed in accordance with applicable regulations and guidance documents, the NJDEP cannot comment as to the absence or presence of a petroleum discharge; the request for designation of no further action cannot be granted.

UST 283C aka UST 283-229
The UST, located within an area addressed under the Installation Restoration Program (IRP) and known specifically as FTMM-61, received a designation of NFA from the Department in January of 2003. As per the submittal, any ground water issues relative to FTMM-55 (Building 290) and FTMM-61 (Building 283) will be addressed through the specific IRP site activities.

UST 290A aka UST 290-64

UST 290-64, although listed in a letter dated August 29, 2000 indicating no further action required for multiple USTs, contained post excavation analytical results of up to 11,900 ppm and 16,200 ppm. UST 290-64 (as well as **UST 290-224** and **UST 290-225**) was located in the area being addressed under the IRP as FTMM-55. Additional soil sampling/characterization efforts are proposed and discussed in the February 2015 *ECP Supplemental Phase II Site Investigation Work Plan Addendum for Parcels 34, 50, 51, 52, 66, 80 and 83* and the DEP's comment letter of June 16, 2015.

UST 290C aka 290-193

Following review of the information submitted in the referenced report, it is agreed no further action is necessary for the former waste oil tank.

UST 296A aka UST 296-69

As indicated in the July 10, 2012 DEP correspondence, although Appendix G of the January 2007 ECP Report indicates a report was submitted in February of 1996, no documentation was found, nor has been submitted since, to allow for comment as to the presence or absence of a discharge at this time.

Please contact this office if you have any questions.

Sincerely,

Linda S. Range

C: Joe Pearson, Calibre
Rich Harrison, FMERA
Joe Fallon, FMERA
James Moore, USACE
Frank Barricelli, RAB

DEPARTMENT OF THE ARMY

OFFICE OF ASSISTANT CHIEF OF STAFF FOR INSTALLATION MANAGEMENT
U.S. ARMY FORT MONMOUTH
P.O. 148
OCEANPORT, NEW JERSEY 07757

November 23, 2015

Ms. Linda Range
New Jersey Department of Environmental Protection
Case Manager
401 East State Street, 5th Floor
PO Box 420
Trenton, NJ 08625-0028

Subject: State of New Jersey Department of Environmental Protection Comments on the Final Environmental Condition of Property Supplemental Phase II Site Investigation Work Plan Addendum for Parcels 34, 50, 51, 52, 66, 80 and 83 dated February 2015 Fort Monmouth, Oceanport, Monmouth County.
PI # G000000032

Dear Ms. Range,

Fort Monmouth (FTMM) and Parsons have reviewed the New Jersey Department of Environmental Protection (NJDEP) comments on the Final Environmental Condition of Property Supplemental Phase II Site Investigation Work Plan Addendum for Parcels 34, 50, 51, 52, 66, 80 and 83 as documented in your letter dated June 16, 2015. Responses to your comments are provided below in the order in which they were presented in the comment letter.

A. General

A1. COMMENT: Tables 3.1 and 3.2 also will require revision based upon the following comments.

A1. RESPONSE: Comment noted. Tables 3.1 and 3.2 have been revised based upon the comments and responses.

B. Parcel 34/Building 2567/FTMM-58:

B1. COMMENT: *Section 2.4.1, Page B4-line 2* – Although this office agrees with the statement "post excavation soil samples were collected…and analyzed for TPHCs, VOCs, and lead", review of historic information appears to indicate elevated levels of benzene remain in the soil in the area of the dispenser island south of Building 2567. See additional detail under Section 3.2, below.

B1. RESPONSE: Soil sampling data obtained by Weston in 1993 (which indicate elevated levels of benzene in soil) and additional soil data generated by FTMM in 2013 have been reviewed and summarized (in results tables) in the Work Plan Addendum, and an assessment of remaining data gaps has been provided. The additional sampling performed by FTMM in 2013 did not address the benzene in the vadose zone referred to in the comment; therefore, the Work Plan has been revised to include additional soil sampling. See additional details below in responses B2 and B3.

B2. COMMENT: *Section 2.5, Page B-7, line 21* – This statement regarding the removal of piping was amended via email to Wanda Green (copy to Rob Youhas and Joe Pearson) on June 18, 2013 1519 hrs. The report documenting the investigation of the piping, however, as you likely are aware, has not been received by this office.

B2. RESPONSE: The statement referred to in the comment is**: "…**they (NJDEP) stated that it is necessary to remove the piping and dispensing equipment/island." Due to personnel changes over the years this communication could not be located and reviewed. Please provide said communication so that the Army can respond to this comment.

In addition, soil sampling was performed by FTMM in 2013 to assess the potential for contamination along piping from the former fiberglass gasoline USTs (removed in 2008) to the fuel dispensers. The soil was not sampled until 2013 because the piping was used to dispense fuel from the replacement ASTs until Base closure in 2011. Seven soil samples (PSB-1 through PSB-7) were collected along the piping corridor at a depth of 2.5 to 3 feet bgs and analyzed for VOCs+TICs and lead. There were no exceedances of NJDEP direct contact soil remediation standards, and only one slight exceedance of the NJDEP Impact to Ground Water (IGW) screening level (SL) for benzene (0.011 mg/kg versus screening level of 0.005 mg/kg). This additional historical information documenting the investigation of the piping has been added to the ECP Work Plan Addendum (Appendix B).

B3. COMMENT: *Section 3.2 Sampling Plan* – Although it is agreed the proposal is appropriate for the TBA in ground water, the referenced submittal considers only the issue of TBA in ground water (the proposal for two annual sampling events of monitor wells 2567MW01 and 2567MW03 was approved on July 3, 2014). However, as briefly discussed in a conference call on June 12, 2015, a review of historic information appears to indicate levels of benzene above both the residential and non-residential criteria/standard remain in numerous locations in the vicinity of the dispenser area south of Building 2567. The information was obtained from the October 28, 2005 RIR/RAW, including Figure 2-1 dated 6/9/94, which indicates levels of benzene remain up to 85 ppm. The June 2010 RAPR appears to omit reference to analytical results from the post excavation soil sampling performed in 1993 during removal of USTs 42 through 45, stating only the samples were analyzed for TPHC, VOCs, and lead, however, a copy of the September 2, 2010 PBR Request contained within the submittal's Appendix B referenced benzene remaining to 45 ppm. Pages i, 3-5 and 6-1 of the June 2010 RAPR also indicate the "remaining original UST dispenser island areas" would undergo assessment upon BRAC closure. It is understood available information is currently being evaluated to determine the status of the soils in this area. At this time, however, this office considers the soil in the area an unaddressed area of concern in need of additional delineation.

B3. RESPONSE: A total of 23 post-excavation soil samples (exact depths unknown, but likely collected at approximately 4 feet bgs) were collected by Weston around the perimeter of the soil excavation for four USTs and the dispenser area in 1993. The samples were designated A through W. The UST removal report prepared by Weston (1995) states that groundwater observed at 4 feet bgs in nearby monitoring wells was not observed during the excavation; therefore the excavation was extended to 7 feet bgs "when necessary". The samples were analyzed for VOCs+TICs, TPHC, and lead. Benzene concentrations exceeded the current

RDCSRS and IGW SL at 9 and 11 locations, respectively. Ethylbenzene and xylenes exceeded the current IGW SL at 5 and 11 locations, respectively. Acetone was also detected above the IGW SL at one location, but was also detected in the associated blank sample and likely represents laboratory contamination. The maximum TPHC and lead concentrations in soil were 4,539 mg/kg and 129 mg/kg, respectively. None of the lead concentrations exceed the current RDCSRS of 400 mg/kg, and there is no NJDEP standard or screening value for total gasoline-range petroleum hydrocarbons. This historical information, including a sample location map and sampling results table, have been added to the ECP Work Plan Addendum (Appendix B).

Four new soil borings will be advanced at four excavation sidewall sample locations that had relatively high BTEX concentrations in 1993 in order to assess current concentrations. The borings will be advanced at the locations of the 1st, 2nd, 3rd, and 5th highest soil benzene concentrations detected in 1993 (locations Q, O, N, and G). Benzene concentrations at these four locations ranged from 14 to 85 J mg/kg. The location of the 4th highest benzene concentration (25 J mg/kg) will not be sampled because it was located approximately 6 feet from the 3rd highest concentration (27 mg/kg) and had a very similar concentration. Soil borings will be advanced to at least 5 feet below the water table (estimated to be present at approximately 4 feet bgs at this site), through and below any fuel smear zone bordering the water-table that may be present. Up to three samples per boring will be collected based on field observations of contamination and PID headspace screening. If there is no indication of contamination at a boring location, then one sample will be collected from 0.5 to 1.0 feet below the bottom of the pavement and one sample will be collected from the 6-inch interval just above the water table. If there is field evidence of contamination (visual, olfactory, PID screening) then the sample intervals will be: 1) the most contaminated 6-inch interval in the top 2 feet of the soil column based on field screening, 2) a 6-inch interval that is below any field evidence of contamination to delineate vertical extent, and 3) the most contaminated intermediate 6-inch interval encountered based on field evidence. Soil samples will be analyzed for VOCs+TICs including 1,2-DBA and 1,2-DCA. This proposed additional soil sampling has been added to Appendix B of the ECP Work Plan Addendum.

C. <u>Parcel 50</u>:

C1. COMMENT: *Section 2.2.1 - FTMM-54* - Page C-2 lines 39 & 42 reference the year of the eleven tank removals as 2003, while page C-3, line 17 indicates removal of the eleven tanks was 1993, which appears correct.

C1. RESPONSE: Comment noted, Page C-2 lines 39 & 42 have been updated to 1993.

C2. COMMENT: *Section 2.2.2 – FTMM-55 – Page C-5, line 11* – Waste oil UST No. 91533-193 is indicated as being NFA in a January 10, 2003 letter. Although the tanks referenced on line 15 were found on the January 10, 2003 NJDEP NFA letter, that letter does not appear to reference UST No. 91533-193; no record of a letter of no further action for that tank could be located.

C2. RESPONSE: The waste oil UST number stated in the referenced Appendix C text is 81533-193. A request for NFA for UST290C (81533-193) was submitted to the NJDEP on January 30, 2015 ("Underground Storage Task within Parcels 49 and 50, Fort Monmouth,

NJ"). NJDEP approved NFA in a letter dated November 16, 2015. The Work Plan text has been revised accordingly.

C3. COMMENT: *Section 3.2 Sampling Plan* – As noted on page C-6, line 37, levels of TPHC remained in soil at the former location of UST No. 81533-64 at 16,200 and 11,900 ppm, at samples A and B, both at a depth of 5.5-6'. The proposal indicates horizontal delineation sampling is to be performed at locations A (16,200 ppm) and F (9,670 ppm), which is acceptable. Vertical delineation is also required. It is unclear, however, why sampling is not proposed at sample location B, as it does not appear to be vertically delineated.

C3. Response: Comment noted. Vertical delineation is required at sample locations A, F and B; therefore a new soil boring will be advanced to at least five feet below the water table at the locations of samples A, F and B to assess current concentrations and vertical extent of EPH. Two soil samples will be collected from each boring. Samples will be collected from 5.5-6.0 feet and a deeper 6-inch interval that is below any field evidence of contamination to delineate vertical extent based on field evidence (visual, olfactory, PID screening). Appendix C of the Work Plan Addendum has been updated with this information.

C4. Comment: The Department's EPH Protocol, http://www.nj.gov/dep/srp/guidance/srra/eph protocol.pdf, is to be followed, with contingency samples collected/analyzed as required. As per EPH Methodology Version 3.0, the non-fractionation option is appropriate only if the EPH level is anticipated to be below 1,700 ppm. As this cannot be presumed, the "unfractionated EPH" does not appear to be the appropriate option.

C4. RESPONSE: The tank being investigated at Parcel 50 is a fuel oil tank and, based on our review of NJDEP *Protocol for Addressing Extractable Petroleum Hydrocarbons* (Version 5, August 2010), the appropriate category of discharge for this investigation is Category 1. According to the EPH protocols for this category, total EPH results are to be compared to a trigger value of 5,100 mg/kg. With regard to contingency analyses, if EPH is detected in any of the samples over 1,000 ppm then 25% of the samples where EPH exceeds 1,000 mg/kg collected at Parcel 50 will be analyzed for 2-methylnaphthalene and naphthalene. The NJDEP EPH protocol does not specify that the EPH samples related to a No. 2 fuel oil or diesel fuel oil tank (Category 1) need to be fractionated. Based on our reading of the EPH protocol, fractionation is only required for discharges that fall into a Category 2 where EPH is anticipated to be above 1,700 ppm.

D. Parcel 51:

D1. COMMENT: *Section 2.5, Page D-5, line 40 and Page D-6, line 4* - The submittal indicates the UST questions contained in this office's July 10, 2012 letter are to be addressed under the UHOT program. This office looks forward to submittal of same.

D1. RESPONSE: Comment noted. A summary of closure and site assessment data for the multiple USTs within Parcel 51 will be provided under separate cover.

D2. COMMENT: *Section 3.0* – With receipt of the additional clarification provided on page D-4, as well as the figure received on June 15, 2015, the questions noted in the Department's July 2012 letter relative to USTs 1123B and 1123C have been answered. It is

agreed no additional action is necessary for UST 1123B. However, it is not agreed there are no COCs at Parcel 51. As indicated on line 11, 2-methylnaphthalene was found in the ground water at P51-Gl2 above the Ground Water Quality Standards (GWQS), as reported in the July 2008 SI. TPHC (collected due to elevated field screening readings) was also found in soil at that location at 6-6.5' at 7,487 ppm. Additional sampling is necessary.

D2. RESPONSE: During the 2007 SI sampling, fuel-contaminated soil and groundwater were encountered at location P51-G12. A soil sample collected from 6-6.5 feet bgs contained approximately 7,500 mg/kg TPHC, and a groundwater sample collected using a HydroPunch contained 40.5 µg/L of 2-methylnaphthalene; the interim groundwater quality criterion for this SVOC is 30 µg/L. The groundwater grab sampling results for SI location P51-E12, located approximately 200 feet north of P51-G12, bound the groundwater contamination in the downgradient direction (no GWQS exceedances for VOCs or SVOCs). During review of the files associated with Parcel 51, additional information was located. The following is a summary of the new information and proposed sampling program.

<u>New Information</u>

A 2000-gallon No. 2 fuel oil UST (#81533-107) that was located adjacent to the northeast corner of Building 686 was removed in 1995 (*Closure and Site Investigation Report for Underground Storage Tanks in the 600 Area* [Versar, February 2002]). This UST was located approximately 60 feet south (hydraulically upgradient) of 2007 SI sampling location P51-G12. During tank removal, contaminated soil was excavated, and this tank was one of 68 USTs approved for No Further Action by NJDEP via letter dated January 10, 2003.

The following investigation work was performed by the Army at UST #81533-107 in approximately January 2010. Sampling locations are shown on Figure D2:

- Four soil borings (P51-SB-1, P51-SB-2, P51-SB-3, and P51-SB-4) were advanced to the water table near the former UST location; one boring was advanced on each side of the former UST. A single soil sample was collected from each boring at 7.0-7.5 feet bgs and analyzed for BN+15 and VOCs+10.
- One 2-inch diameter PVC temporary monitoring well, screened across the water table, was installed in boring P51-SB-2 and a second temporary well (51-TMP-1, screened from 5-10 feet bgs) was installed immediately north of the former UST; the groundwater samples from temporary well P51-SB-2 was analyzed for BN+15 and VOCs+10, and the groundwater sample from 51-TMP-1 was analyzed for BN+15.
- A soil sample was collected from a depth of 7-7.5 feet bgs during drilling of temporary well 51-TMP-1 and analyzed for BN+15.
- Existing permanent groundwater monitoring well 600MW01, installed in 1994, was sampled for BN+15.
- A new permanent groundwater monitoring well, 600MW04, was installed at the former fuel oil UST location (i.e., the contamination source area), but has not been sampled to date.

The results of the field investigation revealed that fuel hydrocarbon contamination was detected in soil samples from P51-SB-1 and P51-SB-2; naphthalene concentrations in samples from these borings ranged from 6.29 to 19.28 D mg/kg, exceeding the 6-mg/kg RDCSRS. There were no detections of target analytes in soil from P51-SB-3 or P51-SB-4; however, the total SVOC TIC

concentration detected in the soil sample from P51-SB-4 was 931.45J mg/kg. GWQS exceedances in the groundwater sample from temporary well P51-SB-2 included benzo(a)anthracene (0.152 µg/L), and 2-methylnaphthalene (139 µg/L); these concentrations exceeded the interim groundwater quality criteria of 0.1 µg/L and 30 µg/L, respectively. There were no exceedances of GWQS in the groundwater sample from permanent well 600MW01.

The SVOC 2-methylnaphthalene was detected in the groundwater sample from temporary well 51-TMP-1 at a concentration of 85.6 µg/L, which exceeds the NJDEP interim criterion of 30 µg/L. The soil sample collected at a depth of 7 – 7.5 feet bgs during drilling of temporary well 51-TMP-1 contained naphthalene at a concentration of 11.3 mg/kg, exceeding the current RDCSRS of 6 mg/kg, and 2-methylnaphthalene at a concentration of 34.1 mg/kg, exceeding the current IGW SL of 8 mg/kg.

The elevated TPHC concentration detected in soil at SI boring P51-G12 (6-6.5 feet bgs) in 2007 is bounded laterally to the north, south, and west by sampling results for other nearby SI borings installed in 2007, and is bounded above by the TPHC concentration in the sample collected from 4.5 to 5 feet (273 mg/kg) and the non-detect result for the sample from 0-0.5 feet. However, the TPHC contamination is not bounded below a depth of 6.5 feet; this depth interval was likely just above the water table given that the SI groundwater sampling interval for this location is shown as 5-10 feet in the SI report (U.S. Army BRAC, 2008). Deeper soil samples were not collected in 2007.

Proposed Sampling Program

The following new investigation/sampling activities are proposed in the ECP Work Plan Addendum based on the information summarized above:

- A new soil boring will be advanced to at least 5 feet below the water table at the location of P51-G12 to assess current concentrations and vertical extent of EPH. Three soil samples will be collected from this boring. Samples will be collected from 6-6.5 feet, a deeper 6-inch interval that is below any field evidence of contamination to delineate vertical extent, and from the most contaminated intermediate interval encountered (between 6-6.5 feet and the deeper vertical extent sample) based on field evidence (visual, olfactory, PID screening). Soil samples will be analyzed for fractionated EPH, and 25% of the samples having EPH detections exceeding 1,000 mg/kg will be analyzed for naphthalene and 2-methylnaphthalene.
- A second, step-out soil boring will be advanced approximately 50 feet east of P51-G12 to obtain lateral extent information in this direction. The boring, sampling, and analysis details for the step-out boring will be the same as for the boring that will be advanced at P51-G12.
- Existing permanent monitoring wells 600MW04 and 600MW01 will be sampled, with samples analyzed for VOCs+TICs and SVOCs+TICs. Depending on the length and saturation of the well screens, two samples from each well may be collected to obtain vertical profiling information.
- A new permanent monitoring well will be installed approximately 40 feet north of P51-G12 in the hydraulically downgradient direction to assess the northern extent of fuel hydrocarbon concentrations in groundwater exceeding GWQS. The well will have a 10-

foot-long screen that extends two feet above the water table. It will be developed and sampled for VOCs+TICs and SVOCs+TICs.

This proposed additional soil and groundwater sampling has been added to Appendix D of the ECP Work Plan Addendum.

D3. COMMENT: *Motor Pool Area* -Although information regarding the 750 Motor Pool is not contained within this submittal, concerns regarding the area include, but are not limited to, adequate investigation of;

- Building 750 – UST 191 (15,000 gallon diesel) & UST192 (8000 gallon unleaded gasoline)
- two outdoor service pits for draining vehicle oil, the pipes from which discharged to a former oil water separator (OWS), north of garage bays
- current wash rack previously connected to former OWS, then to new OWS
- Building 753 – three hydraulic lifts and floor drain
- Building 754 – floor drain

D3. RESPONSE: Comment noted. The Motor Pool Area will be addressed as part of a separate Work Plan.

D4. COMMENT: Is FTMM 68/Building 700 not considered within Parcel 51?

D4. RESPONSE: FTMM-68 is not within Parcel 51; as part of the upcoming property transfer it has been designated as Parcel 96. Environmental investigation at FTMM-68 is being performed under a separate RI/FS Work Plan (already reviewed and approved by NJDEP) that also includes FTMM-22, FTMM-53, and FTMM-59. The RI/FS field work for FTMM-68 was completed in November 2015.

E. <u>Parcel 52/FTMM-53/Building 699 Gas Station:</u>

E1. COMMENT: *Section 1.0, Page E-1, line 8* – As many of the parcel narratives include, a listing of NJDEP correspondence by year is provided, which refers the reader back to *Section 5 References* to ascertain which document is being referenced. It does not include, however, this office's January 8, 2014 response to the September 2013 RI/FS Workplan, nor the May 6, 2014 response to the Army's April 22, 2014 response to same, in which delineation sampling was discussed and the revised proposal accepted. Results of the investigation have not yet been received by this office.

E1. RESPONSE: Comment noted, the missing correspondence has been added to the references cited in the Work Plan.

E2. COMMENT: *Section 2.4, Previous Investigation and Historical Data* – No mention is made of the 2000 gallon #2 fuel UST, 0081533-112, given an NFA designation in January of 2003, nor more particularly, of waste oil UST 0081533-197, a 1000 gallon waste oil UST removed in January of 1992 from east of UST-112, at which analytical results indicate TPHC to 11,600 ppm remains in soil. As acceptably indicated in the Army's April 22, 2014 response letter, Response C4, additional sampling was to be performed.

E2. RESPONSE: Comment noted. The text in the 2nd paragraph of Section 2.4 has been revised to read: "Additionally, four 4,000-gallon steel gasoline USTs (tank Nos. 81533-235 through 238), one 2,000-gallon #2 fuel oil UST (tank No. 81533-112), one 1,000-gallon waste

oil UST (tank No. 81533-197) and their associated piping were removed in the 1990s. A NFA designation was granted by the NJDEP in the letter *UST Closure Reports – Closure Approvals, Fort Monmouth Army Base* dated January 10, 2003 for the gasoline and #2 Fuel Oil USTs (NJDEP, 2003). The waste oil UST has been investigated as described in the March 2015 *Final Remedial Investigation / Feasibility Study Work Plan For Sites FTMM-22, FTMM -53, FTMM -59 and FTMM -68* (Parsons, 2015).

E3. COMMENT: *Section 2.4, Page E-5, lines 21-27* – It appears "IASL" (indoor air screening levels) may have been inadvertently used in the narrative, on lines 22, 26 and 27. These lines reference sub-slab results, the measure of which is against the SGSLs (Soil Gas Screening Levels), accurately referenced on lines 18, 20, 23, 25 and 25.

E3. RESPONSE: Comment noted, Section 2.4, Page E-5, IASL found on lines 22, 26 and 27 have been revised to SGSLs.

E4. COMMENT: *Section 2.5 Synthesis of Results, Correspondence and Data Gaps* – As indicated above, the submittal does not appear to include the activities proposed in the September 2013 RI/FS Workplan, nor the followup communications.

E4. RESPONSE: Comment noted. The following text has been added to Section 2.5: "FTMM-53 is an IRP site and has recently been investigated as described in the *Remedial Investigation / Feasibility Study Work Plan For Sites FTMM-22, FTMM -53, FTMM -59 and FTMM -68* that was initially submitted to NJDEP on September 18, 2013. The objectives of the RI field work at FTMM-53 are as follows:

- Define the extent of soil contamination at the site to the north;
- Determine current concentrations of COPCs in areas where they were elevated in the past;
- Define the extent of chlorinated solvent contamination in shallow groundwater; and
- Determine the hydraulic conductivity of the shallow water-bearing zone that has been impacted by fuel-related contamination.

The RI/FS Work Plan was revised based on NJDEP comments dated May 16, 2014 and resubmitted on March 30, 2015. The revised RI/FS Work Plan was approved by the NJDEP on April 27, 2015. The RI/FS field work at FTMM-53 was completed in November 2015. ."

E5. COMMENT: *Section 3.2 Sampling Plan* – As indicated, above and through previous correspondence, additional delineation sampling is necessary.

E5. RESPONSE: Comment noted. The text in Section 3.2 has been revised as follows: "No additional sampling at Parcel 52 / FTMM-53 is proposed to be performed under this ECP Work Plan Addendum. FTMM-53 is an IRP site and has recently been investigated as described in the *Remedial Investigation / Feasibility Study Work Plan For Sites FTMM-22, FTMM-53, FTMM-59 and FTMM -68* that was approved by NJDEP on April 27, 2015."

ECP Parcel 66:

F1. COMMENT: *Section 1.0* & *Section 2.5, Page F-3, line 15* – No mention appears to be made among the listed correspondence between NJDEP and FTMM of the *August 1, 2012 Proposed Soil Sampling and Delineation Plan for Electrical Substations at Building 2700*

(Charles Wood Area) and Building 978 (Main Post), nor the September 10, 2012 NJDEP approval letter for delineation of the PCBs.

F1. RESPONSE: The correspondence referenced in the comment was located and is now referenced in the text in Section 2.5; however the delineation plan proposed in the ECP Work Plan Addendum will be followed.

F2. COMMENT: *Section 2.2, Page F-1, line 20 -typo* - It is believed FTMM-56 should read FTMM-66.

F2. RESPONSE: Comment noted. FTMM-56 has been changed to FTMM-66 in *Section 2.2, Page F-1, line 20.*

F3. COMMENT: *Section 2.2, Page F-2, lines 2-4* & *Section 2.5* – The submittal references the ECP Report's Appendix A, stating, "no release or disposal of hazardous substances or petroleum products has occurred at Parcel 66…", and that Parcel 66 was assigned an ECP Category of 1. This office does not agree with same, as PCBs are noted present up to 0.84 ppm.

F3. RESPONSE: As part of the upcoming property transfer from the Army to FMERA, the Building 978 electrical substation has now been designated as Parcel 97; this parcel includes the PCB detections. Therefore, Parcel 66 can remain as an ECP Category 1.

F4. COMMENT: *Section 3.2 Sampling Plan* – The sampling as proposed on pages F-3 and F-4 is acceptable. Please note that the NJDEP was informed that sampling of Parcel 97 (formerly Parcel 66) would occur in November 2015 via email dated October 22 by the Army because of the potential environmental impacts associated with this parcel may have an overall impact on the transfer of the FTMM property.

F4. RESPONSE: Comment noted.

Parcel 80:

G1. COMMENT: *Section 1.0, line 14* – For clarification, per the 2008 ECP Main Post map (Figure 19), FTMM-56 is also known as Parcel 84 (Building 80), a small ¼+ acre area designated within the larger Parcel 83.

G1. RESPONSE: The additional investigation work presented in the ECP Work Plan Addendum is intended to address Parcel 80, not FTMM-56. The line 14 statement "A RI Report for FTMM-56, including Parcel 80, has been approved by stakeholders and finalized." has been removed and replaced with "A Parcel 80 SI Report Addendum has been approved by stakeholders and finalized." All other references to FTMM-56 have been removed.

G2. COMMENT: *Section 2.4 Previous Investigations and Historical Data* – As previously indicated, the Weston report was not accepted by the Department as representative of background conditions at Fort Monmouth.

The section also references the July 10, 2012 letter, in which the NJDEP requested additional information regarding the basis for determination of the sample locations, i.e., were as-builts or other plans for the demolished buildings used to assist in locating former floor drains, septic systems, discharge points, etc, and therefore the boring locations. No rationale for sample location selection has been received; therefore a determination remains unavailable regarding the adequacy of the soil sampling performed.

G2. RESPONSE:

Due to the age of the buildings and the fact that they were demolished 25 years ago, as-builts including interior floor drains or other potential points of discharge for these buildings are no longer available. Therefore, in lieu of specific building plans, the original SI was set up to provide widespread coverage over the parcel. However two drawings have been located that depict historical operations at former Building 105. One drawing shows the rooms of former Building 105 and the print or photographic processes that occurred in each room. The other drawing shows the exterior sewer, water, and electrical connections associated with former Buildings 104 and 105. Both drawings are provided in Attachment G1.

During review of the files associated with former Buildings 106 and 105, additional information was located. The following is a summary of the new information and newly proposed sampling locations:

New Information

A 2002 Underground Storage Tank Closure and Site Investigation Report for Building 106 was reviewed. The report indicates that on February 2, 1998 during a UST investigation at former Building 106, a concrete-lined pit, suspected to be a former oil-water separator, was discovered and removed. It was determined that the oil-water separator was used in conjunction with a waste oil tank associated with Building 106. However, no evidence of the waste oil tank was observed during the investigation and it was assumed that the tank had been previously removed. The oil-water separator and approximately 246 cubic yards of visually impacted soils surrounding it were removed. While the UST was never located, 10 post-excavation soil samples were collected and submitted for TPH analysis. All 10 post-excavation soil samples were determined to be in compliance with NJDEP's then current cleanup standard for TPH of 10,000 mg/kg, as shown on Table 3 and Figure 3 in **Attachment G1**. TPH concentrations ranged from non detect to 1,517.36 mg/kg. Following receipt of all post-excavation soil sampling results, the excavation was backfilled-to grade.

According to the UST closure report, two groundwater samples were collected from one temporary well point installed within the excavation area, (specific location not documented) on June 8 and July 7, 2001 (Table 4, **Attachment G1**). The groundwater samples were analyzed for VOCs, SVOCs, pesticides, PCBs, and TAL metals. Both groundwater samples were in compliance with the NJDEP's GWQS for VOCs and SVOCs. Concentrations of the pesticides alpha-chlordane and gamma-chlordane exceeded the NJDEP GWQS of 0.5 micrograms per liter (µg/L), at 0.605 µg/L and 0.571 µg/L, respectively, during the June 8, 2001 groundwater sampling event. Total concentrations of the following metals also exceeded their NJDEP GWQS during the June 8, 2001 sampling event:

- Arsenic exceeded the GWQS of 3 µg/L at 24.6 µg/L.
- Aluminum exceeded the GWQS of 200 µg/L at 12,300 µg/L.
- Lead exceeded the NJDEP GWQS of 10 µg/L at 24.4 µg/L.
- Manganese exceeded the GWQS of 50 µg/L at 297 µg/L.

Concentrations of the pesticides alpha-chlordane and gamma-chlordane exceeded the NJDEP GWQS of 0.5 micrograms per liter (µg/L), at 1.71 µg/L and 1.79 µg/L, respectively, during the July 7, 2001 groundwater sampling event. Total concentrations of the following metals also exceeded their NJDEP GWQS during the July 7, 2001 sampling event:

- Arsenic exceeded the GWQS of 3 µg/L at 5.88 µg/L.
- Aluminum exceeded the GWQS of 200 µg/L at 3250 µg/L.
- Manganese exceeded the GWQS of 50 µg/L at 319 µg/L.

No further action was recommended for the former waste oil tank and oil water separator in the 2002 UST closure report. On January 10, 2003 the no further action request for the oil water separator and waste oil tank was granted by the NJDEP (Attachment G1).

In 2010, additional investigations were performed to address the beryllium detections in groundwater samples that exceeded the NJDEP GWQS at the 2007 SI location P80-SB/GW-1, as well as to investigate the source of the pesticides that were detected in groundwater samples collected as part of the Building 106 UST investigation. All 2010 data are provided in Attachment G1.

On January 7, 2010, a 2-inch diameter, PVC temporary monitoring point (0.010-inch slotted PVC screen) identified as TMP-1 was installed at the location of the former sampling point designated as P80-SB/GW-1. According to the scope of work documents prepared by the Army DPW the temporary monitoring point was screened across the water table. Both unfiltered and filtered water samples were collected from the temporary well for beryllium analysis. Beryllium was detected in the unfiltered and filtered groundwater samples at concentrations of 6.58 and 0.595 µg/L, respectively. The GWQS for beryllium is 1 µg/L.

To address the detections of pesticides in groundwater at the UST excavation in 2001, groundwater monitoring well ECP-80MW01 (aka 106MW06) was installed immediately north of the former excavation area in March 2010. In April 2010, the monitoring well was sampled for pesticides and TAL (total only) metals using low-flow methods. The following metals were determined to exceed the NJDEP GWQS: aluminum, arsenic, beryllium, cadmium, iron, lead, and manganese. All pesticides and the remaining metals not listed above were in compliance with the NJDEP GWQS.

On April 5, 2010, 10 soil samples were collected from five locations (CU-1 through CU-5) for analysis of pesticides and TAL metals. Samples were collected at 0.5-1.0 feet below ground surface (bgs) and at a one deeper depth from each location. Results indicate that chlordane and gamma chlordane exceeded the RDCSRS of 0.2 mg/kg at CU-1 (2.03 and 0.38 mg/kg, respectively at 0.5-1.0 feet and 0.32 mg/kg for chlordane at 2.5 to 3.0 feet bgs), CU-2 (0.3692 mg/kg at 0.5-1.0 feet bgs), and CU-4 (0.3584 mg/kg at 0.5-1.0 feet bgs). In addition, arsenic exceeded the RDCSRS of 19 mg/kg at CU-4 (24.8 mg/kg at 0.5-1.0 ft bgs), and vanadium exceeded the RDCSRS of 78 mg/kg at CU-3 (82.7 mg/kg at 3.0-3.5 bgs).

In November 2010, an additional 10 soil samples were collected from 5 locations (CU-6 through CU-10) to further delineate chlordane and arsenic in soil. Laboratory results show that chlordane was detected above the RDCSRS at CU-8 (2.9146 mg/kg) and CU-10 (2.5741mg/kg) within the 0.5-1 feet bgs interval. Arsenic was detected above the RDCSRS at CU-7 (23.3 mg/kg at 2.5 to 3.0 feet bgs).

Additional sampling completed in Parcel 80 includes two test pits (TP-7 and TP-8) that were excavated in 2001. The test pits were completed for an investigation associated with the new credit union which is located north of the parcel. At both test pits three soil samples were collected from the following depths: 0.5, 3.0, and 5.5 feet bgs. Soil samples were analyzed for VOCs, PAHs, and metals. Results show that the PAHs benzo(a)anthracene, benzo(a)pyrene,

benzo(b)fluoranthene, and indeno(1,2,3-cd)pyrene were detected above the NJDEP RDCSRS in the 0-0.5 foot sample at TP-7. PAHs were not detected in the deeper samples from TP-7, suggesting that the PAH exceedances may be due to asphalt contamination due to its proximity to the road. Metal results show that arsenic and copper were detected above the RDCSRS in the 2.9-3.0 foot sample at TP-7. Additionally one groundwater sample was collected from each of the two test pits and analyzed for VOCs, SVOCs and metals. VOCs and SVOCs were not detected in groundwater at either test pit location. The following metals were detected above the GWQS at both test pit locations: aluminum, arsenic, barium, beryllium, cadmium, chromium, iron, lead, manganese, mercury, nickel and zinc. These samples were collected from a test pit (and are likely to have had elevated turbidities) and are not believed to be representative of the actual groundwater conditions. Test pit locations and data are provided in **Attachment G1**.

Newly Proposed Sampling Locations

Based on Parsons review of the results, the extents of the pesticide chlordane and the metals vanadium, arsenic and copper in soil have not been fully delineated at Parcel 80. However, all results from sampling for pesticides are consistent with levels that would be found from the regular use of properly applied pesticides. Additionally, there is no historic evidence of pesticide storage or a spill within Parcel 80. Therefore, there is no evidence of release of pesticides that is the responsibility of the Army.

Vanadium: Soil borings FTMM-80-SB-03, FTMM-80-SB-04 and FTMM-80-SB-05 will be advanced to delineate the extent of vanadium detected above the RDCSRS at sampling location CU-03. Soil samples will be collected for laboratory analysis at three 6-inch intervals (0.5-1.0 feet and 3.0-3.5 feet and 4.5-5.0 feet bgs). Samples collected at the 4.5-5.0 feet bgs interval at locations FTMM-80-SB-04 and FTMM-80-SB-05 will be submitted to the lab and placed on hold pending the results of the shallow samples. Soil samples will be analyzed for vanadium via method 6010C.

Arsenic and Copper: Soil borings FTMM-80-SB-06, FTMM-80-SB-07 and FTMM-80-SB-08 will be advanced to delineate arsenic and copper detections above the RDCSRS at sampling location CU-07 and TP-7. Soil samples will be collected for laboratory analysis at three 6-inch intervals (0.5-1.0 feet 2.5-3.0 feet and 4.0-4.5 feet bgs). Samples collected at the 4.0-4.5 feet bgs interval at locations FTMM-80-SB-07 and FTMM-80-SB-08 will be submitted to the lab and placed on hold pending the results of the shallow samples. Soil samples will be analyzed for arsenic and copper via method 6010C.

Groundwater: Groundwater samples collected previously from existing monitoring wells ECP-80MW01 (aka 106MW06), P80-SB/GW-1, and P80-SB/GW-2 provide information regarding groundwater quality conditions at this parcel; however, limited additional groundwater sampling is recommended to address data gaps. Historical beryllium exceedences in groundwater from ECP-80MW01 need to be re-evaluated. Therefore, in addition to the installation and sampling of a new monitoring well for beryllium as described in the Work Plan Addendum, existing well ECP-80MW01 will be re-sampled using the low-flow purge and sample methods (to obtain a low turbidity sample). The groundwater sample will be analyzed for total and dissolved concentrations of beryllium via method 6010C.

Sections 2.4, 2.5 and 3.0 of the ECP Work Plan Addendum (Appendix G) have been revised according to information provided above.

G3. COMMENT: *Section 3.2 Sampling Plan* – The proposal to further evaluate beryllium in ground water reported in the 2008 SI as indicated is acceptable.

G3. RESPONSE: Comment noted.

F. <u>Parcel 83</u>:

H1. COMMENT: In October of 2008, the NJDEP requested depiction of all areas of concern (AOCs) on a site figure. Although a structures figure was submitted, no figure designating AOCs has been received.

H1. RESPONSE: A preliminary identification of AOCs for this parcel will be developed by FTMM and reviewed by Counsel; FTMM will then advise NJDEP of the outcome. Depending on the determination of BRAC Environmental Law Division, a SI report will be issued to the Department for review or for information purposes only.

H2. COMMENT: *Section 2.4, Page H-4* – As previously indicated, the Weston "background" report was not accepted by the Department. As regarding the elevated levels of arsenic (SB10A, SB9A), as acknowledged in Section 3.1, this office at this time does not agree these levels of arsenic are representative of naturally occurring conditions. Arsenic is currently considered a contaminant of concern, based on analytical findings at P83-SB9&10. As the NJDEP July 10, 2012 correspondence stated, although Fort Monmouth site soils are often associated with elevated levels of naturally occurring arsenic, the parcel specific soil analytical results, the lead to arsenic ratio, and the decrease of arsenic with depth at those locations exhibiting an elevated level do not appear to indicate the exceedences are naturally occurring, and must be investigated and included in a remedy.

H2. RESPONSE: As stated in the 2nd to last paragraph of Section 3.2 (Appendix H) of the ECP Work Plan Addendum, the vertical extent of elevated concentrations of lead and arsenic at SI boring P83-SB9 (1-1.5 feet) and of arsenic at SI boring P83-SB10 (0-0.5 feet) were delineated in 2007 by deeper samples collected at SB9 (4.5-5 feet) and SB10 (5-5.5 and 6.5-7 feet). The current concentrations and lateral extent of elevated lead and arsenic concentrations detected in surface soil next to Building 279 at P83-SB9 in 2007 will be assessed by proposed new borings FTMM-83-SS-12, SS-13, and SS-14 that are already included in the Work Plan Addendum; this is described in the third paragraph of Section 3.2 in Appendix H. However, proposed new confirmation boring FTMM-83-SS-13 will be moved to within 5 feet of 2007 boring P83-SB9 since it will be used to confirm the current concentrations of arsenic and lead previously detected in surface soil at P83-SB9.

The lateral extent of the elevated arsenic concentration detected in surface soil next to Building 279 at P83-SB10 in 2007 will be assessed by proposed new boring FTMM-83-SS-12 that is already included in the Work Plan Addendum. One additional boring (FTMM-83-SS-15) will be added approximately 50 feet north of P83-SB10 to provide more complete lateral delineation information. A second additional boring (FTMM-83-SS-16) will be added between Building 279 and Riverside Avenue for the same purpose. Up to three soil samples from these borings (same as described for borings SS-12 through SS-14 in the Work Plan Addendum) will be analyzed for arsenic and lead. Appendix H of the Work Plan Addendum has been updated to include these additional soil borings.

H3. COMMENT: *Section 2.5, line 35* – The submittal indicates further information on the various USTs referenced in the July 10, 2012 letter are to be referred to the "UHOT Program". Although not familiar with same, this office looks forward to receipt of additional information regarding the USTs.

H3. RESPONSE: Noted.

H4. COMMENT: *Section 3.2 Sampling Plan* – Sampling at the former Building 72 area to better define PAH exceedances, as proposed, is acceptable.

H4. RESPONSE: Noted.

H5. COMMENT: *Section 3.2, lines 15, 16* – PCBs – Please ensure these delineation samples, include PCBs analyses, for delineation of the 0.8 ppm PCBs noted at P83-B5, 1-1.5'.

H5. RESPONSE: Soil samples from proposed delineation borings FTMM-83-SS-09, -10, and -11 will also be analyzed for PCBs. The surface soil samples collected from the 0-6 inch interval beneath the asphalt paving will be analyzed for PCBs. If PCBs are detected in any of the surface soil samples, the deeper samples collected at that location will also be analyzed for PCBs. Appendix H of the Work Plan Addendum has been updated to include the PCB analyses. In addition, the sampling plan for these three borings was revised to target lead rather than the full suite of TAL metals because lead was the only metal of concern at P83-B5 identified during the SI sampling in 2007.

H6. COMMENT: *Section 3.2* – Building 279 – Although the proposed sampling locations are acceptable, they are inadequate to complete delineation. Arsenic remains undelineated at P83SB10.It is anticipated elevated levels of lead may be present west of P83SB9; what efforts for delineation are planned? If location FTMM-83-SS-13 is considered a resample of P83SB9, it should be located within 10' feet of the original sample location.

H6. RESPONSE: See response to H2. Proposed new boring FTMM-83-SS-13 has been moved to within 10 feet of P83-SB9. In addition, soil data from SI borings P83-SB10 and P83-SB11, and proposed new borings FTMM-83-SS-12, -SS-14, –SS-15, and –SS16 will be used to delineate the lateral extent of lead at P83-SB9. If elevated lead concentrations are detected in soil west of Building 279 at proposed new boring FTMM-83-SS-16, then SI borings P83-SB14 and P83-SB15 can be used to delineate the lateral extent of lead west of Riverside Avenue.

Should you have any questions or require additional information, please contact me at (732) 383-5104 or by email at john.e.occhipinti.civ@mail.mil.

Regards,

John E. Occhipinti
Fort Monmouth Site Manager

cc: James Moore, USACE
Cris Grill, Parsons

State of New Jersey

CHRIS CHRISTIE
Governor

KIM GUADAGNO
Lt. Governor

DEPARTMENT OF ENVIRONMENTAL PROTECTION
Bureau of Case Management
401 East State Street
P.O. Box 420/Mail Code 401-05F
Trenton, NJ 08625-0028
Phone #: 609-633-1455
Fax #: 609-633-1439

BOB MARTIN
Commissioner

December 22, 2015

John Occhipinti
BRAC Environmental Coordinator
OACSIM – U.S. Army Fort Monmouth
PO Box 148
Oceanport, NJ 07757

Re: **Revision 1 -** *Final Environmental Condition of Property Supplemental Phase II Site Investigation Work Plan Addendum for Parcels 34, 50, 51, 52, 66/97, 80 and 83* dated *November 2015*
Fort Monmouth
Oceanport, Monmouth County
PI G000000032

Dear Mr. Occhipinti:

The New Jersey Department of Environmental Protection (Department) has completed review of the referenced report, received November 24, 2015, prepared by Parsons Government Services Inc. (Parsons), on behalf of the U.S. Army Engineering and Support Center, Huntsville (USAESCH). As indicated in the report, activities are to be performed with the goal of Decision Document acceptance in compliance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), the National Contingency Plan (NCP), 40 CFR Part 300, and "to the extent possible to meet the requirements of New Jersey Administrative Code (NJAC) 7:26E Technical Requirements for Site Remediation", as well as support closure of environmental sites to facilitate transfer of real property.

The workplan describes Site Investigation activities to be performed at the ECP Parcels as indicated above; based upon the revisions included in the referenced submittal, the workplan is approved. Comments, however, are as follows:

Review of the revised document would have been more efficient if all modifications had been made discernible within the submittal in some manner. Although the correspondence which accompanied the workplan did note many areas of modifications and amendments, many others were found during a "side by side" comparison of the workplans, significantly slowing the review process.

As has been noted in previous correspondence, all material, including tables, figures and maps to be utilized in the review of a submittal are to be included in paper form. Referencing the material as included on the CD is insufficient.

Maps/figures are to include not just sample locations, but also analytical results, in accordance with the Technical Requirements (e.g. Figures B1, G1). This, again, costs review time, as the previous results must be plotted during review to ensure adequate delineation locations/depths are proposed.

It is understood upcoming property transfer needs have necessitated the creation of additional parcel designations to address various areas of contamination while allowing other areas to transfer. A map of the site with each of the parcels noted has previously been received. A narrative description of each of these newly designated parcels would be very beneficial, however, including each parcel's size.

Please contact this office if you have any questions.

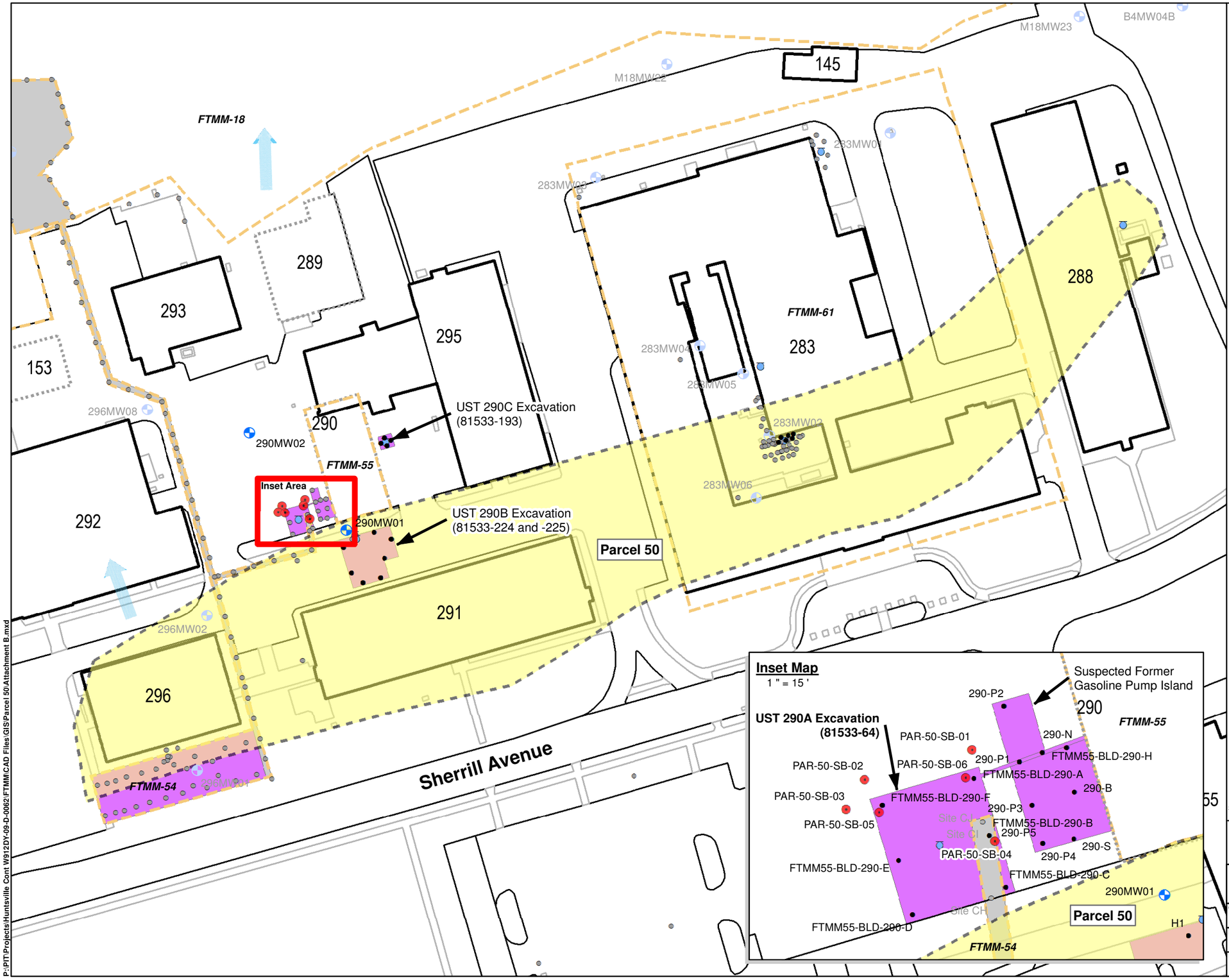
Sincerely,

Linda S. Range

Linda S. Range

C: Joe Pearson, Calibre
James Moore, USACE
Rick Harrison, FMERA
Joe Fallon, FMERA
Frank Barricelli, RAB

ATTACHMENT B
Layout of Parcel 50 including FTMM-55 Sample Locations



LEGEND:

- Soil Boring Location (for analysis of Extractable Petroleum Hydrocarbons [EPH]) (2016)
- Previous Soil Sample Locations Associated with UST Excavations
- Previous Soil Sample Location Associated with UST or Piping Excavation
- Former UST Location
- UST Excavation
- Former Fuel Distribution Piping Excavation Area
- Parcel 50 Boundary (Approximate)
- FTMM-18, FTMM-54, FTMM-55, and FTMM-61 Boundaries (Approximate)
- Shallow Monitoring Well Associated with FTMM-55
- Shallow Monitoring Well not Associated with FTMM-55
- Inferred Groundwater Flow Direction
- Former Building (Demolished)

N

1 inch = 70 feet

0 35 70 140 Feet

Source: FTMM Supplied CAD

P:\PIT\Projects\Huntsville Cont W912DY-09-D-0062\FTMM\CAD Files\GIS\Parcel 50\Attachment B.mxd

PARSONS 401 Diamond Drive NW, Huntsville AL	Fort Monmouth New Jersey
LAYOUT OF PARCEL 50 INCLUDING FTMM-55 AND SAMPLE LOCATIONS	
CREATED BY: RR	REVIEWED BY: CL
DATE: AUG. 2016	FIGURE NUMBER: ATTACHMENT B
PROJECT NUMBER: 748810-01000	FILE: Attachment B.mxd

ATTACHMENT C

Previous Reports

1. *Underground Storage Tank Closure and Site Investigation Report, Building 290,* Weston, October 1993
2. *Site/Remedial Investigation Report, Building 290,* SMC Environmental Services Group, July 1999
3. *Underground Storage Tank Closure and Site Investigation Report, Building 290*; Volume 1 of 3, ATC Associates, May 2000
4. *Underground Storage Tank Closure and Site Investigation Report, Building 290B,* Versar, May 2001
5. Appendix M of *Final August 2013 Baseline Groundwater Sampling Report*, Parsons, March 2014

UNDERGROUND STORAGE TANK
CLOSURE AND SITE INVESTIGATION REPORT
BUILDING 290
NJDEPE UST REGISTRATION NO. 81533-193

October 28, 1993

W.O. No.: 03886-088-001

Prepared For:

UNITED STATES ARMY, FORT MONMOUTH NEW JERSEY
DIRECTORATE OF PUBLIC WORKS
BUILDING 167
FORT MONMOUTH, NJ 07703

Prepared by:

ROY F. WESTON, INC.
Raritan Plaza I, 4th Floor
Edison, New Jersey 08837

WESTON
MANAGERS DESIGNERS/CONSULTANTS

TABLE OF CONTENTS

SECTION	TITLE	PAGE
	EXECUTIVE SUMMARY	ES-1
1.0	**UNDERGROUND STORAGE TANK DECOMMISSIONING ACTIVITIES**	
1.1	Overview	1-1
1.2	Site Description	1-2
1.2.1	Geological/Hydrogeological Setting	1-2
1.3	Health and Safety	1-5
1.4	Removal of Underground Storage Tank	1-5
1.4.1	General Procedures	1-5
1.4.2	Underground Storage Tank Excavation	1-5
1.5	Underground Storage Tank Transportation and Disposal	1-6
1.6	Management of Excavated Soils	1-6
2.0	**SITE INVESTIGATION ACTIVITIES**	
2.1	Overview	2-1
2.2	Field Screening/Monitoring	2-2
2.3	Soil Sampling	2-2
3.0	**CONCLUSIONS AND RECOMMENDATIONS**	
3.1	Soil Sampling Results	3-1
3.2	Conclusions and Recommendations	3-1

APPENDICES

APPENDIX A - NJDEPE-DHWM CONDITIONAL CLOSURE APPROVAL LETTER

APPENDIX B - NJDEPE UST SITE ASSESSMENT SUMMARY FORM

APPENDIX C - ANALYTICAL DATA PACKAGE

TABLE OF CONTENTS (CONTINUED)

LIST OF TABLES

TABLE	TITLE	PAGE
2-1	Summary of Post-Excavation Sampling Activities	2-3
3-1	Summary of Analytical Results	3-2
3-2	Analytical Methods/Quality Assurance Summary Table	3-4

LIST OF FIGURES

FIGURE	TITLE	PAGE
1-1	Site Location Map	1-3
2-1	Post-Excavation Sample Location Map	2-4

EXECUTIVE SUMMARY

On 17 December 1991, one single wall fiberglass, underground storage tank (UST) was closed at U.S. Army Fort Monmouth, in Fort Monmouth, New Jersey. The UST, New Jersey Department of Environmental Protection and Energy (NJDEPE) Registration No. 81533-193, was located adjacent to Building 290 in the Main Post area of Fort Monmouth. UST No. 81533-193 was a 550-gallon capacity, waste oil tank. The tank was located immediately adjacent to Building 290. Mr. Paul Addisson of the NJDEPE Division of Hazardous Waste Management (NJDEPE-DHWM)was on-site for the duration of the UST closure activities. Fabiano and Son, Inc. performed the tank closure. At the date of closure, contractor certification was not required by the NJDEPE.

