

**Data Summary Report**  
for  
**Site 2 – Fire Training Area**

**Naval Weapons  
Industrial Reserve Plant**  
Calverton, New York

**VOLUME I - TEXT**



**Engineering Field Activity Northeast  
Naval Facilities Engineering Command**

**Contract Number N62472-03-D-0057**

**Contract Task Order 004**

August 2005

**DATA SUMMARY REPORT FOR  
SITE 2 – FIRE TRAINING AREA**

**NAVAL WEAPONS INDUSTRIAL RESERVE PLANT  
CALVERTON, NEW YORK**

**COMPREHENSIVE LONG-TERM  
ENVIRONMENTAL ACTION NAVY (CLEAN) CONTRACT**

**Submitted to:  
Engineering Field Activity Northeast  
Environmental Branch (Code EV2)  
Naval Facilities Engineering Command  
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## ACRONYMS

AS/SVE	Air sparging/soil vapor extraction
bgs	Below ground surface
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CLEAN	Comprehensive Long-Term Environmental Action Navy
CMS	Corrective Measures Study
CTO	Contract Task Order
DPT	Direct-push technology
DRO	Diesel range organics
ECM	Electronic Counter Measures
FFS	Focused Feasibility Study
FS	Feasibility Study
GOCO	Government-Owned-Contractor-Operated
GRO	Gasoline range organics
HNUS	Halliburton NUS Corporation
IAS	Initial Assessment Study
IR	Installation Restoration
µg/kg	micrograms per kilogram
mg/kg	milligrams per kilogram
NYCRR	New York Codes, Rules and Regulations
NYSDEC	New York State Department of Environmental Conservation
NWIRP	Naval Weapons Industrial Reserve Plant
PA	Preliminary Assessment
PAH	Polycyclic aromatic hydrocarbon
PCB	Polychlorinated biphenyl
PID	Photoionization detector
ppm	Part per million
QA	Quality assurance
QC	Quality control
RBC	Risk-Based Concentration
RCRA	Resource Conservation and Recovery Act
RFA	RCRA Facility Assessment - Sampling Visit
RFI	RCRA Facility Investigation
RI	Remedial Investigation
SI	Site Investigation
TAGM	Technical and Administrative Guidance Memorandum

TAL	Target Analyte List
TPH	Total petroleum hydrocarbon
TtNUS	Tetra Tech NUS, Inc.
USEPA	United States Environmental Protection Agency
VOC	Volatile organic compound

## 1.0 INTRODUCTION

### 1.1 PURPOSE

This Data Summary Report documents field procedures and presents the findings of surface and soil boring sampling activities at Site 2 - Fire Training Area at the Naval Weapons Industrial Reserve Plant (NWIRP) in Calverton, New York. This report was prepared by Tetra Tech NUS, Inc. (TiNUS) under the Comprehensive Long-Term Environmental Action Navy (CLEAN) Contract N62472-03-D-0057, Contract Task Order (CTO) 004.

Historically, free product and petroleum-contaminated groundwater and soil have been identified at Site 2. The horizontal and vertical extent of the contamination at Site 2 has not been adequately defined. A pilot-scale air sparging/soil vapor extraction (AS/SVE) system operated seasonally at the site from 1995 to 2000 and removed an estimated 30,000 pounds of petroleum hydrocarbons through biodegradation. However, this system was not completely effective at cleaning up of the site. The petroleum-contaminated soil likely inhibited air flow at some locations and therefore reduced the efficiency of the system.

This work is part of the Navy's Installation Restoration (IR) Program, which is designed to identify contamination of Navy and Marine Corps lands and facilities resulting from past operations and to institute remedial actions as necessary and consists of four distinct stages. Stage 1 is the Preliminary Assessment (PA), which was formerly known as the Initial Assessment Study (IAS). Stage 2 is a Resource Conservation and Recovery Act (RCRA) Facility Assessment-Sampling Visit (RFA), also referred to as a Site Investigation (SI), which augments information collected in the PA. Stage 3 is the RCRA Facility Investigation (RFI) and Corrective Measures Study (CMS), also referred to as a Remedial Investigation (RI) and Feasibility Study (FS) or Focused Feasibility Study (FFS) that characterizes site contamination and develops options for remediation of the site. Stage 4 is the Corrective Action, also referred to as the Remedial Action, which results in the control or cleanup of contamination at a site. The Navy had determined that an interim removal action may be appropriate for Site 2 at NWIRP Calverton. This data summary report summarizes field activities conducted in May 2005 and associated test results. This report has been prepared under Stage 3 of the Navy's IR Program.