Soils surrounding the tank were screened visually and with air monitoring instruments for evidence of contamination. The tank was inspected following removal for cracks and puncture holes for indications of historical leakage from the tank. No holes were noted in UST No. 81533-193 and no potentially contaminated soils were identified surrounding the tank.

Following removal of the tank, four post-excavation soil samples were collected and analyzed for total petroleum hydrocarbons (TPHC) and priority pollutants plus 40 tentatively identified compounds (PP+40). All samples contained either non-detectable concentrations of contaminants or concentrations below proposed NJDEPE subsurface cleanup criteria.

No further action is proposed at this site in reference to UST No. 81533-193 since no soils are present with concentrations of contaminants exceeding proposed NJDEPE subsurface cleanup criteria.

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SECTION 1.0

UNDERGROUND STORAGE TANK DECOMMISSIONING ACTIVITIES

1.1 Overview:

One underground storage tank (UST), New Jersey Department of Environmental Protection and Energy (NJDEPE) UST Registration No. 81533-193 (UST No. 85133-193), was closed at Building 290 at U.S. Army Fort Monmouth, New Jersey on 17 December 1991. UST. No. 81533-193 was a single wall fiberglass, 550-gallon capacity waste oil tank. This UST Closure and Site Investigation Report was prepared by Roy F. Weston Inc. (WESTON®), to assist the United State Army Directorate of Public Works (DPW) in complying with the NJDEPE Bureau of Underground Storage Tanks (NJDEPE-BUST) regulations. The applicable NJDEPE-BUST regulations at the date of closure were the "Interim Closure Requirements for Underground Storage Tank Systems" (NJAC 7:14B-1 et seq. September 1990 and revisions dated 1 November 1991). Closure of UST No. 81533-193 proceeded under approval and onsite supervision of Mr. Paul Addisson of the NJDEPE Division of Hazardous Waste Management (NJDEPE-DHWM). This report presents the results of the DPW's implementation of the UST Decommissioning/Closure Plan submitted to the NJDEPE-DHWM on 12 July 1991.

All activities associated with the decommissioning of UST No. 81533-193 complied with all applicable Federal, State and Local laws and ordinances in effect at the date of decommissioning. These laws included but were not limited to: NJAC 7:14B-1 et seq., NJAC 5:23-1 et seq., and Occupational Safety and Health Administration (OSHA) 1910.146 &1910.120. All permits including but not limited to the NJDEPE-approved Decommissioning/Closure Plan were posted onsite for inspection. Fabiano and Sons Inc., the contractors that conducted the decommissioning activities, are currently registered and certified by the NJDEPE for performing UST closure activities. The NJDEPE conditional closure approval letter and the UST Site Assessment Summary Form for UST No. 81533-193 have been included in Appendices A and B, respectively. The UST Site Assessment Summary Form has been signed and sealed by Mr. James Ott, Director of DPW and Professional Engineer.

Section 1 of this UST Closure and Site Investigation Report provides a summary of the tank decommissioning activities. Section 2 of this report describes the site investigation activities. Conclusions and recommendations, including the results of the soil sampling investigation, are presented in the final section of this report.

1.2 Site Description

Building 290 is located off Wilson Avenue in the Main Post area of Fort Monmouth. A site location map is provided in Figure 1-1. Building 290 is an inactive military vehicle repair and maintenance facility. UST No. 81533-193 was located immediately adjacent to the eastern portion of Building 290.

1.2.1 Geological/Hydrogeological Setting

The following is a description of the geological/hydrogeological setting of the area surrounding Building 290. Included is a description of the regional geology of the area surrounding Fort Monmouth as well as descriptions of the local geology and hydrogeology of the Main Post area.

Regional Geology

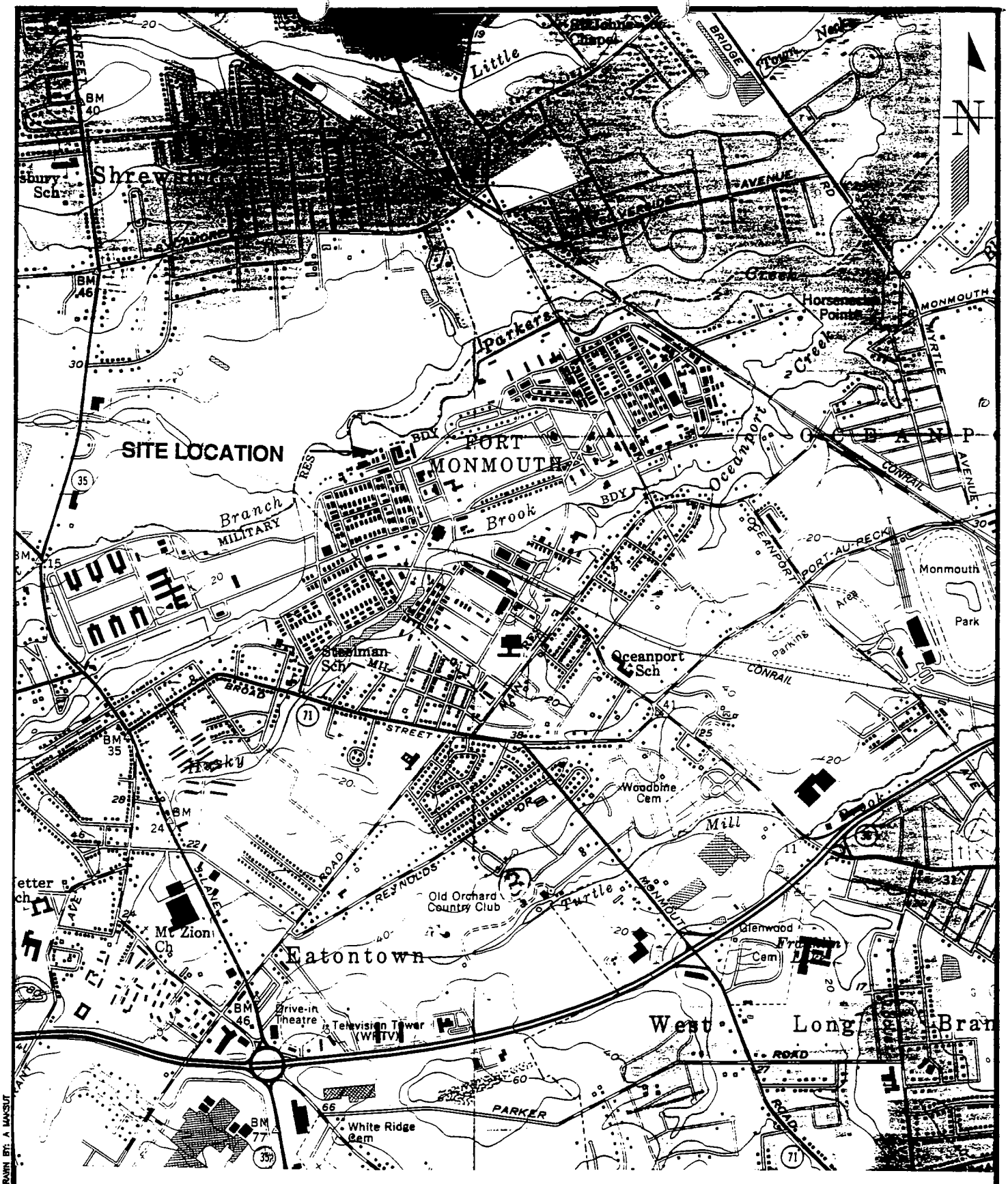
Monmouth County lies within the New Jersey Section of the Atlantic Coastal Plain physiographic province. The Main Post, Charles Wood, and the Evans areas are located in what may be referred to as the Outer Coastal Plain subprovince, or the Outer Lowlands.

In general, New Jersey, Coastal Plain formations consist of a seaward-dipping wedge of unconsolidated deposits of clay, silt, sand, and gravel. These formations typically strike northeast-southwest with a dip ranging from 10 to 60 feet per mile and were deposited on Precambrian and lower Paleozoic rocks (Zapecza, 1989). These sediments, predominantly derived from deltaic, shallow marine, and continental shelf environments, date from Cretaceous through the Quaternary Periods. The mineralogy ranges from quartz to glauconite.

The formations record several major transgressive/regressive cycles and contain units which are generally thicker to the southeast and reflect a deeper water environment. Over 20 regional geologic units are present within the sediments of the Coastal Plain. Regressive, upward-coarsening deposits are usually aquifers (e.g., Englishtown and Kirkwood Formations, and the Cohansey Sand) while the transgressive deposits act as confining units (e.g., the Merchantville, Marshalltown, and Navesink Formations). The individual thicknesses for these units vary greatly (i.e., from several feet to several hundred feet). The Coastal Plain deposits thicken to the southeast from the Fall Line to greater than 6,500 feet in Cape May County (Brown and Zapecza, 1990).

Local Geology

Based on the regional geologic map (Jablonski, 1968), the Cretaceous age Red Bank and Tinton Sands outcrop at the Main Post area. The Red Bank sand conformably overlies the Navesink Formation and dips to the southeast at 35 feet per mile. The upper member (Shrewsbury) of the Red Bank sand is a yellowish-gray to reddish brown clayey, medium-to-coarse-grained sand



SOURCE: U.S.G.S. LONG BRANCH NJ, QUADRANGLE, MONMOUTH COUNTY, 1954 (PHOTOREVISED 1981) SCALE: 1"=2000'

REVISION #: 0000 DATE: 10-19-93 PLOT NAME:
FILE NAME: BLDG-290.DWG DRAWN BY: A MARSUT

WESTON MANAGERS DESIGNERS/CONSULTANTS

PROJECT NAME: UNDERGROUND STORAGE TANK CLOSURE AND SITE INVESTIGATION REPORT BUILDING 290 – TANK NO. 193
FORT MONMOUTH, NEW JERSEY

CLIENT NAME: U.S. ARMY–DEH FORT MONMOUTH

SITE LOCATION MAP

DATE: 10–22–93

FIGURE #: 1–1

that contains abundant rock fragments, minor mica and glauconite (Jablonski). The lower member (Sandy Hook) is a dark grey to black, medium-to-fine grained sand with abundant clay,mica, and glauconite.

The Tinton sand conformably overlies the Red Bank Sand and ranges from a clayey, medium-to-very coarse grained feldspathic quartz and glauconite sand to a glauconitic coarse sand. The color varies from dark yellowish orange or light brown to moderate brown and from light olive to grayish olive. Glauconite may constitute 60 to 80 percent of the sand fraction in the upper part of the unit (Minard, 1969). The upper part of the Tinton is often highly oxidized and iron-oxide encrusted (Minard).

Over the last 80 years, the natural topography of Fort Monmouth has been altered by excavation and filling activities by the military. Topographic elevations for the Main Post area range from five feet above mean sea level (MSL) to 31 feet above MSL.

Hydrogeology

The water table aquifer at the Main Post area is identified as part of the "composite confining units", or minor aquifers. The minor aquifers include the Navesink formation, Red Bank Sand, Tinton Sand, Hornerstown Sand, Vincentown Formation, Manasquan Formation, Shark River Formation, Piney Point Formation, and the basal clay of the Kirkwood Formation.

Based on records from wells drilled at the Main Post area, around water is typically encountered at depths of two to nine feet below ground surface (BGS). According to Jablonski, wells drilled in the Red Bank and Tinton Sands may produce from 2 to 25 gallons per minute (gpm). Some well owners have reported acidic water that requires treatment to remove iron.

Shallow groundwater is locally influenced within the Main Post area by the following factors:

- tidal influence (based on proximity to the Atlantic Ocean),
- topography,
- nature of the fill material within the Main Post,
- presence of clay and silt lenses in the natural overburden deposits, and
- local groundwater recharge areas (i.e. stream, lakes).

Due to the fluvial nature of the overburden deposits (i.e. sand and clay lenses), shallow groundwater flow direction is best determined on a case-by-case basis. This is consistent with lithologies observed in borings installed within the Main Post area, which primarily consisted of fine-to-medium grained sands, with occasional lenses or laminations of silt and/or clay

1.3 Health and Safety

Before, during, and after all activities, hazards at the work site which may have posed a threat to the health and safety of all personnel who were involved with, or were affected by, the decommissioning of the UST system were minimized. All areas which posed, or may have been suspected to pose a vapor hazard were monitored by a qualified individual utilizing approved equipment. The trained individual ascertained if the area was properly vented to render the area safe, as defined by OSHA.

1.4 Removal of Underground Storage Tank

1.4.1 General Procedures

- All underground obstructions (utilities,... etc.) were marked out by the contractor performing the closure prior to excavation activities.
- All activities were carried out with the greatest regard to safety and health and the safeguarding of the environment.
- All excavated soils were screened visually and with air monitoring instruments for evidence of contamination. No potentially contaminated soils were identified during closure activities.
- Surface materials (i.e, asphalt, concrete, etc...) were excavated and staged separate from all soils. These materials were later recycled in accordance with all applicable laws and regulations.
- A Sub-Surface Evaluator from the DPW was present during all closure activities.

1.4.2 Underground Storage Tank Excavation

Soil was excavated to expose the UST and the associated piping. The piping was not removed/disturbed until all free product was drained into the UST. The UST was rendered vapor free by purging prior to any cutting or access. After the removal of the associated piping, a manway was made in the UST to allow for the proper cleaning of the UST. The UST was completely emptied of all liquids prior to removal of the UST from the ground. Liquids were transported and disposed of by L and L Oil Service, Inc. All of the openings in the tank were plugged except for one hole (manway).

After the UST was removed from the excavation, it was staged on polyethylene sheeting and examined for cracks or punctures holes. The presence or absence of cracks or puncture holes was documented by the Sub-Surface Evaluator. No cracks or puncture holes were observed

upon the inspection of the UST. Soils surrounding the UST were screened visually and with a Flame Ionization Detector (FID) for evidence of contamination. No evidence of contamination was noted in soils surrounding the UST.

1.5 Underground Storage Tank Transportation and Disposal:

The tanks were transported by Fabiano and Sons to Redbank Recycling Inc., for recycling in compliance with all applicable regulations and laws.

The Subsurface Evaluator labelled the UST prior to transport with the following information:

- site of origin,
- contact person,
- NJDEPE UST Facility ID number,
- name of transporter/contact person, and
- destination site/contact person.

1.6 Management of Excavated Soils:

No potentially contaminated soils were excavated as part of the removal of the UST. All soils were free of evidence of contamination and were backfilled into the excavation following removal of the UST.

WESTON
MANAGERS DESIGNERS/CONSULTANTS

SECTION 2.0

SITE INVESTIGATION ACTIVITIES

2.1 Overview:

The Site Investigation was managed and carried out by U.S ARMY DPW personnel. All analyses were performed and reported by Environmental Profile Laboratories, a NJDEPE-certified testing laboratory. All sampling was performed under the direct supervision of a NJDEPE Certified Sub-Surface Evaluator according to the methods described in the NJDEPE Field Sampling Procedures Manual (May 1988). Sampling frequency and parameters analyzed complied with the NJDEPE-BUST document "Interim Closure Requirements for Underground Storage Tank Systems " (September 1990 and revisions dated 1 November 1991) which was the applicable regulation at the date of closure. All records of the Site Investigation activities are maintained by Fort Monmouth DPW: Environmental Office.

The following Parties participated in Closure and
Site Investigation activities.

- Closure Contractor: FABIANO AND SONS.
  Contact Person: Anthony Fabiano
  Phone Number: (908) 571-1004
  NJDEPE Company Certification No.: PLEO1349

- Subsurface Evaluator: Charles Appleby
  Employer: U.S. Army, Fort Monmouth
  Phone Number: (908) 532-6224
  NJDEPE Certification No.: 2056

- Analytical Laboratory: Environmental Profile Laboratories
  Contact Person: DANIEL WRIGHT
  Phone Number: (908) 244-6278
  NJDEPE Company Certification No.: 15526

- NJDEPE On-site Representative: Paul Addisson
  DIVISION OF HAZARDOUS WASTE MANAGEMENT
  Phone Number: (609) 584-4200

2.2 Field Screening/Monitoring

All soils that were excavated as part of the removal of the UST were screened using a FID, for evidence of contamination. Soils were also visually screened for evidence of contamination (staining, free product, etc..). No evidence of contamination was noted during excavation of soils surrounding the UST.

Soils on the sidewalls and base of the excavation were screened with a FID by an individual under the direct supervision of the NJDEPE Certified Sub-Surface Evaluator. No evidence of contamination was noted within soils on the sidewalls or base of the excavation.

2.3 Soil Sampling

Following removal of the UST, four post-excavation soil samples were collected in accordance with NJDEPE procedure and the approved closure plan. A summary of sampling activities including parameters analyzed is provided in Table 2-1. Figure 2-1 depicts the location of the post-excavation samples. The samples were typically collected along the base and sidewalls of the excavation using decontaminated stainless steel scoops. Following soil sampling activities, the samples were chilled and delivered to Environmental Profile Laboratories located in Toms River, New Jersey.

All samples were analyzed for total petroleum hydrocarbons (TPHC) and priority pollutants plus 40 tentatively identified compounds (PP+40). The frequency of sampling and parameters analyzed were approved by the on-site NJDEPE-DHWM Representative and were consistent with the applicable NJDEPE regulations at the date of closure, which were the "Interim Closure Requirements for Underground Storage Tank Systems" (NJAC 7:14B-1 et seq. September 1990 and revisions dated 1 November 1991).

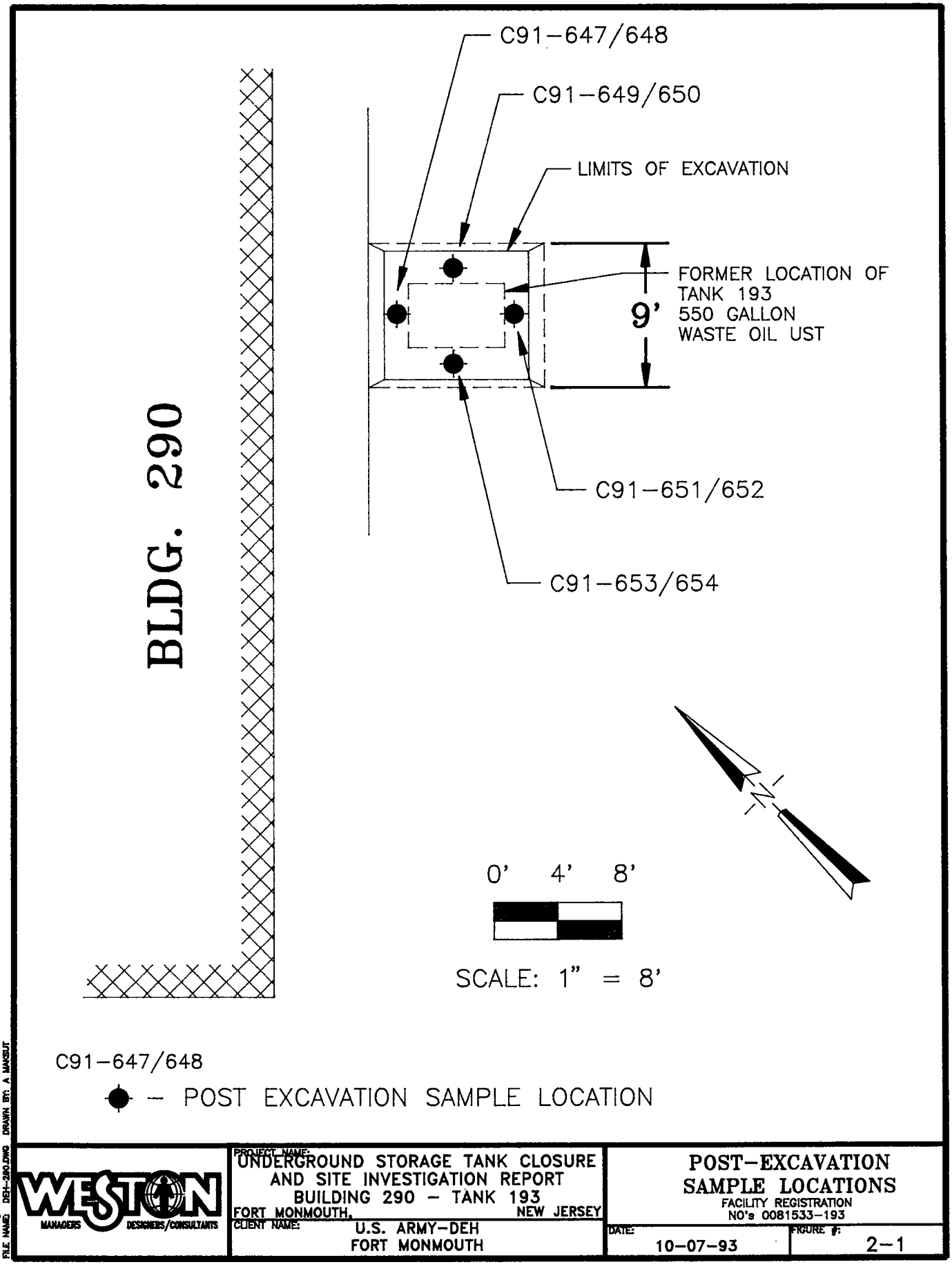
TABLE 2-1

SUMMARY OF POST-EXCAVATION SAMPLING ACTIVITIES
UST REGISTRATION NO. 81533-193
BUILDING NO. 290
FORT MONMOUTH, NEW JERSEY

Sample I.D No.	Date of Collection	Matrix	Sample Type	Analytical Parameters	Sampling Method
C91-647/648	12/17/91	Soil	Post-Excavation	TPHC, PP+40	Stainless Steel Scoop
C91-649/650	12/17/91	Soil	Post-Excavation	TPHC, PP+40	Stainless Steel Scoop
C91-651/652	12/17/91	Soil	Post-Excavation	TPHC, PP+40	Stainless Steel Scoop
C91-653/654	12/17/91	Soil	Post-Excavation	TPHC, PP+40	Stainless Steel Scoop

TPHC - Total Petroleum Hydrocarbons.

PP+40 - Priority pollutants list plus 40 non-targeted organic compounds.



REVISION #: DEH-290.DWG DATE: 10-28-93
FILE NAME: DRAWN BY: A. MANSUT

WESTON MANAGERS DESIGNERS/CONSULTANTS

PROJECT NAME: UNDERGROUND STORAGE TANK CLOSURE AND SITE INVESTIGATION REPORT BUILDING 290 – TANK 193
FORT MONMOUTH, NEW JERSEY

CLIENT NAME: U.S. ARMY-DEH FORT MONMOUTH

POST-EXCAVATION SAMPLE LOCATIONS
FACILITY REGISTRATION NO's 0081533-193

DATE: 10-07-93

FIGURE #: 2-1

WESTON
MANAGERS DESIGNERS/CONSULTANTS

SECTION 3.0

CONCLUSIONS AND RECOMMENDATIONS

3.1 Soil Sampling Results

To evaluate soils conditions following removal of the UST and associated soils, analytical results from the post-excavation samples were compared to proposed NJDEPE subsurface cleanup criteria (NJAC 7:26D and revisions dated 8 March 1993). A summary of the analytical results and comparison to proposed NJDEPE subsurface cleanup criteria is provided in Table 3-1. A summary of the analytical methods used and quality assurance information is provided in Table 3-2. The analytical data package summary is provided in Appendix C. The full data package, including associated quality control and chromatograph data is on file at U.S. Army Fort Monmouth, DPW.

TPHC were detected in samples C91-649/650 and C91-651/652 at concentrations of 490 mg/kg and 20 mg/kg, respectively. All other samples contained non-detectable concentrations of TPHC. No subsurface cleanup criterion has been proposed for TPHC by NJDEPE, however the proposed NJDEPE subsurface cleanup criterion for total organic compounds is 10,000 mg/kg. The concentrations of total organic compounds detected in all samples was below the proposed NJDEPE subsurface cleanup criterion of 10,000 mg/kg. Di-n-butylphthalate, and bis(2-Ethylhexyl) phthalate were detected in sample C91-649/650; however, at concentrations well below the proposed NJDEPE subsurface cleanup criteria. Bis(2-Ethylhexyl)phthalate was tentatively identified in sample C91-651/652 at a concentration of .61 mg/kg, which is below the proposed NJDEPE subsurface cleanup criterion of 100 mg/kg. Several tentatively identified base neutral compounds were detected in samples C91-647/648 and C-91 649/650; however, at concentrations well below proposed NJDEPE subsurface cleanup criteria. Methylene chloride, a common laboratory contaminant, was detected in all samples, however at concentrations well below the proposed NJDEPE subsurface cleanup criterion of 10 mg/kg. Several metals were detected in the samples, however no subsurface cleanup criteria have been proposed for these analytes by NJDEPE.

3.2 Conclusions and Recommendations:

On 17 December 1991, DPW successfully closed UST No. 81533-193 at Building 290 in the Main Post area of Fort Monmouth. Based on visual inspection of the UST and field screening of the soils adjacent to the UST, it was determined that no discharges had historically occurred from the UST. Analytical results of the post-excavation samples confirm that no soils are present with concentrations of contaminants exceeding proposed NJDEPE subsurface cleanup criteria.

No further action is proposed at Building 290 in reference to UST No. 81533-193.

TABLE 3-1

SUMMARY OF ANALYTICAL RESULTS
UST REGISTRATION NO. 81533-193
BUILDING NO. 290
FORT MONMOUTH, NEW JERSEY

Sample ID No.		C91-647/648	C91-649/650	C91-651/652	C91-653/654	Proposed NJDEPE Subsurface Cleanup Criteria
Lab ID No.		6985.1/2	6985.3/4	6985.5/6	6985.7/8	
Matrix		Soil	Soil	Soil	Soil	
Sample Type		PE	PE	PE	PE	
Date of Collection		12/17/91	12/17/91	12/17/91	12/17/91	
Analytical Parameter	Units					mg/kg
TPHC	mg/kg	ND	490	20	ND	NC*
Base Neutral Compounds	mg/kg					
Di-n-butylphthalate		ND	.15J	ND	ND	100
Bis(2-Ethylhexyl) phthalate		ND	.36J	.61	ND	100
Volatile Organic Compounds						
Methylene Chloride	mg/kg	.067	.087	.083	.099	10

TABLE 3-1

SUMMARY OF ANALYTICAL RESULTS (CONTINUED)
UST REGISTRATION NO. 81533-193
BUILDING NO. 290
FORT MONMOUTH, NEW JERSEY

Sample ID No.		C91-647/648	C91-649/650	C91-651/652	C91-653/654	Proposed NJDEPE Subsurface Cleanup Criteria
Lab ID No.		6985.1/2	6985.3/4	6985.5/6	6985.7/8	
Matrix		Soil	Soil	Soil	Soil	
Sample Type		PE	PE	PE	PE	
Date of Collection		12/17/91	12/17/91	12/17/91	12/17/91	
Priority Pollutant Metals	mg/kg					
Arsenic		3.4	5.0	3.5	3.9	NC
Beryllium		0.63	0.55	0.55	0.38	NC
Cadmium		0.040	0.019	0.012	0.019	NC
Chromium		44.4	69.1	71.2	63.1	NC
Copper		6.88	6.20	5.00	6.30	NC
Lead		2.88	3.30	1.80	2.40	NC
Mercury		0.040	ND	0.038	0.038	NC
Nickel		ND	8.6	8.1	9.4	NC
Silver		ND	ND	ND	10.0	NC
Zinc		28.1	29.0	21.3	25.0	NC

Notes:
TPHC: - Total Petroleum Hydrocarbons.
PE: - Post-Excavation.
NC*: - No cleanup criterion has been proposed for TPHC by NJDEPE; however, the proposed NJDEPE subsurface cleanup criterion for total organic compounds is 10,000 mg/kg.
NC: - No subsurface cleanup criterion has been proposed for this analyte by NJDEPE.
NA: - Not analyzed.
mg/kg: - Milligrams per Kilogram.
J: - Indicates an estimated value.

TABLE 3-2

ANALYTICAL METHODS/QUALITY ASSURANCE SUMMARY TABLE
UST REGISTRATION NO. 81533-193
BUILDING NO. 290
FORT MONMOUTH, NEW JERSEY

Analytical Parameter	No. of Samples Collected	Matrix	Date Collected	Date Analysis Started	Preservation Method	USEPA SW-486 Analytical Method
TPHC	4	S	12/17/91	12/23/91	Cool to 4°	418.1
VOCs	4	S	12/17/91	12/24/91	Cool to 4°	8240
BNA	4	S	12/17/91	12/24/91	Cool to 4°	8270
PCBs	4	S	12/17/91	12/24/91	Cool to 4°	608
PP Metals	4	S	12/17/92	12/20/91	Cool to 4°	6010,7060,7470 7740, 7841

Notes:
PCBs - Poly Chlorinated Biphenyls
PP Metals - Priority Pollutant Metals
VOCs - Volatile Organic Compounds
TPHC - Total Petroleum Hydrocarbons
608 - PCB samples were analyzed using method 608 cited in 40 CFR Part 36

APPENDIX A

NJDEPE-DHWM CONDITIONAL CLOSURE APPROVAL LETTER

State of New Jersey
Department of Environmental Protection and Energy
Office of Enforcement Policy
CENTRAL BUREAU OF WATER AND HAZARDOUS WASTE ENFORCEMENT
FIELD OPERATIONS

Scott A. Weiner
Commissioner

Edward M. Neafsey
Director

September 20,1991

James Ott, Deputy Director
Directorate of Engineering and Housing
U.S. Army Commmunications-Electronic Command
Building 167 SELHI-FE
Fort Monmouth, NJ 07003

Dear Mr. Ott

The Department of Environmental Protection & Energy has completed its review of your submitted closure plans for six underground waste oil tanks. It has been determined that the plan is acceptable conditioned on the following revision/modifications:

1.In addition to the total petroleum hydrocarbon (TPHC) analysis for each sample taken, the total priority pollutant analysis (PP+40 or TCL) should be utilized for an initial screening. These analyses would be helpful for the remediation of tank number 68 which is known to contain 1000 ppm of hydrogenated chlorides.

2.A detailed description of the steps needed to decontaminate the tanks should be included.

3.An indication of whether the tanks will be disposed off-site as hazardous waste. If not the tanks must be decontaminated and a final rinse water sample and a washwater blank sample must be analyzed for total petroleum hydrocarbons (TPHC) concentration to determine the adequacy of decontamination. The decontamination procedure may have to be repeated to achieve a concentration acceptable to the Department or until the TPHC results of two consecutive samples do not show an appreciable change.

Please Respond To:
CN 407
TRENTON, NJ 08625

Tel. # (609) 584-4200

Please submit these changes in an addendum to your submitted closure plans prior to beginning any closure activities. This writer should be notified 2 weeks in advance of initiation of closure activities.

If you have any questions regarding these requirements, please contact me at (609) 584-4200.

Yours truly,

Douglas Greenfield
Sr. Environmental Engineer
Hazardous Waste Enforcement
CBW&HWEFO

APPENDIX B

NJDEPE UST SITE ASSESSMENT SUMMARY FORM

UST-014
2/91

UST #
Date Rec'd
TMS #
Staff

STATE OF NEW JERSEY
DEPARTMENT OF ENVIRONMENTAL PROTECTION

DIVISION OF WATER RESOURCES
BUREAU OF UNDERGROUND STORAGE TANKS
TANK MANAGEMENT SECTION

CN 029, 401 EAST STATE STREET
TRENTON, N.J. 08625-0029

UNDERGROUND STORAGE TANK SITE ASSESSMENT SUMMARY

Under the provisions of the Underground Storage of Hazardous Substances Act in accordance with N.J.A.C. 7:14B

This Summary form shall be used by all owners and operators of Underground Storage Tank Systems (USTS) who have either reported a release and are subject to the site assessment requirements of N.J.A.C. 7:14B-8.2 or who have closed USTS pursuant to N.J.A.C. 7:14B-9.1 et seq. and are subject to the site assessment requirements of N.J.A.C. 7:14B-9.2 and 9.3.

INSTRUCTIONS:

- *Please print legibly or type.*
- *Fill in all applicable blanks. This form will require various attachments in order to complete the Summary. The technical guidance document, Interim Closure Requirements for UST's, explains the regulatory (and technical) requirements for closure and the Scope of Work, Investigation and Corrective Action Requirements for Discharges from Underground Storage Tanks and Piping Systems explains the regulatory (and technical) requirements for corrective action.*
- *Return one original of the form and all required attachments to the above address.*
- *Attach a scaled site diagram of the subject facility which shows the information specified in Item IV B of this form.*
- *Explain any "No" or "N/A" response on a separate sheet.*

Date of Submission _____

0081533-193
FACILITY REGISTRATION #

I. FACILITY NAME AND ADDRESS

U.S. Army Fort Monmouth New Jersey
Directorate of Engineering and Housing Building 167
Fort Monmouth, NJ 07703 County Monmouth
Telephone No. 908-532-6224

OWNER'S NAME AND ADDRESS, if different from above

Telephone No. _____

(5)

II. DISCHARGE REPORTING REQUIREMENTS

A. Was contamination found? ___ Yes _X_ No If Yes, Case No._____
(Note: All discharges must be reported to the Environmental Action Hotline (609) 292-7172)

B. The substance(s) discharged was(were) N/A

C. Have any vapor hazards been mitigated? ___ Yes ___ No _X_ N/A

III. DECOMMISSIONING OF TANK SYSTEMS Closure Approval No. N/A

The site assessment requirements associated with tank decommissioning are explained in the Technical Guidance Document, **Interim Closure Requirements for UST's**, Section V. A-D. Attach complete documentation of the methods used and the results obtained for each of the steps of tank decommissioning used. Please include a site map which shows the locations of all samples and borings, the location of all tanks and piping runs at the facility at the beginning of the tank closure operation and annotated to differentiate the status of all tanks and piping (e.g., removed, abandoned, temporarily closed, etc.). The same site map can be used to document other parts of the site assessment requirements, if it is properly and legibly annotated.

IV. SITE ASSESSMENT REQUIREMENTS

A. Excavated Soil

Any evidence of contamination in excavated soil will require that the soil be classified as either Hazardous Waste or Non-Hazardous Waste. Please include all required **documentation** of compliance with the requirements for handling contaminated **excavated** soil (if any was present) as explained in the technical guidance documents for closure and corrective action. Describe amount of soil removed, its classification, and disposal location.

B. Scaled Site Diagrams

1. Scaled site diagrams must be attached which include the following information:

   a. North arrow and scale
   b. The locations of the ground water monitoring wells
   c. Location and depth of each soil sample and boring
   d. All major surface and sub-surface structures and utilities
   e. Approximate property boundaries
   f. All existing or closed underground storage tank systems, including appurtenant piping
   g. A cross-sectional view indicating depth of tank, stratigraphy and location of water table
   h. Locations of surface water bodies

C. Soil samples and borings (check appropriate answer)

1. Were soil samples taken from the excavation as prescribed? _X_ Yes ___ No ___ N/A

2. Were soil borings taken at the tank system closure site as prescribed? ___ Yes ___ No _X_ N/A

3. Attach the analytical results in tabular form and include the following information about each sample:
   a. Customer sample number (keyed to the site map)
   b. The depth of the soil sample
   c. Soil boring logs
   d. Method detection limit of the method used
   e. QA/QC Information as required

D. Ground Water Monitoring

1. Number of ground water monitoring wells installed 0

2. Attach the analytical results of the ground water samples in tabular form. Include the following information for each sample from each well:

   a. Site diagram number for each well installed
   b. Depth of ground water surface
   c. Depth of screened interval
   d. Method detection limit of the method used
   e. Well logs
   f. Well permit numbers
   g. QA/QC information as required

V. SOIL CONTAMINATION

A. Was soil contamination found? ___ Yes X No
If "Yes", please answer Question B-E
If "No", please answer Question B

B. The highest soil contamination still remaining in the ground has been determined to be:
1. 0 ppb total BTEX, N/A ppb total non-targeted VOC
2. 610 ppb total B/N, N/A ppb total non-targeted B/N
3. 490 ppm TPHC
4. N/A ppb N/A (for non-petroleum substance)

C. Remediation of free product contaminated soils

1. All free product contaminated soil on the property boundaries and above the water table are believed to have been removed from the subsurface ___ Yes X No
2. Free product contaminated soils are suspected to exist below the water table ___ Yes X No
3. Free product contaminated soils are suspected to exist off the property boundaries. ___ Yes X No

D. Was the vertical and horizontal extent of contamination determined? ___ Yes ___ No X N/A

E. Does soil contamination intersect ground water? ___ Yes ___ No X N/A

VI. GROUND WATER CONTAMINATION

A. Was ground water contamination found? ___ Yes X No
If "Yes", please answer Questions B-G.
If "No", please answer only Question B.

B. The highest ground water contamination at any 1 sampling location and at any 1 sampling event to date has been determined to be:

1. N/A ppb total BTEX, N/A ppb total non-targeted VOC
2. N/A ppb total B/N, N/A ppb total non-targeted B/N
3. N/A ppb total MTBE, N/A ppb total TBA
4. N/A ppb N/A (for non-petroleum substance)
5. greatest thickness of separate phase product found N/A
6. separate phase product has been delineated ___ Yes ___ No X N/A

C. Result(s) of well search

1. A well search (including a review of manual well records) indicates that private, municipal or commercial wells do exist within the distances specified in the Scope of Work. ___ Yes ___ No X N/A

2. The number of these wells identified is N/A .

D. Proximity of wells and contaminant plume

1. The shallowest depth of any well noted in the well search which may be in the horizontal or vertical potential path(s) of the contaminant plume(s) is N/A feet below grade (consideration has been given for the effects of pumping, subsurface structures, etc. on the direction(s) of contaminant migration). This well is N/A feet from the source and its screening begins at a depth of N/A feet.

2. The shallowest depth to the top of the well screen for any well in the potential path of the plume(s) (as described in D1 above) is N/A feet below grade. This well is located N/A feet from the source.

3. The closest horizontal distance of a private, commercial or municipal well in the potential path of the plume (as determined in D1) is N/A feet from the source. This well is N/A feet deep and screening begins at a depth of N/A feet.

E. A plan for separate phase product recovery has been included. ___Yes ___No N/AN/A

F. A ground water contour map has been submitted which includes the ground water elevations for each well.
___Yes ___No X N/A

G. Delineation of contamination

1. The ground water contaminants have been delineated to MCLs or lower values at the property boundaries. ___Yes ___No N/A

2. The plume is suspected to continue off the property at concentrations greater than MCLs.
___Yes ___No N/A

3. Off property access (circle one): is being sought has been approved has been denied N/A

VII. SITE ASSESSMENT CERTIFICATION [preparer of site assessment plan - N.J.A.C. 7:14B-6.3(b) &9.5(a)3]

The person signing this certification as the "Qualified Ground Water Consultant" (as defined in N.J.A.C.7:14B-1.6) responsible for the design and implementation of the site assessment plan as specified in N.J.A.C. 7:14B-8.3(a) & 9.2(b)2, must supply the name of the certifying organization and certification number.

"I certify under penalty of law that the information provided in this document is true, accurate, and complete and was obtained by procedures in compliance with N.J.A.C. 7:14B-8 and 9. I am aware that there are significant penalties for submitting false, inaccurate, or incomplete information, including fines and/or imprisonment."

NAME (Print or Type) Charles Appleby SIGNATURE

COMPANY NAME U.S. Army Fort Monmouth DATE 10/29/93
(Preparer of Site Assessment Plan)

CERTIFYING ORGANIZATION NJDEPE CERTIFICATION NUMBER 2056

VIII. **TANK DECOMMISSIONING CERTIFICATION** [person performing tank decommissioning portion of closure plan - N.J.A.C. 7:14B-9.5(a)4]

"I certify under penalty of law that tank decommissioning activities were performed in compliance with N.J.A.C. 7:14B-9.2(b)3. I am aware that there are significant penalties for submitting false, inaccurate, or incomplete information, including fines and/or imprisonment."

NAME (Print or Type) Charles Appleby SIGNATURE _____

COMPANY NAME U.S. Army Fort Monmouth DATE 10/29/93
(Performer of Tank Decommissioning)

IX. **CERTIFICATIONS BY THE RESPONSIBLE PARTY(IES) OF THE FACILITY**

A. The following certification shall be signed by the highest ranking individual with overall responsibility for that facility [N.J.A.C. 7:14B-2.3(c)1i].

"I certify under penalty of law that the information provided in this document is true, accurate, and complete . I am aware that there are significant penalties for submitting false, inaccurate, or incomplete information, including fines and/or imprisonment."

NAME (Print or Type) James Ott, P.E. SIGNATURE _____

COMPANY NAME U.S. Army FOrt Monmouth DATE 10/29/93

B. The following certification shall be signed as follows (according to the requirements of N.J.A.C. 7:14B-2.3(C)2i]:

1. For a corporation, by a principal executive officer of at least the level of vice president.
2. For a partnership or sole proprietorship, by a general partner or the proprietor, respectively; or
3. For a municipality, State, Federal or other public agency by either the principal executive officer or ranking elected official.
4. In cases where the highest ranking corporate partnership, governmental officer or official at the facility as required in A above is the same person as the official required to certify in B, only the certification in A need to be made. In all other cases, the certifications of A and B shall be made.

"I certify under penalty of law that I have personally examined and am familiar with the information submitted in this application and all attached documents, and that based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the submitted information is true, accurate, and complete. I am aware that there are significant penalties for submitting false, inaccurate, or incomplete information, including fines and/or imprisonment."

NAME (Print or Type) _____ SIGNATURE _____

COMPANY NAME _____ DATE _____

ATTACHMENT I

NO/NA RESPONSE EXPLANATION

SAS QUESTION #	RESPONSE	EXPLANATION
IIA.	No	No contaminants were identified in soil samples at concentrations exceeding proposed NJDEPE cleanup criteria.
IIB.	N/A	Same as above.
IIC.	N/A	Same as above.
III.	N/A	Closure of Facility Registration No. 0081533-193 was conducted under verbal approval and on-site supervision of the NJDEPE Division of Hazardous Waste Management.
IV.C.2	N/A	No soil borings were required in the DHWM approval closure plan.
V.A	No	No contaminants were identified in soil samples at concentrations exceeding proposed NJDEPE cleanup criteria.
V.B.1-4	N/A	Same as above.
V.C.1-3	N/A	Same as above.
V.D	N/A	Same as above.
V.E	N/A	Same as above.
VI.A-G	No	No groundwater monitoring wells were installed as part of closure of Facility Registration No. 0081533-193; therefore, no groundwater samples were collected.

ATTACHMENT I

NO/NA RESPONSE EXPLANATION

SAS QUESTION #	RESPONSE	EXPLANATION
VI.B.1-6	N/A	Same as above.
VI.C.1-3	N/A	No release to groundwater has occurred from Facility Registration No. 0081533-193; therefore, no well search was performed as part of the site assessment.
VI.E	N/A	Same as above.
VI.F	N/A	Same as above.
VI.G.1-3	N/A	No groundwater contamination resulting from a release from Facility Registration No. 0081533-193 has been identified.

United States Army

Fort Monmouth, New Jersey

Site/Remedial Investigation Report

Building 290
Main Post-West Area

July 1999

SITE/REMEDIAL INVESTIGATION REPORT

BUILDING 290

MAIN POST-WEST AREA

JULY 1999

PREPARED FOR:

UNITED STATES ARMY, FORT MONMOUTH, NEW JERSEY
DIRECTORATE OF PUBLIC WORKS
BUILDING 167
FORT MONMOUTH, NJ 07703

PREPARED BY:

SMC ENVIRONMENTAL SERVICES GROUP
1900 FROST ROAD
SUITE 110
BRISTOL, PA 19007

PROJECT NO. 2429-308

290.DOC

TABLE OF CONTENTS

EXECUTIVE SUMMARY iv

1.0 BACKGROUND INFORMATION 1

1.1 OVERVIEW 1
1.2 SITE DESCRIPTION 1
1.3 GEOLOGICAL/HYDROGEOLOGICAL SETTING 1
1.4 HEALTH AND SAFETY 3

2.0 SITE/REMEDIAL INVESTIGATION ACTIVITIES 4

2.1 OVERVIEW 4
2.2 FIELD SCREENING/MONITORING 4
2.3 MANAGEMENT OF EXCAVATED SOILS 5
2.4 POST-EXCAVATION SOIL SAMPLING AND RESULTS 5

3.0 CONCLUSIONS AND RECOMMENDATIONS 7

3.1 CONCLUSIONS 7
3.2 RECOMMENDATIONS 7

TABLE OF CONTENTS (CONTINUED)

TABLES

Table 1	Summary of Post-Excavation Sampling Activities
Table 2	Post-Excavation Soil Sampling Results
Table 3	VOA Sampling Results
Table 4	Total Lead

FIGURES

Figure 1	Site Location Map
Figure 2	Site Map
Figure 3	Soil Sampling Location Map

APPENDICES

Appendix A	Soil Analytical Data Package
Appendix B	Photographs

EXECUTIVE SUMMARY

Site/Remedial Investigation and Post-Excavation Soil Sampling

SMC was retained by the U.S. Army DPW to implement a site/remedial investigation in an area that was discovered during construction activities at Building 290. The area may have been related to a gasoline dispensing island. Building 290 is located at the Main Post-West area of the U.S. Army Fort Monmouth Base. The objective of the site/remedial investigation activities was to remove all potentially impacted soil by past operations. The site/remedial investigation was performed by SMC personnel in accordance with the NJDEP *Technical Requirements for Site Remediation* (N.J.A.C. 7:26E) and the NJDEP *Field Sampling Procedures Manual.*

Visibly stained soils and soils exhibiting elevated PID levels (greater than 5 ppm) of VOCs, were excavated. Excavation activities continued until potentially impacted soil had been removed. To confirm PID readings and verify the effectiveness of the soil excavation activities, 7 post-excavation soil samples were collected from within the excavation between March 28 and April 1, 1997. All samples were analyzed for TPHC, volatile organic compounds, lead and total solids. The post-excavation soil samples collected from the excavation contained concentrations of TPHC, lead and volatile organic compounds below the NJDEP soil cleanup criteria.

Management of Excavated Soils

A total of approximately 40 cubic yards of contaminated soil was excavated from around the former UST location and placed on and covered with tarps. All contaminated soil characterization and disposal was handled directly by the U.S. Army Fort Monmouth DPW.

Site Restoration

Upon receiving analytical results and confirming the effectiveness of the excavation activities completed at the site, the excavation was backfilled to grade with certified clean crushed stone and sand.

Conclusions and Recommendations

The results of the analysis of the post-remediation soil samples reveal that there are no target compounds present above applicable NJDEP cleanup standards within the excavation associated with Building 290. Therefore, SMC does not recommend any further site investigation or remediation.

1.0 BACKGROUND INFORMATION

1.1 OVERVIEW

SMC Environmental Services Group (SMC) was retained by the United States Army Directorate of Public Works (DPW) to implement a site/remedial investigation in an area that was discovered during construction activities at Building 290. The area may have been related to a gasoline dispensing island. Building 290 is located at the Main Post-West area of the U.S. Army Fort Monmouth Base, Fort Monmouth, New Jersey. Refer to the site location map in Figure 1.

This report describes the results of the site/remedial investigation activities completed at the site. The objective of the site/remedial investigation activities was to remove all potentially impacted soil resulting from past operations.

This report outlines background information, the site/remedial investigation activities, results of these activities, and conclusions and recommendations drawn from these results.

1.2 SITE DESCRIPTION

Building 290 is located in the Main Post-West area of the Fort Monmouth Army Base. The excavation was located a few feet west of the southwest corner of Building 290. A site map is provided in Figure 2.

1.3 GEOLOGICAL/HYDROGEOLOGICAL SETTING

The following is a description of the geological/hydrogeological setting of the area surrounding Building 290. Included is a description of the regional geology of the area surrounding Fort Monmouth, as well as descriptions of the local geology and hydrogeology of the Main Post area.

Regional Geology

Monmouth County lies within the New Jersey Section of the Atlantic Coastal Plain physiographic province. The Main Post, Charles Wood, and the Evans areas are located in what may be referred to as the Outer Coastal Plain subprovince, or the Outer Lowlands.

In general, New Jersey Coastal Plain formations consist of a seaward-dipping wedge of unconsolidated deposits of clay, silt, and gravel. These formations typically strike northeast-southwest with a dip ranging from 10 to 60 feet per mile and were deposited on Precambrian and lower Paleozoic rocks (Zapecza, 1989). These sediments, predominantly derived from deltaic, shallow marine, and continental shelf environments, date from Cretaceous through the Quaternary Periods. The mineralogy ranges from quartz to glauconite.

The formations record several major transgressive/regressive cycles and contain units which are generally thicker to the southeast and reflect a deeper water environment. Over 20 regional geologic units are present within the sediments of the Coastal Plain. Regressive, upward coarsening deposits are usually aquifers (e.g., Englishtown and Kirkwood Formations, and the Cohansey Sand) while the transgressive deposits act as confining units (e.g., the Merchantville, Marshalltown, and Navesink Formations). The individual thickness for these units vary greatly (i.e., from several feet to several hundred feet). The Coastal Plain deposits thicken to the southeast from the Fall Line to greater than 6,500 feet in Cape May County (Brown and Zapecza, 1990).

Local Geology

Based on the regional geologic map (Jablonski, 1968), the Cretaceous age Red Bank and Tinton Sands outcrop at the Main Post area. The Red Bank sand conformably overlies the Navesink Formation and dips to the southeast at 35 feet per mile. The upper member (Shrewsbury) of the Red Bank sand is a yellowish-gray to reddish brown clayey, medium-to-coarse-grained sand that contains abundant rock fragments, minor mica and glauconite (Jablonski). The lower member (Sandy Hook) is a dark gray to black, medium-to-fine grained sand with abundant clay, mica, and glauconite.

The Tinton sand conformably overlies the Red Bank Sand and ranges from a clayey medium to very coarse grained feldspathic quartz and glauconite sand to a glauconitic coarse sand. The color varies from dark yellowish orange or light brown to moderate brown and from light olive to grayish olive. Glauconite may constitute 60 to 80 percent of the sand fraction in the upper part of the unit (Minard, 1969). The upper part of the Tinton is often highly oxidized and iron oxide encrusted (Minard).

Hydrogeology

The water table aquifer in the Main Post area is identified as part of the "composite confining units", or minor aquifers. The minor aquifers include the Navesink formation, Red Bank Sand, Tinton Sand, Hornerstown Sand, Vincentown Formation, Manasquan Formation, Shark River Formation, Piney Point Formation, and the basal clay of the Kirkwood Formation.

Based on records of wells drilled in the Main Post area, water is typically encountered at depths of 2 to 9 feet below ground surface (bgs). According to Jablonski, wells drilled in the Red Bank and Tinton Sands may produce 2 to 25 gallons per minute (gpm). Some well owners have reported acidic water that requires treatment to remove iron.

Due to the proximity of the Atlantic Ocean to Fort Monmouth, shallow groundwater may be tidally influenced and may flow toward creeks and brooks as the tide goes out, and away from creeks and brooks as the tide comes in. However, an abundance of clay lenses and sand deposits were noted in borings installed throughout Fort Monmouth. Therefore, the direction of shallow groundwater should be determined on a case-by-case basis.

Shallow groundwater is locally influenced within the Main Post area by the following factors:

- tidal influence (based on proximity to the Atlantic Ocean, rivers, and tributaries)
- topography
- nature of the fill material within the Main Post area
- presence of clay and silt lenses in the natural overburden deposits
- local groundwater recharge areas (i.e., streams, lakes)

Due to the fluvial nature of the overburden deposits (i.e., sand and clay lenses), shallow groundwater flow direction is best determined on a case-by-case basis. This is consistent with lithologies observed in borings installed within the Main Post area, which primarily consisted of fine-to-medium grained sands, with occasional lenses or laminations of gravel silt and/or clay.

Building 290 is located approximately 300 feet south of Parkers Creek, the nearest water body. Based on Main Post topography, groundwater flow in the area of Building 290 is anticipated to be to the north.

1.4 HEALTH AND SAFETY

During all site/remedial investigation activities, hazards at the work site, which may have posed a threat to the Health and Safety of personnel, were minimized. All areas, which posed, or may have been suspected to pose a vapor hazard, were monitored by a qualified individual utilizing an organic vapor analyzer (OVA). The individual ascertained if the area was safe, as defined by the Occupational Safety & Health Administration (OSHA).

2.0 SITE/REMEDIAL INVESTIGATION ACTIVITIES

2.1 OVERVIEW

The Site/Remedial Investigation was managed and carried out by SMC personnel. All analyses were performed and reported by U.S. Army Fort Monmouth Environmental Laboratory, an NJDEP-certified testing laboratory. All sampling was performed under the direct supervision of a NJDEP Certified Sub-Surface Evaluator according to the methods described in the NJDEP *Field Sampling Procedures Manual.* Sampling frequency and parameters analyzed complied with the NJDEP *Technical Requirements for Site Remediation* (N.J.A.C. 7:26E).

The following Parties participated in Site/Remedial Investigation Activities:

- Subsurface Evaluator: David H. Daniels
  Employer: SMC Environmental Services Group
  Phone Number: (215) 788-7844
  NJDEP Certification No.: 10279

- Project Manager: Charles Appleby
  Employer: DPW U.S. Army, Fort Monmouth
  Phone Number: (732) 532-6224
  NJDEP Certification No.: 2056

- Analytical Laboratory: U.S. Army Fort Monmouth Environmental Laboratory
  Contact Person: Daniel K. Wright
  Phone Number: (732) 532-4359
  NJDEP Company Certification No.: 13461

2.2 FIELD SCREENING/MONITORING

Field screening and visual observations to identify potentially contaminated material was performed by a NJDEP Certified Sub-Surface Evaluator. During the excavation activities, all soil removed was screened with a photoionization detector (PID) to check for the presence of elevated volatile organic concentrations (VOCs).

Soils that displayed elevated PID readings (i.e., above 5 ppm) were stockpiled separate from those soils which did not display elevated PID readings (i.e., less than 5 ppm). The ground surface in the areas used to stockpile contaminated soils was covered with tarps. All stockpiled contaminated soil was covered with tarps at the completion of each day of excavation.

2.3 MANAGEMENT OF EXCAVATED SOILS

A total of approximately 40 cubic yards of contaminated soil (soil displaying PID readings above 5 ppm) was excavated, placed on, and covered with tarps.

All contaminated soil characterization and disposal was handled directly by the U.S. Army Fort Monmouth Directorate of Public Works.

2.4 POST-EXCAVATION SOIL SAMPLING AND RESULTS

The excavation of the impacted soil proceeded laterally in all directions until non-detectable field screening readings (i.e., less than 5 ppm) were obtained with the PID. The excavation extended vertically to a depth of 4 feet below ground surface (bgs). Groundwater was encountered at a depth of 3-½ feet bgs.

To confirm the PID readings and verify the effectiveness of the soil excavation activities, 7 post-excavation soil samples were collected from within the excavation between March 28 and April 1, 1997. Of these, 3 soil samples were collected from the excavation sidewalls at a depth of 3 feet bgs. The sidewall samples were designated 290-N, 290-S and 290-P1. The remaining 4 post-excavation soil samples were collected from the bottom of the excavation at a depth of 4 feet bgs. The bottom samples were designated 290-B, 290-P2, 290-P3 and 290-P4. Sample 290-P5 was a duplicate. The locations of the 7 post-excavation soil samples are shown in Figure 3.

SMC personnel, in accordance with the NJDEP Technical Requirements and the NJDEP Field Sampling Procedures Manual, performed the post-excavation soil sampling activities. A summary of sampling activities, including parameters analyzed, is provided in Table 1. Following soil sampling activities, the samples were chilled and delivered to the U.S. Army Fort Monmouth Environmental Laboratory located in Fort Monmouth, New Jersey, for analysis.

All samples were analyzed for total petroleum hydrocarbons (TPHC), volatile organic compounds, lead and total solids. The TPHC post-excavation sampling results were compared to the NJDEP residential direct contact total organic contaminants soil cleanup criteria of 10,000 mg/kg (N.J.A.C. 7:26D and revisions dated February 3, 1994).

A summary of the TPHC analytical results and comparison to the NJDEP soil cleanup criteria is provided in Table 2. A summary of the results of the volatile organic compounds and lead and comparison to the NJDEP soil cleanup criteria is provided in Table 3. The analytical data packages are provided in Appendix A.

The post-excavation soil samples collected from the excavation contained concentrations of TPHC greater than 1,000 mg/kg in two of the samples (290-P1 and 290-P2). All of the samples revealed levels below the NJDEP soil cleanup criteria for volatile organic compounds and lead.

Upon receiving analytical results and confirming the effectiveness of the excavation activities completed at the site, the excavation was backfilled to grade with certified clean crushed stone and sand. Appendix B provides photographs of the site/remedial investigations.

3.0 CONCLUSIONS AND RECOMMENDATIONS

3.1 CONCLUSIONS

SMC was retained by the U.S. Army DPW to implement a site/remedial investigation in an area that was discovered during construction activities at Building 290. The area may have been related to a gasoline dispensing island. Building 290 is located at the Main Post-West area of the U.S. Army Fort Monmouth Base. The objective of the site/remedial investigation activities was to remove all potentially impacted soil resulting from past operations.

Visibly stained soils and soils exhibiting elevated PID levels (greater than 5 ppm) of VOCs were excavated. Excavation activities continued until potentially impacted soil had been removed. In all, a total of approximately 40 cubic yards of contaminated soil was excavated from the location. All contaminated soil characterization and disposal was handled directly by the U.S. Army Fort Monmouth DPW.

To confirm the PID readings and verify the effectiveness of the soil excavation activities, 7 post-excavation soil samples were collected from within the excavation between March 28 and April 1, 1997. All samples were analyzed for TPHC, volatile organic compounds, lead and total solids. The post-excavation soil samples collected from the excavation contained concentrations of TPHC, volatile organic compounds and lead below the NJDEP soil cleanup criteria.

Upon receiving analytical results and confirming the effectiveness of the excavation activities completed at the site, the excavation was backfilled to grade with certified clean crushed stone and sand.

3.2 RECOMMENDATIONS

The results of the analysis of the post-remediation soil samples reveal that there are no target compounds present above applicable NJDEP cleanup standards within the excavation associated with Building 290. Therefore, SMC does not recommend any further site investigation or remediation.

TABLES

TABLE 1

SUMMARY OF POST-EXCAVATION SAMPLING ACTIVITIES
AREA 290, MAIN POST-EAST AREA
FORT MONMOUTH, NEW JERSEY

Sample ID	Date of Collection	Date Analysis Started	Matrix	Sample Type	Analytical Parameters*	Analysis Method
290-P1	3/28/97	3/31/97	Soil	Post-Excavation	TPHC	OQA-QAM-025
290-N	3/28/97	3/31/97	Soil	Post-Excavation	TPHC	OQA-QAM-025
290-B	3/28/97	3/31/97	Soil	Post-Excavation	TPHC	OQA-QAM-025
290-S	3/28/97	3/31/97	Soil	Post-Excavation	TPHC	OQA-QAM-025

Note:
* TPHC Total Petroleum Hydrocarbons

TABLE 1

SUMMARY OF POST-EXCAVATION SAMPLING ACTIVITIES
AREA 290, MAIN POST-EAST AREA
FORT MONMOUTH, NEW JERSEY

Sample ID	Date of Collection	Date Analysis Started	Matrix	Sample Type	Analytical Parameters*	Analysis Method
290-P2	4/1/97	4/2/97	Soil	Post-Excavation	TPHC	OQA-QAM-025
290-P3	4/1/97	4/2/97	Soil	Post-Excavation	TPHC	OQA-QAM-025
290-P4	4/1/97	4/2/97	Soil	Post-Excavation	TPHC	OQA-QAM-025
290-P5	4/1/97	4/2/97	Soil	Post-Excavation	TPHC	OQA-QAM-025

Note:
* TPHC Total Petroleum Hydrocarbons

TABLE 2

POST-EXCAVATION SOIL SAMPLING RESULTS
AREA 290, MAIN POST-EAST AREA
FORT MONMOUTH, NEW JERSEY

Sample ID	Sample Laboratory ID	Sample Date	Analysis Date	Analytical Method Used	Method Detection Limit (mg/kg)	Compound of Concern	Result (mg/kg) *	NJDEP Soil Cleanup Criteria ** (mg/kg)	Exceeds Cleanup Criteria
290-P1=	2416.01	3/28/97	3/31/97	Total Solid	--	--	75.64	--	--
				TPHC	207	Yes	3816.37	10,000	No
290-N=	2416.02	3/28/97	3/31/97	Total Solid	--	--	76.62	--	--
				TPHC	200	Yes	ND	10,000	No
290-B=	2416.03	3/28/97	3/31/97	Total Solid	--	--	78.53	--	--
				TPHC	198	Yes	242.92	10,000	No
290-S=	2416.04	3/28/97	3/31/97	Total Solid	--	--	75.32	--	--
				TPHC	207	Yes	322.23	10,000	No

Note:
* Total Solid results are expressed as a percentage.
** NJDEP Residential Direct Contact soil cleanup criteria for total organics
-- Not detected above stated sample quantitation limit
TPHC Total Petroleum Hydrocarbons

TABLE 2
POST-EXCAVATION SOIL SAMPLING RESULTS
AREA 290, MAIN POST-EAST AREA
FORT MONMOUTH, NEW JERSEY

Sample ID	Sample Laboratory ID	Sample Date	Analysis Date	Analytical Method Used	Method Detection Limit (mg/kg)	Compound of Concern	Result (mg/kg) *	NJDEP Soil Cleanup Criteria ** (mg/kg)	Exceeds Cleanup Criteria
290-P2=	2420.01	4/1/97	4/2/97	Total Solid	--	--	80.63	--	--
				TPHC	182	Yes	6092.65	10,000	No
290-P3=	2420.02	4/1/97	4/2/97	Total Solid	--	--	66.91	--	--
				TPHC	237	Yes	293.57	10,000	No
290-P4=	2420.03	4/1/97	4/2/97	Total Solid	--	--	81.33	--	--
				TPHC	190	Yes	501.69	10,000	No
290-P5=	2420.04	4/1/97	4/2/97	Total Solid	--	--	78.98	--	--
				TPHC	188	Yes	952.13	10,000	No

Note:
* Total Solid results are expressed as a percentage.
** NJDEP Residential Direct Contact soil cleanup criteria for total organics
-- Not detected above stated sample quantitation limit
TPHC Total Petroleum Hydrocarbons

Table 3
VOLATILE ORGANICS ANALYSIS DATA SHEET

Lab Name: FMETL NJDEP # 13461 Project: 2429

Case No.: 2416 Location: AREA 290 SDG No.: _____

Matrix: (soil/water) SOIL Lab Sample ID: 2416.01

CONCENTRATION UNITS:
(ug/L or ug/Kg)

CAS NO.	PARAMETER	RESULTS	QUALIFIER	RESIDENTIAL	NON-RESIDENTIAL
107028	Acrolein			NA	NA
107131	Acrylonitrile			1000	5000
75650	tert-Butyl alcohol			NA	NA
1634044	Methyl-tert-Butyl ether			NA	NA
108203	Di-isopropyl ether			NA	NA
	Dichlorodifluoromethane	5	U	NA	NA
74-87-3	Chloromethane	1	U	520000	1000000(d)
75-01-4	Vinyl Chloride	4	U	2000	7000
74-83-9	Bromomethane	3	U	79000	1000000(d)
75-00-3	Chloroethane	4	U	NA	NA
75-69-4	Trichlorofluoromethane	3	U	NA	NA
75-35-4	1, 1-Dichloroethene	1	U	8000	150000
67-64-1	Acetone	3	U	1000000(d)	1000000(d)
75-15-0	Carbon Disulfide	1	U	NA	NA
75-09-2	Methylene Chloride	3	U	49000	210000
156-60-5	trans-1,2-Dichloroethene	3	U	1000000(d)	1000000(d)
75-35-3	1,1-Dichloroethane	1	U	570000	1000000(d)
108-05-4	Vinyl Acetate	4	U	NA	NA
78-93-3	2-Butanone	4	U	1000000(d)	1000000(d)
156-59-2	cis-1,2-Dichloroethene	1	U	79000	1000000(d)
67-66-3	Chloroform	1	U	19000(k)	28000(k)

Table 3
VOLATILE ORGANICS ANALYSIS DATA SHEET

Lab Name: FMETL NJDEP # 13461 Project: 2429

Case No.: 2416 Location: AREA 290 SDG No.: _____

Matrix: (soil/water) SOIL Lab Sample ID: 2416.01

CONCENTRATION UNITS:
(ug/L or ug/Kg)

CAS NO.	PARAMETER	RESULTS	QUALIFIER	RESIDENTIAL	NON-RESIDENTIAL
75-55-6	1,1,1-Trichloroethane	1	U	NA	NA
56-23-5	Carbon Tetrachloride	3	U	2000(k)	4000(k)
71-43-2	Benzeze	1	U	3000	13000
107-06-2	1,2-Dichloroethane	3	U	6000	24000
79-01-6	Trichloroethene	1	U	23000	54000(k)
78-87-5	1, 2-Dichloropropane	1	U	10000	43000
75-27-4	Bromodichloromethane	1	U	11000(g)	46000(g)
110-75-8	2-Chloroethyl vinyl ether	3	U	NA	NA
10061-01-5	cis-1,3-Dichloropropene	1	U	NA	NA
108-10-1	4-Methyl-2-Pentanone	3	U	1000000(d)	1000000(d)
108-88-3	Toluene	1	U	1000000(d)	1000000(d)
10061-02-6	trans-1,3-Dichloropropene	3	U	NA	NA
79-00-5	1,1,2-Trichloroethane	3	U	22000	420000
127-18-4	Tetrachloroethene	1	U	4000(k)	6000(k)
591-78-6	2-Hexanone	3	U	NA	NA
126-48-1	Dibromochloromethane	3	U	NA	NA
108-90-7	Chlorobenzene	1	U	37000	680000
100-41-4	Ethylbenzene	3	U	1000000(d)	1000000(d)
1330-20-7	m+p-Xylenes	4	U	NA	NA

Table 3
VOLATILE ORGANICS ANALYSIS DATA SHEET

Lab Name: FMETL NJDEP # 13461 Project: 2429

Case No.: 2416 Location: AREA 290 SDG No.: _____

Matrix: (soil/water) SOIL Lab Sample ID: 2416.01

CONCENTRATION UNITS:
(ug/L or ug/Kg)

CAS NO.	PARAMETER.	RESULTS	QUALIFIER	RESIDENTIAL	NON-RESIDENTIAL
1330-20-7	o-Xylene	3	U	NA	NA
100-42-5	Styrene	3	U	23000	97000
75-25-2	Bromoform	3	U	86000	370000
79-34-5	1,1,2,2-Tetrachloroethane	3	U	34000	70000(k)
541-73-1	1,3-Dichlorobenzene	4	U	5100000	10000000(c)
106-46-7	1,4-Dichlorobenzene	4	U	570000	10000000(c)
95-50-1	1,2-Dichlorobenzene	4	U	5100000	10000000(c)

Table 3
VOLATILE ORGANICS ANALYSIS DATA SHEET

Lab Name: FMETL NJDEP # 13461 Project: 2429

Case No.: 2420 Location: AREA 290 SDG No.: _____

Matrix: (soil/water) SOIL Lab Sample ID: 2420.01

CONCENTRATION UNITS:
(ug/L or ug/Kg)

CAS NO.	PARAMETER	RESULTS	QUALIFIER	RESIDENTIAL	NON-RESIDENTIAL
107028	Acrolein			NA	NA
107131	Acrylonitrile			1000	5000
75650	tert-Butyl alcohol			NA	NA
1634044	Methyl-tert-Butyl ether			NA	NA
108203	Di-isopropyl ether			NA	NA
	Dichlorodifluoromethane	5	U	NA	NA
74-87-3	Chloromethane	1	U	520000	1000000(d)
75-01-4	Vinyl Chloride	4	U	2000	7000
74-83-9	Bromomethane	2	U	79000	1000000(d)
75-00-3	Chloroethane	4	U	NA	NA
75-69-4	Trichlorofluoromethane	2	U	NA	NA
75-35-4	1, 1-Dichloroethene	1	U	8000	150000
67-64-1	Acetone	2	U	1000000(d)	1000000(d)
75-15-0	Carbon Disulfide	1	U	NA	NA
75-09-2	Methylene Chloride	2	U	49000	210000
156-60-5	trans-1,2-Dichloroethene	2	U	1000000(d)	1000000(d)
75-35-3	1,1-Dichloroethane	1	U	570000	1000000(d)
108-05-4	Vinyl Acetate	4	U	NA	NA
78-93-3	2-Butanone	4	U	1000000(d)	1000000(d)
156-59-2	cis-1,2-Dichloroethene	1	U	79000	1000000(d)
67-66-3	Chloroform	1	U	19000(k)	28000(k)

Table 3
VOLATILE ORGANICS ANALYSIS DATA SHEET

Lab Name: FMETL NJDEP # 13461 Project: 2429

Case No.: 2420 Location: AREA 290 SDG No.: _____

Matrix: (soil/water) SOIL Lab Sample ID: 2420.01

CONCENTRATION UNITS:
(ug/L or ug/Kg)

CAS NO.	PARAMETER	RESULTS	QUALIFIER	RESIDENTIAL	NON-RESIDENTIAL
75-55-6	1,1,1-Trichloroethane	1	U	NA	NA
56-23-5	Carbon Tetrachloride	2	U	2000(k)	4000(k)
71-43-2	Benzeze	1	U	3000	13000
107-06-2	1,2-Dichloroethane	2	U	6000	24000
79-01-6	Trichloroethene	1	U	23000	54000(k)
78-87-5	1, 2-Dichloropropane	1	U	10000	43000
75-27-4	Bromodichloromethane	1	U	11000(g)	46000(g)
110-75-8	2-Chloroethyl vinyl ether	2	U	NA	NA
10061-01-5	cis-1,3-Dichloropropene	1	U	NA	NA
108-10-1	4-Methyl-2-Pentanone	2	U	1000000(d)	1000000(d)
108-88-3	Toluene	22		1000000(d)	1000000(d)
10061-02-6	trans-1,3-Dichloropropene	2	U	NA	NA
79-00-5	1,1,2-Trichloroethane	34		22000	420000
127-18-4	Tetrachloroethene	1	U	4000(k)	6000(k)
591-78-6	2-Hexanone	2	U	NA	NA
126-48-1	Dibromochloromethane	2	U	NA	NA
108-90-7	Chlorobenzene	1	U	37000	680000
100-41-4	Ethylbenzene	220	E	1000000(d)	1000000(d)
1330-20-7	m+p-Xylenes	590	E	NA	NA

Table 3
VOLATILE ORGANICS ANALYSIS DATA SHEET

Lab Name: FMETL NJDEP # 13461 Project: 2429

Case No.: 2420 Location: AREA 290 SDG No.: _____

Matrix: (soil/water) SOIL Lab Sample ID: 2420.01

CONCENTRATION UNITS:
(ug/L or ug/Kg)

CAS NO.	PARAMETER.	RESULTS	QUALIFIER	RESIDENTIAL	NON-RESIDENTIAL
1330-20-7	o-Xylene	380	E	NA	NA
100-42-5	Styrene	2	U	23000	97000
75-25-2	Bromoform	2	U	86000	370000
79-34-5	1,1,2,2-Tetrachloroethane	2	U	34000	70000(k)
541-73-1	1,3-Dichlorobenzene	4	U	5100000	10000000(c)
106-46-7	1,4-Dichlorobenzene	4	U	570000	10000000(c)
95-50-1	1,2-Dichlorobenzene	4	U	5100000	10000000(c)

SOIL CLEANUP CRITERIA (MG/KG)

(LAST REVISED-7/11/96)

(A) CRITERIA ARE HEALTH BASED USING AN INCIDENTAL INGESTION EXPOSURE PATHWAY EXCEPT WHERE NOTED BELOW.

(B) CRITERIA ARE SUBJECT TO CHANGE BASED ON SITE SPECIFIC FACTORS (E.G., AQUIFER CLASSIFICATION, SOIL TYPE, NATURAL BACKGROUND, ENVIRONMENTAL IMPACTS, ETC.)

(C) HEALTH BASED CRITERION EXCEEDS THE 10,000 MG/KG MAXIMUM FOR TOTAL ORGANIC CONTAMINANTS.

(D) HEALTH BASED CRITERION EXCEEDS THE 1000 MG/KG MAXIMUM FOR TOTAL VOLATILE ORGANIC CONTAMINANTS

(E) CLEANUP STANDARD PROPOSAL WAS BASED ON NATURAL BACKGROUND.

(F) HEALTH BASED CRITERION IS LOWER THAN ANALYTICAL LIMITS; CLEANUP CRITERION BASED ON PRACTICAL QUANTITATION LEVEL.

(G) CRITERION HAS BEEN RECALCULATED BASED ON NEW TOXICOLOGICAL DATA.

(H) THE IMPACT TO GROUND WATER VALUES FOR INORGANIC CONSTITUENTS WILL BE DEVELOPED BASED UPON SITE SPECIFIC CHEMICAL AND PHYSICAL PARAMETERS.

(I) ORIGINAL CRITERION WAS INCORRECTLY CALCULATED AND HAS BEEN RECALCULATED.

(J) TYPOGRAPHICAL ERROR.

(K) CRITERIA BASED ON INHALATION EXPOSURE PATHWAY, WHICH YIELDED A MORE STRINGENT CRITERION THAN THE INCIDENTAL INGESTION EXPOSURE PATHWAY.

(L) NEW CRITERION DERIVED USING METHODOLOGY IN THE BASIS AND BACKGROUND DOCUMENT.

(M) CRITERION BASED ON ECOLOGICAL (PHYTOTOXICITY) EFFECTS.

(N) LEVEL OF THE HUMAN HEALTH BASED CRITERION IS SUCH THAT EVALUATION FOR POTENTIAL ENVIRONMENTAL IMPACTS ON A SITE BY SITE BASIS IS RECOMMENDED.

(O) LEVEL OF THE CRITERION IS SUCH THAT EVALUATION FOR POTENTIAL ACUTE EXPOSURE HAZARD IS RECOMMENDED.

(P) CRITERION BASED ON THE USEPA INTEGRATED EXPOSURE UPTAKE BIOKINETIC (IEUBK) MODEL UTILIZING THE DEFAULT PARAMETERS. THE CONCENTRATION IS CONSIDERED TO PROTECT 95% OF TARGET POPULATION (CHILDREN) AT A BLOOD LEVEL OF 10 UG/DL.

(Q) CRITERIA WAS DERIVED FROM A MODEL DEVELOPED BY THE SOCIETY FOR ENVIRONMENTAL GEOCHEMISTRY AND HEALTH (SEGH) AND WAS DESIGNED TO BE PROTECTIVE FOR ADULTS IN THE WORKPLACE.

(R) INSUFFICIENT INFORMATION AVAILABLE TO CALCULATE IMPACT TO GROUND WATER CRITERIA.

Table 4
TOTAL LEAD

Lab Name: FMETL NJDEP # 13461 Project: 2429

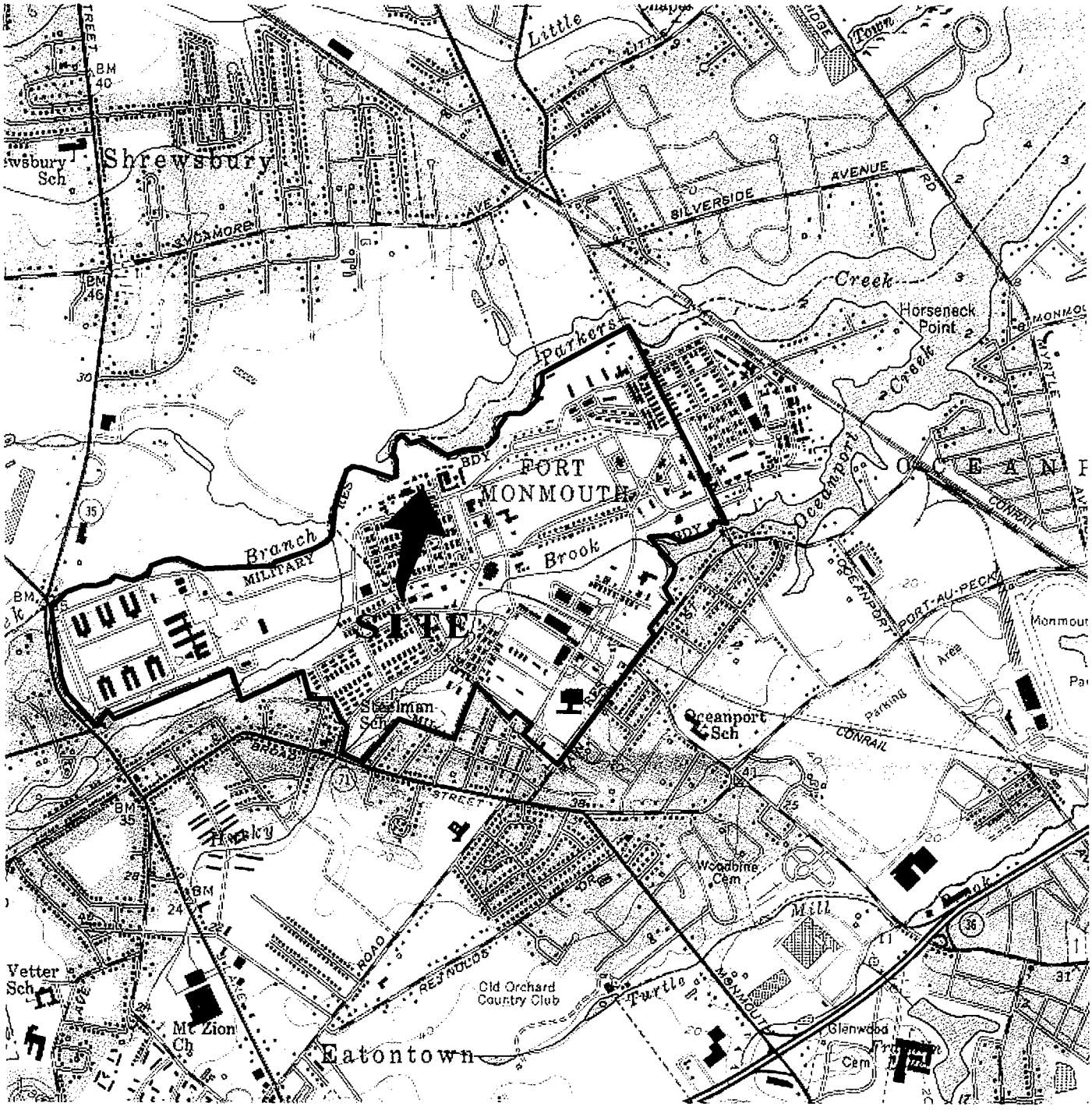
Case No.: _____ Location: AREA 290 SDG No.: _____

Matrix: (soil/water) SOIL Lab Sample ID: 2416.01-.04 And 2420.01-.04

CONCENTRATION UNITS:
(mg/kg)

LABORATORY I.D. #	SAMPLE LOCATION	RESULT (mg/kg)	MDL (mg/kg)	RESIDENTIAL	NON-RESIDENTIAL
2416.01	290-P1	3.05	2.03	400 (p)	600 (q)
2416.02	290-N	ND	1.50	400 (p)	600 (q)
2416.03	290-B	292.17	1.19	400 (p)	600 (q)
2416.04	290-S	23.01	1.77	400 (p)	600 (q)
2420.01	290-P2	93.89	2.32	400 (p)	600 (q)
2420.02	290-P3	23.60	2.62	400 (p)	600 (q)
2420.03	290-P4	24.13	2.30	400 (p)	600 (q)
2420.04	290-P5	33.91	2.26	400 (p)	600 (q)

FIGURES



LONG BRANCH, N. J.

40073-C8-TF-024

1954
PHOTOREVISED 1981
DMA 6164 I SE-SERIES V822

NEW JERSEY

QUADRANGLE LOCATION

Mapped, edited and published by the Geological Survey

FIGURE 1

SITE LOCATION MAP
Building 290
Main Post-West
Fort Monmouth Army Base
Monmouth County, NJ

SMC Environmental Services Group
Engineers, Managers, Scientists & Planners
Valley Forge, PA.

SCALE: 1"= 2000'

DATE: MARCH 1997

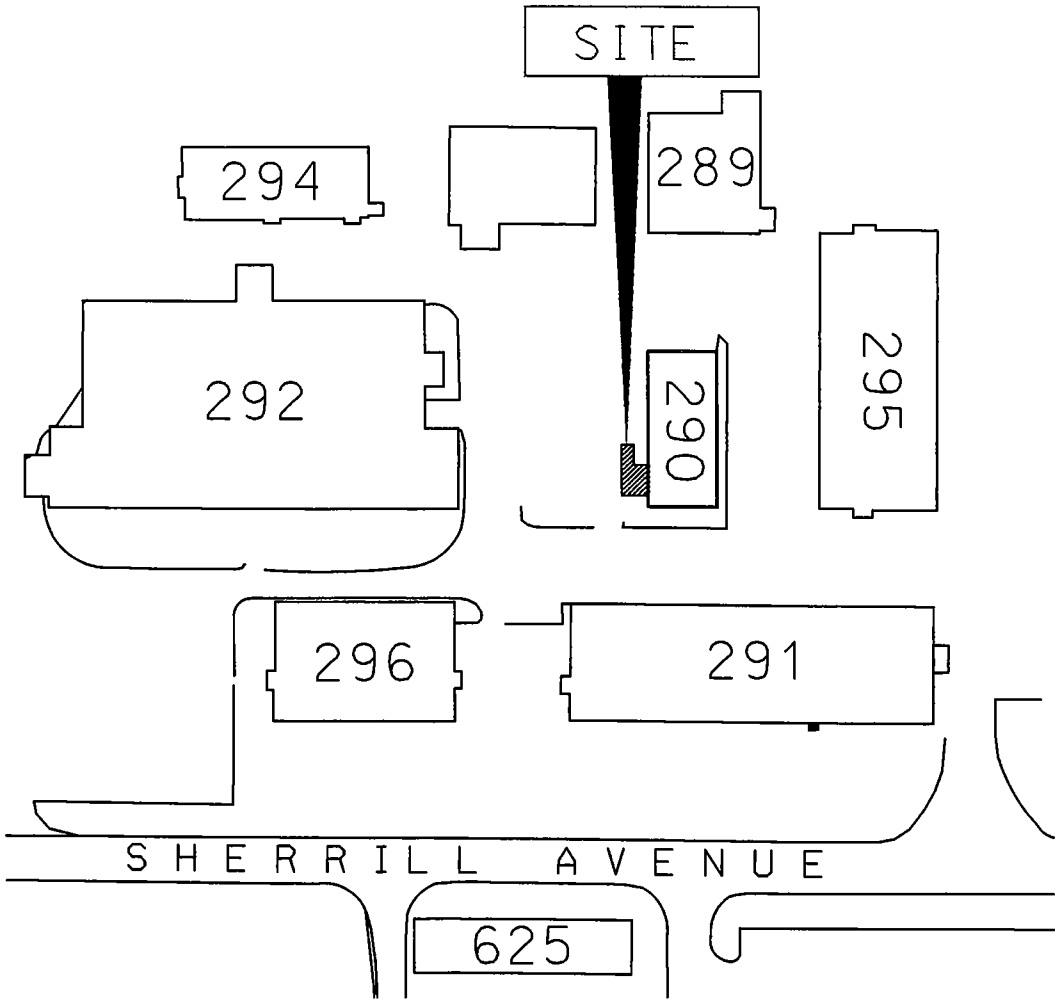


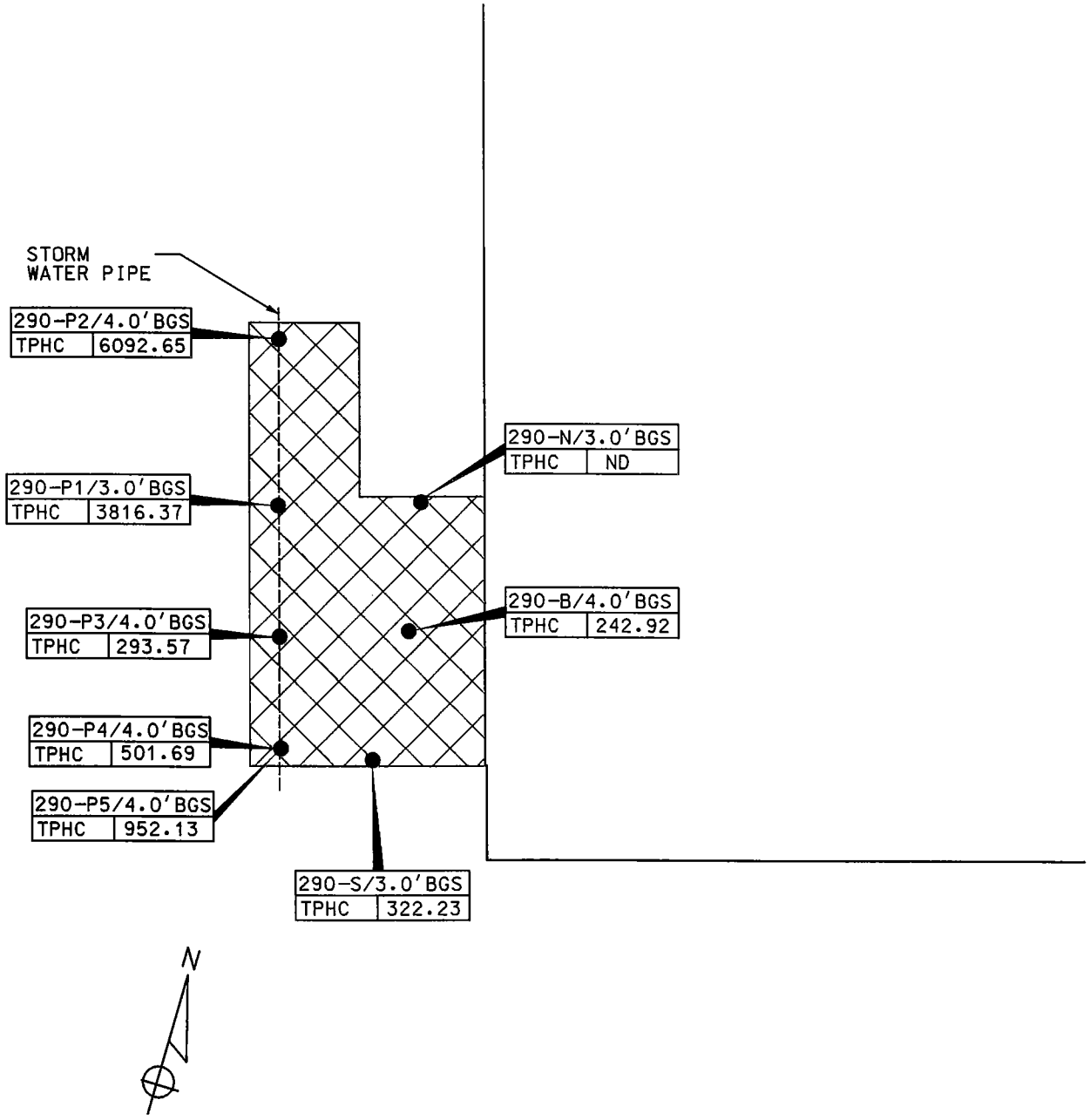
FIGURE 2
SITE MAP
BUILDING 290
FORT MONMOUTH ARMY BASE
MONMOUTH COUNTY, NJ

SMC ENVIRONMENTAL
SERVICES GROUP
Engineers, Managers, Scientists & Planners
VALLEY FORGE, PA.

SCALE: 1"=100'

DATE: MARCH 1997

290 2429 FIG2



LEGEND

- SOIL SAMPLE LOCATION (MARCH 28, 1997)
- SOIL SAMPLE LOCATION (APRIL 1, 1997)
- LIMIT OF EXCAVATION (APRIL 1, 1997)

NOTES:

1. ALL RESULTS IN MG/KG.
2. SEE TABLE 2 FOR NJDEP SOIL CLEANUP CRITERIA
3. BGS = BELOW GROUND SURFACE

FIGURE 3
SOIL SAMPLING LOCATION MAP
BUILDING 290
FORT MONMOUTH ARMY BASE
MONMOUTH COUNTY, NJ

SMC ENVIRONMENTAL SERVICES GROUP
Engineers, Managers, Scientists & Planners
VALLEY FORGE, PA.

SCALE: 1"=10'

DATE: MARCH 1997

290 2429 FIG3

United States Army

Fort Monmouth, New Jersey

Underground Storage Tank Closure and Site Investigation Report

Building 290
Main Post

NJDEP UST Registration No. 081533-64
NJDEP Closure Approval No. C-93-3179

May 2000

UNDERGROUND STORAGE TANK
CLOSURE AND SITE INVESTIGATION REPORT

BUILDING 290

MAIN POST
NJDEP UST REGISTRATION NO. 081533-64
NJDEP CLOSURE APPROVAL NO. C-93-3179

MAY 2000

PROJECT NO.: 09-5004-08
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PREPARED FOR:

UNITED STATES ARMY, FORT MONMOUTH, NEW JERSEY
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TABLE OF CONTENTS

EXECUTIVE SUMMARY

1.0 UNDERGROUND STORAGE TANK DECOMMISSIONING ACTIVITIES

- 1.1 OVERVIEW
- 1.2 SITE DESCRIPTION
  - 1.2.1 Geological/Hydrogeological Setting
- 1.3 HEALTH AND SAFETY
- 1.4 REMOVAL OF UNDERGROUND STORAGE TANK
  - 1.4.1 General Procedures
  - 1.4.2 Underground Storage Tank Excavation and Cleaning
- 1.5 UNDERGROUND STORAGE TANK TRANSPORTATION AND DISPOSAL
- 1.6 MANAGEMENT OF EXCAVATED SOILS

2.0 SITE INVESTIGATION ACTIVITIES

- 2.1 OVERVIEW
- 2.2 FIELD SCREENING/MONITORING
- 2.3 SOIL SAMPLING

3.0 CONCLUSIONS AND RECOMMENDATIONS

- 3.1 SOIL SAMPLING RESULTS
- 3.2 CONCLUSIONS AND RECOMMENDATIONS

Following Page No.

TABLES

Table 1 Summary of Post-Excavation Sampling Activities 7
Table 2 Post-Excavation Soil Sampling Results 8

TABLE OF CONTENTS (CONTINUED)

Following Page No.

FIGURES

Figure 1	Site Location Map	1
Figure 2	Site Map	2
Figure 3	Soil Sampling Results	8

APPENDICES

Appendix A	NJDEP-BUST Closure Approval
Appendix B	Certifications
Appendix C	Waste Manifest
Appendix D	UST Disposal Certificate
Appendix E	NJDEP Well Permits and Well Construction Logs
Appendix F	Soil Analytical Data Package
Appendix G	Groundwater Analytical Data Package

EXECUTIVE SUMMARY

UST Closure

On September 12, 1994, a fiberglass underground storage tank (UST) was closed by removal in accordance with the New Jersey Department of Environmental Protection (NJDEP) Closure Approval No. C-93-3179 at U.S. Army Fort Monmouth, Fort Monmouth, New Jersey. The UST, NJDEP Registration No. 081533-64, was located immediately adjacent to Building 290 in the Main Post area of U.S. Army, Fort Monmouth. UST No. 081533-64 was a 2,000-gallon No. 2 diesel oil UST. The UST fill port was located directly above the tank. The tank closure was performed by Cleaning Up The Environment Inc. (CUTE Inc.).

Site Assessment - Soil

The site assessment was performed by U.S. Army personnel in accordance with the NJDEP *Technical Requirements for Site Remediation* (N.J.A.C. 7:26E) and the NJDEP *Field Sampling Procedures Manual*. Soils surrounding the tank were screened visually and with air monitoring equipment for evidence of contamination. Following removal, the UST was inspected for corrosion holes. No holes were noted in the UST, however, evidence of potentially contaminated soils was observed surrounding the tank.

On September 12, 1994, following the removal of the UST, approximately 40 cubic yards of potentially contaminated soil was removed from the excavation due to visual contamination.

On September 13, 1994, following removal of approximately 10 cubic yards of potentially contaminated soil, post-excavation soil samples A, B, C, D, E, F, and DUP A were collected from a total of a total of six (6) locations along the sidewalls of the excavation. The samples were collected at a depth of 5.5 feet below ground surface (bgs). Sample H was collected along the former piping length of the excavation, which was approximately 15 feet in length. The piping samples were collected at a depth of 5.5 feet bgs. All samples were analyzed for total petroleum hydrocarbons (TPHC).

On September 21, 1994, due to elevated TPHC levels, a sample was collected from the north sidewall of the excavation in the vicinity of sample A, and was analyzed for volatile organic compounds plus 15 tentatively identified compounds (VOCs). The sample was collected at a depth of 5.5 feet bgs.

Findings - Soil

Post-excavation soil samples (samples C, D, and H) collected from the UST excavation and from below piping associated with the former UST at Building 290 contained TPHC concentrations below the NJDEP residential direct contact total organic contaminants soil cleanup criteria of

10,000 milligrams per kilogram (mg/kg) (N.J.A.C. 7:26D and revisions dated February 3, 1994). Samples C, D, and H, contained levels of TPHC ranging in concentration from 57.3 mg/kg to 730.0 mg/kg. Samples E, and F contained TPHC concentrations of 3,110.0 mg/kg and 9,670.0 mg/kg, respectively. Samples A, B, and DUP A contained levels of TPHC ranging in concentration from 10,400.0 mg/kg to 16,200.0 mg/kg, which exceeded the NJDEP soil cleanup criteria for 10,000 mg/kg. Post-excavation soil sample A, collected on September 21, 1994, contained methylene chloride at 0.46 mg/kg, and 2-butanone at 1.5 mg/kg. No other compounds were detected.

Based on field screening of subsurface soils, the DPW has concluded that an historical discharge was associated with the UST and associated piping. On September 13, 1994, a spill was reported to the NJDEP "Hotline" for UST No. 081533-64 and was assigned Spill Case No. 94-9-13-1503-57.

Site Restoration

Following receipt of all post-excavation soil sampling results, the excavation was backfilled to grade with a combination of uncontaminated excavated soil and certified clean fill. The excavation site was then restored to its original condition.

Site Assessment - Groundwater

One shallow overburden monitoring well (MW-1) was installed at the Building 290 area on July 15, 1994. It was installed approximately 30 feet south off the southeastern corner of Building 290 in the assumed downgradient direction of the former excavation. It was screened in the 2.0- to 12.5- foot depth interval, across the water table, which is approximately 3 feet below grade surface.

A second shallow overburden monitoring well (MW-2) was installed at the Building 290 area on August 16, 1995. It was installed approximately 8 feet north off the northwestern corner of Building 290 in the assumed downgradient direction of the former excavation. It was screened in the 1.5- to 11.5- foot depth interval, across the water table, which is approximately 4 feet below grade surface.

Monitoring well MW-1 was sampled on November 8, 1994, November 29, 1994, and December 18, 1995, and analyzed for volatile organic compounds with xylenens (VOCs), tertiary butyl alcohol (TBA), methyl teriary butyl ether (MTBE), and total lead.

Monitoring well MW-2 was sampled on November 18, 1995, and analyzed for volatile organic compounds with xylenes (VOCs), tertiary butyl alcohol, methyl tertiary butyl ether (MTBE), and total lead.

All sampling and analyses were performed in accordance with the NJDEP *Field Sampling Procedures Manual*, and the *Technical Requirements for Site Remediation*, N.J.A.C. 7:26E (*Technical Requirements*).

Findings - Groundwater

The sample collected from MW-1 on November 8, 1994, contained lead at 17.0 micrograms per liter (ug/l). This exceeded the Ground Water Quality Criteria (GWQC) for lead of 10 ug/l. All other groundwater analytical results were either below the detection limit or in compliance with the New Jersey Groundwater Quality Criteria (GWQC).

The sample collected on November 29, 1994, contained lead at 3.0 ug/l, which complies with the GWQC for lead. No other compounds were detected.

The sample collected on December 18, 1995, contained methylene chloride at 1.1 ug/l, and cis-1,2-Dichloroethene at 1.1 ug/l. The sample also contained aluminum at 2,200.0 ug/l, barium at 55.0 ug/l, calcium at 4,100.0 ug/l, copper at 60.0 ug/l, iron at 6,400.0 ug/l, potassium at 5,000.0 ug/l, magnesium at 4,500.0 ug/l, manganese at 23.0 ug/l, sodium at 9,200.0 ug/l, and zinc at 180.0 ug/l. This exceeds the GWQC for alumium of 200.0 ug/l, and iron of 300.0 ug/l. The trip blank and the field blank contained methylene chloride at 1.4 ug/l. No other compounds were detected.

The sample collected from MW-2 on November 28, 1995 contained methylene chloride at 2.3 ug/l, cis-1,2-Dichloroethene at 1.3 ug/l, and chloroform at 0.50 ug/l. The sample also contained silver at 440.0 ug/l, aluminum at 360.0 ug/l, barium at 74.0 ug/l, calcium at 5,300.0 ug/l, iron at 1,100.0 ug/l, magnesium at 4,700.0 ug/l, manganese at 30.0 ug/l, sodium at 11,000.0 ug/l, lead at 1.5 ug/l, and zinc at 100.0 ug/l. This exceeds the GWQC for aluminum of 200.0 ug/l, and iron of 300.0 ug/l. The trip blank and the field blank contained methylene chloride at 0.70 ug/l, and 0.60 ug/l, respectively. The field blank also contained manganese at 32.0 ug/l, lead at 2.8 ug/l, and zinc at 27.0 ug/l. No other compounds were detected.

No product or sheen was observed in MW-1 or MW-2 on any of the sampling dates. The depth to the water table in MW-1 on November 8, 1994 was 8.14 feet below grade, 7.15 feet on November 29, 1994, and 3.06 feet below grade on December 18, 1995. The depth to the water table in MW-2 was 3.18 feet below grade on November 28, 1995.

Site Assessment Quality Assurance

The sampling and laboratory analysis conducted during the site assessment were performed in accordance with Section 7:26E-2.1 of the *Technical Requirements*.

Conclusions and Recommendations

Based on the post-excavation soil sampling results, soils with TPHC concentrations exceeding the NJDEP soil cleanup criteria for total organic contaminants of 10,000 mg/kg, do exist in the former location of the UST or associated piping.

The groundwater sample collected on November 8, 1994, contained a lead concentration which exceeded the New Jersey GWQC of 10 ug/l. However, lead was detected below the GWQC during the second round of groundwater sampling on November 29, 1994. Based on the analytical results of the groundwater samples collected on November 29, 1994, November 28, 1995, and December 18, 1995, groundwater quality at the Building 290 UST closure site complies with the New Jersey GWQC.

_____ is proposed in regard to the closure and site assessment of UST No. 081533-64 at Building 290.

1.0 UNDERGROUND STORAGE TANK DECOMMISSIONING ACTIVITIES

1.1 OVERVIEW

One underground storage tank (UST), New Jersey Department of Environmental Protection (NJDEP) Registration No. 081533-64, was closed at Building 290 at U.S. Army Fort Monmouth, Fort Monmouth, New Jersey on September 12, 1994. Refer to site location map on Figure 1. This report presents the results of the DPW's implementation of the UST Decommissioning/Closure Plan submitted to the NJDEP on June 28, 1993. The plan was approved on August 26, 1993 and assigned TMS No. C-93-3179. The UST was a fiberglass 2,000-gallon tank containing No. 2 diesel oil.

Decommissioning activities for UST No. 081533-64 complied with all applicable Federal, State and Local laws and ordinances in effect at the date of decommissioning. These laws included but were not limited to: N.J.A.C. 7:14B-1 et seq., N.J.A.C. 5:23-1 et seq., and Occupational Safety and Health Administration (OSHA) 1910.146 & 1910.120. All permits including but not limited to the NJDEP-approved Decommissioning/Closure Plan were posted onsite for inspection. CUTE Inc., the contractor that conducted the decommissioning activities, is registered and certified by the NJDEP for performing UST closure activities. Closure of UST No. 081533-64 proceeded under the approval of the NJDEP Bureau of Underground Storage Tanks (NJDEP-BUST). The NJDEP-BUST closure approval and signed certifications for UST No. 081533-64 are included in Appendices A and B, respectively.

Based on field screening of subsurface soils, the DPW has concluded that an historical discharge was associated with the UST and associated piping. On September 13, 1994, a spill was reported to the NJDEP "Hotline" for UST No. 081533-64 and was assigned Spill Case No. 94-9-13-1503-57.

This UST Closure and Site Investigation Report has been prepared by Smith Technology Corporation, to assist the United States Army Directorate of Public Works (DPW) in complying with the NJDEP Bureau of Underground Storage Tanks (NJDEP-BUST) regulations. The applicable NJDEP-BUST regulations at the date of closure were the *Interim Closure Requirements for Underground Storage Tank Systems* (N.J.A.C. 7:14B-1 et seq. September 1990 and revisions dated November 1, 1991).

This report was prepared using information required at the time of closure. Section 1 of this UST Closure and Site Investigation Report provides a summary of the UST decommissioning activities. Section 2 of this report describes the site investigation activities. Conclusions and recommendations, including the results of the soil sampling investigation, are presented in the final section of this report.

1.2 SITE DESCRIPTION

Building 290 is located in the central portion of the Main Post area of Fort Monmouth, as shown on Figure 1. UST No. 081533-64 was located southwest of Building 290 and appurtenant piping ran approximately 15 feet northeast from the excavation to Building 290. The fill port area was located directly above the tank. A site map is provided on Figure 2.

1.2.1 Geological/Hydrogeological Setting

The following is a description of the geological/hydrogeological setting of the area surrounding Building 290. Included is a description of the regional geology of the area surrounding Fort Monmouth as well as descriptions of the local geology and hydrogeology of the Main Post area.

Regional Geology

Monmouth County lies within the New Jersey Section of the Atlantic Coastal Plain physiographic province. The Main Post, Charles Wood, and the Evans areas are located in what may be referred to as the Outer Coastal Plain subprovince, or the Outer Lowlands.

In general, New Jersey Coastal Plain formations consist of a seaward-dipping wedge of unconsolidated deposits of clay, silt, and gravel. These formations typically strike northeast-southwest with a dip ranging from 10 to 60 feet per mile and were deposited on Precambrian and lower Paleozoic rocks (Zapecza, 1989). These sediments, predominantly derived from deltaic, shallow marine, and continental shelf environments, date from Cretaceous through the Quaternary Periods. The mineralogy ranges from quartz to glauconite.

The formations record several major transgressive/regressive cycles and contain units which are generally thicker to the southeast and reflect a deeper water environment. Over 20 regional geologic units are present within the sediments of the Coastal Plain. Regressive, upward coarsening deposits are usually aquifers (e.g., Englishtown and Kirkwood Formations, and the Cohansey Sand) while the transgressive deposits act as confining units (e.g., the Merchantville, Marshalltown, and Navesink Formations). The individual thicknesses for these units vary greatly (i.e., from several feet to several hundred feet). The Coastal Plain deposits thicken to the southeast from the Fall Line to greater than 6,500 feet in Cape May County (Brown and Zapecza, 1990).

Local Geology

Based on the regional geologic map (Jablonski, 1968), the Cretaceous age Red Bank and Tinton Sands outcrop at the Main Post area. The Red Bank sand conformably overlies the Navesink Formation and dips to the southeast at 35 feet per mile. The upper member (Shrewsbury) of the Red Bank sand is a yellowish-gray to reddish brown clayey, medium-to-

coarse-grained sand that contains abundant rock fragments, minor mica and glauconite (Jablonski). The lower member (Sandy Hook) is a dark gray to black, medium-to-fine grained sand with abundant clay, mica, and glauconite.

The Tinton sand conformably overlies the Red Bank Sand and ranges from a clayey medium to very coarse grained feldspathic quartz and glauconite sand to a glauconitic coarse sand. The color varies from dark yellowish orange or light brown to moderate brown and from light olive to grayish olive. Glauconite may constitute 60 to 80 percent of the sand fraction in the upper part of the unit (Minard, 1969). The upper part of the Tinton is often highly oxidized and iron oxide encrusted (Minard).

Hydrogeology

The water table aquifer in the Main Post area is identified as part of the "composite confining units," or minor aquifers. The minor aquifers include the Navesink formation, Red Bank Sand, Tinton Sand, Hornerstown Sand, Vincentown Formation, Manasquan Formation, Shark River Formation, Piney Point Formation, and the basal clay of the Kirkwood Formation.

Based on records of wells drilled in the Main Post area, water is typically encountered at depths of 2 to 9 feet below ground surface (bgs). According to Jablonski, wells drilled in the Red Bank and Tinton Sands may produce 2 to 25 gallons per minute (gpm). Some well owners have reported acidic water that requires treatment to remove iron.

Due to the proximity of the Atlantic Ocean to Fort Monmouth, shallow groundwater may be tidally influenced and may flow toward creeks and brooks as the tide goes out, and away from creeks and brooks as the tide comes in. However, an abundance of clay lenses and sand deposits were noted in borings installed throughout Fort Monmouth. Therefore the direction of shallow groundwater should be determined on a case by case basis.

1.3 HEALTH AND SAFETY

Before, during, and after all decommissioning activities, hazards at the work site which may have posed a threat to the Health and Safety of all personnel who were involve with, or were affected by, the decommissioning of the UST system were minimized. All areas which posed, or may have been suspected to pose a vapor hazard were monitored by a qualified individual utilizing an organic vapor analyzer (OVA). The individual ascertained if the area was properly vented to render the area safe, as defined by OSHA.

1.4 REMOVAL OF UNDERGROUND STORAGE TANK

1.4.1 General Procedures

- All underground obstructions (utilities, etc.) were marked out by the contractor performing the closure prior to excavation activities.

- All activities were carried out with the greatest regard to safety and health and the safeguarding of the environment.

- All excavated soils were visually examined and screened with an OVA for evidence of contamination. Potentially contaminated soils were identified and logged during closure activities.

- Surface materials (i.e., asphalt, concrete, etc.) were excavated and staged separately from all soil and recycled in accordance with all applicable regulations and laws.

- A Sub-Surface Evaluator from the DPW was present during all site assessment activities.

1.4.2 Underground Storage Tank Excavation and Cleaning

Prior to UST decommissioning activities, surficial soil was removed to expose the UST and associated piping. All free product present in the piping was drained into the UST, and the UST was purged to remove vapors prior to cutting and removal of the piping. After removal of the associated piping, a manway was made in the UST to allow for proper cleaning. The UST was completely emptied of all liquids prior to removal from the ground. Approximately 20 gallons of liquid were transported by Freehold Cartage Inc. to Lionetti Oil Recovery Co. Inc., a NJDEP-approved petroleum recycling and disposal company located in Old Bridge, New Jersey. Refer to Appendix C for the waste manifest (NJA-1907275).

The UST was cleaned prior to removal from the excavation in accordance with the NJDEP-BUST regulations. After the UST was removed from the excavation, it was staged on polyethylene sheeting and examined for holes. No holes or punctures were observed during the inspection by the Sub-Surface Evaluator. Soils surrounding the UST were screened visually and with an OVA for evidence of contamination. Evidence of contamination was observed surrounding the UST.

Soil screening was also performed along the piping associated with the UST. No contamination was noted anywhere along the piping length.

1.5 UNDERGROUND STORAGE TANK TRANSPORTATION AND DISPOSAL

The tank was transported by CUTE Inc. to Monmouth County Reclamation Center for disposal in compliance with all applicable regulations and laws. The UST Disposal Certificate was not available.

The removal contractor labeled the UST prior to transport with the following information:

- site of origin
- contact person
- NJDEP UST Facility ID number
- name of transporter/contact person
- destination site/contact person

1.6 MANAGEMENT OF EXCAVATED SOILS

Based on visual observations, approximately 40 cubic yards of potentially contaminated soil was removed from the excavation on September 12, 1994. On September 13, 1994, approximately 10 additional cubic yards of potentially contaminated soil was removed. All potentially contaminated soils were stockpiled separately from other excavated material and were placed on and covered with polyethylene sheets. Potentially contaminated soils were transported to 490 storage area on Main Post prior to ultimate disposal at Soil Remediation of Philadelphia. Soils that did not exhibit signs of contamination were used as backfill following removal of the UST.

2.0 SITE INVESTIGATION ACTIVITIES

2.1 OVERVIEW

The Site Investigation was managed and carried out by U.S. Army DPW personnel. All TPHC analyses were performed and reported by U.S. Army Fort Monmouth Environmental Laboratory. The VOC, SVOC, and metal analyses were performed and reported by Princeton Laboratory and EMSL Laboratory. All three laboratories are NJDEP-certified testing laboratories. All sampling was performed under the direct supervision of a NJDEP Certified Sub-Surface Evaluator according to the methods described in the NJDEP *Field Sampling Procedures Manual* (1992). Sampling frequency and parameters analyzed complied with he NJDEP-BUST document *Interim Closure Requirements for Underground Storage Tank Systems* (September 1990 and revisions dated November 1, 1991) which was the applicable regulation at the date of the closure. All records of the Site Investigation activities are maintained by the Fort Monmouth DPW Environmental Office.

The following Parties participated in Closure and Site Investigation Activities.

- Closure Contractor: Cleaning Up The Environment Inc. (CUTE Inc.)
  Closure Supervisor: George Bernotsky
  Phone Number: (201)427-2881
  NJDEP Company Certification No.:

- Subsurface Evaluator: Dinkerrai M. Desai
  Employer: U.S. Army, Fort Monmouth
  Phone Number: (908)532-1475
  NJDEP Certification No.: E0002266

- Analytical Laboratory: U.S. Army Fort Monmouth Environmental Laboratory
  Contact Person: Brian K. McKee
  Phone Number: (908)532-4359
  NJDEP Company Certification No.: 13461

- Analytical Laboratory: Princeton Laboratory
  Contact Person: Allan Volk
  Phone Number: (609)452-9050
  NJDEP Company Certification No.: 11118

- Analytical Laboratory: EMSL Analytical, INC.
  Contact Person: Paul Laria
  Phone Number: (908)981-0550
  NJDEP Company Certification No.: 04653

- Hazardous Waste Hauler: Freehold Cartage Inc.
  Contact Person: Barry Olsen
  Phone Number: (908)721-0900
  NJDEP Hazardous Waste Hauler No.: 2265

2.2 FIELD SCREENING/MONITORING

Field screening was performed by a NJDEP Certified Sub-Surface Evaluator using an OVA and visual observations to identify potentially contaminated material. Soil excavated from around the tank and appurtenant piping, as well as the UST excavation sidewalls and bottom, did exhibit evidence of potential contamination. On September 12, 1994, approximately 40 cubic yards of potentially contaminated soil was removed from the excavation due to visual contamination. On September 13, 1994, approximately 10 cubic yards of potentially contaminated soil was removed from the excavation and was stockpiled for disposal.

2.3 SOIL SAMPLING

On September 13, 1994, post-excavation soil samples samples A, B, C, D, E, F, and DUP A were collected from a total of a total of six (6) locations along the sidewalls of the excavation, at a depth of 5.5 feet below ground surface (bgs). Sample H was collected from along the former piping length of the excavation, which was approximately 15 feet in length. The piping samples were collected at a depth of 5.5 feet bgs. All samples were analyzed for total petroleum hydrocarbons (TPHC).

On September 21, 1994, due to elevated TPHC levels, a sample was collected from the north sidewall of the excavation in the vicinity of sample A, and was analyzed for volatile organic compounds plus 15 tentatively identified compounds (VOCs). The sample was collected at a depth of 5.5 feet bgs.

The site assessment was performed by U.S. Army personnel in accordance with the NJDEP *Technical Requirements* and the NJDEP *Field Sampling Procedures Manual.* A summary of sampling activities including parameters analyzed is provided in Table 1. The post-excavation soil samples were collected using polystyrene scoops. Actual soil TPHC values may be higher than reported, due to sample utensil absorbency. If absorbency resulted in reducing the actual soil TPHC concentration by 50 %, the highest soil contaminant would have been 32,400.0 mg/kg, which exceeds the applicable NJDEP soil cleanup standard for total organic contaminants of 10,000 mg/kg. Following soil sampling activities, the samples were chilled and delivered to U.S. Army Fort Monmouth Environmental Laboratory located in Fort Monmouth, New Jersey, for analysis.

2.4 GROUNDWATER SAMPLING

2.4.1 Monitoring Well Installation

One shallow overburden monitoring well (MW-1) was installed at the Building 290 area on July 15, 1994. It was installed approximately 30 feet south off the southeastern corner of Building 290 in the assumed downgradient direction of the former excavation. It was screened in the 2- to- 12.5 foot depth interval, across the water table, which is approximately 3 feet below grade surface.

A second monitoring well (MW-2) was installed at the Building 290 area on August 16, 1994. A monitoring well location map is provided on Figure 4. It was installed approximately 8 feet north off the northwestern corner of Building 290 in the assumed downgradient direction of the former excavation. It was screened in the 1.5- to 11.5- foot depth interval, across the water table, which is approximately 4 feet below grade surface.

The two wells were constructed in accordance with the NJDEP's well construction protocols outlined in its May 1992 *Field Sampling Procedures Manual*. The NJDEP well permits and well construction logs are presented in Appendix D.

Monitoring well MW-1 was constructed with 4-inch (ID) PVC riser and 0.020 slotted PVC well screen. A silica sand pack was installed in the annulus between the borehole wall and the screen. The sand pack was extended approximately 1 foot above the top of the screen. The sand pack above the well screen was graded down to a fine sand to minimize grout intrusion.

The borehole was tremie-grouted with bentonite-cement grout from the top of the sand pack to grade. The well was secured with a water-tight, steel protective casing with a stickup that is approximately 3 feet above ground surface. The steel protective casing was set in place with concrete, which was placed in the remaining open borehole. The elevation of the well riser was surveyed to the nearest 0.01 feet by a New Jersey-licensed surveyor. The well permit number was marked on the well casing as required.

Monitoring well MW-2 was constructed with 4-inch (ID) PVC riser and 0.020 slotted PVC well screen. A silica sand pack was installed in the annulus between the borehole wall and the screen. The sand pack was extended approximately 1 foot above the top of the screen. The sand pack above the well screen was graded down to a fine sand to minimize grout intrusion.

The borehole was tremie-grouted with bentonite-cement grout from the top of the sand pack to grade. The well was secured with a water-tight, flush-mounted locking road box. The locking road box was set in place with concrete, which was placed in the remaining open borehole. The elevation of the well riser was surveyed to the nearest 0.01 feet by a New Jersey-licensed surveyor. The well permit number was marked on the well casing as required.

The monitoring wells were developed using a submersible pump. The wells were pumped for 1 hour or until silt free. All residual soils and liquids generated during monitoring well installation and development program were collected in New Jersey Department of Transportation-approved 55-gallon drums. The drums were placed in a designated secure location for waste characterization and offsite disposal.

2.4.2 Monitoring Well Sampling

Monitoring well MW-1 was sampled on November 8, 1994, November 29, 1994, and December 18, 1995, and analyzed for volatile organic compounds with xylenens (VOCs), tertiary butyl alcohol (TBA), methyl teriary butyl ether (MTBE), and total lead.

Monitoring well MW-2 was sampled on November 18, 1995, and analyzed for volatile organic compounds with xylenes (VOCs), tertiary butyl alcohol, methyl tertiary butyl ether (MTBE), and total lead.

All sampling and analyses were performed in accordance with the NJDEP *Field Sampling Procedures Manual*, and the *Technical Requirements for Site Remediation*, N.J.A.C. 7:26E (*Technical Requirements*).

Prior to sampling each well, the water level was measured to the nearest 0.01 feet, and the distance to the bottom of the well was be measured to the nearest 0.1 feet. The well was checked for floating product (light non-aqueous phase liquids). The well was then purged of three to five well volumes of standing water. Sample volume was then collected using a dedicated decontaminated Teflon bottom-fill bailer attached to PTFE (Teflon)-coated stainless steel.

3.0 CONCLUSIONS AND RECOMMENDATIONS

3.1 SOIL SAMPLING RESULTS

To evaluate soil conditions following removal of the UST and associated piping, post-excavation soil samples were collected from a total of seven (7) locations on September 13, 1994. All samples were analyzed for TPHC. The post-excavation sampling results were compared to the NJDEP residential direct contact total organic contaminants soil cleanup criteria of 10,000 mg/kg (N.J.A.C. 7:26D and revisions dated February 3, 1994). One sample was collected on September 21, 1994 from the north sidewall of the excavation in the vicinity of sample A and was analyzed for VOCs. The results were compared to the NJDEP Soil Cleanup Criteria. A summary of the analytical results and comparison to the NJDEP soil cleanup criteria is provided in Table 2 and the soil sampling results are shown on Figure 3. The analytical data package is provided in Appendix E.

Post-excavation soil samples (samples C, D, and H) collected from the UST excavation and from below piping associated with the former UST at Building 290 contained TPHC concentrations below the NJDEP residential direct contact total organic contaminants soil cleanup criteria of 10,000 milligrams per kilogram (mg/kg) (N.J.A.C. 7:26D and revisions dated February 3, 1994). Samples C, D, and H, contained levels of TPHC ranging in concentration from 57.3 mg/kg to 730.0 mg/kg. Samples E, and F contained TPHC concentrations of 3,110.0 mg/kg and 9,670.0 mg/kg, respectively. Samples A, B, and DUP A contained levels of TPHC ranging in concentration from 10,400.0 mg/kg to 16,200.0 mg/kg, which exceeded the NJDEP soil cleanup criteria for 10,000 mg/kg. Post-excavation soil sample Site A, collected on September 21, 1994, contained methylene chloride at 0.46 mg/kg, and 2-butanone at 1.5 mg/kg. No other compounds were detected.

3.2 GROUNDWATER SAMPLING RESULTS

The sample collected from MW-1 on November 8, 1994, contained lead at 17.0 micrograms per liter (ug/l). This exceeded the Ground Water Quality Criteria (GWQC) for lead of 10 ug/l. All other groundwater analytical results were either below the detection limit or in compliance with the New Jersey GWQC.

The sample collected on November 29, 1994, contained lead at 3.0 ug/l, which complies with the GWQC for lead. No other compounds were detected.

The sample collected on December 18, 1995, contained methylene chloride at 1.1 ug/l, and cis-1,2-Dichloroethene at 1.1 ug/l. The sample also contained aluminum at 2,200.0 ug/l, barium at 55.0 ug/l, calcium at 4,100.0 ug/l, copper at 60.0 ug/l, iron at 6,400.0 ug/l, potassium at 5,000.0 ug/l, magnesium at 4,500.0 ug/l, manganese at 23.0 ug/l, sodium at 9,200.0 ug/l, and zinc

at 180.0 ug/l. This exceeds the GWQC for alumium of 200.0 ug/l, and iron of 300.0 ug/l. The trip blank and the field blank contained methylene chloride at 1.4 ug/l. No other compounds were detected.

The sample collected from MW-2 on November 28, 1995 contained methylene chloride at 2.3 ug/l, cis-1,2-Dichloroethene at 1.3 ug/l, and chloroform at 0.50 ug/l. The sample also contained silver at 440.0 ug/l, aluminum at 360.0 ug/l, barium at 74.0 ug/l, calcium at 5,300.0 ug/l, iron at 1,100.0 ug/l, magnesium at 4,700.0 ug/l, manganese at 30.0 ug/l, sodium at 11,000.0 ug/l, lead at 1.5 ug/l, and zinc at 100.0 ug/l. This exceeds the GWQC for aluminum of 200.0 ug/l, and iron of 300.0 ug/l. The trip blank and the field blank contained methylene chloride at 0.70 ug/l, and 0.60 ug/l, respectively. The field blank also contained manganese at 32.0 ug/l, lead at 2.8 ug/l, and zinc at 27.0 ug/l. No other compounds were detected.

No product or sheen was observed in MW-1 or MW-2 on any of the sampling dates. The depth to the water table in MW-1 on November 8, 1994 was 8.14 feet below grade, 7.15 feet on November 29, 1994, and 3.06 feet below grade on December 18, 1995. The depth to the water table in MW-2 was 3.18 feet below grade on November 28, 1995.

3.3 CONCLUSIONS AND RECOMMENDATIONS

The analytical results for all post-excavation soil samples collected from the UST closure excavation at Building 290 were below the NJDEP soil cleanup criteria for total organic contaminants.

Based on the post-excavation sampling results, soils with TPHC concentrations exceeding the NJDEP soil cleanup criteria for total organic contaminants of 10,000 mg/kg, do exist in the former location of the UST or associated piping.

The groundwater sample collected on November 8, 1994, contained a lead concentration which exceeded the New Jersey GWQC of 10 ug/l. However, lead was detected at a concentration below the GWQC during a second round of groundwater sampling on November 29, 1994. Based oon the analytical results of the groundwater samples collected on November 29, 1994, November 28, 1995, and December 18, 1995, groundwater quality at the Building 290 UST closure site complies with the New Jersey GWQC.

_____ is proposed in regard to the closure and site assessment of UST No. 081533-64 at Building 290.

TABLE 1

SUMMARY OF SAMPLING ACTIVITIES
BUILDING 290, MAIN POST
FORT MONMOUTH, NEW JERSEY

Sample ID	Date of Collection	Matrix	Sample Type	Analytical Parameters (and USEPA Methods) *	Sampling Method
A	9/13/94	Soil	Post-Excavation	TPHC	Polystyrene Scoop
B	9/13/94	Soil	Post-Excavation	TPHC	Polystyrene Scoop
C	9/13/94	Soil	Post-Excavation	TPHC	Polystyrene Scoop
D	9/13/94	Soil	Post-Excavation	TPHC	Polystyrene Scoop
E	9/13/94	Soil	Post-Excavation	TPHC	Polystyrene Scoop
F	9/13/94	Soil	Post-Excavation	TPHC	Polystyrene Scoop
Dup A	9/13/94	Soil	Post-Excavation	TPHC	Polystyrene Scoop
H	9/13/94	Soil	Post-Excavation	TPHC	Polystyrene Scoop
Site A	9/21/94	Soil	Post-Excavation	VOCs	Polystyrene Scoop
290-B-1	3/26/98	Soil	Boring	TPHC	Split Spoon
290-B-2	3/26/98	Soil	Boring	TPHC	Split Spoon
290-B-3	3/26/98	Soil	Boring	TPHC	Split Spoon
290-B-4	3/26/98	Soil	Boring	TPHC	Split Spoon
290-B-5	3/27/98	Soil	Boring	TPHC	Split Spoon
MW-1	11/08/94	Aqueous	Groundwater	Lead, VOCs	Teflon Bottom Bailer
MW-1	11/29/94	Aqueous	Groundwater	Lead, VOCs	Teflon Bottom Bailer
MW-1	12/18/95	Aqueous	Groundwater	VOCs, SVOCs, Metals	Teflon Bottom Bailer
MW-2	11/28/95	Aqueous	Groundwater	VOCs, SVOCs, Metals, Pesticides/PCBs	Teflon Bottom Bailer
MW-1	6/13/97	Aqueous	Groundwater	VOCs, SVOCs, Metals, Pesticides/PCBs	Teflon Bottom Bailer

* Note:
TPHC Total Petroleum Hydrocarbons (Method 418.1 / soil and aqueous)
VOCs Volatilte Organic Compounds calibrated for xylenes plus 15 tentatively identified compounds (Method 524.2 / aqueous)

SVOCs Semivolatile Organic Compounds plus 15 tentatively identified compounds (Method 625 / aqueous)
Metals (Method SW-846 / aqueous)
Pesticides/PCBs (Method 608 / aqueous)

Smith Technology Corporation (Project No. 09-5004-08)

TABLE 2

POST-EXCAVATION SOIL SAMPLING RESULTS
BUILDING 290
FT. MONMOUTH, NEW JERSEY

Sample ID/Depth	Sample Laboratory ID	Sample Date	Analysis Date	Compound Name	Sample Quantitation Limit (mg/kg)	Compound of Concern	Result (mg/kg)	NJDEP Soil Cleanup Criteria * (mg/kg)	Exceeds Cleanup Criteria
A/5.5-6.0′	1641.1	9/13/94	9/14/94	Total Solid	--	--	86 %	--	--
				TPHC	130.0	yes	16,200.0	10,000	--
B/5.5-6.0′	1641.2	9/13/94	9/14/94	Total Solid	--	--	88 %	--	--
				TPHC	130.0	yes	11,900.0	10,000	yes
C/5.5-6.0′	1641.3	9/13/94	9/14/94	Total Solid	--	--	83 %	--	--
				TPHC	6.6	yes	730.0	10,000	--
D/5.5-6.0′	1641.4	9/13/94	9/14/94	Total Solid	--	--	82 %	--	--
				TPHC	6.6	yes	126.0	10,000	--
E/5.5-6.0′	1641.5	9/13/94	9/14/94	Total Solid	--	--	84 %	--	--
				TPHC	46.0	yes	3,110.0	10,000	--
F/5.5-6.0′	1641.6	9/13/94	9/14/94	Total Solid	--	--	85 %	--	--
				TPHC	46.0	yes	9,670.0	10,000	--
Dup A/5.5-6.0′	1641.7	9/13/94	9/14/94	Total Solid	--	--	85 %	--	--
				TPHC	46.0	yes	10,400	10,000	yes
H/5.5-6.0′	1641.8	9/13/94	9/14/94	Total Solid	--	--	83 %	--	--
				TPHC	9.9	yes	57.3	10,000	--
290-B-1	3437.02	3/26/98	3/27/98	Total Solid	--	--	92.81 %	--	--
				TPHC	169.0	yes	317.67	10,000	--
290-B-2	3437.03	3/26/98	3/27/98	Total Solid	--	--	84.28 %	--	--
				TPHC	185.0	yes	ND	10,000	--

290-B-3	3437.04	3/26/98	3/27/98	Total Solid	--	--	78.81 %	--	--
				TPHC	196.0	yes	224.45	10,000	--
290-B-4	3437.06	3/26/98	3/27/98	Total Solid	--	--	74.89 %	--	--
				TPHC	196.0	yes	ND	10,000	--
290-B-5	3442.02	3/27/98	3/30/98	Total Solid	--	--	82.86 %	--	--
				TPHC	184.0	yes	ND	10,000	--

Notes:
* Cleanup criteria for total organics
-- Not applicable / does not exceed criteria
ND Not detected above method detection limit
TPHC Total Petroleum Hydrocarbons

TABLE 2

POST-EXCAVATION SOIL SAMPLING RESULTS
BUILDING 290
FT. MONMOUTH, NEW JERSEY
VOLATILE ORGANIC COMPOUNDS

Sample ID/Depth	Sample Date	Analysis Date	Compound Name	Sample Quantitation Limit (mg/kg)	Compound of Concern	Result (mg/kg)	NJDEP Soil Cleanup Criteria * (mg/kg)	Exceeds Cleanup Criteria
Site A/5.5-6.0′	9/21/94	9/23/94	Chloromethane	1.2	--	ND	520/10	--
			Bromomethane	1.2	--	ND	79/1	--
			Vinyl chloride	1.2	--	ND	2/10	--
			Chloroethane	1.2	--	ND	--	--
			Methylene chloride	0.46	--	0.46 J	49/1	--
			Acetone	0.62	--	ND	1,000/100	--
			Carbon Disulfide	0.62	--	ND	--	--
			1,1-Dichloroethene	0.62	--	ND	8/10	
			1,1-Dichloroethane	0.62	--	ND	570/10	--
			1,2-Dichloroethene (total)	0.62	--	ND	79/1	--
			Chloroform	0.62	--	ND	19/1	--
			1,2-Dichloroethane	0.62	--	ND	6/1	--
			2-Butanone	1.5	--	1.5	1,000/50	--
			1,1,1-Trichloroethane	0.62	--	ND	210/50	--
			Carbon Tetrachloride	0.62	--	ND	2/1	--
			Bromodichloromethane	0.62	--	ND	11/1	--
			1,1,2,2-Tetrachloroethane	0.62	--	ND	34/1	--
			1,2-Dichloropropane	0.62	--	ND	10/--	--
			trans-1,3-Dichloropropene	0.62	--	ND	4/1	--
			Trichloroethene	0.62	--	ND	23/1	--
			Dibromochloromethane	0.62	--	ND	110/1	--
			1,1,2-Trichloroethane	0.62	--	ND	22/1	--
			Benzene	0.62	--	ND	3/1	--
			cis-1,3-Dichloropropene	0.62	--	ND	4/1	--
			Bromoform	0.62	--	ND	86/1	--
			2-Hexanone	0.62	--	ND	--	--
			4-Methyl-2-Pentanone	0.62	--	ND	1,000/50	--
			Tetrachloroethene	0.62	--	ND	4/1	--
			Toluene	0.62	--	ND	1,000/500	--

Chlorobenzene	0.62	--	ND	37/1	--
Ethylbenzene	0.62	--	ND	1,000/100	--
Styrene	0.62	--	ND	23/100	--
Total Xylenes	0.62	--	ND	410/10	--

TABLE 2

POST-EXCAVATION SOIL SAMPLING RESULTS
BUILDING 290
FT. MONMOUTH, NEW JERSEY
VOLATILE ORGANIC COMPOUNDS

Sample ID/Depth	Sample Date	Analysis Date	Compound Name	Sample Quantitation Limit (mg/kg)	Compound of Concern	Result (mg/kg)	NJDEP Soil Cleanup Criteria * (mg/kg)	Exceeds Cleanup Criteria
Field Blank	9/21/94	9/23/94	Chloromethane	0.01	--	ND	520/10	--
			Bromomethane	0.01	--	ND	79/1	--
			Vinyl chloride	0.01	--	ND	2/10	--
			Chloroethane	0.01	--	ND	--	--
			Methylene chloride	0.005	--	ND	49/1	--
			Acetone	0.005	--	ND	1,000/100	--
			Carbon Disulfide	0.005	--	ND	--	--
			1,1-Dichloroethene	0.005	--	ND	8/10	
			1,1-Dichloroethane	0.005	--	ND	570/10	--
			1,2-Dichloroethene (total)	0.005	--	ND	79/1	--
			Chloroform	0.005	--	ND	19/1	--
			1,2-Dichloroethane	0.005	--	ND	6/1	--
			2-Butanone	0.005	--	ND	1,000/50	--
			1,1,1-Trichloroethane	0.005	--	ND	210/50	--
			Carbon Tetrachloride	0.005	--	ND	2/1	--
			Bromodichloromethane	0.005	--	ND	11/1	--
			1,1,2,2-Tetrachloroethane	0.005	--	ND	34/1	--
			1,2-Dichloropropane	0.005	--	ND	10/--	--
			trans-1,3-Dichloropropene	0.005	--	ND	4/1	--
			Trichloroethene	0.005	--	ND	23/1	--
			Dibromochloromethane	0.005	--	ND	110/1	--
			1,1,2-Trichloroethane	0.005	--	ND	22/1	--
			Benzene	0.005	--	ND	3/1	--
			cis-1,3-Dichloropropene	0.005	--	ND	4/1	--
			Bromoform	0.005	--	ND	86/1	--
			2-Hexanone	0.005	--	ND	--	--
			4-Methyl-2-Pentanone	0.005	--	ND	1,000/50	--
			Tetrachloroethene	0.005	--	ND	4/1	--
			Toluene	0.005	--	ND	1,000/500	--

Chlorobenzene	0.005	--	ND	37/1	--
Ethylbenzene	0.005	--	ND	1,000/100	--
Styrene	0.005	--	ND	23/100	--
Total Xylenes	0.005	--	ND	410/10	--

Notes:
* Residential Direct Contact / Impact to Groundwater
-- Not applicable / does not exceed criteria
(ND) Indicates compound is not detected

Smith Technology Corporation (Project No. 09-5004-08)

APPENDIX F

SOIL ANALYTICAL DATA PACKAGE

Report of Analysis
U.S. Army, Fort Monmouth Environmental Laboratory
NJDEPE Certification # 13461

Client: U.S. Army
DPW, SELFM-PW-EV
Bldg. 167
Ft. Monmouth, NJ 07703

Lab. ID #: 1641.1-.8
Sample Rec'd: 09/13/94
Analysis Start: 09/14/94
Analysis Comp: 09/14/94

Analysis: 418.1 (TPH)
Matrix: Soil
Analyst: S. Hubbard
Ext. Meth: Sonc.

NJDEPE UST Reg.#: **0081533-64**
Closure #: **C93-3179**
DICAR #: **9-4-9-13-1503-57**
Location #: **Bldg. 290**

Lab ID.	Description	%Solid	Result (mg/Kg)	MDL
1641.1	Site A, Sidewall N. OVA= 30.	86	16200.	130
1641.2	Site B, Sidewall NE. OVA= 20.	88	11900.	130
1641.3	Site C, Sidewall SE. OVA= 10.	83	730.	6.6
1641.4	Site D, Sidewall SO. OVA= 3.	82	126.	6.6
1641.5	Site E, Sidewall SW. OVA= 14.	84	3110.	46.
1641.6	Site F, Sidewall SE. OVA= 16.	85	9670.	46.
1641.7	Site G, Dup OVA= 30.	85	10400.	46.
1641.8	Site H, Pipe OVA= ND	83	57.3	9.9
M. Bl.	Method Blank	100	ND	3.3

Notes: ND = Not Detected, MDL = Method Detection Limit
* = Silica Gel Added, NA = Not Applicable
1641.3dup= 98% 1641.3s= 61% 1641.3sd= 63% RPD= 3.2%
Cal Chk = 102%

Brian K. McKee
Laboratory Director

Report of Analysis
U.S. Army, Fort Monmouth Environmental Laboratory
NJDEPE Certification # 13461

Client: U.S. Army
DPW, SELFM-PW-EV
Bldg. 167
Ft. Monmouth, NJ 07703

Lab. ID #: 1641.1-.8
Sample Rec'd: 09/13/94
Analysis Start: 09/14/94
Analysis Comp: 09/14/94

Analysis: Munsel

Lab ID#	Soil Color
1641.1	5Y 3/2 Dark Olive Gray
1641.2	5Y 3/2 Dark Olive Gray
1641.3	5Y 3/2 Dark Olive Gray
1641.4	5Y 3/2 Dark Olive Gray
1641.5	5Y 2.5/1 Black
1641.6	5Y 2.5/1 Black
1641.7	5Y 2.5/1 Black
1641.8	5Y 4/3 Olive

Brian K. McKee
Laboratory Director

U.S. ARMY FORT MONMOUTH

P.O. #: P4B7 TPHC

Chain of Custody

Project #: C93-3179	Sampler: George / Cube	Date / Time: Sept 13 / 9-50	Analysis Parameters	Start:
Customer: Dinkar Dalai DPW-ENVIRO	Site Name: BLDG 290 08 1533-64 C93-3179 Diesel 9-4-9-13 1503-57		TPH, % Solids, Modified, H-new	Finish:
Phone: X 21457				Preservation Method

Lab Sample ID Number	Date	Time	Customer Sample Location/ID Number	Sample Matrix	# of Bottles	TPH	% Solids	Modified				H-new	Remarks
1641.1	9/13	10-14	Site A (NE) Sidwall	Soil	1	X	X	X				30	Instrument Programmed <4°C
.2	"	10-09	Site B NE	"	"	X	X	X				20	
.3	"	10-18	Site C (SE)	"	"	X	X	X				10	Used - 4H-new already
.4	"	10-21	Site D (SO)	"	"	X	X	X				3	
.5	"	10-25	Site E (SW)	"	"	X	X	X				14	
.6	"	10-26	Site F (SE)	"	"	X	X	X				16	OVM was not working
.7	"	10-12	Site G (Dup)	"	"	X	X	X				30	
.8	"	10-05	Site H (Pile)	"	"	X	X	X				ND	
													SN# 270136

Relinquished By (signature)	Date / Time	Received By (signature)	Shipped By: Hand	
Relinquished By (signature) [signature]	Date / Time 9/13 14-30	Received for Lab by (signature): Sarah J Hubbard	Date / Time 9/13/94 1430	

Note: A drawing depicting sample location should be attached or drawn on the reverse side of this chain of custody. Site map attached

SAI-ENV COC form 01 Page 1 of 2 Pages Rev. A Date: 02 Apr 93.

Enviornmental Laboratory

Certification Number 13461

DIRECTORATE OF ENGINEERING AND HOUSING
FORT MONMOUTH, NEW JERSEY 07703-5108

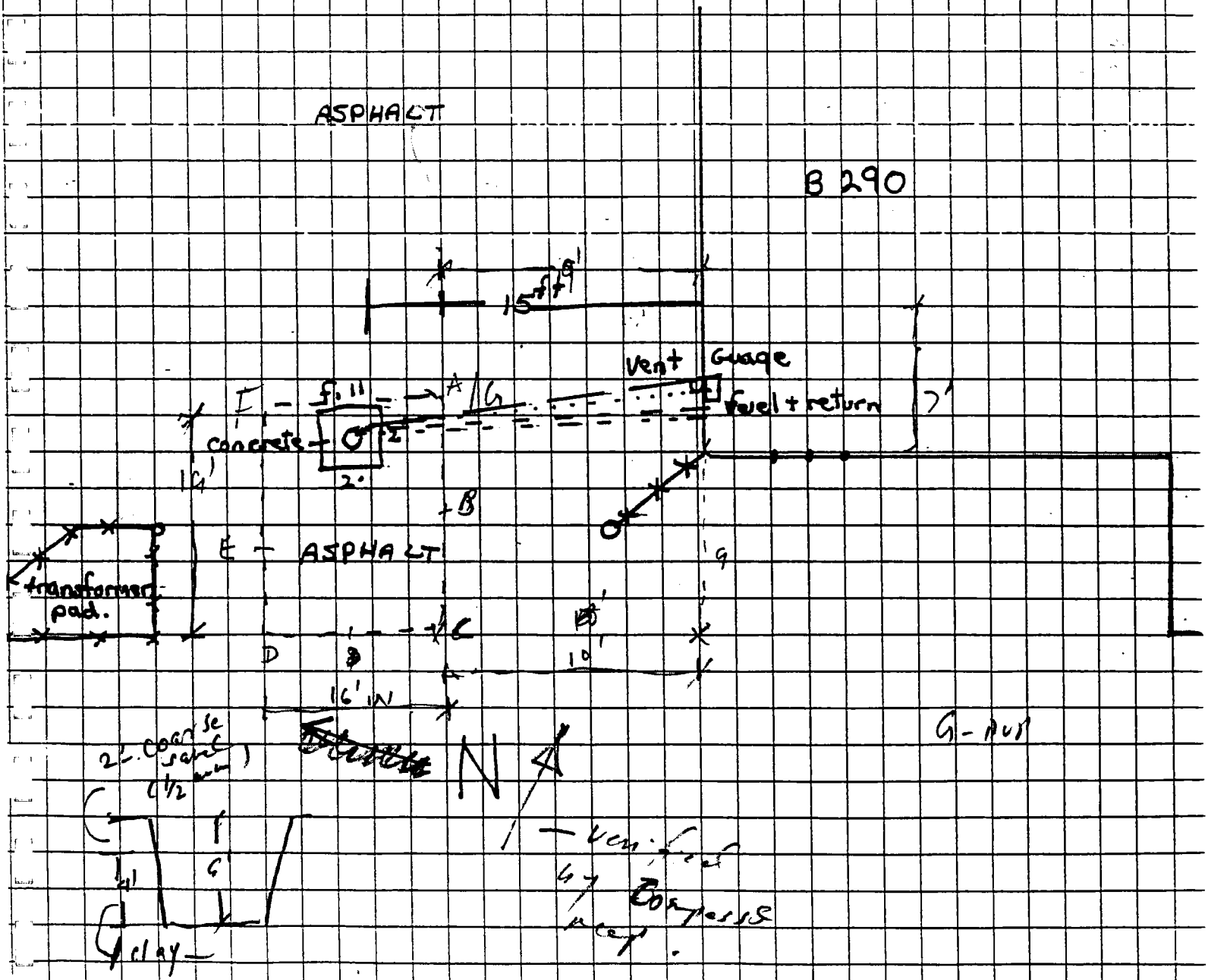
DATE: 11/23

Building Number: 290 Tank Number: 81533 10-64

Tank Size: 2000 gal Contents: #2 Fuel oil

Remarks:

1. All lines 15'
2.
3.



Sept 14, 1994 / Sarah Pickard

1900

Blank 0 MV

40.75 59 MV

81.5 115 MV

163 234 MV

Method Blank 0 MV Building 292

1640.1 5 MV

1640.2 53 MV

1640.3 5 MV

1640.4 8 MV

1640.5 15 MV

1640.6 17 MV

1640.7 4 MV

1640.8 8 MV

1640.9 7 MV

40.75 Std 60 MV

Method Blank Building 290

1641.1 153 dil 13

1641.2 155 dil 13

1641.3 130 MV

1641.3 127 MV Dup

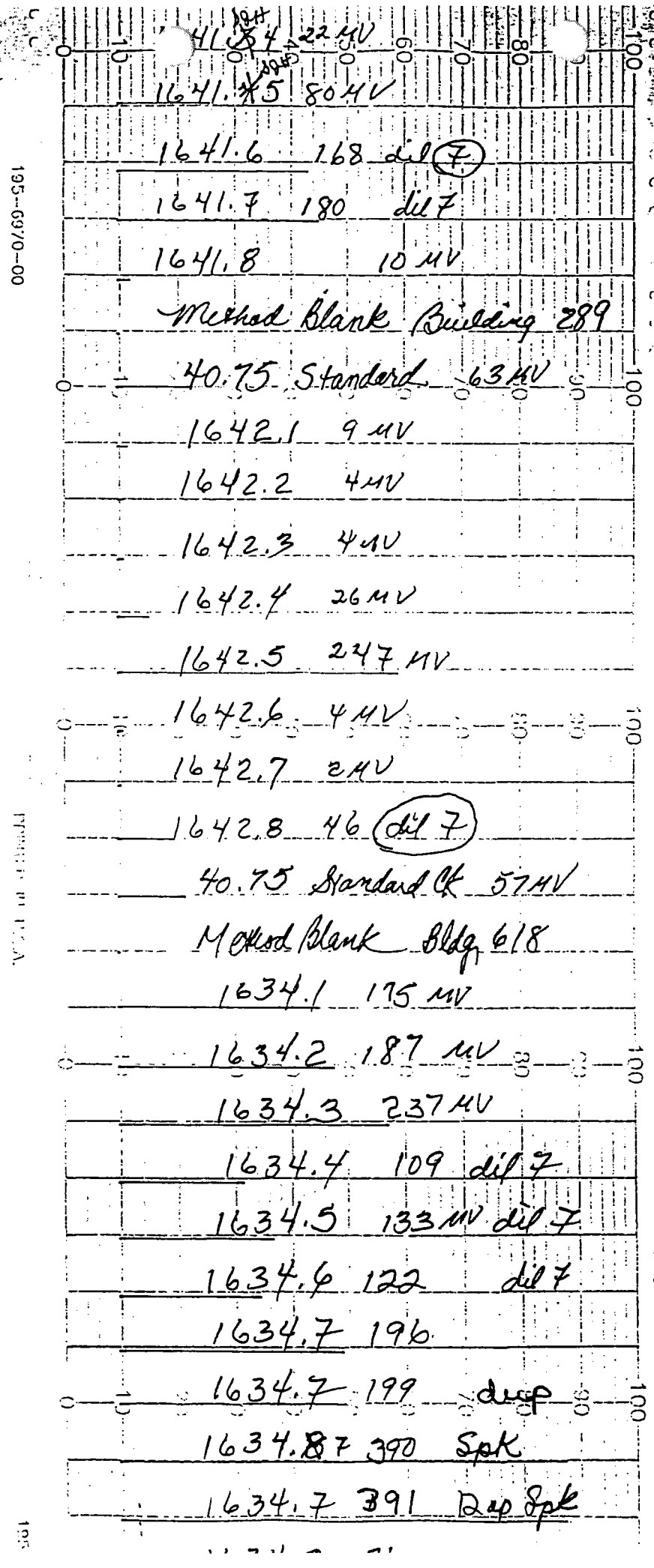
1641.3 191 MV Spk

1641.3 193 MV Dup Spk

1641.4 22 MV

1641.5 80 MV

195-6870-00


1641.54 22 MV
1641.55 80 MV
1641.6 168 dil 7
1641.7 180 dil 7
1641.8 10 MV
Method Blank Building 289
40.75 Standard 63 MV
1642.1 9 MV
1642.2 4 MV
1642.3 4 MV
1642.4 26 MV
1642.5 247 MV
1642.6 4 MV
1642.7 2 MV
1642.8 46 dil 7
40.75 Standard QC 57 MV
Method Blank Bldg 618
1634.1 175 MV
1634.2 187 MV
1634.3 237 MV
1634.4 109 dil 7
1634.5 133 MV dil 7
1634.6 122 dil 7
1634.7 196
1634.7 199 dup
1634.87 390 Spk
1634.7 391 Dup Spk

1642.8 46 dil 7

40.75 Standard Ck 57 MV

Method Blank Bldg 618

1634.1 175 MV

1634.2 187 MV

1634.3 237 MV

1634.4 109 dil 7

1634.5 133 MV dil 7

1634.6 122 dil 7

1634.7 196

1634.7 199 dup

1634.87 390 Spk

1634.7 391 Dup Spk

1634.8 21

Method Blk Bldg 619

1638.1 9 dil 7

1638.2 22

1638.3 8

1638.4 15

PHC Conformance/Non-conformance Summary Report

	No	Yes
1. Blank Contamination - If yes, list the sample and the corresponding concentrations in each blank	✓	
2. Matrix Spike/Matrix Sp Dup. Recoveries Meet Criteria (If not met, list the sample and corresponding recovery which falls outside the acceptable range)		✓
3. IR Spectra submitted for standards, blanks, & samples		✓
4. Chromatograms submitted for standards, blanks, and samples if GC fingerprinting was conducted.		N/A
5. Extraction holding time met. (If not met, list number of days exceeded for each sample)		✓
6. Analysis holding time met. (If not met,list number of days exceeded for each sample)		✓

Comments: _____

Laboratory Authentication Statement

I certify under penalty of law, where applicable, that this laboratory meets the Laboratory Performance Standards and Quality Control requirements specified in N.J.A.C. 7:18 and 40 CFR Part 136 for Water and Wastewater Analyses and SW 846 for Solid Waste Analysis. I have personally examined the information contained in this report, and to the best of my knowledge, I believe that the submitted information is true, accurate, complete, and meets the above referenced standards where applicable. I am aware that there are significant penalties for purposefully submitting falsified information, including the possibility of a fine and imprisonment.

Project #1641

Brian K. McKee
Laboratory Manager

princeton t[illegible] laboratory inc.

P.O. Box 3108
3490 U.S. Route 1
Princeton, NJ 08543-3108
(609) 452-9050
FAX (609) 452-0347

U.S. ARMY, FORT MONMOUTH
ATTN: SELFM-PW
Building 167
Fort Monmouth, New Jersey 07703-5108

Attn: Charles Appleby

Project # 94-8-11-1345-43
Building 482

JOB # 9404760-001

Laboratory Certification # 11118

Reviewed by: W. Alan Volk 11/4/94
W. Alan Volk

princeton testing laboratory inc.

P.O. Box 3108
3490 U.S. Route 1
Princeton, NJ 08543-3108
(609) 452-9050
FAX (609) 452-0347

TABLE OF CONTENTS

	PAGE #
SDG File Inventory Sheets	0
Sample Analysis Request Forms	1
Chain of Custody Forms	2
Laboratory Chronicle	3
Methodology Summary	4
Conformance/Non-conformance Summary	5
Case Narrative	6
VOLATILE DATA	
QC Summary	7
Sample Data	30
Standards Data	104
Raw QC Data	133
Analysis Run-Log Sheets	174

P404760

LABORATORY DELIVERABLES

THIS FORM MUST BE COMPLETED BY THE LABORATORY OR ENVIRONMENTAL CONSULTANT AND ACCOMPANY ALL DATA SUBMISSIONS

The following laboratory deliverables shall be included in the data submission. All deviations from the accepted methodology and procedures, or performance values outside acceptable ranges shall be summarized in the Non-Conformance Summary. The proposed "Technical Requirements for Site Remediation" rules, which appeared in the May 4, 1992 New Jersey Register, provides further details. The document shall be bound and paginated, contain a table of contents, and all pages shall be legible. Incomplete packages will be returned or held without review until the data package is completed.

It is recommended that the analytical results summary sheets listing all targeted and non-targeted compounds with the method detection limits be included in one section of the data package and in the main body of the report.

		Check if Complete
1.	Cover Page, Title Page listing Lab Certification #, facility name & address, & date of report	✓
2.	Table of Contents	✓
3.	Summary Sheets listing analytical results for all targeted and non-targeted compounds	✓
4.	Summary Table cross-referencing field ID #'s vs. Lab ID #'s	✓
5.	Document bound, paginated and legible	✓
6.	Chain of Custody	✓
7.	Methodology Summary	✓
8.	Laboratory Chronicle and Holding Time Check	✓
9.	Results submitted on a dry weight basis (if applicable)	✓
10.	Method Detection Limits	✓
11.	Lab certified by NJDEPE for parameters or appropriate category of parameters or a member of the USEPA CLP	✓
12.	Non-Conformance Summary	✓

Laboratory Manager or Environmental Consultant's Signature

4/4/94
Date

ORGANICS COMPLETE SDG FILE (CSF) INVENTORY SHEET

LABORATORY NAME Princeton Testing Laboratory
CITY/STATE Princeton, NJ.

CASE NO. 4760 SDG NO. 1544.1 SDG NOS. TO FOLLOW _____
_____ _____ SAS NO. _____

CONTRACT NO. Fort Monmouth
SOW NO. OLM01.8

All documents delivered in the complete SDG file must be original documents where possible. (REFERENCE EXHIBIT B, SECTION II and SECTION III.)

		PAGE NOs FROM	TO	CHECK LAB	EPA
1.	Inventory Sheet (Form DC-2) (Do not number)	___	___	✓	___
2.	SDG Case Narrative	___	___	✓	___
3.	SDG Cover Sheet/Traffic Report	___	___	✓	___
4.	Volatiles Data				
	a. QC Summary				
	System Monitoring Compound Summary (Form II VOA)	___	___	✓	___
	Matrix Spike/Matrix Spike Duplicate Summary (Form III VOA)	___	___	✓	___
	Method Blank Summary (Form IV VOA)	___	___	✓	___
	GC/MS Instrument Performance Check (Form V VOA)	___	___	✓	___
	Internal Standard Area and RT Summary (Form VIII VOA)	___	___	✓	___
	b. Sample Data	___	___		
	TCL Results - (Form I VOA)			✓	___
	Tentatively Identified Compounds (Form I VOA-TIC)			✓	___
	Reconstructed total ion chromatograms (RIC) for each sample			✓	___
	For each sample:				
	Raw spectra and background-subtracted mass spectra of target compounds identified			✓	___
	Quantitation reports			✓	___
	Mass spectra of all reported TICs with three best library matches			✓	___
	c. Standards Data (All Instruments)	___	___		
	Initial Calibration Data (Form VI VOA)			✓	___
	RICs and Quan Reports for all Standards			✓	___
	Continuing Calibration Data (Form VII VOA)			✓	___
	RICs and Quantitation Reports for all Standards			✓	___
	d. Raw QC Data				
	BFB	___	___	✓	___
	Blank Data	___	___	✓	___
	Matrix Spike/Matrix Spike Duplicate Data	___	___	✓	___

ORGANICS COMPLETE SDG FILE (CSF) INVENTORY SHEET (Cont.)

CASE NO. 4760 SDG NO. 1544.1 SDG NOS. TO FOLLOW _____
_____ _____ SAS NO. _____

	PAGE NOs FROM	TO	CHECK LAB	EPA
7. Miscellaneous Data				
Original preparation and analysis forms or copies of preparation and analysis logbook pages	___	___	___	___
Internal sample and sample extract transfer chain-of-custody records	___	___	___	___
Screening records	___	___	___	___
All instrument output, including strip charts from screening activities (describe or list)				
_____	___	___	___	___
_____	___	___	___	___
8. EPA Shipping/Receiving Documents				
Airbills (No. of shipments ___)	___	___	___	___
Chain-of-Custody Records	___	✓	___	___
Sample Tags	___	___	___	___
Sample Log-In Sheet (Lab & DCI)	___	___	___	___
Miscellaneous Shipping/Receiving Records (describe or list)				
_____	___	___	___	___
_____	___	___	___	___
9. Internal Lab Sample Transfer Records and Tracking Sheets (describe or list)				
_____	___	___	___	___
_____	___	___	___	___
10. Other Records (describe or list)				
Telephone Communication Log	___	___	___	___
_____	___	___	___	___
_____	___	___	___	___

11. Comments: _____

Completed by: _____ W. A. Yolk QA/QC Coordinator 11/1/94
(CLP Lab) (Signature) (Printed Name/Title) (Date)

Audited by: _____ _____ _____
(EPA) (Signature) (Printed Name/Title) (Date)

FORM DC-2-4

APPROVED SAMPLE ANALYSIS REQUEST

U.S. Army, Fort Monmouth N.J.
ATTN: SELFM-PW
Building 167
Fort Monmouth, New Jersey 07703-5108
Attention: Charles Appleby
Phone:(908) 532-6224 FAX:(908) 532-2367

Temp. Cust#: L9094
P.O. Number: E03-94U
Standard Tests

Project No.: 9404760-001M
Client Job#: 1644/1645
Date Received: 09/23/94
Analysis Due : 10/12/94

Number Of Samples : 3
Number Of Containers: 3

Approved By: Steven Burns

Reports: Custom Report Format

Sample I.D.'s	Code	Requested Analytical Services	Sampled
001 1645.1 Bldg 290 Site A Sidewall 9/21/94	VMS0B	Volatile Organics Library Search	09/21/94
	VMS0A	Volatile Organics, SW, SW-846 8240	
002 1644.1 Bldg 482 Site C-2 9/21/94 Sidewall SE	VMS0B	Volatile Organics Library Search	09/21/94
	VMS0A	Volatile Organics, SW, SW-846 8240	
003 1644.2 Fld Blk Bldgs 482/290 09/21/94	VMW0B	Volatile Organics Library Search	09/21/94
	VMW0A	Volatile Organics, WW, SW-846 8240	

Project Notes:

*** Results must be sent with ASCII disk. ***

Customer Notes:

Three Copies of Packages. See Data Mgmt for Details

Initials/Date

Received By Lab: _____
Reviewed By: _____
Q.A. Approved: _____

Printed By: Gene Dennison
Date: 11/01/94
Time: 12:31:29

940,166 001 M

U.S. ARMY FORT MONMOUTH

P.O. #: Princeton Lab 94-0551

Chain of Custody

Project #: 9-4-9-13-1503-57	Sampler: George / Cute	Date / Time 9/21/94 0900	Analysis Parameters: VOA +15	Start:
Customer: D. Desai Self - PW - EV	Site Name: Bldg. 290 UST 81533-64 TMS# C-93-3179 dlear 9-4-9-13 -1503-57			Finish:
Phone (908) 532-1475				Preservation Method

Lab Sample ID Number	Date/Time	Customer Sample Location/ID Number	Sample Matrix	# of Bottles	Remarks
1645.1	9/21/94 0945 ~~1005~~	Site A, Sidewall	soil	1	Shipped w/ ice
1644.2	9/21/94 0940	Field Blank	Aqua	1	

Relinquished By (signature)	Date / Time	Received By (signature)	Shipped By:
[signature]	9/21/94 1100	Sarah J. Hubbard	Hand
[signature]	9/23/94 1000	John Kennedy	9/23/94 1000

Note: A drawing depicting sample location should be attached or drawn on the reverse side of this chain of custody. Map Attached

SAI-ENV COC form 01 Page 1 of 2 Pages Rev. A Date: 02 Apr 93

Enviornmental Laboratory

N

Certification Number 13461

princeton testing laboratory inc.

P.O. Box 3108
3490 U.S. Route 1
Princeton, NJ 08543-3108
(609) 452-9050
FAX (609) 452-0347

LABORATORY CHRONICLE
ORGANIC ANALYSIS

Company: US Army, Fort Monmouth NJ Job #: 9404760-00/M

Date Received & Refrigerated: 09/23/94

EXTRACTION INFORMATION	ANALYSIS INFORMATION
Base-Neutral Extractables	Base-Neutral Extractables
___ ___/___/___	___ ___/___/___
___ ___/___/___	___ ___/___/___
___ ___/___/___	___ ___/___/___
Acid Extractables	Acid Extractables
___ ___/___/___	___ ___/___/___
___ ___/___/___	___ ___/___/___
___ ___/___/___	___ ___/___/___
Pesticides/ PCBs	Pesticides/ PCBs
___ ___/___/___	___ ___/___/___
___ ___/___/___	___ ___/___/___
PCBs only	PCBs only
___ ___/___/___	___ ___/___/___
___ ___/___/___	___ ___/___/___
Herbicides	Herbicides
___ ___/___/___	___ ___/___/___
___ ___/___/___	___ ___/___/___
Pesticides (EPTOX)	Pesticides (EPTOX)
___ ___/___/___	___ ___/___/___
Other: _____	Volatiles - 601/602
___ ___/___/___	___ ___/___/___
	___ ___/___/___
	Volatiles - 624/8240
	12 09/23/94
	___ 09/29/94
	___ 10/04/94
	Other: _____
	___ ___/___/___

Dept. Manager Review and Approval: [signature] 10/24/94

QC Supervisor Review and Approval: [signature] 11/4/94

princeton testing laboratory inc.

P.O. Box 3108
3490 U.S. Route 1
Princeton, NJ 08543-3108
(609) 452-9050
FAX (609) 452-0347

METHODOLOGY SUMMARY

Laboratory: Princeton Testing Lab. Case Name: U.S. Army Ft. Monmouth

Location: Princeton, New Jersey Case Number: 9404760-001

VOLATILE ORGANIC ANALYSES:

EPA SW 846 8240

SEMIVOLATILE ORGANIC ANALYSES (ABN EXTRACTABLES):

PESTICIDES/PCBs and CHLORINATED HERBICIDES:

METALS ANALYSES:

TOTAL CYANIDE ANALYSES:

TOTAL PHENOL ANALYSES:

OTHER ANALYSES (SPECIFY):

NOTE: Only methods actually used in the performance of analyses for this data package may be entered on this form:
NJDEPE Form A-3 (9/91)

GCMS ANALYSIS NON CONFORMANCE SUMMARY

	NO	YES
1. GCMS TUNE SPECIFICATION.		
a. BFB Passed	____	✓
b. DFTPP Passed	____	____
2. GCMS TUNING FREQUENCY.		
a. Performed every 12 hours.	____	✓
b. Performed every 24 hours.	____	____
3. GCMS Calibration.		
a. Initial calibration performed w/i 30 days of sample analysis.	____	✓
b. Continuing calibration w/i 12 hours.	____	✓
c. Continuing calibration w/i 24 hours.	____	____
4. GCMS Calibration requirements.		
a. Calibration check compounds.	____	✓
b. System performance check compounds.	____	✓
5. Blank Contamination.		
a. VOA Fraction	10/04/94 Blank had Acetone below limits	
b. B/N Fraction		
c. Acid Fraction		
6. Surrogate Recoveries Within Limits.		
a. VOA Fraction	____	✓
b. B/N Fraction	____	____
c. Acid Fraction	____	____
7. Extraction Holding Time Met.	____	✓
8. Analysis Holding Time Met.		
a. VOA Fraction	____	✓
b. BNA Fraction	____	____

Comments:

Laboratory Manager [signature] Date 10/24/94

princeton testing laboratory inc.

P.O. Box 3108
3490 U.S. Route 1
Princeton, NJ 08543-3108
(609) 452-9050
FAX (609) 452-0347

October 21,1994.

U.S.Army, Fort Monmouth N.J
ATTN:SELFM-PW
Building 167
Fort Monmouth,New Jersey 07703-5108
Attention: Charles Appleby

Job Number: 9404760

CASE NARRATIVE

The following package contains analytical data pertaining to samples received by Princeton Testing Laboratory on 09/23/94. The samples were analyzed for volatile organics using SW-846, 8240 Methodologies.

VOLATILE ORGANICS

BLANKS: No contamination found in the blanks except 10/04 blank had acetone below Mdls.

SAMPLES: Methylene chloride and 2-butanone was found in samples 1645.1 and 1644.1.

SURROGATES: All surrogate recoveries were within QC limits.

MS/MSD: Sample 1639.1 Bldg 697 from the PTL Job# 9404683 was used for matrix spike and duplicate. All recoveries were within the QC limits.

If you have any further questions please do not hesitate to call me.

Khaja Eazazuddin.
GC/MS Supervisor.

S T A N D A R D T E S T L I S T

Test Name: Volatile Organics, SW, SW-846 8240
SPEC CODE: VMS0A

Lab Code: M
Manager : KE
Units : ug/kg

Short Name: VO.SW.8240
List Price:
Report Type:

Description

#	Compound	MDL	CAS#	KEY#	CLIENT KEY#
1	Chloromethane	10	00074873	C010	1454
2	Bromomethane	10	00074839	C015	1462
3	Vinyl chloride	10	00075014		1531
4	Chloroethane	10	00075003		1452
5	Methylene chloride	5	00075092		1172
6	Acetone	5	00067641		1498
7	Carbon disulfide	5	00075150		1646
8	1,1-Dichloroethene	5	00075354		1442
9	1,1-Dichloroethane	5	00075343		1580
10	1,2-Dichloroethene (Total)	5	00540590		1583
11	Chloroform	5	00067663		1078
12	1,2-Dichloroethane	5	00107062		1383
13	2-Butanone	5	00078933		1278
14	1,1,1-Trichloroethane	5	00071556		1068
15	Carbon tetrachloride	5	00056235		1384
16	Bromodichloromethane	5	00075274		1480
	1,1,2,2-Tetrachloroethane	5	00079345		1200
18	1,2-Dichloropropane	5	00078875		1368
19	trans-1,3-Dichloropropene	5	10061026		1364
20	Trichloroethene	5	00079016		1074
21	Dibromochloromethane	5	00124481		1390
22	1,1,2-Trichloroethane	5	00079005		1070
23	Benzene	5	00071432		1466
24	cis-1,3-Dichloropropene	5	10061015		1362
25	Bromoform	5	00075252		1124
26	2-Hexanone	5	00591786		1324
27	4-Methyl-2-Pentanone	5	00108101		1158
28	Tetrachloroethene	5	00127184		1096
29	Toluene	5	00108333		1426
30	Chlorobenzene	5	00108907		1564
31	Ethylbenzene	5	00100414		1394
32	Styrene	5	00100425		1120
33	Total Xylenes	5	01330207		1677
34	.				
35	.				
36	RECOVERY DATA	QC LIMITS			
37	.				
38	1,2-Dichloroethane-D4	70-121%			1577
39	Toluene-d8	84-138%	02037265		1579
40	4-Bromofluorobenzene	59-113%	00460004		1433

2B
VOLATILE SURROGATE SUMMARY

Lab Name:_Princeton Testing Lab. Contract:_US Army, Fort Monmouth.

Lab Code:_PTL_ Case No.:_4760_ SAS No.:_____ SDG No.:_____

Instrument ID: _INCOS-500___

SAMPLE NO.	(1,2-DCE)	(TOL-D8)	(4-BFB)
M.BLANK 9/23/94	111	104	101

(1,2-DCE)= 1,2-DICHLOROETHANE-d4 (76-114)
(TOL-d8)= TOLUENE-d8 (84-110)
(4-BFB) = 4-BROMOFLUOROBENZENE (86-115)

COMMENTS:

2B
VOLATILE SURROGATE SUMMARY

Lab Name:_Princeton Testing Lab. Contract:_US Army, Fort Monmouth.

Lab Code:_PTL_ Case No.:_4760_ SAS No.:_____ SDG No.:____

Instrument ID: _INCOS-500___

SAMPLE NO.	(1,2-DCE)	(TOL-D8)	(4-BFB)
1639.1 MS Bldg 697	71	93	77
1639.1 MSDBldg 697	72	88	79

(1,2-DCE)= 1,2-DICHLOROETHANE-d4 (70-121)
(TOL-d8)= TOLUENE-d8 (84-138)
(4-BFB) = 4-BROMOFLUOROBENZENE (59-113)

COMMENTS:

2B
VOLATILE SURROGATE SUMMARY

Lab Name:_Princeton Testing Lab. Contract:_US Army, Fort Monmouth.

Lab Code:_PTL_ Case No.:_4760_ SAS No.:_____ SDG No.:____

Instrument ID: _INCOS-500___

SAMPLE NO.	(1,2-DCE)	(TOL-D8)	(4-BFB)
M.BLANK 9/29/94	90	95	86
1645.1 9/21/94	80	90	86
1644.1 9/21/94	106	90	92

(1,2-DCE)= 1,2-DICHLOROETHANE-d4 (70-121)
(TOL-d8)= TOLUENE-d8 (84-138)
(4-BFB) = 4-BROMOFLUOROBENZENE (59-113)

COMMENTS:

page 1 of 1 FORM II VOA-2

2B
VOLATILE SURROGATE SUMMARY

Lab Name:_Princeton Testing Lab. Contract:_US Army, Fort Monmouth.

Lab Code:_PTL_ Case No.:_4760_ SAS No.:_____ SDG No.:_____

Instrument ID: _INCOS-500___

SAMPLE NO.	(1,2-DCE)	(TOL-D8)	(4-BFB)
M.BLANK 10/04/94	88	108	104
1644.2 09/21/94	96	105	92

(1,2-DCE)= 1,2-DICHLOROETHANE-d4 (76-114)
(TOL-d8)= TOLUENE-d8 (84-110)
(4-BFB) = 4-BROMOFLUOROBENZENE (86-115)

COMMENTS:

Princeton Testing Laboratory Inc.

P.O. Box 3108
3490 U.S. Route 1
Princeton, NJ 08543-3108
(609) 452-9050
(FAX) (609) 452-0347

Matrix Spike/Matrix Spike Duplicate Recovery Data
Test: Volatile Organics, Method 8240

Client: U.S. Army, Fort Monmouth N.J.

Project No.: 9404683-001

Lab Sample I.D.: 001

Client Sample I.D.: 1639.1 Bldg 697 MW 1 09/13/94

Analyst: Uma Chaudhary
Instrument: Incos 500 Volatiles
Units: ug/kg

QC Batch Number: 940923SV

COMPOUND	SPIKE ADDED	SAMPLE CONCENTRATION	MATRIX SPIKE CONCENTRATION	MS % REC	QC LIMITS REC
1,1-Dichloroethene	50	0	44.1	88.20	59-172
Trichloroethene	50	0	45.1	90.20	62-137
Benzene	50	0	44.3	88.60	66-142
Toluene	50	0	41.1	82.20	59-139
Chlorobenzene	50	0	46.6	93.20	60-133

COMPOUND	SPIKE ADDED	MSD CONCENTRATION	RPD	MSD % REC	QC LIMITS RPD
1,1-Dichloroethene	50	44.1	.00	88.20	0-22
Trichloroethene	50	48.7	7.68	97.40	0-24
Benzene	50	47.1	6.13	94.20	0-21
Toluene	50	43.3	5.21	86.60	0-21
Chlorobenzene	50	50.6	8.23	101.20	0-21

4A

VOLATILE METHOD BLANK SUMMARY

Lab Name: PTL,INC. Contract: US Army,Fort Monmouth.

Lab Code: PTL Case No.:4760-001SAS No.: xxxx SDG.No xxxx

Lab File ID: CBLK923... Lab Sample ID: LAB BLANK

Date Analyzed: 09/23/94 Time Analyzed: 12:08

Matrix (soil/water) SOIL... Level: (low/med) LOW

Instrument ID: FINN

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS AND MSD:

	EPA SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED
01	1639.1.MS...	4683-001-01.	.C8667...	09/23/94...
02	1639.1.MSD.	.4683-001-01.	.C8668...	09/23/94...
04	.....	.....	.....	.....
05	.....	.....	.....	.....

COMMENTS:

Princeton Testing Laboratory Inc.

P.O. Box 3108
3490 U.S. Route 1
Princeton, NJ 08543-3108
(609) 452-9050
(FAX) (609) 452-1959

U.S. Army, Fort Monmouth N.J.
ATTN: SELFM-PW
Building 167
Fort Monmouth, New Jersey 07703-5108
Attention: Charles Appleby

Report Date: 10/20/94
Job Number: 9404760-001
Date Received: 09/23/94

Analysis: Volatile Organics, SW, SW-846 8240
Units: ug/kg

Parameters	*Sample I.D.: Blank 09/23/94*
Chloromethane	<10
Bromomethane	<10
Vinyl chloride	<10
Chloroethane	<10
Methylene chloride	<5.0
Acetone	<5.0
Carbon disulfide	<5.0
1,1-Dichloroethene	<5.0
1,1-Dichloroethane	<5.0
1,2-Dichloroethene (Total)	<5.0
Chloroform	<5.0
1,2-Dichloroethane	<5.0
2-Butanone	<5.0
1,1,1-Trichloroethane	<5.0
Carbon tetrachloride	<5.0
Bromodichloromethane	<5.0
1,1,2,2-Tetrachloroethane	<5.0
1,2-Dichloropropane	<5.0
trans-1,3-Dichloropropene	<5.0
Trichloroethene	<5.0
Dibromochloromethane	<5.0
1,1,2-Trichloroethane	<5.0
Benzene	<5.0
cis-1,3-Dichloropropene	<5.0
Bromoform	<5.0
2-Hexanone	<5.0
4-Methyl-2-Pentanone	<5.0
Tetrachloroethene	<5.0
Toluene	<5.0
Chlorobenzene	<5.0
Ethylbenzene	<5.0
Styrene	<5.0
Total Xylenes	<5.0

RECOVERY DATA	QC LIMITS	
1,2-Dichloroethane-d4 (Surrogate)	70-121%	111
Toluene-d8 (Surrogate)	84-138%	104
4-Bromofluorobenzene (Surrogate)	59-113%	101

EPA SAMPLE NO.
LAB BLK 9/23

1E
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

Lab Name: Princeton Testing Lab US_ARMY,FORT_MONMOUTH.

Lab Code: PTL Case No.:4760-001SAS No.:XXX SDG No.:XXX

Matrix: (Soil/Water) Soil Lab Sample ID: LAB_BLK

Sample wt/vol: 5 (g/mL) g Lab File ID: CBLK923

Level: (low/med) LOW Date Received:

%Moisture: not dec. Date Analyzed: 09/23/94

GC Column: VOCOL ID: 0.53 mm Dilution Factor: 1

Soil Extract Vol: ul Soil Aliquot Vol: ul

Number TICs found: 0 CONCENTRATION UNITS:
(ug/L or ug/Kg) ug/Kg

#S	CAS NUMB	COMPOUND NAME	RT	EST. CONC.	SCAN

4A

VOLATILE METHOD BLANK SUMMARY

Lab Name: PTL,INC. Contract: US Army,Fort Monmouth.

Lab Code: PTL Case No.:4760-001SAS No.: xxxx SDG.No xxxx

Lab File ID: CBLK929A.. Lab Sample ID: LAB BLANK

Date Analyzed: 09/29/94 Time Analyzed: 10:26

Matrix (soil/water) SOIL.... Level: (low/med) LOW

Instrument ID: FINN

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS AND MSD:

	EPA SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED
01	1645.1.....	4760-001-01.	.C8694...	09/26/94...
02	1644.1.....	.4760-001-02.	.C8695...	09/26/94...
04	.....	.....	.....	.....
05	.....	.....	.....	.....

COMMENTS:

Princeton Testing Laboratory Inc.

P.O. Box 3108
3490 U.S. Route 1
Princeton, NJ 08543-3108
(609) 452-9050
(FAX) (609) 452-1959

U.S. Army, Fort Monmouth N.J.
ATTN: SELFM-PW
Building 167
Fort Monmouth, New Jersey 07703-5108
Attention: Charles Appleby

Report Date: 10/20/94
Job Number: 9404760-001
Date Received: 09/23/94

Analysis: Volatile Organics, SW, SW-846 8240
Units: ug/kg

Parameters	*Sample I.D.: Blank 09/29/94*
Chloromethane	<10
Bromomethane	<10
Vinyl chloride	<10
Chloroethane	<10
Methylene chloride	<5.0
Acetone	<5.0
Carbon disulfide	<5.0
1,1-Dichloroethene	<5.0
1,1-Dichloroethane	<5.0
1,2-Dichloroethene (Total)	<5.0
Chloroform	<5.0
1,2-Dichloroethane	<5.0
2-Butanone	<5.0
1,1,1-Trichloroethane	<5.0
Carbon tetrachloride	<5.0
Bromodichloromethane	<5.0
1,1,2,2-Tetrachloroethane	<5.0
1,2-Dichloropropane	<5.0
trans-1,3-Dichloropropene	<5.0
Trichloroethene	<5.0
Dibromochloromethane	<5.0
1,1,2-Trichloroethane	<5.0
Benzene	<5.0
cis-1,3-Dichloropropene	<5.0
Bromoform	<5.0
2-Hexanone	<5.0
4-Methyl-2-Pentanone	<5.0
Tetrachloroethene	<5.0
Toluene	<5.0
Chlorobenzene	<5.0
Ethylbenzene	<5.0
Styrene	<5.0
Total Xylenes	<5.0

RECOVERY DATA	QC LIMITS	
1,2-Dichloroethane-d4 (Surrogate)	70-121%	90
Toluene-d8 (Surrogate)	84-138%	95
4-Bromofluorobenzene (Surrogate)	59-113%	86

EPA SAMPLE NO.
LAB BLK 9/29

1E
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

Lab Name: Princeton Testing Lab US_ARMY,FORT_MONMOUTH.

Lab Code: PTL Case No.:4760-001 SAS No.:XXX SDG No.:XXX

Matrix: (Soil/Water) Soil Lab Sample ID: LAB_BLK

Sample wt/vol: 5 (g/mL) g Lab File ID: CBLK929A

Level: (low/med) LOW Date Received:

%Moisture: not dec. Date Analyzed: 09/29/94

GC Column: VOCOL ID: 0.53 mm Dilution Factor: 1

Soil Extract Vol: ul Soil Aliquot Vol: ul

Number TICs found: 0 CONCENTRATION UNITS:
(ug/L or ug/Kg) ug/Kg

#S	CAS NUMB	COMPOUND NAME	RT	EST. CONC.	SCAN
1	1073-06-9	BENZENE,1-BROMO-3-FLUORO-	20:06	56	798

4A

VOLATILE METHOD BLANK SUMMARY

Lab Name: PTL,INC. Contract: US Army,Fort Monmouth.

Lab Code: PTL Case No.:4760-001SAS No.: xxxx SDG.No xxxx

Lab File ID: CBLK1004.. Lab Sample ID: LAB BLANK

Date Analyzed: 10/04/94 Time Analyzed: 13:33

Matrix (soil/water) WATER... Level: (low/med) LOW

Instrument ID: FINN

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS AND MSD:

	EPA SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED
01	1644.2.9/21	.4760-001-03.	.C8711...	10/04/94...
02				
03				

COMMENTS:

Princeton Testing Laboratory Inc.

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U.S. Army, Fort Monmouth N.J.
ATTN: SELFM-PW
Building 167
Fort Monmouth, New Jersey 07703-5108
Attention: Charles Appleby

Report Date: 11/02/94
Job Number: 9404760-001
Date Received: 09/23/94
Client Job No.: 1644/1645
Page: 1

Analysis: Volatile Organics, WW, SW-846 8240
Units: ug/liter

Parameters	*Sample I.D.: Blank 10/04/94*
Chloromethane	<10
Bromomethane	<10
Vinyl chloride	<10
Chloroethane	<10
Methylene chloride	<5.0
Acetone	2.6 J
Carbon disulfide	<5.0
1,1-Dichloroethene	<5.0
1,1-Dichloroethane	<5.0
1,2-Dichloroethene (Total)	<5.0
Chloroform	<5.0
1,2-Dichloroethane	<5.0
2-Butanone	<5.0
1,1,1-Trichloroethane	<5.0
Carbon tetrachloride	<5.0
Bromodichloromethane	<5.0
1,1,2,2-Tetrachloroethane	<5.0
1,2-Dichloropropane	<5.0
trans-1,3-Dichloropropene	<5.0
Trichloroethene	<5.0
Dibromochloromethane	<5.0
1,1,2-Trichloroethane	<5.0
Benzene	<5.0
cis-1,3-Dichloropropene	<5.0
Bromoform	<5.0
2-Hexanone	<5.0
4-Methyl-2-Pentanone	<5.0
Tetrachloroethene	<5.0
Toluene	<5.0
Chlorobenzene	<5.0
Ethylbenzene	<5.0
Styrene	<5.0
Total Xylenes	<5.0

RECOVERY DATA	QC LIMITS	
1,2-Dichloroethane-d4 (Surrogate)	76-114%	88
Toluene-d8 (Surrogate)	88-110%	108
4-Bromofluorobenzene (Surrogate)	86-115%	104

J = Estimated Value Detected Below MDL

EPA SAMPLE NO.
LAB BLK 10/04

1E
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

Lab Name: Princeton Testing Lab US_ARMY,FORT_MONMOUTH.

Lab Code: PTL **Case No.:** 4760-001 **SAS No.:** XXX **SDG No.:** XXX

Matrix: (Soil/Water) WATER

Lab Sample ID: LAB_BLK

Sample wt/vol: 5 (g/mL) mL

Lab File ID: CBLK1004

Level: (low/med) LOW

Date Received:

%Moisture: not dec.

Date Analyzed: 10/04/94

GC Column: VOCOL ID: 0.53 mm

Dilution Factor: 1

Soil Extract Vol: ul

Soil Aliquot Vol: ul

Number TICs found: 0

CONCENTRATION UNITS:
(ug/L or ug/Kg) ug/L

#S	CAS NUMB	COMPOUND NAME	RT	EST. CONC.	SCAN

5A

VOLATILE ORGANIC GC/MS TUNING AND MASS CALIBRATION - BROMOFLUOROBENZENE (BFB)

Lab Name: Princeton Testing Lab. Contract: US ARMY, FORT MONMOUTH

Lab Code: PTL Case No.: 4760 SAS No.: _____ SDG No.: _____

Lab File ID: BFB914 BFB Injection Date: 9/14/94

Instrument ID: FINN500V BFB Injection Time: 1200

Matrix:(soil/water) WATER Level:(low/med) Low Column:(pack/cap) Cap

m/e	ION ABUNDANCE CRITERIA	% RELATIVE ABUNDANCE
50	15.0 - 40.0% of mass 95	18.3
75	30.0 - 60.0% of mass 95	48.5
95	Base peak, 100% relative abundance	100.0
96	5.0 - 9.0% of mass 95	8.3
173	Less than 2.0% of mass 174	0.0
174	Greater than 50.0% of mass 95	86.4
175	5.0 - 9.0% of mass 174	7.4
176	Greater than 95.0%, but less than 101.0% of mass 174	99.3
177	5.0 - 9.0% of mass 176	6.9

1-Value is % mass 174 2-Value is % mass 176

THIS TUNE APPLIES TO THE FOLLOWING SAMPLES, MS, MSD, BLANKS, AND STANDARDS:

EPA SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED	TIME ANALYZED
50 PPB STD	50 PPB STD	CV91450A	9/14/94	1943
10 PPB STD	10 PPB STD	CV91410A	9/14/94	2123
20 PPB STD	20 PPB STD	CV91420A	9/14/94	2034
100 PPB STD	100 PPB STD	CV914100B	9/14/94	1853
200 PPB STD	200 PPB STD	CV914200	9/14/94	1803

5A

VOLATILE ORGANIC GC/MS TUNING AND MASS CALIBRATION - BROMOFLUOROBENZENE (BFB)

Lab Name: Princeton Testing Lab. Contract: US ARMY, FORT MONMOUTH

Lab Code: PTL Case No.: 4760 SAS No.: _____ SDG No.: _____

Lab File ID: BFB923 BFB Injection Date: 9/23/94

Instrument ID: FINN500V BFB Injection Time: 1055

Matrix:(soil/water)SOIL Level:(low/med)Low Column:(pack/cap)Cap

m/e	ION ABUNDANCE CRITERIA	% RELATIVE ABUNDANCE
50	15.0 - 40.0% of mass 95	20.7
75	30.0 - 60.0% of mass 95	53.9
95	Base peak, 100% relative abundance	100.0
96	5.0 - 9.0% of mass 95	7.3
173	Less than 2.0% of mass 174	0.0
174	Greater than 50.0% of mass 95	52.7
175	5.0 - 9.0% of mass 174	7.2
176	Greater than 95.0%, but less than 101.0% of mass 174	99.3
177	5.0 - 9.0% of mass 176	7.0

1-Value is % mass 174 2-Value is % mass 176

THIS TUNE APPLIES TO THE FOLLOWING SAMPLES, MS, MSD, BLANKS, AND STANDARDS:

EPA SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED	TIME ANALYZED
50_PPB STD	50 PPB STD	CV0923	9/23/94	1107
LAB_BLANK	M.BLK	CBLK923	9/23/94	1208
1639.1 MS	4683-001-01	C8667	9/23/94	1633
1639.1_MSD	4683-001-01	C8668	9/23/94	1723

5A

VOLATILE ORGANIC GC/MS TUNING AND MASS CALIBRATION - BROMOFLUOROBENZENE (BFB)

Lab Name: Princeton Testing Lab. Contract: US ARMY, FORT MONMOUTH

Lab Code: PTL Case No.: 4760 SAS No.: _____ SDG No.: _____

Lab File ID: BFB929 BFB Injection Date: 9/29/94

Instrument ID: FINN500V BFB Injection Time: 08:45

Matrix:(soil/water) SOIL Level:(low/med) Low Column:(pack/cap) Cap

m/e	ION ABUNDANCE CRITERIA	% RELATIVE ABUNDANCE
50	15.0 - 40.0% of mass 95	19.9
75	30.0 - 60.0% of mass 95	52.4
95	Base peak, 100% relative abundance	100.0
96	5.0 - 9.0% of mass 95	7.1
173	Less than 2.0% of mass 174	0.0
174	Greater than 50.0% of mass 95	65.2
175	5.0 - 9.0% of mass 174	7.1
176	Greater than 95.0%, but less than 101.0% of mass 174	97.8
177	5.0 - 9.0% of mass 176	6.8

1-Value is % mass 174 2-Value is % mass 176

THIS TUNE APPLIES TO THE FOLLOWING SAMPLES, MS, MSD, BLANKS, AND STANDARDS:

EPA SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED	TIME ANALYZED
50_PPB STD	50 PPB STD	CV0929	9/29/94	0856
LAB_BLANK	M.BLK	CBLK929A	9/29/94	1026
1645.1	4760-001-01	C8694	9/29/94	1746
1644.1	4760-001-02	C8696	9/29/94	1928

5A

VOLATILE ORGANIC GC/MS TUNING AND MASS CALIBRATION - BROMOFLUOROBENZENE (BFB)

Lab Name: Princeton Testing Lab. Contract: US ARMY, FORT MONMOUTH

Lab Code: PTL Case No.: 4760 SAS No.: XXX SDG No.: XXX

Lab File ID: BFB1004B BFB Injection Date: 10/04/94

Instrument ID: FINN500V BFB Injection Time: 11:42

Matrix: (soil/water) WATER Level: (low/med) Low Column: (pack/cap) Cap

m/e	ION ABUNDANCE CRITERIA	% RELATIVE ABUNDANCE
50	15.0 - 40.0% of mass 95	21.3
75	30.0 - 60.0% of mass 95	52.7
95	Base peak, 100% relative abundance	100.0
96	5.0 - 9.0% of mass 95	7.3
173	Less than 2.0% of mass 174	0.0
174	Greater than 50.0% of mass 95	57.7
175	5.0 - 9.0% of mass 174	7.6
176	Greater than 95.0%, but less than 101.0% of mass 174	95.3
177	5.0 - 9.0% of mass 176	7.4

1-Value is % mass 174 2-Value is % mass 176

THIS TUNE APPLIES TO THE FOLLOWING SAMPLES, MS, MSD, BLANKS, AND STANDARDS:

EPA SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED	TIME ANALYZED
50 PPB STD	50 PPB STD	CV0104	10/04/94	1234
LAB BLANK	M.BLK	CBLK1004	10/04/94	1333
1644.2	4760-001-03	C8711	10/04/94	1421

8A

VOLATILE INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: Princeton Testing Lab. Contract: US_Army,Fort_monmouth.___.
Case No.: 4760_ Lab File ID (standard):CV0923_____ Instrument ID:FINN
Date Analyzed: 09/23/94____ Time Analyzed: 11:07_____

	IS1(BCM)	RT	IS2(DFB)	RT	IS3(CB)	RT
12hr. STD __	12697_____	07:35	158172_____	09:52	106406_____	22:18_
Upper Limit_	25394_____	07:85	316344_____	10:02	21281_____	22:68_
Lower Limit	6348_____	06:85	79086_____	09:02	53203_____	21:68_
EPA Sample.						
1 M.BLANK__9/23	12703_____	07:29	121792_____	09:48	88184_____	22:01_
2 1639.1_MS____	8847_____	07:33	101972_____	09:49	74708_____	22:02_
3 1639.1_MSD___	8993_____	07:33	96476_____	09:49	72942_____	22:02_

IS1=BROMOCHLOROMETHANE
IS2=1,4-DIFLUOROBENZENE
IS3=CHLOROBENZENE-D5

Area Upper Limit = +100% of Internal Standard area.
Area Lower Limit = - 50% of Internal Standard area.
RT Upper Limit = +0.50 minutes of Internal Standard RT.
RT Lower Limit = -0.50 minutes of Internal Standard RT.

* Values outside of QC limits. FORM VIII V-1 PAGE 1 of 1.

8A

VOLATILE INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: Princeton Testing Lab. Contract: US_Army,Fort_monmouth.___.
Case No.: 4760_ Lab File ID (standard):CV0929_____ Instrument ID:FINN
Date Analyzed: 09/29/94____ Time Analyzed: 08:56_____

		IS1(BCM)	RT	IS2(DFB)	RT	IS3(CB)	RT
	12hr. STD __	17120_____	07:30	142012_____	09:46	99603_____	21:58_
	Upper Limit_	34240_____	07:80	284024_____	09:96	199206_____	22:08_
	Lower Limit	8560_____	06:80	71006_____	08:96	49801_____	21:08_
	EPA Sample.						
1	M.BLANK__9/29	10486_____	07:33	121433_____	09:48	89390_____	21:59_
2	1645.1_____	10152_____	07:30	68901_____	09:46	56616_____	22:01_
3	1644.1_____	8235_____	07:32	144726_____	09:48	114280_____	21:59_

IS1=BROMOCHLOROMETHANE
IS2=1,4-DIFLUOROBENZENE
IS3=CHLOROBENZENE-D5

Area Upper Limit = +100% of Internal Standard area.
Area Lower Limit = - 50% of Internal Standard area.
RT Upper Limit = +0.50 minutes of Internal Standard RT.
RT Lower Limit = -0.50 minutes of Internal Standard RT.

* Values outside of QC limits. FORM VIII V-1 PAGE 1 of 1.

8A

VOLATILE INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: Princeton Testing Lab. Contract: US_Army,Fort_monmouth.___.
Case No.: 4760_ Lab File ID (standard):CV0104_____ Instrument ID:FINN
Date Analyzed: 10/04/94____ Time Analyzed: 12:34_____

	IS1(BCM)	RT	IS2(DFB)	RT	IS3(CB)	RT
12hr. STD __	15702_____	07:22	113786_____	09:38	82666_____	21:48_
Upper Limit_	31404_____	07:72	227572_____	09:88	165332_____	21:98_
Lower Limit	7851_____	06:72	56893_____	08:88	41333_____	20:98_
EPA Sample.						
1 M.BLANK_10/04	10934_____	07:24	102320_____	09:38	73456_____	21:53_
2 1644.2_____	11875_____	07:22	87995_____	09:40	47327_____	21:53_

IS1=BROMOCHLOROMETHANE
IS2=1,4-DIFLUOROBENZENE
IS3=CHLOROBENZENE-D5

Area Upper Limit = +100% of Internal Standard area.
Area Lower Limit = - 50% of Internal Standard area.
RT Upper Limit = +0.50 minutes of Internal Standard RT.
RT Lower Limit = -0.50 minutes of Internal Standard RT.

* Values outside of QC limits. FORM VIII V-1 PAGE 1 of 1.

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U.S. Army, Fort Monmouth N.J.
ATTN: SELFM-PW
Building 167
Fort Monmouth, New Jersey 07703-5108
Attention: Charles Appleby

Report Date: 11/01/94
Job Number: 9404760-001
Date Received: 09/23/94
Client Job No.: 1644/1645
Page: 1

Analysis: Volatile Organics, SW, SW-846 8240
Units: ug/kg

Parameters	*Sample I.D.: 1645.1 Bldg 290 Site A Sidewall 9/21/94*
Chloromethane	<1200
Bromomethane	<1200
Vinyl chloride	<1200
Chloroethane	<1200
Methylene chloride	460 J
Acetone	<620
Carbon disulfide	<620
1,1-Dichloroethene	<620
1,1-Dichloroethane	<620
1,2-Dichloroethene (Total)	<620
Chloroform	<620
1,2-Dichloroethane	<620
2-Butanone	1500
1,1,1-Trichloroethane	<620
Carbon tetrachloride	<620
Bromodichloromethane	<620
1,1,2,2-Tetrachloroethane	<620
1,2-Dichloropropane	<620
trans-1,3-Dichloropropene	<620
Trichloroethene	<620
Dibromochloromethane	<620
1,1,2-Trichloroethane	<620
Benzene	<620
cis-1,3-Dichloropropene	<620
Bromoform	<620
2-Hexanone	<620
4-Methyl-2-Pentanone	<620
Tetrachloroethene	<620
Toluene	<620
Chlorobenzene	<620
Ethylbenzene	<620
Styrene	<620
Total Xylenes	<620

RECOVERY DATA	QC LIMITS	
1,2-Dichloroethane-d4 (Surrogate)	70-121%	80
Toluene-d8 (Surrogate)	84-138%	90
4-Bromofluorobenzene (Surrogate)	59-113%	86

J = Estimated Value Detected Below MDL

EPA SAMPLE NO.
1645.1 9/21

1E
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

Lab Name: Princeton Testing Lab US_ARMY,FORT_MONMOUTH

Lab Code: PTL Case No.:4760-001 SAS No.:XXX SDG No.:XXX

Matrix: (Soil/Water) Soil Lab Sample ID: 01

Sample wt/vol: 5 (g/mL) g Lab File ID: C8694

Level: (low/med) med Date Received: 09/23/94

%Moisture: not dec. 19 Date Analyzed: 09/29/94

GC Column: VOCOL ID: 0.53 mm Dilution Factor: 100

Soil Extract Vol: ul Soil Aliquot Vol: ul

Number TICs found: 16 CONCENTRATION UNITS: (ug/L or ug/Kg) ug/Kg

#S	CAS NUMB	COMPOUND NAME	RT	EST. CONC.	SCAN
1	0-00-0	UNKNOWN	36:30	4200	1449
2	1758-88-9	BENZENE,2-ETHYL-1,4-DIME	36:39	5300	1455
3	17301-325	UNDECANE,4,7-DIMETHYL-	36:53	9200	1464
4	16519-689	CYCLOHEXANONE,2,6-DIETHYL	36:56	6500	1466
5	1758-88-9	BENZENE,2-ETHYL-1,4-DIME	37:53	9900	1504
6	0-00-0	UNKNOWN_HYDROCARBON	38:17	6400	1520
7	2958-76-1	NAPHTHALENE,DECAHYDRO-2ME	38:34	9300	1531
8	62108-230	DECANE,2,5,6-TRIMETHYL-	38:45	16000	1538
9	0-00-0	UNKNOWN	38:58	19000	1547
10	0-00-0	UNKNOWN	39:30	14000	1568
11	527-53-7	BENZENE,1,2,3,5-TETRAMETHYL-	39:45	5300	1578
12	1758-88-9	BENZENE,2-ETHYL-1,4-DIME	40:03	8600	1590
13	0-00-0	UNKNOWN_HYDROCARBON	24:18	2800	965
14	0-00-0	UNKNOWN_HYDROCARBON	26:33	4800	1054
15	0-00-0	UNKNOWN_HYDROCARBON	30:56	16000	1228
16	0-00-0	UNKNOWN_HYDROCARBON	33:56	11000	1347

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U.S. Army, Fort Monmouth N.J.
ATTN: SELFM-PW
Building 167
Fort Monmouth, New Jersey 07703-5108
Attention: Charles Appleby

Report Date: 11/01/94
Job Number: 9404760-001
Date Received: 09/23/94
Client Job No.: 1644/1645
Page: 1

Analysis: Volatile Organics, SW, SW-846 8240
Units: ug/kg

Parameters	*Sample I.D.: 1644.1 Bldg 482 Site C-2 9/21/94 Sidewall SE*
Chloromethane	<600
Bromomethane	<600
Vinyl chloride	<600
Chloroethane	<600
Methylene chloride	470
Acetone	<300
Carbon disulfide	<300
1,1-Dichloroethene	<300
1,1-Dichloroethane	<300
1,2-Dichloroethene (Total)	<300
Chloroform	<300
1,2-Dichloroethane	<300
2-Butanone	1200
1,1,1-Trichloroethane	<300
Carbon tetrachloride	<300
Bromodichloromethane	<300
1,1,2,2-Tetrachloroethane	<300
1,2-Dichloropropane	<300
trans-1,3-Dichloropropene	<300
Trichloroethene	<300
Dibromochloromethane	<300
1,1,2-Trichloroethane	<300
Benzene	<300
cis-1,3-Dichloropropene	<300
Bromoform	<300
2-Hexanone	<300
4-Methyl-2-Pentanone	<300
Tetrachloroethene	<300
Toluene	<300
Chlorobenzene	<300
Ethylbenzene	<300
Styrene	<300
Total Xylenes	<300

RECOVERY DATA	QC LIMITS	
1,2-Dichloroethane-d4 (Surrogate)	70-121%	106
Toluene-d8 (Surrogate)	84-138%	90
4-Bromofluorobenzene (Surrogate)	59-113%	92

EPA SAMPLE NO.
1644.1 9/21

1E
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

Lab Name: Princeton Testing Lab US_ARMY,FORT_MONMOUTH.

Lab Code: PTL **Case No.:** 4760-001 **SAS No.:** XXX **SDG No.:** XXX

Matrix: (Soil/Water) Soil

Lab Sample ID: 02

Sample wt/vol: 5 (g/mL) g

Lab File ID: C8696

Level: (low/med) med

Date Received: 09/23/94

%Moisture: not dec. 16

Date Analyzed: 09/29/94

GC Column: VOCOL ID: 0.53 mm

Dilution Factor: 50

Soil Extract Vol: ul

Soil Aliquot Vol: ul

Number TICs found: 15

CONCENTRATION UNITS: (ug/L or ug/Kg) ug/Kg

#S	CAS NUMB	COMPOUND NAME	RT	EST. CONC.	SCAN
1	493-01-6	UNKNOWN_HYDROCARBON	35:49	1900	1422
2	29053-041	UNKNOWN_HYDROCARBON	36:01	2800	1430
3	17312-811	UNDECANE,3,5-DIMETHYL-	36:45	1400	1459
4	2980-70-3	UNKNOWN_HYDROCARBON	36:51	990	1463
5	98-06-6	BENZENE,(1,1-DIMETHYLETHYL	37:49	1100	1501
6	1758-88-9	UNKNOWN_HYDROCARBON	38:11	1300	1516
7	2958-76-1	NAPHTHALENE,DECAHYDRO-2ME	38:26	2300	1526
8	0-00-0	UNKNOWN	38:38	1800	1534
9	0-00-0	UNKNOWN	38:51	2200	1542
10	2958-76-1	NAPHTHALENE,DECAHYDRO-2ME	39:24	2800	1564
11	25155-151	BENZENE,METHYL(1-METHYLETH	39:37	1100	1573
12	527-53-7	BENZENE,1,2,3,5-TETRAMETHYL	39:56	1700	1585
13	0-00-0	UNKNOWN	39:59	-750	1587
14	0-00-0	UNKNOWN_HYDROCARBON	30:51	2100	1225
15	0-00-0	UNKNOWN_HYDROCARBON	33:14	1900	1319

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ATTN: SELFM-PW
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Attention: Charles Appleby

Report Date: 11/01/94
Job Number: 9404760-001
Date Received: 09/23/94
Client Job No.: 1644/1645
Page: 1

Analysis: Volatile Organics, WW, SW-846 8240
Units: ug/liter

Parameters	*Sample I.D.: 1644.2 Fld Blk Bldgs 482/290 09/21/94*
Chloromethane	<10
Bromomethane	<10
Vinyl chloride	<10
Chloroethane	<10
Methylene chloride	<5.0
Acetone	<5.0
Carbon disulfide	<5.0
1,1-Dichloroethene	<5.0
1,1-Dichloroethane	<5.0
1,2-Dichloroethene (Total)	<5.0
Chloroform	<5.0
1,2-Dichloroethane	<5.0
2-Butanone	<5.0
1,1,1-Trichloroethane	<5.0
Carbon tetrachloride	<5.0
Bromodichloromethane	<5.0
1,1,2,2-Tetrachloroethane	<5.0
1,2-Dichloropropane	<5.0
trans-1,3-Dichloropropene	<5.0
Trichloroethene	<5.0
Dibromochloromethane	<5.0
1,1,2-Trichloroethane	<5.0
Benzene	<5.0
cis-1,3-Dichloropropene	<5.0
Bromoform	<5.0
2-Hexanone	<5.0
4-Methyl-2-Pentanone	<5.0
Tetrachloroethene	<5.0
Toluene	<5.0
Chlorobenzene	<5.0
Ethylbenzene	<5.0
Styrene	<5.0
Total Xylenes	<5.0

RECOVERY DATA	QC LIMITS	
1,2-Dichloroethane-d4 (Surrogate)	76-114%	96
Toluene-d8 (Surrogate)	88-110%	105
4-Bromofluorobenzene (Surrogate)	86-115%	92

EPA SAMPLE NO.
1644.2 09/21

1E
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

Lab Name: Princeton Testing Lab US_ARMY,FORT_MONMOUTH.

Lab Code: PTL Case No.:4760-001 SAS No.:XXX SDG No.:XXX

Matrix: (Soil/Water) WATER Lab Sample ID: 03

Sample wt/vol: 5 (g/mL) mL Lab File ID: C8711

Level: (low/med) LOW Date Received: 09/23/94

%Moisture: not dec. Date Analyzed: 10/04/94

GC Column: VOCOL ID: 0.53 mm Dilution Factor: 1

Soil Extract Vol: ul Soil Aliquot Vol: ul

Number TICs found: 4 CONCENTRATION UNITS:
(ug/L or ug/Kg) ug/L

#S	CAS NUMB	COMPOUND NAME	RT	EST. CONC.	SCAN
1	34419-766	UNKNOWN_HYDROCARBON	3:00	27	119
2	109-66-0	PENTANE_(ACN)_(DOT)	3:17	13	130
3	107-83-5	PENTANE,2-METHYL-	4:16	11	169
4	557-11-9	UREA,2-PROPENYL-	4:36	4.5	182

US ARMY FT. MONMOUTH ENVIRONMENTAL LABORATORY
NJDEPE # 13461

REPORT OF ANALYSIS

Client: U.S. Army
DPW, SELFM-PW-EV
Bldg. 173
Ft. Monmouth, NJ 07703

Project: Total Petroleum Hydrocarbons
98-0001
Bldg.290

Project # 3437
Date Rec. 03/26/98
Date Compl. 03/27/98
Released by:

Daniel K. Wright
Laboratory Director

Table of Contents

Section	Pages
Cover Sheet	1
Table of Contents	2
Method Summary	3
Conformance/Non-Conformance	4
Chain of Custody	5
Results Summary	6
Initial Calibration Summary	7
Continuing Calibration Summary	8
Surrogate Results Summary	9
MS/MSD Results Summary	10
Quality Control Spike Summary	11
Raw Sample Data	12-19
Laboratory Deliverable Checklist	20

Method Summary

NJDEP Method OQA-QAM-025-10/97

Gas Chromatographic Determination of Total Petroleum Hydrocarbons in Soil

Fifteen grams (15g)(wet weight) of a soil sample is added to a 125 mL acid cleaned, solvent rinsed, capped Erlenmeyer flask. 15g anhydrous sodium sulfate is added to dry sample. Surrogate standard spiking solution is then added to the flask.

Twenty five milliliters(25mL) Methylene Chloride is added to the flask and it is secured on a gyrotory shaker table. The agitation rate is set to 400rpm and the sample is shaken for 30 minutes. The flask is the removed from the table and the particulate matter is allowed to settle. The extract is transferred to a Teflon capped vial. A second 25mL of Methylene Chloride is added to the flask and shaken for an additional 30 minutes. The flask is again removed and allowed to settle. The extracts are combined in the vial then transferred to a 1mL autosampler vial.

The extract is then injected directly into a GC-FID for analysis. The sample is analyzed for petroleum hydrocarbons covering a range of C8-C42 including pristane and phytane. Total Petroleum Hydrocarbon concentration is determined by integrating between 5 minutes and 22 minutes. The baseline is established by starting the integration after the end of the solvent peak and stopping after the last peak.

The final concentration of Total Petroleum Hydrocarbons is calculated using percent solid, sample weight and concentration.

PHC Conformance/Non-conformance Summary Report

	No	Yes
1. Method Detection Limits provided.	__	✓
2. Method Blank Contamination - If yes, list the sample and the corresponding concentrations in each blank.	✓	__
3. Matrix Spike Results Summary Meet Criteria. (If not met, list the sample and corresponding recovery which falls outside the acceptable range).	__	✓
4. Duplicate Results Summary Meet Criteria. (If not met, list the sample and corresponding recovery which falls outside the acceptable range).	__	✓
5. IR Spectra submitted for standards, blanks, & samples	__	NA __
6. Chromatograms submitted for standards, blanks, and samples if GC fingerprinting was conducted.	__	✓
7. Analysis holding time met. (If not met, list number of days exceeded for each sample)	__	✓

Additional Comments: _____

Laboratory Authentication Statement

I certify under penalty of law, where applicable, that this laboratory meets the Laboratory Performance Standards and Quality Control requirements specified in N.J.A.C. 7:18 and 40 CFR Part 136 for Water and Wastewater Analyses and SW 846 for Solid Waste Analysis. I have personally examined the information contained in this report, and to the best of my knowledge, I believe that the submitted information is true, accurate, complete, and meets the above referenced standards where applicable. I am aware that there are significant penalties for purposefully submitting falsified information, including the possibility of a fine and imprisonment.

Daniel K. Wright
Laboratory Manager

Fort Monmouth Environmental Testing Laboratory

Bldg. 173, SELFM-PW-EV, Fort Monmouth, NJ 07703
Tel (732)532-4359 Fax (732)532-3484 EMail:appleby@doim6.monmouth.army.mil
NJDEP Certification #13461

Chain of Custody Record

Customer: C. Appleby
Phone #: 532-4359
( )DERA (X)OMA ( )Other:

Project No: GST/98-0001
Location: Bldg-290

Samplers Name / Company :

Lab Sample I.D.	Sample Location	Date	Time	Sample Type	# bottles	VOA + 15	TPH							Comments: Remarks / Preservation Method
						Analysis Parameters								
3437.01	TRIP BLANK	3-26-98	~~1348~~	AQ	2	X								HCL
02	290-B-1		1348	SOIL	1		X							9 PPM) 24-30" (ARC)
03	290-B-2		1433	SOIL	1		X							100 PPM) 22-26" (MW)
04	290-B-3		1507	SOIL	1		X							90 PPM)
(MW) ~~05~~	~~290-B-4~~			~~SOIL~~	~~1~~		~~X~~							
05	290-B-2-W		1550	AQ	2	X								
06	290-B-4		1625	SOIL	1		X							

Relinquished by (signature):	Date/Time:	Received by (signature):	Relinquished by (signature):	Date/Time:	Received by (signature):
[signature]	3-26-98 1640	[signature]			
Relinquished by (signature):	Date/Time:	Received by (signature):	Relinquished by (signature):	Date/Time:	Received by (signature):
		[signature]			

Report Type: (_)Full, (_)Reduced, (_)Standard, (_)Screen / non-certified
Turnaround time: (_)Standard 4 wks, (_)Rush ____ Days, (_)ASAP Verbal ____ Hrs.

Remarks:

print legibly

~me1a23.xls2/20/98

Report of Analysis
U.S. Army, Fort Monmouth Environmental Laboratory
NJDEP Certification # 13461

Client :	U.S. Army	**Lab. ID # :**	3437
	DPW. SELFM-PW-EV	**Date Rec'd:**	26-Mar-98
	Bldg. 173	**Analysis Start:**	27-Mar-98
	Ft. Monmouth, NJ 07703	**Analysis Complete:**	27-Mar-98
Analysis:	OQA-QAM-025	**UST Reg. #:**	
Matrix:	Soil	**Closure #:**	
Analyst:	D.DEINHARDT	**DICAR #:**	
Ext. Meth:	Shake	**Location #:**	BLDG. 290

Sample	Field ID	Dilution Factor	Weight (g)	% Solid	MDL (mg/kg)	TPHC Result (mg/kg)
3437.02	290-B-1	1.00	14.98	92.81	169	317.67
3437.03	290-B-2	1.00	15.11	84.28	185	ND
3437.04	290-B-3	1.00	15.22	78.81	196	224.45
3437.06	290-B-4	1.00	16.04	74.89	196	ND
METHOD BLANK	27-Mar-98	1.00	15.00	100.00	157	ND

ND = Not Detected

MDL = Method Detection Limit

Daniel K. Wright
Laboratory Director

Response Factor Report FID/TCD

Method : C:\HPCHEM\1\METHODS\TPH27.M (Chemstation Integrator)
Title : TPHC Calibration 06/05/97 21 peaks
Last Update : Thu Mar 19 07:39:01 1998

Calibration Files
200 =T04649.D 100 =T04654.D 50 =T04651.D
10 =T04652.D 5 =T04653.D

		Compound	200	100	50	10	5	Avg		%RSD
1)	tC	C8	1.801	2.041	1.835	1.725	1.727	1.826	E4	7.10
2)	tC	C10	1.933	2.259	1.974	1.798	1.804	1.953	E4	9.60
3)	TC	C12	2.116	2.476	2.169	1.953	1.968	2.136	E4	9.89
4)	tC	C14	2.185	2.559	2.270	2.025	2.004	2.209	E4	10.19
5)	tC	C16	2.233	2.625	2.327	2.097	2.075	2.271	E4	9.81
6)	tC	C18	2.504	2.926	2.710	2.444	2.375	2.592	E4	8.67
7)	tC	C20	2.415	2.851	2.515	2.261	2.228	2.454	E4	10.22
8)	tC	C22	2.423	2.840	2.510	2.200	2.209	2.436	E4	10.80
9)	tC	C24	2.432	2.772	2.450	2.161	2.155	2.394	E4	10.62
10)	tC	C26	2.319	2.709	2.406	2.137	2.015	2.317	E4	11.53
11)	tC	C28	2.021	2.356	2.104	1.873	1.841	2.039	E4	10.16
12)	tC	C30	1.799	2.063	1.863	2.013	1.652	1.878	E4	8.83
13)	tC	C32	1.643	1.872	1.718	1.186	1.254	1.535	E4	19.53
14)	tC	C34	1.367	1.551	1.502	1.141	1.378	1.388	E4	11.46
15)	tC	C36	1.034	1.168	1.188	0.925	0.988	1.060	E4	10.76
16)	tC	C38	7.201	8.395	8.389	6.574	7.621	7.636	E3	10.27
17)	tC	C40	5.866	6.687	6.507	5.147	6.028	6.047	E3	10.00
18)	tC	c42	4.967	5.805	5.464	4.397	5.259	5.178	E3	10.29
19)	TC	Pristane	2.592	2.935	2.513	2.288	2.304	2.526	E4	10.43
20)	TC	Phytane	2.414	2.957	2.616	2.363	2.356	2.541	E4	10.06
21)	sC	o-terphenyl	2.709	3.183	2.823	2.559	2.556	2.766	E4	9.35
22)	tC	TPHC - total	2.282	2.624	2.440	2.600	2.736	2.536	E4	6.98

(#) = Out of Range

Evaluate Continuing Calibration Report

Data File : C:\HPCHEM\1\DATA\980327\T04706.D Vial: 2
Acq On : 27 Mar 98 3:16 pm Operator: DEINHARDT
Sample : 50 PPM STANDARD Inst : FID/TCD
Misc : Multiplr: 1.00
IntFile : TPHCINT.E

Method : C:\HPCHEM\1\METHODS\TPH27.M (Chemstation Integrator)
Title : TPHC Calibration 06/05/97 21 peaks
Last Update : Thu Mar 19 07:39:01 1998
Response via : Multiple Level Calibration

Min. RRF : 0.000 Min. Rel. Area : 50% Max. R.T. Dev 0.50min
Max. RRF Dev : 25% Max. Rel. Area : 200%

		Compound	AvgRF	CCRF	%Dev	Area%	Dev(min)
1	tC	C8	18.259	16.651 E3	8.8	94	0.01
2	tC	C10	19.534	18.921 E3	3.1	101	0.00
3	TC	C12	21.365	20.448 E3	4.3	101	0.00
4	tC	C14	22.088	20.910 E3	5.3	101	0.00
5	tC	C16	22.714	21.256 E3	6.4	101	0.00
6	tC	C18	25.919	23.759 E3	8.3	103	0.01
7	tC	C20	24.542	22.762 E3	7.3	102	0.01
8	tC	C22	24.364	22.827 E3	6.3	103	0.01
9	tC	C24	23.940	22.386 E3	6.5	102	0.01
10	tC	C26	23.170	22.081 E3	4.7	106	0.01
11	tC	C28	20.391	19.317 E3	5.3	109	0.01
12	tC	C30	18.781	17.288 E3	7.9	112	0.01
13	tC	C32	15.348	15.035 E3	2.0	107	0.01
14	tC	C34	13.879	14.158 E3	-2.0	120	0.02
15	tC	C36	10.605	11.317 E3	-6.7	125	0.02
16	tC	C38	7.636	8.520 E3	-11.6	126	0.03
17	tC	C40	6.047	6.617 E3	-9.4	125	0.03
18	tC	c42	5.178	5.405 E3	-4.4	122	0.05
19	TC	Pristane	25.262	22.814 E3	9.7	101	0.01
20	TC	Phytane	25.410	23.954 E3	5.7	102	0.01
21	sC	o-terphenyl	27.662	25.952 E3	6.2	103	0.01
22	tC	TPHC - total	25.364	22.924 E3	9.6	101	2.56#

(#) = Out of Range SPCC's out = 0 CCC's out = 0

4

Report of Analysis
U.S. Army, Fort Monmouth Environmental Laboratory
NJDEP Certification # 13461

Surrogate Recovery Report

Lab. ID # : 3437

Location #: BLDG. 290

Sample		Surrogate Added (ppm)	Amount Recovered (ppm)	Percent Recovery
3437.02		10.00	10.38	**103.84**
3437.03		10.00	10.11	**101.09**
3437.04		10.00	10.70	**107.01**
3437.06		10.00	10.56	**105.56**
METHOD BLANK	27-Mar-98	10.00	10.31	**103.10**

Surrogate Added : **o-Terphenyl**

3/31/98

a

U.S. Army, Fort Monmouth Environmental Laboratory
NJDEP Certification # 13461

Matrix Spike Recovery Report

Lab. ID # : 3437

Location #: BLDG. 290

Sample	Spike Amount Added (ppm)	Sample Amount (ppm)	Matrix Spike Amount (ppm)	Percent Recovery	QC Limits %
3437.04MS	1000	53.85	1016.39	96.25	75-125
3437.04MSD	1000	53.85	1049.29	99.54	75-125

RPD	3.36	20.00

3/31/98

10

Report of Analysis
U.S. Army, Fort Monmouth Environmental Laboratory
NJDEP Certification # 13461

Blank Spike Recovery Report

Lab. ID # : 3437

Location #: BLDG. 290

Sample	Date Extracted	Spike Amount Added (ppm)	Matrix Spike Amount (ppm)	Percent Recovery	QC Limits %
Blank Spike	27-Mar-98	1000	1062.16	106.22	75-125

3/31/98

LABORATORY DELIVERABLES CHECKLIST AND NON-CONFORMANCE SUMMARY

THIS FORM MUST BE COMPLETED BY THE LABORATORY OR ENVIRONMENTAL CONSULTANT AND ACCOMPANY ALL DATA SUBMISSIONS

The following Laboratory Deliverables checklist and Non-Conformance Summary shall be included in the data submission. All deviations from the accepted methodology and procedures, of performance values outside acceptable ranges shall be summarized in the Non-Conformance Summary. The Technical Requirements for Site Remediation, effective June 7, 1993, provides further details. The document shall be bound and paginated, contain a table of contents, and all pages shall be legible. Incomplete packages will be returned or held without review until the data package is completed.

It is recommended that the analytical results summary sheets listing all targeted and non-targeted compounds with the method detection limits, practical quantitation limits, and the laboratory and/or sample numbers be included in one section of the data package <u>and</u> in the main body of the report.

1. Cover page, Title Page listing Lab Certification #, facility name and address, & date of report submitted ✓
2. Table of Contents submitted ✓
3. Summary Sheets listing analytical results for all targeted and non-targeted compounds submitted ✓
4. Document paginated and legible ✓
5. Chain of Custody submitted ✓
6. Samples submitted to lab within 48 hours of sample collection ✓
7. Methodology Summary submitted ✓
8. Laboratory Chronicle and Holding Time Check submitted ✓
9. Results submitted on a dry weight basis ✓
10. Method Detection Limits submitted ✓
11. Lab certified by NJDEP for parameters of appropriate category of parameters or a member of the USEPA CLP ✓

Laboratory Manager or Environmental Consultant's Signature _____

Date 4/6/98

Laboratory Certification #13461

*Refer to NJAC 7:26E - Appendix A, Section IV - Reduced Data Deliverables - Non-USEPA/CLP Methods for further guidance

US ARMY FT. MONMOUTH ENVIRONMENTAL LABORATORY
NJDEPE # 13461

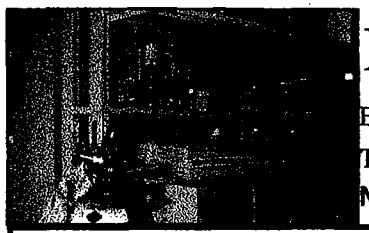
REPORT OF ANALYSIS

Client: U.S. Army
DPW, SELFM-PW-EV
Bldg. 173
Ft. Monmouth, NJ 07703

Project: Volatiles - EPA Method 624
Bldg. 290

Project # 3437
Date Rec. 03/26/98
Date Compl. 03/30/98
Released by:

Daniel K. Wright
Laboratory Director



Fort Monmouth Environmental Testing Laboratory

Bldg. 173, SELFM-PW-EV, Fort Monmouth, NJ 07703
Tel (732)532-4359 Fax (732)532-3484 EMail:appleby@doim6.monmouth.army.mil
NJDEP Certification #13461

Chain of Custody Record

Customer:

Phone #:

( )DERA ( )OMA ( )Other:_____

Project No:

Location: Bldg-290

Samplers Name / Company :

Comments: OVA #2-AS1903

Lab Sample I.D.	Sample Location	Date	Time	Sample Type	# bottles	VOA + 15	TPH						Remarks / Preservation Method
3437.01	TRIP BLANK	3-26-98	~~1348~~	AQ	2	X							HCL
02	290-B-1		1348	SOIL	1		X						9 PPM) 24-30" (ALC)
03	290-B-2		1433	SOIL	1		X						100 PPM) 22-26" (ML)
04	290-B-3		1507	SOIL	1		X						90 PPM)
(MW) ~~05~~	~~290-B-4~~			~~SOIL~~	~~1~~		~~X~~						
05	290-B-2-W		1550	AQ	2	X							
06	290-B-4		1625	SOIL	1		X						

Relinquished by (signature):	Date/Time:	Received by (signature):	Relinquished by (signature):	Date/Time:	Received by (signature):
	3-26-98 1640				
Relinquished by (signature):	Date/Time:	Received by (signature):	Relinquished by (signature):	Date/Time:	Received by (signature):

Report Type: (_)Full, (_)Reduced, (_)Standard, (_)Screen / non-certified

Turnaround time: (_)Standard 4 wks, (_)Rush ____ Days, (_)ASAP Verbal ____ Hrs.

Remarks:

print legibly

~me1a23.xls2/20/98

Volatile Analysis Report
U.S. Army, Fort Monmouth Environmental Laboratory
NJDEP Certification #13461

Data File Name	**V03392.D**	Sample Name	**VBLK41**
Operator	**Skelton**	Field ID	**VBLK41**
Date Acquired	**30 Mar 1998 20:22**	Sample Multiplier	**1**

CAS#	Compound Name	R.T.	Response	Result	GW Criteria	MDL	Qualifiers
107028	Acrolein			not detected	nle	6.25 ug/L	
107131	Acrylonitrile			not detected	nle	6.25 ug/L	
75650	tert-Butyl alcohol			not detected	nle	12.50 ug/L	
1634044	Methyl-tert-Butyl ether			not detected	nle	2.50 ug/L	
108203	Di-isopropyl ether			not detected	nle	1.25 ug/L	
	Dichlorodifluoromethane			not detected	nle	3.63 ug/L	
74-87-3	Chloromethane			not detected	30	0.79 ug/L	
75-01-4	Vinyl Chloride			not detected	5	2.61 ug/L	
74-83-9	Bromomethane			not detected	10	1.45 ug/L	
75-00-3	Chloroethane			not detected	nle	2.20 ug/L	
75-69-4	Trichlorofluoromethane			not detected	nle	1.31 ug/L	
75-35-4	1,1-Dichloroethene			not detected	2	0.74 ug/L	
67-64-1	Acetone			not detected	700	1.57 ug/L	
75-15-0	Carbon Disulfide			not detected	nle	0.54 ug/L	
75-09-2	Methylene Chloride			not detected	2	1.66 ug/L	
156-60-5	trans-1,2-Dichloroethene			not detected	100	0.50 ug/L	
75-35-3	1,1-Dichloroethane			not detected	70	0.83 ug/L	
108-05-4	Vinyl Acetate			not detected	nle	2.07 ug/L	
78-93-3	2-Butanone			not detected	300	2.06 ug/L	
	cis-1,2-Dichloroethene			not detected	10	0.65 ug/L	
67-66-3	Chloroform			not detected	6	0.43 ug/L	
75-55-6	1,1,1-Trichloroethane			not detected	30	0.81 ug/L	
56-23-5	Carbon Tetrachloride			not detected	2	1.20 ug/L	
71-43-2	Benzene			not detected	1	0.51 ug/L	
107-06-2	1,2-Dichloroethane			not detected	2	1.27 ug/L	
79-01-6	Trichloroethene			not detected	1	0.94 ug/L	
78-87-5	1,2-Dichloropropane			not detected	1	0.78 ug/L	
75-27-4	Bromodichloromethane			not detected	1	0.77 ug/L	
110-75-8	2-Chloroethyl vinyl ether			not detected	nle	1.05 ug/L	
10061-01-5	cis-1,3-Dichloropropene			not detected	nle	0.60 ug/L	
108-10-1	4-Methyl-2-Pentanone			not detected	400	1.33 ug/L	
108-88-3	Toluene			not detected	1000	0.73 ug/L	
10061-02-6	trans-1,3-Dichloropropene			not detected	nle	1.43 ug/L	
79-00-5	1,1,2-Trichloroethane			not detected	3	1.49 ug/L	
127-18-4	Tetrachloroethene			not detected	1	0.92 ug/L	
591-78-6	2-Hexanone			not detected	nle	1.12 ug/L	
126-48-1	Dibromochloromethane			not detected	10	1.36 ug/L	
108-90-7	Chlorobenzene			not detected	4	0.66 ug/L	
100-41-4	Ethylbenzene			not detected	700	1.14 ug/L	
1330-20-7	m+p-Xylenes			not detected	nle	2.53 ug/L	
1330-20-7	o-Xylene			not detected	nle	1.92 ug/L	
100-42-5	Styrene			not detected	100	1.57 ug/L	
75-25-2	Bromoform			not detected	4	1.68 ug/L	
79-34-5	1,1,2,2-Tetrachloroethane			not detected	2	1.71 ug/L	
541-73-1	1,3-Dichlorobenzene			not detected	600	2.51 ug/L	
106-46-7	1,4-Dichlorobenzene			not detected	74	3.08 ug/L	
95-50-1	1,2-Dichlorobenzene			not detected	600	2.75 ug/L	

Qualifiers

B = Compound found in related blank
E = Value above linear range
D = Value from dilution
MDL = Method Detection Limit
NLE = No Limit Established
R.T. = Retention Time

1E

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

FIELD ID.

VBLK41

Lab Name: FMETL NJDEP # 13461

Project: Case No.: 3437 Location: B.290 SDG No.:

Matrix: (soil/water) WATER Lab Sample ID: VBLK41

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: V03392.D

Level: (low/med) LOW Date Received: 03/26/98

% Moisture: not dec. Date Analyzed: 03/30/98

GC Column: Rtx502.2 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L

Number TICs found: 1

CAS NO.	COMPOUND	RT	EST. CONC.	Q
1.	unknown	12.16	27	J

Volatile Analysis Report
U.S. Army, Fort Monmouth Environmental Laboratory
NJDEP Certification #13461

Data File Name	**v03408.d**	Sample Name	**3437.01**
Operator	**Skelton**	Field ID	**Trip Blank**
Date Acquired	**31 Mar 1998 8:57**	Sample Multiplier	**1**

CAS#	Compound Name	R.T.	Response	Result	GW Criteria	MDL	Qualifiers
107028	Acrolein			not detected	nle	6.25 ug/L	
107131	Acrylonitrile			not detected	nle	6.25 ug/L	
75650	tert-Butyl alcohol			not detected	nle	12.50 ug/L	
1634044	Methyl-tert-Butyl ether			not detected	nle	2.50 ug/L	
108203	Di-isopropyl ether			not detected	nle	1.25 ug/L	
	Dichlorodifluoromethane			not detected	nle	3.63 ug/L	
74-87-3	Chloromethane			not detected	30	0.79 ug/L	
75-01-4	Vinyl Chloride			not detected	5	2.61 ug/L	
74-83-9	Bromomethane			not detected	10	1.45 ug/L	
75-00-3	Chloroethane			not detected	nle	2.20 ug/L	
75-69-4	Trichlorofluoromethane			not detected	nle	1.31 ug/L	
75-35-4	1,1-Dichloroethene			not detected	2	0.74 ug/L	
67-64-1	Acetone			not detected	700	1.57 ug/L	
75-15-0	Carbon Disulfide			not detected	nle	0.54 ug/L	
75-09-2	Methylene Chloride			not detected	2	1.66 ug/L	
156-60-5	trans-1,2-Dichloroethene			not detected	100	0.50 ug/L	
75-35-3	1,1-Dichloroethane			not detected	70	0.83 ug/L	
108-05-4	Vinyl Acetate			not detected	nle	2.07 ug/L	
78-93-3	2-Butanone			not detected	300	2.06 ug/L	
	cis-1,2-Dichloroethene			not detected	10	0.65 ug/L	
67-66-3	Chloroform			not detected	6	0.43 ug/L	
75-55-6	1,1,1-Trichloroethane			not detected	30	0.81 ug/L	
56-23-5	Carbon Tetrachloride			not detected	2	1.20 ug/L	
71-43-2	Benzene			not detected	1	0.51 ug/L	
107-06-2	1,2-Dichloroethane			not detected	2	1.27 ug/L	
79-01-6	Trichloroethene			not detected	1	0.94 ug/L	
78-87-5	1,2-Dichloropropane			not detected	1	0.78 ug/L	
75-27-4	Bromodichloromethane			not detected	1	0.77 ug/L	
110-75-8	2-Chloroethyl vinyl ether			not detected	nle	1.05 ug/L	
10061-01-5	cis-1,3-Dichloropropene			not detected	nle	0.60 ug/L	
108-10-1	4-Methyl-2-Pentanone			not detected	400	1.33 ug/L	
108-88-3	Toluene			not detected	1000	0.73 ug/L	
10061-02-6	trans-1,3-Dichloropropene			not detected	nle	1.43 ug/L	
79-00-5	1,1,2-Trichloroethane			not detected	3	1.49 ug/L	
127-18-4	Tetrachloroethene			not detected	1	0.92 ug/L	
591-78-6	2-Hexanone			not detected	nle	1.12 ug/L	
126-48-1	Dibromochloromethane			not detected	10	1.36 ug/L	
108-90-7	Chlorobenzene			not detected	4	0.66 ug/L	
100-41-4	Ethylbenzene			not detected	700	1.14 ug/L	
1330-20-7	m+p-Xylenes			not detected	nle	2.53 ug/L	
1330-20-7	o-Xylene			not detected	nle	1.92 ug/L	
100-42-5	Styrene			not detected	100	1.57 ug/L	
75-25-2	Bromoform			not detected	4	1.68 ug/L	
79-34-5	1,1,2,2-Tetrachloroethane			not detected	2	1.71 ug/L	
541-73-1	1,3-Dichlorobenzene			not detected	600	2.51 ug/L	
106-46-7	1,4-Dichlorobenzene			not detected	74	3.08 ug/L	
95-50-1	1,2-Dichlorobenzene			not detected	600	2.75 ug/L	

Qualifiers

B = Compound found in related blank
E = Value above linear range
D = Value from dilution
MDL = Method Detection Limit
NLE = No Limit Established
R.T. = Retention Time

1E

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

FIELD ID.

Trip Blank

Lab Name: FMETL NJDEP # 13461

Project: Case No.: 3437 Location: B.290 SDG No.:

Matrix: (soil/water) WATER Lab Sample ID: 3437.01

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: V03408.D

Level: (low/med) LOW Date Received: 03/26/98

% Moisture: not dec. Date Analyzed: 03/31/98

GC Column: Rtx502.2 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L

Number TICs found: 0

CAS NO.	COMPOUND	RT	EST. CONC.	Q

Volatile Analysis Report
U.S. Army, Fort Monmouth Environmental Laboratory
NJDEP Certification #13461

Data File Name	**v03409.d**	Sample Name	**3437.05**
Operator	**Skelton**	Field ID	**290-B-2-W**
Date Acquired	**31 Mar 1998 9:41**	Sample Multiplier	**1**

CAS#	Compound Name	R.T.	Response	Result	GW Criteria	MDL	Qualifiers
107028	Acrolein			not detected	nle	6.25 ug/L	
107131	Acrylonitrile			not detected	nle	6.25 ug/L	
75650	tert-Butyl alcohol			not detected	nle	12.50 ug/L	
1634044	Methyl-tert-Butyl ether			not detected	nle	2.50 ug/L	
108203	Di-isopropyl ether			not detected	nle	1.25 ug/L	
	Dichlorodifluoromethane			not detected	nle	3.63 ug/L	
74-87-3	Chloromethane			not detected	30	0.79 ug/L	
75-01-4	Vinyl Chloride			not detected	5	2.61 ug/L	
74-83-9	Bromomethane			not detected	10	1.45 ug/L	
75-00-3	Chloroethane			not detected	nle	2.20 ug/L	
75-69-4	Trichlorofluoromethane			not detected	nle	1.31 ug/L	
75-35-4	1,1-Dichloroethene			not detected	2	0.74 ug/L	
67-64-1	Acetone			not detected	700	1.57 ug/L	
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E = Value above linear range
D = Value from dilution
MDL = Method Detection Limit
NLE = No Limit Established
R.T. = Retention Time

1E

VOLATILE ORGANICS ANALYSIS DATA SHEET FIELD ID.

TENTATIVELY IDENTIFIED COMPOUNDS

B-4

Lab Name: FMETL NJDEP # 13461

Project: Case No.: 3437 Location: B.290 SDG No.:

Matrix: (soil/water) WATER Lab Sample ID: 3437.05

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: V03409.D

Level: (low/med) LOW Date Received: 03/26/98

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GC Column: Rtx502.2 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L

Number TICs found: 2

CAS NO.	COMPOUND	RT	EST. CONC.	Q
1. 001070-71-9	Propiolonitrile	5.16	5	JN
2. 000593-75-9	Methane, isocyano-	12.17	9	JN

United States Army
Fort Monmouth, New Jersey

Underground Storage Tank Closure and Site Investigation Report

Building 290B
Main Post-West Area

NJDEP UST Registration No. 81533-224 and 225
DICAR No. 93-11-30-1246-27

May 2001

UNDERGROUND STORAGE TANK
CLOSURE AND SITE INVESTIGATION REPORT

BUILDING 290B

MAIN POST-WEST AREA
NJDEP UST REGISTRATION NO. 81533-224 AND 225

MAY 2001

PREPARED FOR:

UNITED STATES ARMY, FORT MONMOUTH, NEW JERSEY
DIRECTORATE OF PUBLIC WORKS
BUILDING 167
FORT MONMOUTH, NJ 07703

PREPARED BY:

Versar INC.
2558 PEARL BUCK ROAD
SUITE 1
BRISTOL, PA 19007

PROJECT NO. 4936-127

290B.DOC

TABLE OF CONTENTS

EXECUTIVE SUMMARY iv

1.0 UNDERGROUND STORAGE TANK DECOMMISSIONING ACTIVITIES 1

1.1 OVERVIEW 1
1.2 SITE DESCRIPTION 1

1.2.1 Geological/Hydrogeological Setting 2

1.3 HEALTH AND SAFETY 3
1.4 REMOVAL OF UNDERGROUND STORAGE TANK 4

1.4.1 General Procedures 4
1.4.2 Underground Storage Tank Excavation and Cleaning 4

1.5 UNDERGROUND STORAGE TANK TRANSPORTATION AND DISPOSAL 5
1.6 MANAGEMENT OF EXCAVATED SOILS 5

2.0 SITE INVESTIGATION ACTIVITIES 6

2.1 OVERVIEW 6
2.2 FIELD SCREENING/MONITORING 6
2.3 SOIL SAMPLING 7

3.0 CONCLUSIONS AND RECOMMENDATIONS 8

3.1 SOIL SAMPLING RESULTS 8
3.2CONCLUSIONS AND RECOMMENDATIONS 8

TABLE OF CONTENTS (CONTINUED)

TABLES

Table 1	Summary of Post-Excavation Sampling Activities
Table 2	Post-Excavation Soil Sampling Results
Table 3	Post-Excavation Soil Sampling Results
Table 4	Post-Excavation Soil Sampling Results

FIGURES

Figure 1	Site Location Map
Figure 2	Site Map
Figure 3	Cross Sectional View
Figure 4	Soil Sampling Location Map

APPENDICES

Appendix A	NJDEP UST Closure Approval Letter
Appendix B	NJDEP Standard Reporting Form
Appendix C	Site Assessment Summary
Appendix D	Waste Manifest
Appendix E	UST Disposal Certificate
Appendix F	Soil Analytical Data Package

EXECUTIVE SUMMARY

UST Closure

On December 1, 1993, two steel underground storage tanks (USTs) were closed by removal in accordance with New Jersey Department of Environmental Protection (NJDEP) closure procedures at the Main Post-West area of the U.S. Army Fort Monmouth, Fort Monmouth, New Jersey. The USTs, NJDEP Registration Nos. 0081533-224 and 225 (Fort Monmouth ID No. 290B), were located southeast of Building 290. UST Nos. 0081533-224 and 225 were both 2,000-gallon tanks containing gasoline.

Site Assessment-Soil

The site assessment was performed by U.S. Army personnel in accordance with the NJDEP *Technical Requirements for Site Remediation* (N.J.A.C. 7:26E) and the NJDEP *Field Sampling Procedures Manual.* The sampling and laboratory analysis conducted during the site assessment were performed in accordance with Section 7:26E-2.1 of the *Technical Requirements for Site Remediation.* Soils surrounding the tank were screened visually and with air monitoring equipment for evidence of contamination. Following removal, both USTs were inspected for corrosion holes. Numerous holes were noted in the USTs. Soils at the location of the holes were dark in color and appeared to be contaminated. Based on the inspection of the USTs, Directorate of Public Works (DPW) concluded that a discharge of petroleum products was associated with the USTs. The NJDEP hotline was notified and the case was assigned DICAR No. 93-11-30-1246-27. Groundwater was encountered at 5.0 feet below ground surface and sheen was observed on groundwater.

On December 9,1993, following the removal of 259 cubic yards of potentially petroleum contaminated soil from the excavated area, post-excavation soil samples A, B, C, D, E, F, G, H, and I (DUP F) were collected from eight (8) locations within the UST excavation. Sidewall samples A, B, C, D, E, F, G, H, and I (DUP F) were collected at a depth of 4.0 feet bgs. All samples were analyzed for total petroleum hydrocarbons (TPHC), total solids, lead, and Volatile Organic Compounds (VOCs).

Site Assessment-Findings

Analytical results of post-excavation soil samples collected on December 9, 1993, contained either non-detectable concentrations of contaminants or concentrations of contaminants below the NJDEP Residential Direct Contact Soil Cleanup Criteria (RDCSCC).

Site Assessment-Groundwater

Due to the proximity of a former UST (NJDEP Registration No. 0081533-64) excavation, which was located approximately ten- (10) feet northwest of UST Nos. 0081533-224 and 225 excavation, two monitoring wells were installed to monitor groundwater quality for both

UST sites.

On June 1, 2000, a *Site Investigation Report* dated May 2000, prepared by ATC for UST No. 0081533-64 was submitted to the NJDEP. On August 29, 2000, the NJDEP reviewed the *Site Investigation Report* and determined the site requires No Further Action. Therefore, no further action is warranted in regards to the groundwater conditions for UST Nos. 0081533-224 and 225. Please refer to Appendix A for the NJDEP UST Closure Approval Letter.

Conclusion and Recommendations

Based on the analytical results of the post-excavation soil samples collected on December 9, 1993, soil quality at the Building 290 UST closure site does not exceed the NJDEP RDCSCC. Therefore, no further action is warranted.

Based on the review by the NJDEP on August 29, 2000, groundwater quality at Building 290 was either below the detection limit or in compliance with the New Jersey Ground Water Quality Criteria (GWQC).

No further action is proposed in regard to the closure and site assessment of UST Nos. 0081533-224 and 225 at Building 290.

1.0 UNDERGROUND STORAGE TANK DECOMMISSIONING ACTIVITIES

1.1 OVERVIEW

Two underground storage tanks (USTs), New Jersey Department of Environmental Protection (NJDEP) Registration Nos. 81533-224 and 225, were closed at Building 290 at the Main Post-West area of U.S. Army Fort Monmouth, Fort Monmouth, New Jersey on December 1, 1993. Refer to the site location map on Figure 1. This report presents the results of the Department of Public Works' (DPW) implementation of the UST Decommissioning/Closure Plan approved by the NJDEP. The USTs were 2,000-gallon steel tanks containing gasoline.

Decommissioning activities for UST No. 81533-224 and 225 complied with all applicable Federal, State, and Local laws and ordinances in effect at the date of decommissioning. These laws included but were not limited to N.J.A.C. 7:14B-1 et seq., N.J.A.C. 5:23-1 et seq., and Occupational Safety and Health Administration (OSHA) 1910.146 & 1910.120. All permits including but not limited to the NJDEP approved Decommissioning/Closure Plan were posted onsite for inspection. The decommissioning activities were conducted by DPW personnel who are registered and certified by the NJDEP for performing UST closure activities. Closure of UST No. 81533-224 and 225 proceeded under the approval of the NJDEP Bureau of Federal Case Management (NJDEP-BFCM). The Standard Reporting Form and signed Site Assessment Summary form for UST No. 81533-224 and 225 are included in Appendices B and C, respectively.

After removal of the potentially contaminated soil, the site was assessed. Based on inspecting the UST, field screening of remaining subsurface soils, and reviewing analytical results of soil samples and groundwater samples, the DPW has concluded that no significant historical discharges are associated with the UST or associated piping.

This UST Closure and Site Investigation Report has been prepared by Versar, to assist the U.S. Army DPW in complying with the NJDEP regulations. The applicable NJDEP regulations at the date of closure were the *Interim Closure Requirements for Underground Storage Tank Systems* (N.J.A.C. 7:14B-1 et seq. October 1990 and revisions dated November 1, 1991).

This report was prepared using information collected at the time of closure. Section 1 of this UST Closure and Site Investigation Report provides a summary of the UST decommissioning activities. Section 2 of this report describes the site investigation activities. Conclusions and recommendations, including the results of the soil sampling and groundwater investigation, are presented in the final section of this report.

1.2 SITE DESCRIPTION

Building 290 is located in the Main Post-West area of the Fort Monmouth Army Base. USTs No. 0081533-224 and 225 were located southeast of Building 290. The fill ports

were located directly above the tanks. A site map is provided on Figure 2.

1.2.1 Geological/Hydrogeological Setting

The following is a description of the geological/hydrogeological setting of the area surrounding Building 290. Included is a description of the regional geology of the area surrounding Fort Monmouth as well as descriptions of the local geology and hydrogeology of the Main Post area.

Regional Geology

Monmouth County lies within the New Jersey Section of the Atlantic Coastal Plain physiographic province. The Main Post, Charles Wood, and the Evans areas are located in what may be referred to as the Outer Coastal Plain subprovince, or the Outer Lowlands.

In general, New Jersey Coastal Plain formations consist of a seaward-dipping wedge of unconsolidated deposits of clay, silt, and gravel. These formations typically strike northeast-southwest with a dip ranging from 10 to 60 feet per mile and were deposited on Precambrian and lower Paleozoic rocks (Zapecza, 1989). These sediments, predominantly derived from deltaic, shallow marine, and continental shelf environments, date from Cretaceous through the Quaternary Periods. The mineralogy ranges from quartz to glauconite.

The formations record several major transgressive/regressive cycles and contain units which are generally thicker to the southeast and reflect a deeper water environment. More than 20 regional geologic units are present within the sediments of the Coastal Plain. Regressive, upward coarsening deposits are usually aquifers (e.g., Englishtown and Kirkwood Formations, and the Cohansey Sand) while the transgressive deposits act as confining units (e.g., the Merchantville, Marshalltown, and Navesink Formations). The individual thicknesses for these units vary greatly (i.e., from several feet to several hundred feet). The Coastal Plain deposits thicken to the southeast from the Fall Line to greater than 6,500 feet in Cape May County (Brown and Zapecza, 1990).

Local Geology

Based on the regional geologic map (Jablonski, 1968), the Cretaceous age Red Bank and Tinton Sands outcrop at the Main Post area. The Red Bank sand conformably overlies the Navesink Formation and dips to the southeast at 35 feet per mile. The upper member (Shrewsbury) of the Red Bank sand is a yellowish-gray to reddish brown clayey, medium-to-coarse-grained sand that contains abundant rock fragments, minor mica and glauconite (Jablonski). The lower member (Sandy Hook) is a dark gray to black, medium-to-fine grained sand with abundant clay, mica, and glauconite.

The Tinton sand conformably overlies the Red Bank Sand and ranges from a clayey medium to very coarse grained feldspathic quartz and glauconite sand to a glauconitic coarse sand. The color varies from dark yellowish orange or light brown to moderate brown and from light olive to grayish olive. Glauconite may constitute 60 to 80 percent of

the sand fraction in the upper part of the unit (Minard, 1969). The upper part of the Tinton is often highly oxidized and iron oxide encrusted (Minard).

Hydrogeology

The water table aquifer in the Main Post area is identified as part of the "composite confining units," or minor aquifers. The minor aquifers include the Navesink formation, Red Bank Sand, Tinton Sand, Hornerstown Sand, Vincentown Formation, Manasquan Formation, Shark River Formation, Piney Point Formation, and the basal clay of the Kirkwood Formation.

Based on records of wells drilled in the Main Post area, water is typically encountered at depths of 2 to 9 feet below ground surface (bgs). According to Jablonski, wells drilled in the Red Bank and Tinton Sands may produce 2 to 25 gallons per minute (gpm). Some well owners have reported acidic water that requires treatment to remove iron.

Due to the proximity of the Atlantic Ocean to Fort Monmouth, shallow groundwater may be tidally influenced and may flow toward creeks and brooks as the tide goes out, and away from creeks and brooks as the tide comes in. However, an abundance of clay lenses and sand deposits were noted in borings installed throughout Fort Monmouth. Therefore, the direction of shallow groundwater should be determined on a case-by-case basis.

Shallow groundwater is locally influenced within the Main Post area by the following factors:

- tidal influence (based on proximity to the Atlantic Ocean, rivers, and tributaries)
- topography
- nature of the fill material within the Main Post area
- presence of clay and silt lenses in the natural overburden deposits
- local groundwater recharge areas (i.e., streams, lakes)

Due to the fluvial nature of the overburden deposits (i.e., sand and clay lenses), shallow groundwater flow direction is best determined on a case-by-case basis. This is consistent with lithologies observed in borings installed within the Main Post area, which primarily consisted of fine-to-medium grained sands, with occasional lenses or laminations of gravel silt and/or clay.

Building 290B is located approximately 400 feet south of Parkers Creek, the nearest water body. Based on the Main Post topography, the groundwater flow in the area of Building 290 is anticipated to be to the north.

1.3 HEALTH AND SAFETY

Before, during, and after all decommissioning activities, hazards at the work site which may have posed a threat to the Health and Safety of all personnel who were involved with, or were affected by, the decommissioning of the UST system were minimized. All areas,

which posed, or may have been suspected to pose a vapor hazard were monitored by a qualified individual utilizing an organic vapor analyzer (OVA). The individual ascertained if the area was properly vented to render the area safe, as defined by OSHA.

1.4 REMOVAL OF UNDERGROUND STORAGE TANK

1.4.1 General Procedures

- The contractor performing the closure prior to excavation activities identified all underground obstructions (utilities, etc.).
- All activities were carried out with the greatest regard to safety and health and the safeguarding of the environment.
- All excavated soils were visually examined and screened with an OVA for evidence of contamination. Potentially contaminated soils were identified and logged during closure activities.
- Surface materials (i.e., asphalt, concrete, etc.) were excavated and staged separately from all soil and recycled in accordance with all applicable regulations and laws.
- A Sub-Surface Evaluator from the DPW was present during all site assessment activities.

1.4.2 Underground Storage Tank Excavation and Cleaning

Prior to UST decommissioning activities, surficial soil was removed to expose the UST and associated piping. All free product present in the piping was drained into the UST, and the UST was purged to remove vapors prior to cutting and removal of the piping. After removal of the associated piping, a manway was made in the UST to allow for proper cleaning. The UST was completely emptied of all liquids prior to removal from the ground. Approximately 2,500 gallons of liquid from the UST and its associated piping were transported by Casie Protank to Casie Ecology Oil Salvage, Inc. facility, a NJDEP-approved petroleum recycling and disposal company located in Vineland, New Jersey. Refer to Appendix D for the waste manifest.

The USTs were cleaned prior to removal from the excavation in accordance with the NJDEP regulations. After the USTs were removed from the excavation, they were staged on polyethylene sheeting and examined for holes. Numerous holes were observed during the inspection by the Sub-Surface Evaluator. Soils surrounding the USTs were screened visually and with an OVA for evidence of contamination. Soils were stained and appeared to be contaminated. Approximately 259 cubic yards of potentially contaminated soil were removed from the excavated area and transported to the Main Post petroleum contaminated soil holding area. Soil screening was also performed along the piping associated with the UST. No contamination was noted anywhere along the piping length. Groundwater was encountered at 5.0 feet below ground surface and sheen was observed on groundwater. See Figure 3 for a cross-sectional view of the excavated area.

1.5 UNDERGROUND STORAGE TANK TRANSPORTATION AND DISPOSAL

The tanks were transported in compliance with all applicable regulations and laws to Mazza and Sons, Inc., Metal Recyclers. Please refer to Appendix E for the USTs Disposal.

The UST was labeled prior to transport with the following information:

- Site of origin
- Contact person
- NJDEP UST Facility ID number
- Former contents
- Destination site
- Date

1.6 MANAGEMENT OF EXCAVATED SOILS

Based on visual observation, 259 cubic yards of contaminated soil were removed from the excavation area. All potentially contaminated soils were stockpiled separately from other excavated material and were placed on and covered with polyethylene sheets. Potentially contaminated soils were transported to the soil staging area at the Main Post Building. Soils that did not exhibit signs of contamination were used as backfill following the removal of the USTs. Groundwater was encountered at 5.0 feet below ground surface and sheen was observed on groundwater.

2.0 SITE INVESTIGATION ACTIVITIES

2.1 OVERVIEW

The Site Investigation was managed and carried out by U.S. Army DPW personnel. All analyses were performed and reported by U.S. Army Fort Monmouth Environmental Laboratory, a NJDEP certified testing laboratory. All sampling was performed under the direct supervision of a NJDEP Certified Sub-Surface Evaluator according to the methods described in the NJDEP *Field Sampling Procedures Manual* (1992). Sampling frequency and parameters analyzed complied with the NJDEP document *Interim Closure Requirements for Underground Storage Tank Systems* (October 1990 and revisions dated November 1, 1991) which was the applicable regulation at the date of the closure. The Fort Monmouth DPW Environmental Office maintains all records of the Site Investigation activities.

The following Parties participated in Closure and Site Investigation Activities:

- Subsurface Evaluator: Charles Appleby
  Employer: U.S. Army, Fort Monmouth
  Phone Number: (732) 532-0989
  NJDEP Certification No.: 002056

- Analytical Laboratory: U.S.Army Fort Monmouth Environmental laboratory
  Contact Person: Daniel K. Wright
  Phone Number: (732) 532-4359
  NJDEP Company Certification No.: 13461

- Hazardous Waste Hauler: Casie Protank Environmental Services
  Contact Person: James Gutisc
  Phone Number: (609) 696-4401
  NJDEP Company Certification No.: 16931

2.2 FIELD SCREENING/MONITORING

Field screening was performed by a NJDEP Certified Sub-Surface Evaluator using an OVA and visual observations to identify potentially contaminated material. Soil excavated from around the tank exhibited evidence of potential contamination. Approximately 259 cubic yards of potentially petroleum contaminated soil were removed from the excavated area and transported to the Fort Monmouth petroleum contaminated soil holding area. Soils were removed from the excavation until no evidence of contamination remained. Groundwater was encountered at 5.0 feet below ground surface and sheen was observed groundwater.

2.3 SOIL SAMPLING

On December 9,1993, following the removal of 259 cubic yards of potentially petroleum contaminated soil from the excavated area, post-excavation soil samples A, B, C, D, E, F, G, H, and I (DUP F) were collected from a total of eight (8) locations within the UST excavation. Sidewall samples A, B, C, D, E, F, G, H, and I (DUP F) were collected at a depth of 4.0 feet bgs. Piping samples were not collected because the piping was located within the excavation. All samples were analyzed for TPHC, total solids, lead, and VOCs.

U.S. Army personnel in accordance with the NJDEP Technical Requirements and the NJDEP Field Sampling Procedures Manual performed the site assessment. A summary of sampling activities including parameters analyzed is provided in Table 1. The post-excavation soil samples were collected using NJDEP *Field Sampling Procedures Manual* (1992) standard sampling procedures. Following soil sampling activities, the samples were chilled and delivered to U.S. Army Fort Monmouth Environmental Laboratory located in Fort Monmouth, New Jersey, for analysis.

3.0 CONCLUSIONS AND RECOMMENDATIONS

3.1 SOIL SAMPLING RESULTS

To evaluate soil conditions following removal of the USTs and associated soils, eight (8) post-excavation sample results were compared to NJDEP Residential Direct Contact Soil Cleanup Criteria (RDCSCC) (N.J.A.C. 7:26D and revisions dated May 12, 1999). Summaries of analytical results for soils are presented in Tables 1 to 4 and the associated soil sampling locations are shown on Figure 4. The analytical data package is provided in Appendix F.

Excavation of potentially contaminated soil from the area surrounding the USTs was performed between November 29, 1993, and December 9, 1993. Approximately 259 cubic yards of potentially contaminated soil were removed from the excavated area and stored at the Fort Monmouth petroleum contaminated soil staging area.

Analytical results of post-excavation soil samples collected on December 9, 1993, contained either non-detectable concentrations of contaminants or concentrations of contaminants below the NJDEP RDCSCC.

3.2 CONCLUSIONS AND RECOMMENDATIONS

Based on the analytical results of the post-excavation soil samples collected on December 9, 1993, soil quality at the Building 290 UST closure site does not exceed the NJDEP RDCSCC. Therefore, no further action is warranted.

Based on the review by the NJDEP on August 29, 2000, groundwater quality at Building 290 was either below the detection limit or in compliance with the New Jersey Ground Water Quality Criteria (GWQC).

No further action is proposed in regard to the closure and site assessment of UST Nos. 0081533-224 and 225 at Building 290.

TABLES

TABLE 1

SUMMARY OF POST-EXCAVATION SAMPLING ACTIVITIES
BUILDING 290, MAIN POST-WEST AREA
FORT MONMOUTH, NEW JERSEY

Sample ID	Date of Collection	Date Analysis Started	Matrix	Sample Type	Analytical Parameters*	Sampling Method
A	12/09/93	12/13/93	Soil	Post-Excavation	TPHC,VO+15,Lead	Scoop
B	12/09/93	12/13/93	Soil	Post-Excavation	TPHC,VO+15,Lead	Scoop
C	12/09/93	12/13/93	Soil	Post-Excavation	TPHC,VO+15,Lead	Scoop
D	12/09/93	12/13/93	Soil	Post-Excavation	TPHC,VO+15,Lead	Scoop
E	12/09/93	12/13/93	Soil	Post-Excavation	TPHC,VO+15,Lead	Scoop
F	12/09/93	12/13/93	Soil	Post-Excavation	TPHC,VO+15,Lead	Scoop
G	12/09/93	12/13/93	Soil	Post-excavation	TPHC,VO+15,Lead	Scoop
H	12/09/93	12/13/93	Soil	Post-Excavation	TPHC,VO+15,Lead	Scoop
I	12/09/93	12/13/93	Soil	Post-excavation	TPHC,VO+15,Lead	Scoop

Note:
* TPHC Total Petroleum Hydrocarbons

TABLE 2

POST-EXCAVATION SOIL SAMPLING RESULTS
BUILDING 290, MAIN POST-WEST AREA
FORT MONMOUTH, NEW JERSEY

Sample ID/ Depth	Sample Laboratory ID	Sample Date	Analysis Date	Analytical Parameters	Method Detection Limit (mg/kg)	Compound of Concern	Results (mg/kg) *	NJDEP Soil Cleanup Criteria ** (mg/kg)	Exceeds Cleanup Criteria
A/4.0'=	1356.1	12/09/93	12/13/93	Total Solid	--	--	91.00 %	--	--
				TPHC	3.3	yes	426.00	10,000	No
B/4.0'=	1356.2	12/09/93	12/13/93	Total Solid	--	--	90.00 %	--	--
				TPHC	46.0	Yes	2720.00	10,000	No
C/4.0'=	1356.3	12/09/93	12/13/93	Total Solid	--	--	87.00 %	--	--
				TPHC	3.3	Yes	85.90	10,000	No
D/4.0'=	1356.4	12/09/93	12/13/93	Total Solid	--	--	89.00 %	--	--
				TPHC	3.3	yes	7.01	10,000	No
E/4.0'=	1356.5	12/09/93	12/13/93	Total Solid	--	--	90.00 %	--	--
				TPHC	3.3	Yes	9.75	10,000	No
F/4.0'=	1356.6	12/09/93	12/13/93	Total Solid	--	--	92.00 %	--	--
				TPHC	3.3	Yes	ND	10,000	No
G/4.0'=	1356.7	12/09/93	12/13/93	Total Solid	--	--	93.00 %	--	--
				TPHC	3.3	yes	ND	10,000	No
H/4.0'=	1356.8	12/09/93	12/13/93	Total Solid	--	--	93.00 %	--	--
				TPHC	3.3	Yes	ND	10,000	No
I/4.0'=	1356.9	12/09/93	12/13/93	Total Solid	--	--	93.00 %	--	--
				TPHC	3.3	yes	ND	10,000	No

Note:
* Total Solid results are expressed as a percentage.
** NJDEP Residential Direct Contact soil cleanup criteria for total organics
ND Not detected above stated method detection limit
TPHC Total Petroleum Hydrocarbons

TABLE 3

SUMMARY OF ANALYTICAL RESULTS FOR SOIL
BUILDING NO. 290
FORT MONMOUTH, NEW JERSEY

Sample I.D.	Laboratory I.D.	Sample Date	Acetone	2-Butanone	Ethylbenzene	Xylenes(Total)
UNITS:			mg/kg	mg/kg	mg/kg	mg/kg
NJDEP CRITERIA:	Residential		1000	1000	1000	410
	Non-Residential		1000	1000	1000	1000
A	1356.1	12/09/93	0.15 B	ND	ND	ND
B	1356.2	12/09/93	0.72 JB	ND	ND	ND
C	1356.3	12/09/93	0.39 B	ND	0.15	0.10
D	1356.4	12/09/93	0.15 B	ND	ND	ND
E	1356.5	12/09/93	0.15 B	0.02	ND	.005 J
F	1356.6	12/09/93	0.09 B	.008 J	ND	ND
G	1356.7	12/09/93	0.12 B	0.01	ND	ND
H	1356.8	12/09/93	0.22 B	ND	ND	ND
I (DUP F)	1356.9	12/09/93	.084 B	.007 J	ND	ND

Abbreviations:

mg/kg:	Milligrams per Kilogram.
ND:	Indicates compound not detected.
B:	Indicates also in field blank.
J:	Compound identified below detection limit.

TABLE 4

SUMMARY OF ANALYTICAL RESULTS FOR LEAD
BUILDING 290
FORT MONMOUTH, NEW JERSEY

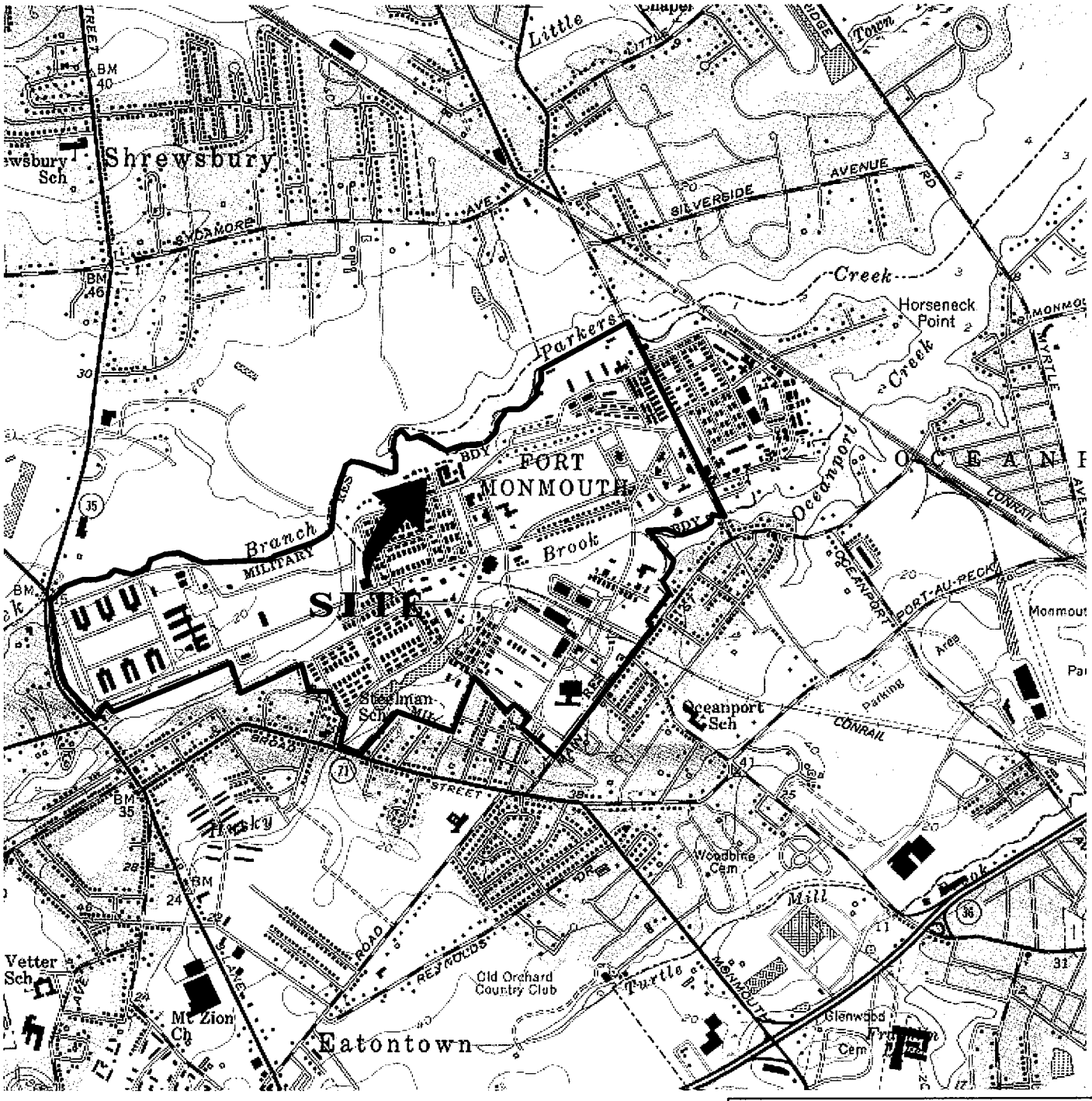
Site: B290
Lab ID #: 1356.1-.9
Matrix: Soils

Sample Received: 12/9/93
Analysis Start: 12/13/93
Analysis Completed: 12/13/93

LABORATORY I.D. #	SAMPLE LOCATION	RESULT (mg/Kg)	RDCSCC (mg/Kg)
1356.1	290-A	ND	400
1356.2	290-B	14.50	400
1356.3	290-C	ND	400
1356.4	290-D	ND	400
1356.5	290-E	ND	400
1356.6	290-F	ND	400
1356.7	290-G	ND	400
1356.8	290-H	ND	400
1356.9	290-I	ND	400

Note:
mg/kg: Milligrams per Kilogram.
ND: Not Detected.
RDCSCC refers to the New Jersey Residential Direct Contact Soil Cleanup Criteria

FIGURES



LONG BRANCH, N. J.

40073-C8-TF-024

1954

PHOTOREVISED 1981

DMA 6164 I SE-SERIES V822

NEW JERSEY

QUADRANGLE LOCATION

Mapped, edited and published by the Geological Survey

FIGURE 1

LOCATION MAP
Building 290
Main-Post West
Fort Monmouth Army Base
Monmouth County, NJ

VERSAR
Engineers, Managers, Scientists, & Planners
Bristol, PA

Scale: 1" = 2000'	Date: Dec. 1993

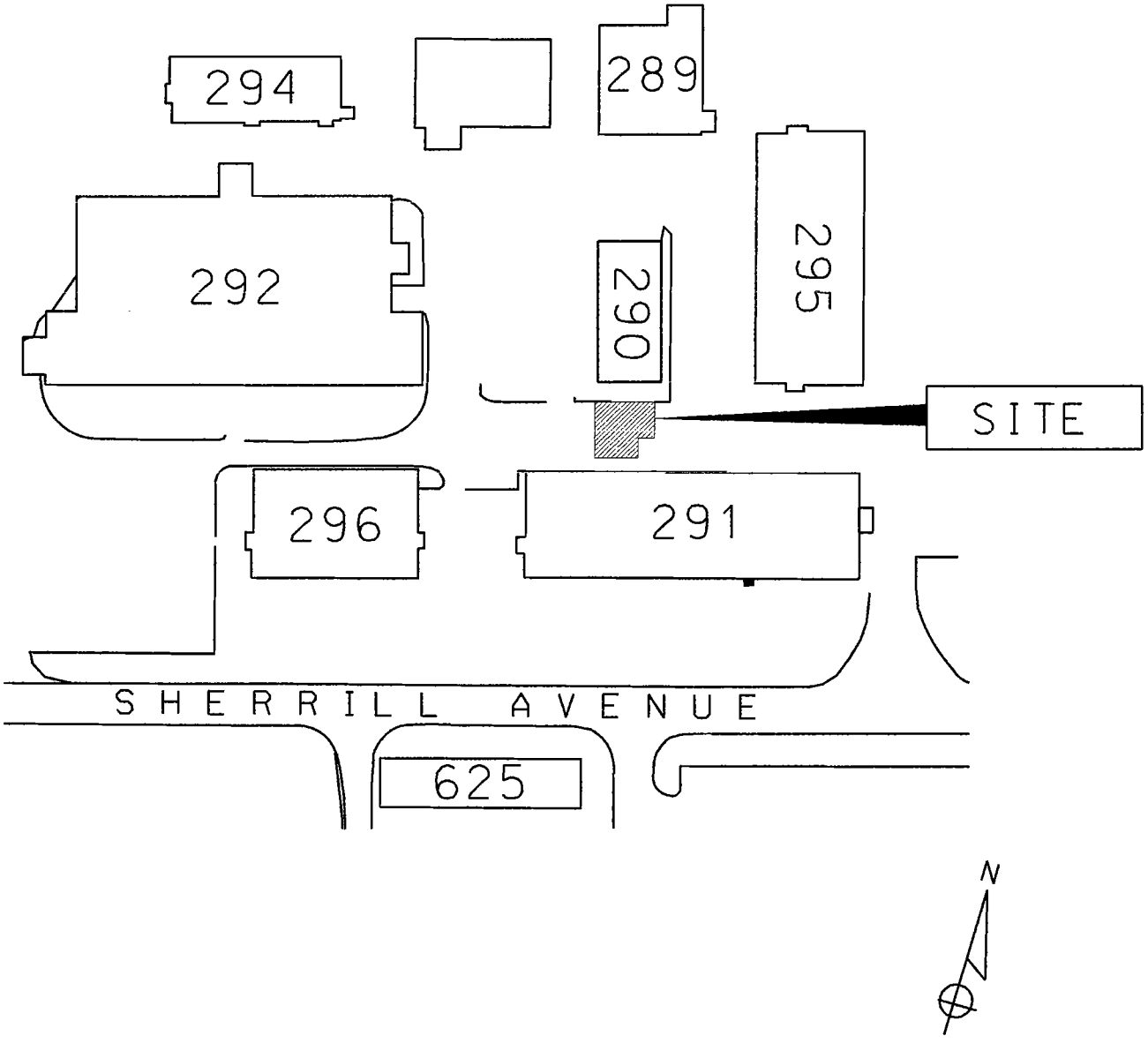


FIGURE 2
SITE MAP
BUILDING 290
FORT MONMOUTH ARMY BASE
MONMOUTH COUNTY, NJ

VERSAR
ENGINEERS, MANAGERS, SCIENTISTS & PLANNERS
BRISTOL, PA.

SCALE: 1"=100' | DATE: DECEMBER 1993

290 FIG2

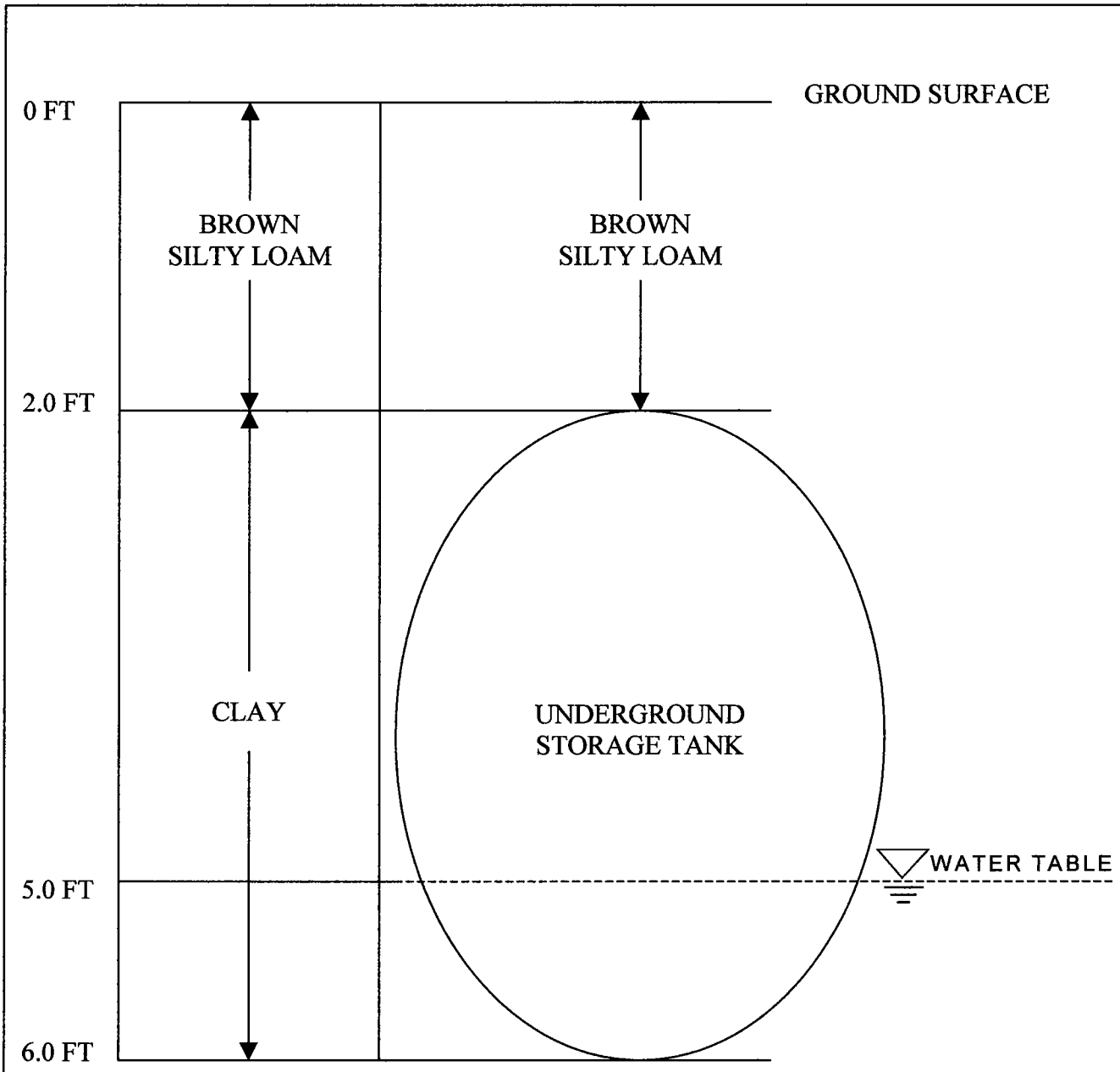
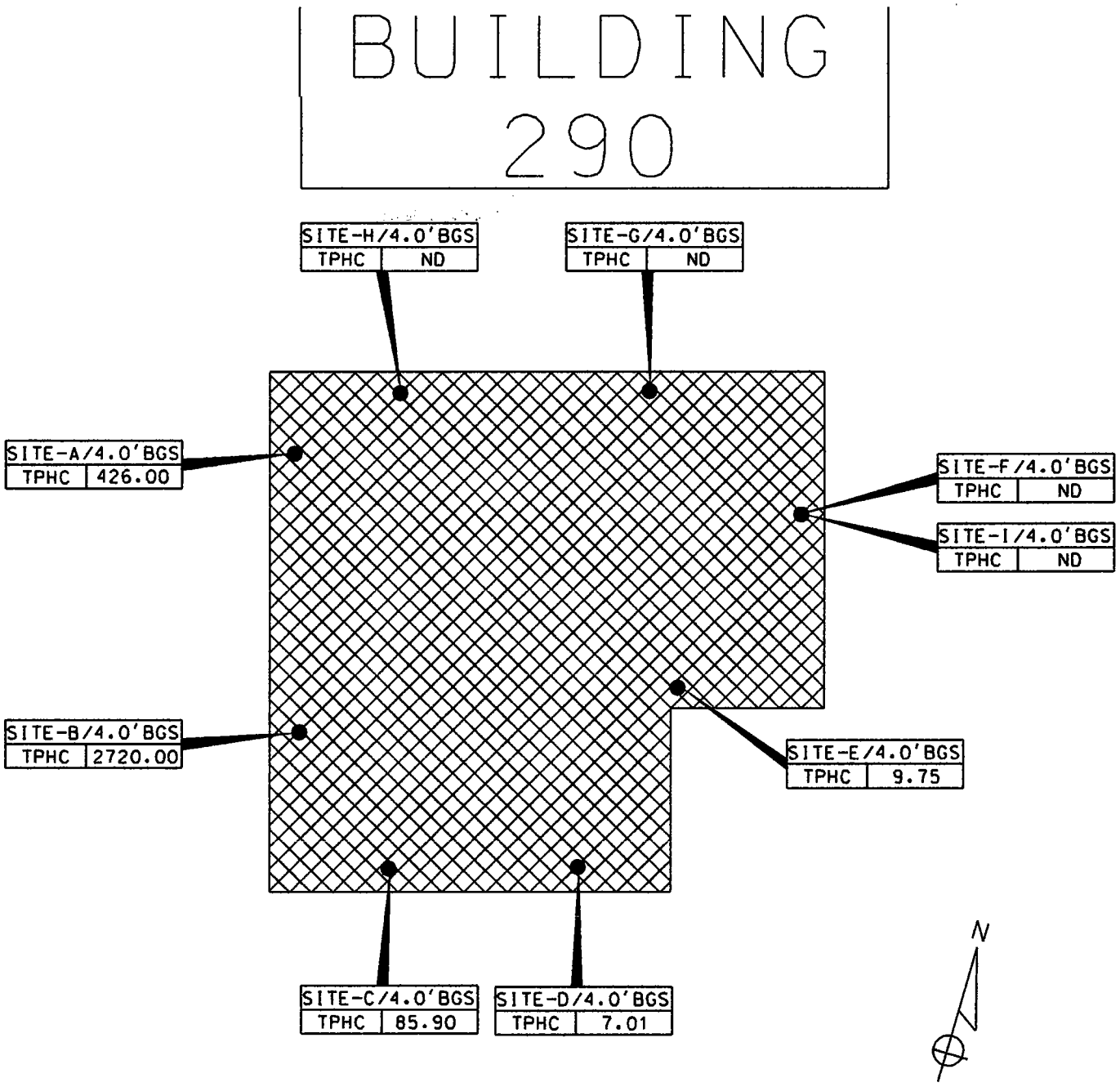


FIGURE 3
CROSS SECTIONAL VIEW
BUILDING 290B
FORT MONMOUTH ARMY BASE
MONMOUTH COUNTY, NJ

VERSAR
Engineers, Managers, Scientists & Planners
Bristol, Pennsylvania

SCALE: NTS	DATE: Dec. 1993



LEGEND

- SOIL SAMPLE LOCATION (DECEMBER 9, 1993)
- LIMIT OF EXCAVATION (DECEMBER 9, 1993)

NOTES:

1. ALL RESULTS IN MG/KG.
2. SEE TABLE 2 FOR NJDEP SOIL CLEANUP CRITERIA
3. BGS = BELOW GROUND SURFACE

FIGURE 4
SOIL SAMPLING LOCATION MAP
BUILDING 290
FORT MONMOUTH ARMY BASE
MONMOUTH COUNTY, NJ

VERSAR
ENGINEERS, MANAGERS, SCIENTISTS & PLANNERS
BRISTOL, PA.

SCALE: 1"=10' | DATE: DECEMBER 1993

290 FIG4

APPENDIX A

NJDEP UST CLOSURE APPROVAL LETTER

State of New Jersey

Department of Environmental Protection

Christine Todd Whitman
Governor

Robert C. Shinn, Jr.
Commissioner

Mr. Dinkerrai Desai
DEPARTMENT OF THE ARMY
HEADQUARTERS, U.S. ARMY COMMUNICATIONS-ELECTRONIC COMMAND
FORT MONMOUTH, NJ 07703-5000

AUG 2 9 2000

Re: UST Closure Approval/NFA
Fort Monmouth Main Post
Monmouth County

Dear Mr. Desai:

The NJDEP is in receipt of seventeen (17) UST closure reports dated June 1, 2000. The Army has requested to receive No Further Action approval letters for each of these reports. This letter approves the NFA requests for the following 17 UST located on the Main Post of the Fort Monmouth site:

NJDEP Req. #	Bldg. #	NJDEP Req. #	Bldg. #
0090010—06	80	0081533—226	707
0090010—17	166	0081533—119	745
0081533—5	207A	0081533—160	1076
0081533—211	207B	0081533—161	1076
0081533—57	282	0081533—168	1108
0081533—64	290	00192486—1	2000
0081533—68	295	0081515—62	2700.4
0081533—108	689A	00192486—30	3050
0081533—109	689B		

The NJDEP has determined that the Army has performed the remedial actions in a manner consistent or in excess of the regulatory requirements, specifically the Technical Requirements For Site Remediation (N.J.A.C. 7:26E et seq.). Soils with contamination in excess of the NJDEP residential cleanup criteria have been excavated and the Army has taken great care to provide documentation which assures us that all sources of contamination have been remediated.

The NJDEP has one comment in that we request that future reports provide ground water flow direction indications on the well location maps.

If you should have any questions or comments, please do not hesitate to contact me at (609) 633-7232 or via E-mail.

Sincerely,

Ian R. Curtis, Case Manager
Bureau of Case Management
ICURTIS@DEP.STATE.NJ.US

FINAL

AUGUST 2013 BASELINE GROUNDWATER SAMPLING REPORT

FORT MONMOUTH, OCEANPORT, MONMOUTH COUNTY, NEW JERSEY

BRAC 05 Facility
Contract W912DY-09-D-0062
Task Order: 0012, Project No. 36985

Submitted To:

U.S. Army Engineering and Support Center

Huntsville, Alabama

Prepared By:

PARSONS
401 Diamond Dr. NW, Huntsville, AL 35806

Revision No. 0
March 2014

APPENDIX M: FTMM-55 Building 290

TABLE OF CONTENTS

1.0 FTMM-55 GROUNDWATER MONITORING M-1
2.0 WATER LEVEL MEASUREMENTS AND ASSESSMENT M-1
3.0 HISTORICAL GROUNDWATER SAMPLING RESULTS M-1
4.0 AUGUST 2013 GROUNDWATER RESULTS M-2
5.0 FINDINGS AND RECOMMENDATIONS M-2

LIST OF TABLES

Table No.	Title
1	Groundwater Gauging Data and Sample Summary
2	Historical Groundwater Analytical Results
3	2013 Baseline Groundwater Analytical Detections
4	Groundwater Sampling Analyte Review

LIST OF FIGURES

Figure No.	Title
1	Layout of FTMM-18, FTMM-54 (Building 296) & FTMM-55 (Building 290)

LIST OF ATTACHMENTS

Attachment	Title
A	LFPS Field Sheets

1.0 FTMM-55 GROUNDWATER MONITORING

Groundwater sampling was conducted at one monitoring well, 290MW01, located at FTMM-55 as part of the August 2013 Baseline Sampling Event. The groundwater sampling program included measuring the depth to water and sample collection using low flow purging and sampling (LFPS) methodology as per the March 2013 Sampling and Analysis Plan (SAP). Sampling was conducted on August 16, 2013. The groundwater sample was analyzed for lead via United States Environmental Protection Agency (USEPA) Method SW6010C. The monitoring well location as well as other site features can be found in **Figure 1**.

In accordance with the New Jersey Department of Environmental Protection (NJDEP) Field Sampling Procedures Manual and the SAP, Quality Assurance/Quality Control (QA/QC) samples were collected. Field blanks, duplicates, matrix spike, matrix spike duplicate and QA split samples were collected for every 5% of samples collected per parameter, per matrix. Trip blanks accompanied each cooler each day in which volatile organic compounds (VOCs) were collected for laboratory analysis.

Completed LFPS records for each well sampled can be found in **Attachment A**.

2.0 WATER LEVEL MEASUREMENTS AND ASSESSMENT

Monitoring well 290MW01, located within FTMM-55 was gauged on August 8, 2013. The groundwater elevation was found to be 4.89 feet above mean sea level (amsl). Groundwater is expected to flow north-northwest in the Site vicinity based on groundwater elevations collected from wells proximal to FTMM-55 (**Figure 1**). Additional details regarding groundwater gauging and sampling can be found in **Table 1**.

During the groundwater gauging carried out at FTMM-55, the condition of the monitoring well was also assessed. FTMM-55 monitoring well, 290MW01 was found to be in good physical condition and contained pump tubing.

3.0 HISTORICAL GROUNDWATER SAMPLING RESULTS

From June 1997 through November 2004, FTMM-55 monitoring wells (290MW01, 290MW02) were sampled for VOCs, semi-volatile organic compounds (SVOCs), pesticides, polychlorinated biphenyls (PCBs), and metals. From January 2005 to April 2006 FTMM-55 wells were sampled for VOCs and metals. In August 2006, 290MW02 was damaged and sampling was discontinued at this location. Groundwater sampling for VOCs and metals continued from August 2006 to September 2009 in monitoring well 290MW01.

In the last four rounds of quarterly groundwater sampling conducted at FTMM-55 from November 2009 to September 2010, samples were submitted for VOCs and metals. Within the last four rounds of groundwater sampling at FTMM-55, arsenic and lead were detected above their respective NJDEP Groundwater Quality Standard (GWQS) in monitoring well 290MW01. However, these concentrations were below the background groundwater concentrations established in the 1995 Weston Report.

No VOCs were detected in exceedance of any NJDEP GWQS within the last four rounds of groundwater sampling. Historical groundwater analytical results are presented in **Table 2**.

4.0 AUGUST 2013 GROUNDWATER RESULTS

Lead was detected at a concentration of 5.3 µg/L in 290MW01, in exceedance of its NJDEP GWQS of 5 µg/L. However, this concentration is below the background concentration (Weston 1995) for lead of 22.7 µ g/L. Groundwater analytical detections from samples collected during the August 2013 Baseline Sampling Event are presented in **Table 3**.

5.0 FINDINGS AND RECOMMENDATIONS

Groundwater analytical results for metals were not detected above background concentrations (Weston 1995) during the August 2013 Baseline Groundwater Sampling Event or within the last four rounds of historical groundwater sampling. Additionally, no VOCs were detected in monitoring well 290MW01 within the last four rounds of historical groundwater sampling. Therefore, it is recommended that groundwater monitoring be discontinued at FTMM-55. **Table 4** presents the matrix used to determine the recommendations for this Site.

TABLES

Table 1 Groundwater Gauging Data and Sample Summary

Table 2 Historical Groundwater Analytical Results

Table 3 2013 Baseline Groundwater Analytical Detections

Table 4 Groundwater Sampling Analyte Review

Table 1
Groundwater Gauging and Sampling Summary
Site FTMM-55
Fort Monmouth, New Jersey

Site	Well Permit #	Y Coord. (North)	X Coord. (East)	Depth	Screen Length	Screen Interval	TOC Elev.	Gauge Date	Gauge Time	PID Reading (ppm)	Gauged DTW (ft) TOC or TPVC	Gauged DTB (ft) TOC or TPVC	GW Elevation (ft.AMSL)	LFPS Sample Date	LFPS Sample Time
				feet											
M-55, B290															
290MW01	29-30961	540254.283	618641.322	12.50	10.50	2-12.5	12.83	8-8-13	1542	0.0	7.94	15.91	4.89	8/16/2013	1310

Notes:
Information on well permit number, X and Y coordinates, depth, screen length, screen interval and TOC elevation were provided by FTMM in a table in June 2013 and were collected in well permits.
DTW = depth to water (measured from the top of well casing)
DTB = depth to bottom of well (measured from the top of well casing)
TOC= Top of Casing
ft. AMSL = feet above means sea level
LFPS - low flow purging and sampling

Table 2
Historical Groundwater Analytical Results
Site FTMM-55
Fort Monmouth, New Jersey

				290MW01																
Round No.	**NJDEP Class IIA GWQS**	**USEPA MCL**	**Weston 1995 Background (Main Post)**	46	47	48	49	50	51	52	53	54	55	55 Dup	56	56 Dup	57	58	59	60	60 Dup
Date Collected				3/4/2008	5/14/2008	8/13/2008	10/24/2008	3/26/2009	6/2/2009	9/17/2009	11/23/2009	2/2/2010	5/10/2010	5/10/2010	9/10/2010	9/10/2010	11/12/2010	2/24/2011	4/19/2011	8/10/2011	8/10/2011
ANALYTE / Lab ID				80066.01	80163.01	80297.01	80388.01	90123.01	90218.01	90386.01	90457.01	10047.01	10182.04	10182.03	10383.04	10383.03	1048501	1106901	1115501	1133201	
Volatile Organic Compounds (µg/L)																					
Acetone	6000	NLE	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
m+p-Xylenes	1,000	10,000	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
o- Xylene	1,000	10,000	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
TICs*	NLE	NLE	-	5	ND	5	ND	ND	ND	ND	ND	4	3	3	7	0	ND	ND	5	ND	ND
Metals (µg/L)																					
Antimony	6	6	20.70	ND	ND	ND	ND	34.7	ND	ND	ND	8.36 ER	8.50 ER	9.59 ER	7.51 ER	8.30 ER	ND	< 6	< 6	< 6	< 6
Arsenic	3	10	89.30	ND	ND	2.62 ER	ND	123	13.9	20.9	3.20 ER	2.96 ER	1.21 ER	1.22 ER	2.78 ER	3.15 ER	2.98	< 3	< 3	13.2	14.5
Barium	6000	2000	699.00	39.6	26	11.6	49.2	335	13.9	21.5	11.9	46.4	59.8	56.1	31	27.5	13.9	< 200	< 200	< 200	< 200
Beryllium	1	4	2.10	ND	0.152 ER	ND	0.375 ER	ND	ND	0.183 ER	ND	ND	0.109 ER	0.121 ER	0.081 ER	0.092 ER	0.429	< 1	< 1	< 1	< 1
Cadmium	4	5	9.50	1.04 ER	1.00 ER	0.498 ER	0.849 ER	6.68	ND	ND	ND	0.634 ER	0.910 ER	0.780 ER	0.868 ER	0.857 ER	1.16	< 3	< 3	< 3	< 3
Chromium	70	100	65.60	ND	0.789 ER	5.09	ND	ND	1.43 ER	22.4	2.27 ER	ND	ND	ND	ND	ND	32.4	< 10	< 10	11.4	10.6
Copper	1300	1300	191.00	6.67	13.6	12	43.1	41.2	5.85	18.1	6.44	4.12 ER	9.3	8.72	8.96	9.02	19.7	54.9	10.7	15.3	15.2
Lead	5	15	22.70	ND	4.39 ER	ND	24.3	7.79	3.28 ER	15.2	2.95 ER	ND	ND	ND	ND	2.48 ER	13.5	4.3	< 3	10.1	10.2
Mercury	2	2	0.26	ND	ND	ND	ND	ND	ND	ND	0.07 ER	ND	0.120 ER	0.140 ER	ND	ND	ND	< 0.2	< 0.2	< 0.2	< 0.2
Nickel	100	NLE	187	10.3	3.32 ER	2.54 ER	4.50 ER	24.8	1.00 ER	4.35 ER	2.21 ER	5.45	6.37	6.09	4.68 ER	4.66 ER	6.23	15.4	< 10	< 10	< 10
Selenium	40	50	29.60	ND	5.74 ER	4.19 ER	ND	131	4.68 ER	ND	ND	NR	NR	NR	ND	ND	1.68	< 10	< 10	< 10	< 10
Thallium	2	2	5.5	2.73 ER	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	< 2	< 2	< 2	< 2

Notes:

Shaded cells= concentrations exceed the NJDEP GWQS

*TICs - Tentatively identified compounds, cannot exceed 500 µg/L for VOCs and SVOCs. No individual compound can exceed 100 µg/L.

NJDEP GWQS = New Jersey Department of Environmental Protection Ground Water Quality Criteria as per N.J.A.C. 7:9-6 (July 22, 2010)

USEPA MCL = U.S.Environmental Protection Agency Maximum Contaminant Level

LF = Low flow sampling method used to collect sample

< = the analyte was not detected above the indicated reporting limit

J = Estimated concentration exceeds the method detection limit (MDL) and is less than the reporting limit (RL)

NA = Not analyzed
ND = Not detected
NLE = No limit established
ER = Estimated result

Table 3
2013 Baseline Groundwater Analytical Detections
Site FTMM-55
Fort Monmouth, New Jersey

SAMPLE ID:			STANDARDS VALUES		FTMM-55-GW-290MW01	FTMM-55-GW-290MW101*
DATE SAMPLED:			NJDEP GWQS[1]	USEPA MCL[2]	16-Aug-2013	16-Aug-2013
LAB SAMPLE ID:					R1306020-015	R1306020-021
SAMPLE INTERVAL (ft bgs):					2-12	2-12
	CAS No.	Unit				
Metals - SW6010C						
Lead	7439-92-1	µg/L	5	15 [3]	**5.3**	**6.2**

QA NOTES AND DATA QUALIFIERS:

* - Field duplicate of sample on left.

D**etections are bolded.**

Detections above the NJDEP GWQS are highlighted.

For Detections above the USEPA MCL, the cell border is bolded.

NOTES:

[1] New Jersey Department of Environmental Protection Ground Water Quality Standards Specific Ground Water Quality Criteria - Class IIA and Practical Quantitation Levels. (http://www.state.nj.us/dep/wms/bwqsa/Appendix_Table_1.htm).

[2] USEPA 2012 Edition of the Drinking Water Standards and Health Advisories, Spring 2012. (http://water.epa.gov/action/advisories/drinking/upload/dwstandards2012.pdf).

[3] Value is the USEPA Action Level.

Table 4
Groundwater Sampling Analyte Review
Historical and Baseline Groundwater Analytical Data
Site FTMM-55
Fort Monmouth, New Jersey

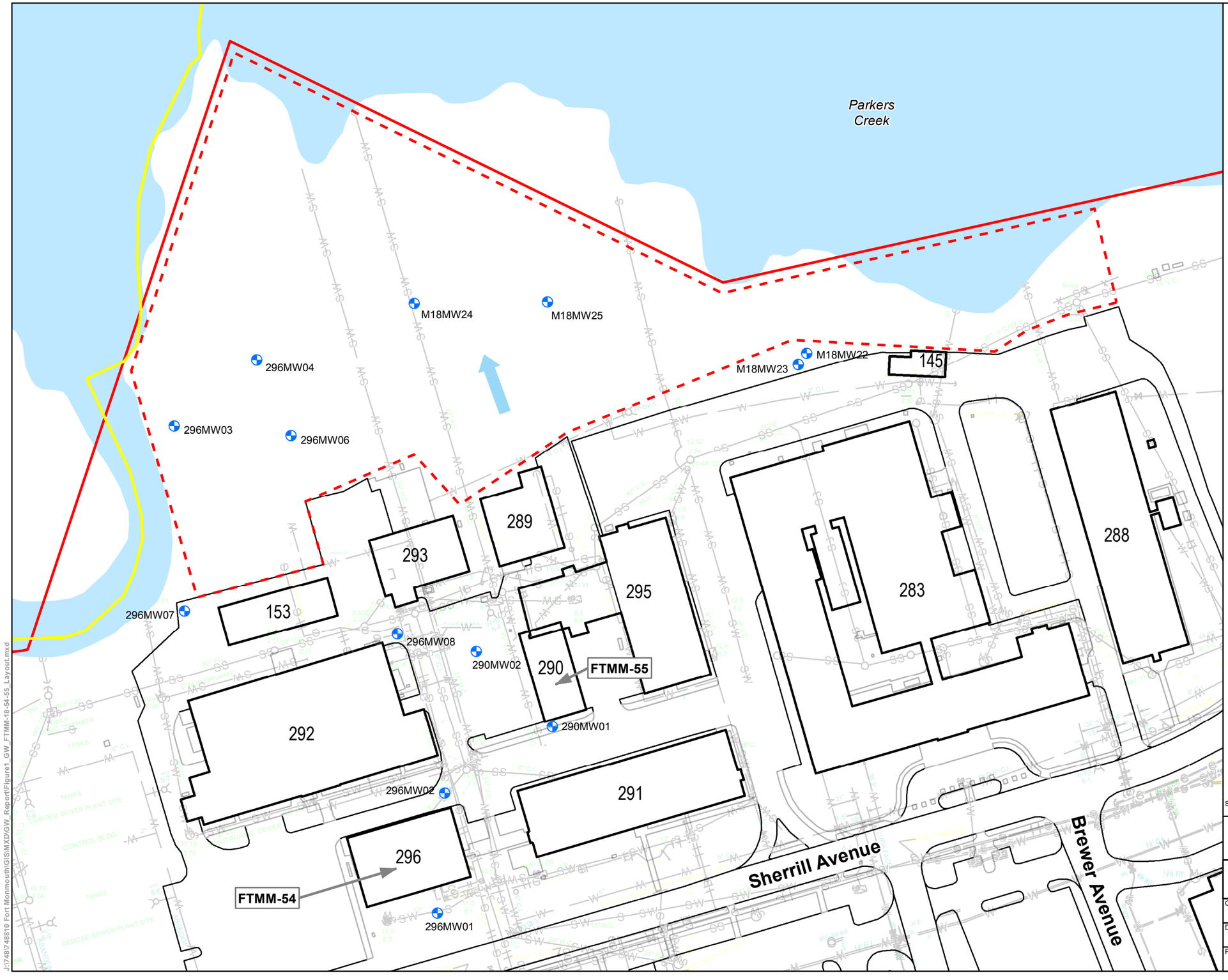
Site Name/ Well ID	Analyte	Does it Exceed NJDEP GWQS (Yes or No) (If Yes Identify Compound)[1]	Does it Exceed FTMM Background Concentration Yes or No (If Yes identify compound)	Exceedance Evaluation				Retain Analyte/Well (Yes or No)	Rationale
				Seasonal Effect? (Y/N)[2]	Anomaly? (Y/N)	Exceedance part of overall trend? (Y/N)[3]	Well needed for sentinel purposes? (Y/N)		
M-55, B290	Pb								
290MW01		As, Pb	NO	N/A	N/A	N/A	NO	NO	No exceedances of site background concentrations.

Notes:

1. Has any of the compounds exceeded the NJDEP GWQS in the 2013 data and the 4 previous data rounds? If no then remove this analyte from Long Term Monitoring (LTM) list.
2. Has any of the compounds exceeded the NJDEP GWQS seasonally (winter/spring vs summer/fall) for the 4 previous data rounds ?
   If yes then keep analyte in LTM list.
   If no then remove this analyte from LTM list.
3. Groundwater sampling analyte review includes the August 2013 and the last four rounds of groundwater analytical data.

FIGURES

Figure 1 Layout of FTMM-18, FTMM-54 (Building 296) & FTMM-55 (Building 290)



Legend

- Shallow Monitoring Well
- M-18 Landfill Boundary
- Municipal Boundary
- Installation Boundary
- W Water Line
- S Sanitary Sewer Line
- SW Storm Sewer Line
- G Gas Line
- Surface Water Feature
- Estimated Groundwater Flow Direction

N

1 inch = 90 feet

0 50 100 200 Feet

Source: FTMM Supplied CAD

PARSONS 401 Diamond Drive NW, Huntsville AL	**Fort Monmouth** **New Jersey**

Layout of FTMM-18, FTMM-54 (Building 296) & FTMM-55 (Building 290)

CREATED BY: TS	REVIEWED BY: IG
DATE: January 2014	FIGURE NUMBER: Figure 1
PROJECT NUMBER: 748810.01000	FILE: Figure1_GW_FTMM-18-54-55_Layout.mxd

J:\748748810 Fort Monmouth\GIS\MXD\GW_Report\Figure1_GW_FTMM-18-54-55_Layout.mxd

ATTACHMENTS

Attachment A LFPS Field Sheets

LOW-FLOW SAMPLING RECORD - GROUNDWATER

PARSONS | **CLIENT:** USAESCH | **WELL #:** 290MW01

PROJECT (STUDY_ID): W912DY-09-D-0062, Task Order 0012, Project No. 36985
AOC # (AREA): M-55
SAMPLIG INSTRUMENTS: Geotech
PID DETECTOR:

DATE: 8-16-2013
LABORATORY:

SAMPLING PERSONNEL
NAME: James Bruns
NAME:

BOREHOLE DIAMETER FACTORS

DIAMETER (INCHES):	1	1.5	2	3	(4)	5	6	7	8	9	10
GALLONS/FOOT:	0.041	0.092	0.163	0.367	0.654	1.02	1.47	2	2.61	3.3	5.87

WELL HEAD VOC CONCENTRATION (ppm): 0.0
WELL DEPTH (TOC): 15.91
FEET OF WATER IN WELL: 8.31
SCREENED INTERVAL (TOC): 5-15
PUMP INTAKE DEPTH (ft below TOC): 10.6
DEPTH TO WATER BEFORE PUMP INSTALLATION (ft below TOC): 7.60

PURGING AND SAMPLING WITH A LOW-FLOW PUMP

TIME	PURGING	SAMPLING	pH (pH units) READING	pH CHANGE*	SPECIFIC CONDUCTIVITY (mS/cm) READING	SPECIFIC CONDUCTIVITY CHANGE*	REDOX POTENTIAL (mv) READING	REDOX POTENTIAL CHANGE*	DISSOLVED OXYGEN (mg/L) READING	DISSOLVED OXYGEN CHANGE*	TURBIDITY (NTU) READING	TURBIDITY CHANGE*	TEMPERATURE (degrees C) READING	TEMPERATURE CHANGE*	PUMPING RATE (ml/min)	DEPTH TO WATER (ft below TOC)
12:15	X		6.44	NA	0.402	NA	145	NA	5.54	NA	26.2	NA	25.36	NA	100	7.55
12:20	X		6.58	+0.14	0.400	-0.002	143	-2	4.85	-0.69	28.6	+2.4	25.29	-0.07	100	7.75
12:25	X		6.67	+0.09	0.403	+0.003	145	+2	4.52	-0.33	18.9	-9.7	25.27	-0.02	100	7.85
12:30	X		6.69	+0.02	0.404	+0.001	145	0.0	4.30	-0.22	15.9	-3.0	25.49	+0.22	100	7.92
12:35	X		6.70	+0.01	0.404	0.0	146	+1	4.34	+0.04	14.9	-1.0	25.51	+0.02	100	8.00
12:40	X		6.71	+0.01	0.403	-0.001	147	+1	4.18	-0.16	13.9	-1.0	25.44	-0.07	100	8.06
12:45	X		6.71	0.0	0.404	+0.001	148	+1	4.28	+0.10	12.9	-1.0	25.54	+0.10	100	8.09
12:50	X		6.72	+0.01	0.403	-0.001	146	-2	4.27	-0.01	11.9	-1.0	25.60	+0.06	100	8.12
12:55	X		6.72	0.0	0.403	0.0	146	0.0	4.23	-0.04	11.5	-0.4	25.57	-0.03	100	8.15
13:00	X		6.72	0.0	0.404	0.0	146	0.0	4.20	-0.03	11.3	-0.2	25.59	+0.02	100	8.17
13:05	X		6.73	+0.01	0.404	0.0	146	0.0	4.26	+0.06	11.1	-0.2	25.49	-0.10	100	8.19
13:10		X	6.73	0.0	0.404	0.0	146	0.0	4.32	+0.06	11.3	+0.2	25.49	0.0	100	8.20

COMMENTS: ~~Dup for this Time~~

*Indicator readings have stabilized when 3 consecutive readings are within: +/- 0.1 for pH; =+/- 3% for Specific Conductivity and Temperature; +/- 10 mv for Redox Potential; and +/- 10% for Dissolved Oxygen and Turbidity

LOW-FLOW SAMPLING RECORD - GROUNDWATER

PARSONS | **CLIENT:** USAESCH | **WELL #:** 290-MW01

SAMPLING INFORMATION

SAMPLING DEVICE: Geotech bladder Pump

SAMPLE NUMBER: FTMM-MSS-GW-290MW01

SAMPLE PARAMETER	TIME	CONTAINER	COLOR	TURBIDITY	COMMENTS
Pb	13:10	500 mL plastic	clr	clr	
~~Pb~~	~~13:10~~	~~500 mL plastic~~	~~clr~~	~~clr~~	~~DUP named FTMM-SS-GW-290MW101~~

QA\QC:

QA/QC DUPLICATE SAMPLE COLLECTED: ~~YES~~ or NO

Duplicate Sample Name: ~~FTMM-SS-GW-290MW101~~

QA\QC RINSATE SAMPLE NAME:

MATRIX SPIKE SAMPLE COLLECTED: YES or NO

INVESTIGATION DERIVED WASTE (IDW): Carbon bucket used

Date:									
Volume Transferred to IDW Tank:									
Volume Transferred to Drum:									

ATTACHMENT D
FTMM-55 Underground Storage Tanks Summary

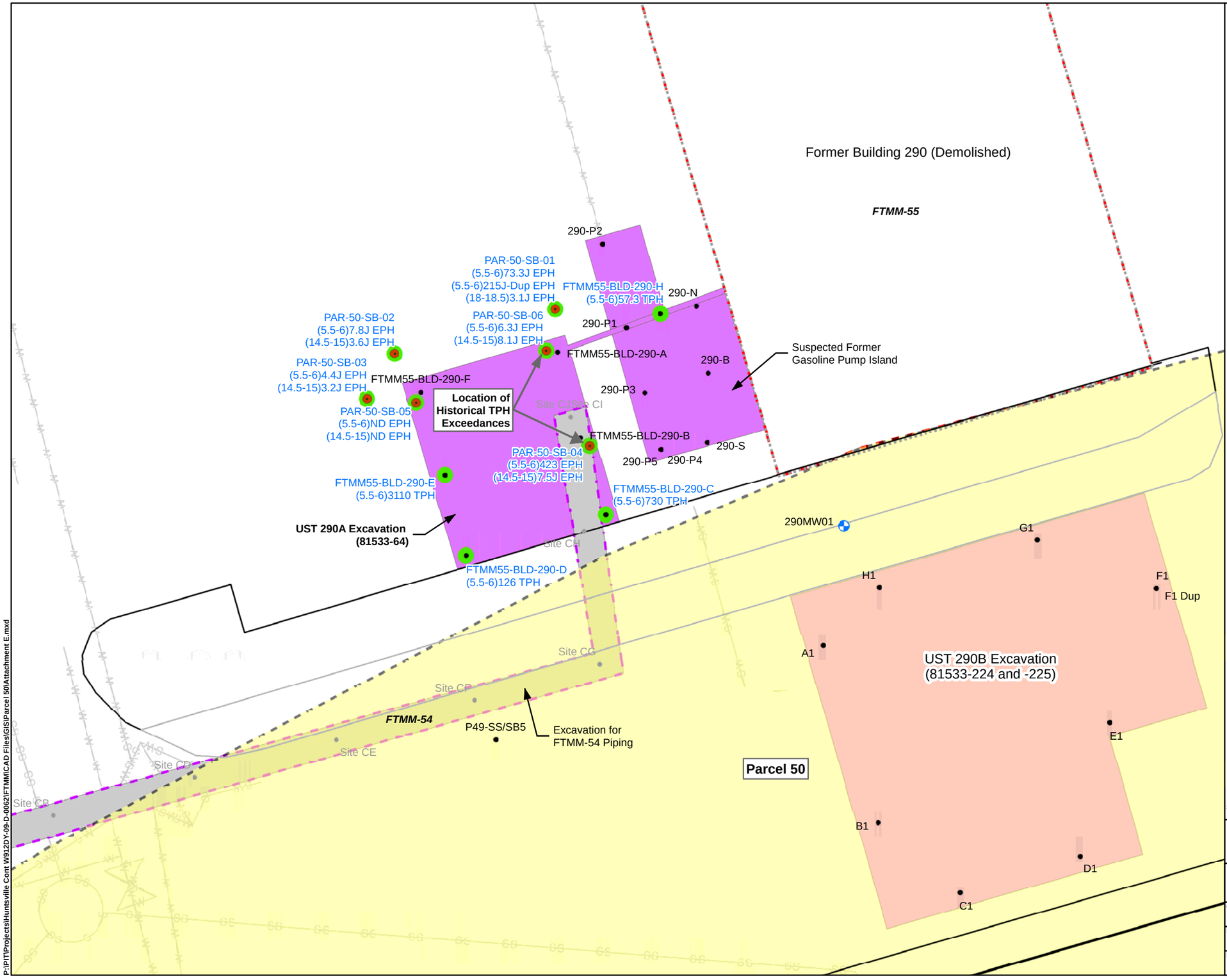
Attachment D
Summary Table of FTMM-55 Underground Storage Tanks

Underground Storage Tank Closure Status

Underground Storage Tank ID	Residential	Registration ID	NJDEP Discharge Investigation and Corrective Action Report (DICAR)	Tank Size and Type	Product	Comments on Current or Requested NJDEP Status
290A	No	81533-64	94-9-13-1503-57	2000 gal. fiberglass	#2 Diesel	NFA requested herein
EC290B	No	81533-225	94-9-2-1455-00	2000 gal. steel	Gasoline	NFA approved per NJDEP 1/10/2003 letter; NFA for soil approved per NJDEP 8/14/2007 letter
290B	No	81533-224	93-11-30-1246-27	2000 gal. steel	Gasoline	NFA approved per NJDEP 1/10/2003 letter; NFA for soil approved per NJDEP 8/14/2007 letter
290C	No	81533-193	N/A	550 gal. fiberglass	Waste Oil	NFA approved per NJDEP 11/16/2015 letter

N/A – Not applicable.
NFA – No Further Action.

ATTACHMENT E
EPH and TPH Concentrations in Soil at FTMM-55



P:\PIT\Projects\Huntsville Cont W912DY-09-D-0062\FTMM\CAD Files\GIS\Parcel 50\Attachment E.mxd

LEGEND:

- Soil Boring Location (for analysis of Extractable Petroleum Hydrocarbons [EPH]) (2016)
- Previous Soil Sample Location Associated with FTMM-55
- Previous Soil Sample Location Not Associated with FTMM-55
- Shallow Monitoring Well Associated with FTMM-55
- Shallow Monitoring Well not Associated with FTMM-55
- Parcel 50 Boundary
- FTMM-55 Boundary
- FTMM-54 Boundary
- UST Excavation Area
- Former Fuel Distribution Piping Excavation Area
- W Water Line
- S Sanitary Sewer Line
- SW Storm Sewer Line
- G Gas Line
- Concentration is Less than NJ Residential Direct Contact Soil Remediation Standard (EPH/TPH =5,100 mg/kg)

PAR-50-SS-01 — Boring ID
(5.5-6)73.3J
- Concentration (mg/kg)
- Depth (feet below ground surface)

ND = Non Detect
Dup = Duplicate Sample

N

1 inch = 10 feet

0 5 10 20 Feet

Source: FTMM Supplied CAD

PARSONS 401 Diamond Drive NW, Huntsville AL	Fort Monmouth New Jersey

EPH AND TPH CONCENTRATIONS IN SOIL AT FTMM-55

CREATED BY: RR	REVIEWED BY: CL
DATE: AUG. 2016	FIGURE NUMBER: ATTACHMENT E
PROJECT NUMBER: 748810-02130	FILE: Attachment E.mxd

ATTACHMENT F
Soil Sample Results – Comparison to NJDEP Standards

ATTACHMENT F
FTMM-55, BUILDING 290 (UST 290A) SOIL SAMPLE RESULTS - COMPARISON TO NJDEP STANDARDS
FORT MONMOUTH, NEW JERSEY

Loc ID		NJ Residential Direct Contact SRS [1]	NJ Non-Residential Direct Contact SRS [2]	NJ Impact to GW Soil Screening Level [3]	SB01 (Area A)			SB02 (Area F)		SB03 (Area F)		SB04 (Area B)	
Matrix					Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Sample ID					PAR-50-SB-01-5.5-6	PAR-50-SB-101-5.5-6	PAR-50-SB-01-18-18.5	PAR-50-SB-02-5.5-6	PAR-50-SB-02-14.5-15	PAR-50-SB-03-5.5-6	PAR-50-SB-03-14.5-15	PAR-50-SB-04-5.5-6	PAR-50-SB-04-14.5-15
Sample Depth Interval (FT)					5.5-6	5.5-6	18-18.5	5.5-6	14.5-15	5.5-6	14.5-15	5.5-6	14.5-15
Parent Sample (SA) or Field Duplicate (DUP)					SA	DUP	SA	SA	SA	SA	SA	SA	SA
Sample Date					3/31/2016	3/31/2016	3/31/2016	3/31/2016	3/31/2016	3/31/2016	3/31/2016	3/31/2016	3/31/2016
Volatile Organic Compounds (mg/kg)													
1,1,2-Trichloroethane	MG/KG	2	6	0.02	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ethyl benzene	MG/KG	7,800	110,000	13	NA	NA	NA	NA	NA	NA	NA	NA	NA
Meta/Para Xylene	MG/KG	NLE	170,000	NLE	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methyl ethyl ketone	MG/KG	3,100	44,000	0.9	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methylene chloride	MG/KG	34	97	0.01	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ortho Xylene	MG/KG	NLE	170,000	NLE	NA	NA	NA	NA	NA	NA	NA	NA	NA
Toluene	MG/KG	6,300	91,000	7	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total Petroleum Hydrocarbons (mg/kg)													
Total Petroleum Hydrocarbons	MG/KG	5,100	54,000	NLE	NA	NA	NA	NA	NA	NA	NA	NA	NA
Extractable Petroleum Hydrocarbons (mg/kg)													
C10-C12 Aromatics	MG/KG	NLE	NLE	NLE	**2 J**	**7.2 J**	< 0.57	< 0.62	< 0.57	< 0.62 UJ	< 0.56	**1.7**	**1 J**
C12-C16 Aliphatics	MG/KG	NLE	NLE	NLE	**1.2 J**	**4.1 J**	< 0.54	< 0.59	< 0.55	< 0.59 UJ	< 0.53	< 0.55 UJ	< 0.6
C12-C16 Aromatics	MG/KG	NLE	NLE	NLE	**9 BJ**	**32.2 BJ**	**0.53 JB**	**0.51 JB**	**0.51 JB**	**0.41 J**	**0.65 J**	**5.4 B**	**1.1 JB**
C16-C21 Aliphatics	MG/KG	NLE	NLE	NLE	< 0.52	**1.2 J**	< 0.53	< 0.58	< 0.54	< 0.58 UJ	< 0.52	**1.8 J**	< 0.58
C16-C21 Aromatics	MG/KG	NLE	NLE	NLE	**22.9 J**	**69.4 J**	**0.28 J**	**0.29 J**	**0.55 J**	**0.35 J**	**0.29 J**	**12.2**	**1 J**
C21-C36 Aromatics	MG/KG	NLE	NLE	NLE	**35.6 J**	**98.2 J**	< 0.3	**0.86 J**	**0.56 J**	**0.42 J**	**0.3 J**	**81.3**	**0.83 J**
C21-C40 Aliphatics	MG/KG	NLE	NLE	NLE	**1.8**	**1.4**	**0.81 J**	**4.3**	< 0.63	**0.8 J**	< 0.61	**320**	**2.9**
C9-C12 Aliphatics	MG/KG	NLE	NLE	NLE	**0.4 J**	**0.97 J**	**0.4 J**	**0.72 J**	**0.5 J**	**1.2 J**	**0.49 J**	**0.69 J**	**0.34 J**
Total Aliphatics	MG/KG	NLE	NLE	NLE	**3.9 J**	**7.7 J**	< 1.8	**5.7**	< 1.9	**2.6 J**	< 1.8	**323 J**	**3.5 J**
Total Aromatics	MG/KG	NLE	NLE	NLE	**69.4 J**	**207 J**	**1.6 J**	**2 J**	**2 J**	**1.7 J**	**1.6 J**	**101**	**3.9 J**
Total EPH	MG/KG	5100 [4]	54000 [4]	NLE	**73.3 J**	**215 J**	**3.1 J**	**7.8 J**	**3.6 J**	**4.4 J**	**3.2 J**	**423**	**7.5 J**

Notes:

(1) The NJ Residential Direct Contact Soil Remediation Standard refers to the NJDEP's May 7, 2012 Remediation Standards.
http://www.nj.gov/dep/rules/rules/njac7_26d.pdf.

(2) The NJ Non-Residential Direct Contact Soil Remediation Standard refers to the NJDEP's May 7, 2012 Remediation Standards.
http://www.nj.gov/dep/rules/rules/njac7_26d.pdf.

(3) The NJ Impact to GW Soil Screening Level refers to the Development of Site Specific Impact to Ground Water Soil Remediation Standards - Nov 2013 revised.
http://www.nj.gov/dep/srp/guidance/rs/partition_equation.pdf.

(4) Refer to the NJDEP Protocol for Addressing Extractable Petroleum Hydrocarbons (Version 5.0, August 9, 2010) and the NJDEP Health Based and Ecological Screening Criteria for Petroleum Hydrocarbons (Version 4.0, August 9, 2010).

< = analyte not detected above method detection limit (MDL).

B =Compound detected in the sample at a concentration less than or equal to 5 times (10 times for common lab contaminants) the blank concentration.

E = Estimated result.

J = estimated detected value due to a concentration below the reporting limit or due to discrepancies in meeting certain analyte-specific quality control criteria.

NA = Not analyzed.

ND = Not detected.

NLE = No limit established.

Shaded cells = concentration exceeds NJDEP RDCSRS and/or NRDCSRS.

Shaded cells = concentration exceeds NJDEP Impact to GW SSL.

ATTACHMENT F
FTMM-55, BUILDING 290 (UST 290A) SOIL SAMPLE RESULTS - COMPARISON TO NJDEP STANDARDS
FORT MONMOUTH, NEW JERSEY

Loc ID		NJ Residential Direct Contact SRS [1]	NJ Non-Residential Direct Contact SRS [2]	NJ Impact to GW Soil Screening Level [3]	SB05 (Area F)		SB06 (Area A)		FTMM55-BLD-290-A		FTMM55-BLD-290-B	FTMM55-BLD-290B-1	FTMM55-BLD-290B-2	FTMM55-BLD-290B-3
Matrix					Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Sample ID					PAR-50-SB-05-5.5-6	PAR-50-SB-05-14.5-15	PAR-50-SB-06-5.5-6	PAR-50-SB-06-14.5-15	FTMM55-SS-BLD-290-A-5.5-6	FTMM55-SS-BLD-290-A-5.5-6-Dup	FTMM55-SS-BLD-290-B-5.5-6	FTMM55-SS-BLD-290B-1-0-0.1	FTMM55-SS-BLD-290B-2-0-0.1	FTMM55-SS-BLD-290B-3-0-0.1
Sample Depth Interval (FT)					5.5-6	14.5-15	5.5-6	14.5-15	5.5-6	5.5-6	5.5-6	0-0.1	0-0.1	0-0.1
Parent Sample (SA) or Field Duplicate (DUP)					SA	SA	SA	SA	SA	DUP	SA	SA	SA	SA
Sample Date					3/31/2016	3/31/2016	3/31/2016	3/31/2016	9/13/1994	9/13/1994	9/13/1994	3/26/1998	3/26/1998	3/26/1998
Volatile Organic Compounds (mg/kg)														
1,1,2-Trichloroethane	MG/KG	2	6	0.02	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ethyl benzene	MG/KG	7,800	110,000	13	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Meta/Para Xylene	MG/KG	NLE	170,000	NLE	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methyl ethyl ketone	MG/KG	3,100	44,000	0.9	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methylene chloride	MG/KG	34	97	0.01	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ortho Xylene	MG/KG	NLE	170,000	NLE	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Toluene	MG/KG	6,300	91,000	7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total Petroleum Hydrocarbons (mg/kg)														
Total Petroleum Hydrocarbons	MG/KG	5,100	54,000	NLE	NA	NA	NA	NA	**16,200**	**10,400**	**11,900**	**317.67**	ND	**224.45**
Extractable Petroleum Hydrocarbons (mg/kg)														
C10-C12 Aromatics	MG/KG	NLE	NLE	NLE	< 0.61	**0.55 J**	**0.68 J**	**0.68 J**	NA	NA	NA	NA	NA	NA
C12-C16 Aliphatics	MG/KG	NLE	NLE	NLE	< 0.58	< 0.53 UJ	< 0.55 UJ	< 0.52	NA	NA	NA	NA	NA	NA
C12-C16 Aromatics	MG/KG	NLE	NLE	NLE	**0.38 JB**	**0.44 JB**	**0.71 JB**	**0.69 JB**	NA	NA	NA	NA	NA	NA
C16-C21 Aliphatics	MG/KG	NLE	NLE	NLE	< 0.57	< 0.51 UJ	< 0.54 UJ	**1.5**	NA	NA	NA	NA	NA	NA
C16-C21 Aromatics	MG/KG	NLE	NLE	NLE	**0.32 J**	**0.34 J**	**0.49 J**	**2.6**	NA	NA	NA	NA	NA	NA
C21-C36 Aromatics	MG/KG	NLE	NLE	NLE	**0.52 J**	**0.36 J**	**1.7**	**1 J**	NA	NA	NA	NA	NA	NA
C21-C40 Aliphatics	MG/KG	NLE	NLE	NLE	**0.75 J**	< 0.6 UJ	**1.8 J**	**0.99 J**	NA	NA	NA	NA	NA	NA
C9-C12 Aliphatics	MG/KG	NLE	NLE	NLE	**0.34 J**	**0.37 J**	**0.45 J**	**0.29 J**	NA	NA	NA	NA	NA	NA
Total Aliphatics	MG/KG	NLE	NLE	NLE	< 2	< 1.8 UJ	**2.7 J**	**3.1 J**	NA	NA	NA	NA	NA	NA
Total Aromatics	MG/KG	NLE	NLE	NLE	**1.7 J**	**1.7 J**	**3.6 J**	**5**	NA	NA	NA	NA	NA	NA
Total EPH	MG/KG	5100 [4]	54000 [4]	NLE	< 3.4	< 3.1	**6.3 J**	**8.1 J**	NA	NA	NA	NA	NA	NA

Notes:

(1) The NJ Residential Direct Contact Soil Remediation Standard refers to the NJDEP's May 7, 2012 Remediation Standards.
http://www.nj.gov/dep/rules/rules/njac7_26d.pdf.

(2) The NJ Non-Residential Direct Contact Soil Remediation Standard refers to the NJDEP's May 7, 2012 Remediation Standards.
http://www.nj.gov/dep/rules/rules/njac7_26d.pdf.

(3) The NJ Impact to GW Soil Screening Level refers to the Development of Site Specific Impact to Ground Water Soil Remediation Standards - Nov 2013 revised.
http://www.nj.gov/dep/srp/guidance/rs/partition_equation.pdf.

(4) Refer to the NJDEP Protocol for Addressing Extractable Petroleum Hydrocarbons (Version 5.0, August 9, 2010) and the NJDEP Health Based and Ecological Screening Criteria for Petroleum Hydrocarbons (Version 4.0, August 9, 2010).

< = analyte not detected above method detection limit (MDL).

B =Compound detected in the sample at a concentration less than or equal to 5 times (10 times for common lab contaminants) the blank concentration.

E = Estimated result.

J = estimated detected value due to a concentration below the reporting limit or due to discrepancies in meeting certain analyte-specific quality control criteria.

NA = Not analyzed.

ND = Not detected.

NLE = No limit established.

Shaded cells = concentration exceeds NJDEP RDCSRS and/or NRDCSRS.

Shaded cells = concentration exceeds NJDEP Impact to GW SSL.

ATTACHMENT F
FTMM-55, BUILDING 290 (UST 290A) SOIL SAMPLE RESULTS - COMPARISON TO NJDEP STANDARDS
FORT MONMOUTH, NEW JERSEY

Loc ID		NJ Residential Direct Contact SRS [1]	NJ Non-Residential Direct Contact SRS [2]	NJ Impact to GW Soil Screening Level [3]	FTMM55-BLD-290B-4	FTMM55-BLD-290B-5	FTMM55-BLD-290-C	FTMM55-BLD-290-D	FTMM55-BLD-290-E	FTMM55-BLD-290-F	FTMM55-BLD-290-H	FTMM55-BLD-290-Site A
Matrix					Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Sample ID					FTMM55-SS-BLD-290B-4-0-0.1	FTMM55-SS-BLD-290B-5-0-0.1	FTMM55-SS-BLD-290-C-5.5-6	FTMM55-SS-BLD-290-D-5.5-6	FTMM55-SS-BLD-290-E-5.5-6	FTMM55-SS-BLD-290-F-5.5-6	FTMM55-SS-BLD-290-H-5.5-6	FTMM55-SS-BLD-290-Site A-0-0.1
Sample Depth Interval (FT)					0-0.1	0-0.1	5.5-6	5.5-6	5.5-6	5.5-6	5.5-6	0-0.1
Parent Sample (SA) or Field Duplicate (DUP)					SA	SA	SA	SA	SA	SA	SA	SA
Sample Date					3/26/1998	3/26/1998	9/13/1994	9/13/1994	9/13/1994	9/13/1994	9/13/1994	9/21/1994
Volatile Organic Compounds (mg/kg)												
1,1,2-Trichloroethane	MG/KG	2	6	0.02	NA	NA	NA	NA	NA	NA	NA	< 0.62
Ethyl benzene	MG/KG	7,800	110,000	13	NA	NA	NA	NA	NA	NA	NA	< 0.62
Meta/Para Xylene	MG/KG	NLE	170,000	NLE	NA	NA	NA	NA	NA	NA	NA	NA
Methyl ethyl ketone	MG/KG	3,100	44,000	0.9	NA	NA	NA	NA	NA	NA	NA	**1.5**
Methylene chloride	MG/KG	34	97	0.01	NA	NA	NA	NA	NA	NA	NA	**0.46 J**
Ortho Xylene	MG/KG	NLE	170,000	NLE	NA	NA	NA	NA	NA	NA	NA	NA
Toluene	MG/KG	6,300	91,000	7	NA	NA	NA	NA	NA	NA	NA	< 0.62
Total Petroleum Hydrocarbons (mg/kg)												
Total Petroleum Hydrocarbons	MG/KG	5,100	54,000	NLE	ND	ND	**730**	**126**	**3,110**	**9,670**	**57.3**	NA
Extractable Petroleum Hydrocarbons (mg/kg)												
C10-C12 Aromatics	MG/KG	NLE	NLE	NLE	NA	NA	NA	NA	NA	NA	NA	NA
C12-C16 Aliphatics	MG/KG	NLE	NLE	NLE	NA	NA	NA	NA	NA	NA	NA	NA
C12-C16 Aromatics	MG/KG	NLE	NLE	NLE	NA	NA	NA	NA	NA	NA	NA	NA
C16-C21 Aliphatics	MG/KG	NLE	NLE	NLE	NA	NA	NA	NA	NA	NA	NA	NA
C16-C21 Aromatics	MG/KG	NLE	NLE	NLE	NA	NA	NA	NA	NA	NA	NA	NA
C21-C36 Aromatics	MG/KG	NLE	NLE	NLE	NA	NA	NA	NA	NA	NA	NA	NA
C21-C40 Aliphatics	MG/KG	NLE	NLE	NLE	NA	NA	NA	NA	NA	NA	NA	NA
C9-C12 Aliphatics	MG/KG	NLE	NLE	NLE	NA	NA	NA	NA	NA	NA	NA	NA
Total Aliphatics	MG/KG	NLE	NLE	NLE	NA	NA	NA	NA	NA	NA	NA	NA
Total Aromatics	MG/KG	NLE	NLE	NLE	NA	NA	NA	NA	NA	NA	NA	NA
Total EPH	MG/KG	5100 [4]	54000 [4]	NLE	NA	NA	NA	NA	NA	NA	NA	NA

Notes:

(1) The NJ Residential Direct Contact Soil Remediation Standard refers to the NJDEP's May 7, 2012 Remediation Standards.
http://www.nj.gov/dep/rules/rules/njac7_26d.pdf.

(2) The NJ Non-Residential Direct Contact Soil Remediation Standard refers to the NJDEP's May 7, 2012 Remediation Standards.
http://www.nj.gov/dep/rules/rules/njac7_26d.pdf.

(3) The NJ Impact to GW Soil Screening Level refers to the Development of Site Specific Impact to Ground Water Soil Remediation Standards - Nov 2013 revised.
http://www.nj.gov/dep/srp/guidance/rs/partition_equation.pdf.

(4) Refer to the NJDEP Protocol for Addressing Extractable Petroleum Hydrocarbons (Version 5.0, August 9, 2010) and the NJDEP Health Based and Ecological Screening Criteria for Petroleum Hydrocarbons (Version 4.0, August 9, 2010).

< = analyte not detected above method detection limit (MDL).

B =Compound detected in the sample at a concentration less than or equal to 5 times (10 times for common lab contaminants) the blank concentration.

E = Estimated result.

J = estimated detected value due to a concentration below the reporting limit or due to discrepancies in meeting certain analyte-specific quality control criteria.

NA = Not analyzed.

ND = Not detected.

NLE = No limit established.

Shaded cells = concentration exceeds NJDEP RDCSRS and/or NRDCSRS.

Shaded cells = concentration exceeds NJDEP Impact to GW SSL.

ATTACHMENT G
2016 Soil Boring Logs

PARSONS Page 1 of 2

Soil Boring Log

CLIENT: USACE
PROJECT NAME: FTMM - ECP
PROJECT LOCATION: FTMM Parcel
PROJECT NUMBER: 748810-

GROUNDWATER OBSERVATIONS
WATER LEVEL: ~7
DATE: 3/31/16
TIME: 1115
MEAS. FROM:

INSPECTOR: LW/JM
DRILLER: JOE BARNAK
WEATHER: 65°F
CONTRACTOR: East Coast Drilling, Inc. (ECDI)
RIG TYPE: Geoprobe(R) 7822DT
DATE/TIME START: 3/31/16 1045
DATE/TIME FINISH: 3/31/16 1125
WEIGHT OF HAMMER: N/A
DROP OF HAMMER: N/A
TYPE OF HAMMER: N/A

BORING/WELL ID: PAR-50-SB-01
LOCATION DESCRIPTION: Parcel 50
LOCATION PLAN: Oceanport, New Jersey

DEPTH (feet)	SAMPLE I.D.	BLOWS per 6"	ADV/ REC.	PID (ppm)	FIELD IDENTIFICATION OF MATERIAL	STRATA	COMMENTS
0			60/43	0	0-3" Topsoil, grass, roots, trace F gravel	I	22"-43" moist, grey, M. stiff F SAND and silt, some clay
				0			
1				9.9	3-8" moist, loose, MF Brown SAND, some silt, little f gravel, trace wood		
				13.1			
2				0.5			
				2.6	8"-16" Dry, loose, MC SAND (orange), coal fragments some F gravel, trace TAR		slight odor
3				0.4			
				0			
4				0	16"-22" moist, M Dense, MF Brown SAND, some silt, little f gravel, trace brick frags		
				0	~~- SEE COMMENTS~~		
5				0	0-28" SAA, saturated @ 24"		
1120	5.5-6			0	28"-60" Saturated, grey/brown/orange mottled, MF SAND some silt, trace clay	II	▽
6				13.2			
				16.3			
7				0			
				12.2			
8				54.7			
				34.3			
9				13.2			
				12.1			
10							

Remarks: TAR - Sticky substance, Black, odor

Sample Types
S – Split-Spoon
U – Undisturbed Tube
C – Rock Core
A – Auger Cuttings

Consistency vs. Blowcount / Foot

Granular (Sand & Gravel)			Fine Grained (Silt & Clay)	
V. Loose: 0-4	Dense: 30-50		V. Soft: <2	Stiff: 8-15
Loose: 4-10	V. Dense: >50		Soft: 2-4	V. Stiff: 15-30
M. Dense: 10-30			M. Stiff: 4-8	Hard: > 30

and - 35-50%
some - 20-35%
little - 10-20%
trace - <10%
moisture, density, color, gradation

PARSONS

Soil Boring Log

CLIENT: USACE
PROJECT NAME: FTMM - ECP
PROJECT LOCATION: FTMM Parcel
PROJECT NUMBER: 748810-

GROUNDWATER OBSERVATIONS
WATER LEVEL: ~7
DATE: 3/31/16
TIME: 1115
MEAS. FROM: BGS

INSPECTOR: CW/SM
DRILLER: JOE BARNAK
WEATHER: 65°F
CONTRACTOR: East Coast Drilling, Inc. (ECDI)
RIG TYPE: Geoprobe(R) 7822DT
DATE/TIME START: 3/31/16 1045
DATE/TIME FINISH: 3/31/16 1125
WEIGHT OF HAMMER: N/A
DROP OF HAMMER: N/A
TYPE OF HAMMER: N/A

BORING/WELL ID: PAR-50-SB-01
LOCATION DESCRIPTION: PARCEL 50
LOCATION PLAN: Oceanport, New Jersey

DEPTH (feet)	SAMPLE I.D.	BLOWS per 6"	ADV/ REC.	PID (ppm)	FIELD IDENTIFICATION OF MATERIAL	STRATA	COMMENTS
0			60/60	23.6	0-25" SAA	II	Slight odor
				85.3	25-60" wet, grey/brown, M. Dense Mf SAND, some silt, trace clay		
1				47.9			
				280			
2				26.7			
				19.8			
3				10.4			
				17.1			
4				6.8			
				17.5			
5			24/60	NR	0-36" NR	VI	
					36"-60" moist, DARK Green, V. Stiff, SILT, some F SAND, little clay		
6							
7							
8	18-18.5			0			
				0			
9				0			
				0			
20							

1205

Remarks:

Sample Types
S – Split-Spoon
U – Undisturbed Tube
C – Rock Core
A – Auger Cuttings

Consistency vs. Blowcount / Foot

Granular (Sand & Gravel)			Fine Grained (Silt & Clay)	
V. Loose: 0-4	Dense: 30-50		V. Soft: <2	Stiff: 8-15
Loose: 4-10	V. Dense: >50		Soft: 2-4	V. Stiff: 15-30
M. Dense: 10-30			M. Stiff: 4-8	Hard: > 30

and - 35-50%
some - 20-35%
little - 10-20%
trace - <10%
moisture, density, color, gradation

PARSONS

Soil Boring Log

CLIENT: USACE
PROJECT NAME: FTMM - ECP
PROJECT LOCATION: FTMM Parcel
PROJECT NUMBER: 748810-

GROUNDWATER OBSERVATIONS
WATER LEVEL: ~8'
DATE: 3/31/16
TIME: 1000
MEAS. FROM: BGS

INSPECTOR: C. Walker
DRILLER: Joe Barnak
WEATHER: 65°F / windy
CONTRACTOR: East Coast Drilling, Inc. (ECDI)
RIG TYPE: Geoprobe(R) 7822DT
DATE/TIME START: 3/31/16 0945
DATE/TIME FINISH: 3/31/16 0955
WEIGHT OF HAMMER: N/A
DROP OF HAMMER: N/A
TYPE OF HAMMER: N/A

BORING/WELL ID: PAR-50-SB-02
LOCATION DESCRIPTION: PAR-50
LOCATION PLAN: Oceanport, New Jersey

DEPTH (feet)	SAMPLE I.D.	BLOWS per 6"	ADV/ REC.	PID (ppm)	FIELD IDENTIFICATION OF MATERIAL	STRATA	COMMENTS
0			60/45	0	0-5" Topsoil, grass, roots, some Brown mf SAND, little f gravel	I	
1					5"-11"- Moist, loose, mF SAND, some wood, little f gravel, little silt		
2					11"-17"- Dry, loose, mf SAND and Rock fragments, trace f gravel, trace wood	II	
3							
4				NR	17"-45" moist, grey, m. stiff f SAND and silt, some clay		
				NR			
1005 5	5.5-6			0	0-17" SAA		
					17"-36" moist, grey/Brown, M. dense, MF SAND, some silt, trace clay	II	
6							
7					36"-60" Saturated, grey/Brown/orange mottled, mf SAND, some silt, trace clay		
8							
9							
10							

Remarks:

Sample Types
S – Split-Spoon
U – Undisturbed Tube
C – Rock Core
A – Auger Cuttings

Consistency vs. Blowcount / Foot

Granular (Sand & Gravel)			Fine Grained (Silt & Clay)	
V. Loose: 0-4	Dense: 30-50		V. Soft: <2	Stiff: 8-15
Loose: 4-10	V. Dense: >50		Soft: 2-4	V. Stiff: 15-30
M. Dense: 10-30			M. Stiff: 4-8	Hard: > 30

and - 35-50%
some - 20-35%
little - 10-20%
trace - <10%
moisture, density, color, gradation

PARSONS

Page 2 of 2

Soil Boring Log

CLIENT: USACE
PROJECT NAME: FTMM - ECP
PROJECT LOCATION: FTMM Parcel
PROJECT NUMBER: 748810-

GROUNDWATER OBSERVATIONS
WATER LEVEL: ~8'
DATE: 3/31/16
TIME: 1000
MEAS. FROM: BGS

INSPECTOR: C. Watson
DRILLER: SOE BARNAK
WEATHER:
CONTRACTOR: East Coast Drilling, Inc. (ECDI)
RIG TYPE: Geoprobe(R) 7822DT
DATE/TIME START: 3/30/16 0945
DATE/TIME FINISH: 3/31/16 0955
WEIGHT OF HAMMER: N/A
DROP OF HAMMER: N/A
TYPE OF HAMMER: N/A

BORING/WELL ID: PAR-50-SB-02
LOCATION DESCRIPTION: PARCEL 50
LOCATION PLAN: Oceanport, New Jersey

DEPTH (feet)	SAMPLE I.D.	BLOWS per 6"	ADV/ REC.	PID (ppm)	FIELD IDENTIFICATION OF MATERIAL	STRATA	COMMENTS
0			60/60	0	0-26" SAA	II	
					26-60" Wet, grey/brown/orange, M. dense mf SAND, some silt		
1							
2							
3							
4							
10 10	MS-15						
5					End of Boring @ 15'		
6							
7							
8							
9							
10							

Remarks:

Sample Types
S – Split-Spoon
U – Undisturbed Tube
C – Rock Core
A – Auger Cuttings

Consistency vs. Blowcount / Foot

Granular (Sand & Gravel)			Fine Grained (Silt & Clay)	
V. Loose: 0-4	Dense: 30-50		V. Soft: <2	Stiff: 8-15
Loose: 4-10	V. Dense: >50		Soft: 2-4	V. Stiff: 15-30
M. Dense: 10-30			M. Stiff: 4-8	Hard: > 30

and - 35-50%
some - 20-35%
little - 10-20%
trace - <10%
moisture, density, color, gradation

PARSONS

Soil Boring Log

CLIENT: USACE
PROJECT NAME: FTMM - ECP
PROJECT LOCATION: FTMM Parcel
PROJECT NUMBER: 748810-

GROUNDWATER OBSERVATIONS
WATER LEVEL: ~7
DATE: 3/31/16
TIME: 0835
MEAS. FROM: B.G.

INSPECTOR: JOE CW/JM
DRILLER: JOE BARNACK
WEATHER: 55-70°F clear
CONTRACTOR: East Coast Drilling, Inc. (ECDI)
RIG TYPE: Geoprobe(R) 7822DT
DATE/TIME START: 3/30/16 0845
DATE/TIME FINISH: 3/30/16 0905
WEIGHT OF HAMMER: N/A
DROP OF HAMMER: N/A
TYPE OF HAMMER: N/A

BORING/WELL ID: PAR-50-SB-03
LOCATION DESCRIPTION: Rural 50
LOCATION PLAN: Oceanport, New Jersey

DEPTH (feet)	SAMPLE I.D.	BLOWS per 6"	ADV/ REC.	PID (ppm)	FIELD IDENTIFICATION OF MATERIAL	STRATA	COMMENTS
0			60/36	0	0-1" grass, topsoil		
					1"-21" Moist, M. Dense, Brown, MC SAND, some Rock fragment, trace wood, trace silt	I	
1							
2					21"-30" moist ~~grey~~, M. Dense ~~loose~~, grey and brown, mf SAND, some silt, trace f gravel		
3				NR	30-36" moist, grey, M. Dense, mf SAND, some silt, trace clay	II	
4							
5			60/60	0	0-24" AA		
0910	5.5-6.0				24"-40" Saturated, grey, M. Dense, mf SAND, some silt, trace clay	II	
6							
7					40"-60" wet, grey/brown/orange mottled, mf SAND, some silt, trace clay		
8							
9							
10							

Remarks:

Sample Types
S – Split-Spoon
U – Undisturbed Tube
C – Rock Core
A – Auger Cuttings

Consistency vs. Blowcount / Foot

Granular (Sand & Gravel)			Fine Grained (Silt & Clay)	
V. Loose: 0-4	Dense: 30-50		V. Soft: <2	Stiff: 8-15
Loose: 4-10	V. Dense: >50		Soft: 2-4	V. Stiff: 15-30
M. Dense: 10-30			M. Stiff: 4-8	Hard: > 30

and - 35-50%
some - 20-35%
little - 10-20%
trace - <10%
moisture, density, color, gradation

PARSONS

Soil Boring Log

CLIENT: USACE
PROJECT NAME: FTMM - ECP
PROJECT LOCATION: FTMM Parcel
PROJECT NUMBER: 748810-

GROUNDWATER OBSERVATIONS
WATER LEVEL: -7
DATE: 3/31/16
TIME: 0855
MEAS. FROM: BGS

INSPECTOR: C. Wilson
DRILLER: JOE BARNAK
WEATHER: 60°F clear
CONTRACTOR: East Coast Drilling, Inc. (ECDI)
RIG TYPE: Geoprobe(R) 7822DT
DATE/TIME START: 3/21/16 0845
DATE/TIME FINISH: 3/21/16 0905
WEIGHT OF HAMMER: N/A
DROP OF HAMMER: N/A
TYPE OF HAMMER: N/A

BORING/WELL ID: OAK-50-SB-03
LOCATION DESCRIPTION: Parcel 50
LOCATION PLAN: Oceanport, New Jersey

DEPTH (feet)	SAMPLE I.D.	BLOWS per 6"	ADV/ REC.	PID (ppm)	FIELD IDENTIFICATION OF MATERIAL	STRATA	COMMENTS
0			60/54	0	0-6" No recovery		
					6-31" wet, grey/Brown/orange, MF, M. Dense SAND, some silt, trace clay	II	
1							
2					31"-60" wet, grey/Brown, MF, M. Dense, SAND, some silt, trace clay		
3							
4							
0920	14.5-15			+			
5							
6							
7							
8							
9							
0							

Remarks:

Sample Types
S – Split-Spoon
U – Undisturbed Tube
C – Rock Core
A – Auger Cuttings

Consistency vs. Blowcount / Foot

Granular (Sand & Gravel)			Fine Grained (Silt & Clay)		
V. Loose:	0-4	Dense: 30-50	V. Soft: <2	Stiff: 8-15	
Loose:	4-10	V. Dense: >50	Soft: 2-4	V. Stiff: 15-30	
M. Dense:	10-30		M. Stiff: 4-8	Hard: > 30	

and - 35-50%
some - 20-35%
little - 10-20%
trace - <10%
moisture, density, color, gradation

PARSONS

Soil Boring Log

CLIENT: USACE
PROJECT NAME: FTMM - ECP
PROJECT LOCATION: FTMM Parcel
PROJECT NUMBER: 748810-

GROUNDWATER OBSERVATIONS
WATER LEVEL: ~7.2'
DATE: 3/31/16
TIME: 1040
MEAS. FROM: BGS

INSPECTOR: DW/SM
DRILLER: JOE BARNAK
WEATHER: 65°F WINDY
CONTRACTOR: East Coast Drilling, Inc. (ECDI)
RIG TYPE: Geoprobe(R) 7822DT
DATE/TIME START: 3/31/16 1020
DATE/TIME FINISH: 3/31/16 1035
WEIGHT OF HAMMER: N/A
DROP OF HAMMER: N/A
TYPE OF HAMMER: N/A

BORING/WELL ID: PAR-50-SB-04
LOCATION DESCRIPTION: Parcel 50
LOCATION PLAN: Oceanport, New Jersey

DEPTH (feet)	SAMPLE I.D.	BLOWS per 6"	ADV/ REC.	PID (ppm)	FIELD IDENTIFICATION OF MATERIAL	STRATA	COMMENTS
0			60/40	0	0-5" Topsoil, grass, roots, some mf Sand, some f gravel		
				0			Slight odor
1				2.3	5"-15" Dry, loose, CM SAND, (orange), coal fragments, some f gravel, trace wood, trace TAR	I	
				0.5			
2				1.4			
				0	15"-24" Moist, loose, mf SAND, (Brown), some silt, little f gravel, little Rock fragments, trace wood		
3				0			
				0			
4					24"-40" moist, grey, M. Stiff, f SAND and Silt, some clay	II	
5			60/60	0	0-23" SAA		
	SS-6.0			0	23"-26" Moist, grey/Brown, M. Dense, mf SAND, some silt, trace clay		
6				0		II	
				0			
7				0	26"-60" Saturated, grey/Brown/orange mottled, MF SAND, some silt, trace clay		
				0			
8				0			
				0			
9				0			
				0			
10							

Remarks: TAR - Sticky substance, black, odor

Sample Types
S -- Split-Spoon
U -- Undisturbed Tube
C -- Rock Core
A -- Auger Cuttings

Consistency vs. Blowcount / Foot

Granular (Sand & Gravel)			Fine Grained (Silt & Clay)	
V. Loose: 0-4	Dense: 30-50		V. Soft: <2	Stiff: 8-15
Loose: 4-10	V. Dense: >50		Soft: 2-4	V. Stiff: 15-30
M. Dense: 10-30			M. Stiff: 4-8	Hard: > 30

and - 35-50%
some - 20-35%
little - 10-20%
trace - <10%
moisture, density, color, gradation

PARSONS

Soil Boring Log

CLIENT: USACE
PROJECT NAME: FTMM - ECP
PROJECT LOCATION: FTMM Parcel
PROJECT NUMBER: 748810-

GROUNDWATER OBSERVATIONS
WATER LEVEL: ~7.2'
DATE: 3/31/16
TIME: 1040
MEAS. FROM: BGS

INSPECTOR: CW/JM
DRILLER: JOE BARNAK
WEATHER: 65°F clear
CONTRACTOR: East Coast Drilling, Inc. (ECDI)
RIG TYPE: Geoprobe(R) 7822DT
DATE/TIME START: 3/31/16 1020
DATE/TIME FINISH: 3/31/16 1035
WEIGHT OF HAMMER: N/A
DROP OF HAMMER: N/A
TYPE OF HAMMER: N/A

BORING/WELL ID: PAR-FU-SB-04
LOCATION DESCRIPTION: parcel 50
LOCATION PLAN: Oceanport, New Jersey

DEPTH (feet)	SAMPLE I.D.	BLOWS per 6"	ADV/ REC.	PID (ppm)	FIELD IDENTIFICATION OF MATERIAL	STRATA	COMMENTS
0			60/60	0	0-29" SAA		
					29"-60" wet, gray/Brown, M. dense, MF SAND some silt, trace clay	II	
1							
2							
3							
4							
	14.5-15.0						
5					end of Boring 15'		
6							
7							
8							
9							
0							

Remarks:

Sample Types
S – Split-Spoon
U – Undisturbed Tube
C – Rock Core
A – Auger Cuttings

Consistency vs. Blowcount / Foot

Granular (Sand & Gravel)		Fine Grained (Silt & Clay)	
V. Loose: 0-4	Dense: 30-50	V. Soft: <2	Stiff: 8-15
Loose: 4-10	V. Dense: >50	Soft: 2-4	V. Stiff: 15-30
M. Dense: 10-30		M. Stiff: 4-8	Hard: > 30

and - 35-50%
some - 20-35%
little - 10-20%
trace - <10%
moisture, density, color, gradation

PARSONS

Soil Boring Log

CLIENT: USACE
PROJECT NAME: FTMM - ECP
PROJECT LOCATION: FTMM Parcel
PROJECT NUMBER: 748810-

GROUNDWATER OBSERVATIONS
WATER LEVEL: w 7.75
DATE: 3/31/16
TIME: 0940
MEAS. FROM: BGS

INSPECTOR: P. Watson
DRILLER: Joe Barnak
WEATHER: 65°F clear
CONTRACTOR: East Coast Drilling, Inc. (ECDI)
RIG TYPE: Geoprobe(R) 7822DT
DATE/TIME START: 3/31/16 0920
DATE/TIME FINISH: 3/31/16 0940
WEIGHT OF HAMMER: N/A
DROP OF HAMMER: N/A
TYPE OF HAMMER: N/A

BORING/WELL ID: PAR-50-SB-05
LOCATION DESCRIPTION: Parcel 50
LOCATION PLAN: Oceanport, New Jersey

DEPTH (feet)	SAMPLE I.D.	BLOWS per 6"	ADV/ REC.	PID (ppm)	FIELD IDENTIFICATION OF MATERIAL	STRATA	COMMENTS
0			60/41	0	0-4" Topsoil, grass, little MC SAND, trace gravel		
					4"-14" Crushed Rock, f gravel, little loose MC SAND	I	
1							
					14"-23" Moist, M. Dense, grey/brown MC SAND, little f gravel, trace Crushed Rock		
2							
					23"-41" moist, grey M. stiff f SAND and silt, some clay		
3							
4				NR		II	
				NR			
5	7		60/60		0-16" SAA (23-41")	II	
	5.5-6.0				~~16"-40"~~		
6					16-33" moist, grey, M. Dense, Mf SAND, some silt, trace clay		
7					33"-60" Saturated, grey/Brown/orange Mottled, Mf SAND, some silt, trace clay		
8							
9							
10							

0940

Remarks:

Sample Types
S – Split-Spoon
U – Undisturbed Tube
C – Rock Core
A – Auger Cuttings

Consistency vs. Blowcount / Foot

Granular (Sand & Gravel)			Fine Grained (Silt & Clay)	
V. Loose: 0-4	Dense: 30-50		V. Soft: <2	Stiff: 8-15
Loose: 4-10	V. Dense: >50		Soft: 2-4	V. Stiff: 15-30
M. Dense: 10-30			M. Stiff: 4-8	Hard: > 30

and - 35-50%
some - 20-35%
little - 10-20%
trace - <10%
moisture, density, color, gradation

PARSONS

Soil Boring Log

CLIENT: USACE
PROJECT NAME: FTMM - ECP
PROJECT LOCATION: FTMM Parcel
PROJECT NUMBER: 748810-

GROUNDWATER OBSERVATIONS
WATER LEVEL: 7.75'
DATE: 3/31/16
TIME: 0940
MEAS. FROM: BGS

INSPECTOR: CW/JM
DRILLER: Joe BARKAK
WEATHER: 65°F clear/windy
CONTRACTOR: East Coast Drilling, Inc. (ECDI)
RIG TYPE: Geoprobe(R) 7822DT
DATE/TIME START: 3/31/16 0420
DATE/TIME FINISH: 3/31/16 0440
WEIGHT OF HAMMER: N/A
DROP OF HAMMER: N/A
TYPE OF HAMMER: N/A

BORING/WELL ID: PAL-90-SB-05
LOCATION DESCRIPTION:
LOCATION PLAN: Oceanport, New Jersey

DEPTH (feet)	SAMPLE I.D.	BLOWS per 6"	ADV/ REC.	PID (ppm)	FIELD IDENTIFICATION OF MATERIAL	STRATA	COMMENTS
10			60/60	0	0-28" saturated, SAA		
					28"-60" wet, grey/brown, M. dense, mf SAND, some silt	II	
11							
12							
13							
14							
0945	MW5-15						
15							
16							
17							
18							
19							
20							

Remarks:

Sample Types
S – Split-Spoon
U – Undisturbed Tube
C – Rock Core
A – Auger Cuttings

Consistency vs. Blowcount / Foot

Granular (Sand & Gravel)		Fine Grained (Silt & Clay)	
V. Loose: 0-4	Dense: 30-50	V. Soft: <2	Stiff: 8-15
Loose: 4-10	V. Dense: >50	Soft: 2-4	V. Stiff: 15-30
M. Dense: 10-30		M. Stiff: 4-8	Hard: > 30

and - 35-50%
some - 20-35%
little - 10-20%
trace - <10%
moisture, density, color, gradation

PARSONS

Soil Boring Log

CLIENT: USACE
PROJECT NAME: FTMM - ECP
PROJECT LOCATION: FTMM Parcel
PROJECT NUMBER: 748810-

GROUNDWATER OBSERVATIONS
WATER LEVEL: ~7.5'
DATE: 3/31/16
TIME: 1020
MEAS. FROM: BGS

INSPECTOR: C.W/JM
DRILLER: JOE BARNAK
WEATHER: 66° F Clear
CONTRACTOR: East Coast Drilling, Inc. (ECDI)
RIG TYPE: Geoprobe(R) 7822DT
DATE/TIME START: 3/31/16 1000
DATE/TIME FINISH: 3/31/16 1015
WEIGHT OF HAMMER: N/A
DROP OF HAMMER: N/A
TYPE OF HAMMER: N/A

BORING/WELL ID: PAR-50-SB-06
LOCATION DESCRIPTION: PAR-50
LOCATION PLAN: Oceanport, New Jersey

DEPTH (feet)	SAMPLE I.D.	BLOWS per 6"	ADV/ REC.	PID (ppm)	FIELD IDENTIFICATION OF MATERIAL	STRATA	COMMENTS
0			60/42	0	0-6" topsoil, grass, roots, some mf SAND, little f gravel	I	
1					6"-16" moist, loose, mf SAND (Brown) little Rock fragments, little silt, little f gravel		
2					16"-42" moist, grey, m stiff, F SAND, and silt, some clay	II	
3					42"-60" NR		
4				NR			
5			60/60	NR	0-22" SAA (16-42")		
1030	5.5-6			NR	22"-28" moist, grey/Brown, M. Dense, mf SAND some silt, trace clay	II	
6				NR			
7				0	28"-60" saturated, grey/Brown/orange mottled, mf SAND, some silt, trace clay		▽
8							
9							
10							

Remarks:

Sample Types
S – Split-Spoon
U – Undisturbed Tube
C – Rock Core
A – Auger Cuttings

Consistency vs. Blowcount / Foot

Granular (Sand & Gravel)			Fine Grained (Silt & Clay)	
V. Loose: 0-4	Dense:	30-50	V. Soft: <2	Stiff: 8-15
Loose: 4-10	V. Dense:	>50	Soft: 2-4	V. Stiff: 15-30
M. Dense: 10-30			M. Stiff: 4-8	Hard: > 30

and - 35-50%
some - 20-35%
little - 10-20%
trace - <10%
moisture, density, color, gradation

PARSONS

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PROJECT NAME: FTMM - ECP
PROJECT LOCATION: FTMM Parcel
PROJECT NUMBER: 748810-

GROUNDWATER OBSERVATIONS
WATER LEVEL: ~7.5'
DATE: 3/31/16
TIME: 1020
MEAS. FROM: BGS

INSPECTOR: CW/JM
DRILLER: Dave BARNAK
WEATHER: 65°F windy
CONTRACTOR: East Coast Drilling, Inc. (ECDI)
RIG TYPE: Geoprobe(R) 7822DT
DATE/TIME START: 3/31/16 1000
DATE/TIME FINISH: 3/31/16 1015
WEIGHT OF HAMMER: N/A
DROP OF HAMMER: N/A
TYPE OF HAMMER: N/A

BORING/WELL ID: PAR-50-SB-06
LOCATION DESCRIPTION: Parcel 5G
LOCATION PLAN: Oceanport, New Jersey

DEPTH (feet)	SAMPLE I.D.	BLOWS per 6"	ADV/ REC.	PID (ppm)	FIELD IDENTIFICATION OF MATERIAL	STRATA	COMMENTS
0			60/60	0	0-18" SAA		
					18"-60" wet, grey/Brown/orange m. Dense, mf SAND, some silt	II	
1							
2							
3							
4							
5					End of Boring @ 15'		
6							
7							
8							
9							
10							

Remarks:

Sample Types
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Granular (Sand & Gravel)			Fine Grained (Silt & Clay)	
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Loose: 4-10	V. Dense: >50		Soft: 2-4	V. Stiff: 15-30
M. Dense: 10-30			M. Stiff: 4-8	Hard: > 30

and - 35-50%
some - 20-35%
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