This work is also being conducted in accordance with the requirements of the New York State Department of Environmental Conservation (NYSDEC) Division of Solid & Hazardous Materials Part 373 Permit issued to the Navy on April 18, 2000 under the NYSDEC implementing regulations [6 New York Codes, Rules, and Regulations (NYCRR) Part 621]. This permit supersedes and replaces the original Part 373 Permit to Operate a Hazardous Waste Storage Facility issued to what was then Grumman Aerospace Corporation on March 25, 1992. The new permit, issued only to the Department of the Navy,

deals exclusively with those Solid Waste Management Units that remain on the former NWIRP Calverton property and any Corrective Actions that may be required to adequately address each IR site. Although the Part 373 Permit is the enforceable document governing the Navy's remedial actions, the NYSDEC State Superfund Group, located in the Albany office, retains primary responsibility for regulatory oversight of the Navy's actions. The Navy has agreed to a request made by the NYSDEC State Superfund Group to utilize terminology associated with the NYSDEC State Superfund program, which is closely related to the federal Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Program. The CERCLA terminology parallels the RCRA terminology, and the implementation phases of each have been determined to meet the substantive requirements of both programs and will also satisfy the Corrective Action requirements set forth in Module III of the Part 373 permit.

Site 2 is listed as Classification 2 in the NYSDEC Registry of Inactive Waste Disposal Sites.

## **1.2 OBJECTIVE AND SCOPE**

Soil contamination at Site 2 can be divided into three categories: (1) shallow petroleum-contaminated subsurface soil; (2) polynuclear aromatic hydrocarbon (PAH)-, polychlorinated biphenyl (PCB)-, and metals-contaminated surface soil; and (3) residual free product at the groundwater table. It is estimated that a layer of relatively clean soil exists between the shallow petroleum-contaminated subsurface soil and the residual free product at the water table. It is suspected that the contaminated surface soil is due to the presence of coal at the site that was used as a road base in the past.

The objective of this investigation was to fill the data gaps with regards to petroleum-contaminated soil identified during previous investigations. Filling these data gaps will define the horizontal and vertical extent of petroleum-contaminated soils.

## **1.3 FACILITY LOCATION**

NWIRP Calverton is located in Suffolk County, Long Island, New York, approximately 70 miles east of New York City (see Figure 1-1). The facility is located within the town of Riverhead. The facility covers approximately 358 acres of the original 6,000-acre facility.

## **1.4 ACTIVITY BACKGROUND INFORMATION**

### **1.4.1 Facility Layout**

The facility is bordered by Middle Country Road (Route 25) to the north, agricultural land to the east, River Road to the south, and Wading River Road to the west. The primary features of the facility were two paved runways. Runway 5-23 was located on the western half of the facility and oriented southwest

to northeast. Runway 32-14 was located on the eastern half of the facility and oriented southeast to northwest.

NWIRP Calverton consists of four separate parcels of land totaling approximately 358 acres. Eight Navy IR sites are included within these parcels as follows (see Figure 1-2):

Parcel A (32 acres)

Site 2 - Fire Training Area

Parcel B1 (40 acres)

Site 6A - Fuel Calibration Area

Site 10B - Engine Test House

Parcel B2 (131 acres)

Southern Area

Parcel C (10 acres)

Site 7 - Fuel Depot

Site 10A - Jet Fuel Systems Laboratory

Parcel D (145 acres)

Site 1 - Northeast Pond Disposal Area

Site 9 - Electronic Counter Measures (ECM) Area

#### 1.4.2 Facility History

NWIRP Calverton has been owned by the United States Navy since the early 1950s. At that time, the property was purchased from a number of private owners. The facility was expanded in 1958 through additional purchases of privately owned land. Northrop Grumman Corporation (previously Grumman Corporation) has operated the facility since its construction (Navy, 1986).

NWIRP Calverton was constructed in the early 1950s for use in the development, assembly, testing, refitting, and retrofitting of Naval combat aircraft. Northrop Grumman has been the sole operator of the facility, which is known as a Government-Owned-Contractor-Operated (GOCO) installation. Construction was completed in 1954. The facility supports aircraft design and production at nearby NWIRP Bethpage, which is also operated by Northrup Grumman.

The majority of industrial activities at the facility were confined to the developed area in the center and south center of the facility, between the two runways. Industrial activities at the facility were related to the manufacturing and assembly of aircraft and aircraft components. Hazardous waste generation at the facility was related to metal finishing processes such as metal cleaning and electroplating. The painting of aircraft and components resulted in additional waste generation (Navy, 1986; HNUS, 1992).

Northrop Grumman operations at the facility ended in February 1996. In September 1998, the majority of the land within the developed section of the facility was transferred to the Town of Riverhead for redevelopment. Because of the need for additional environmental investigation and the potential need for remediation, the Navy retained four parcels of land within the developed section. The four parcels and associated Navy IR sites are presented on Figure 1-2.

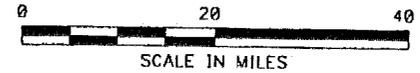
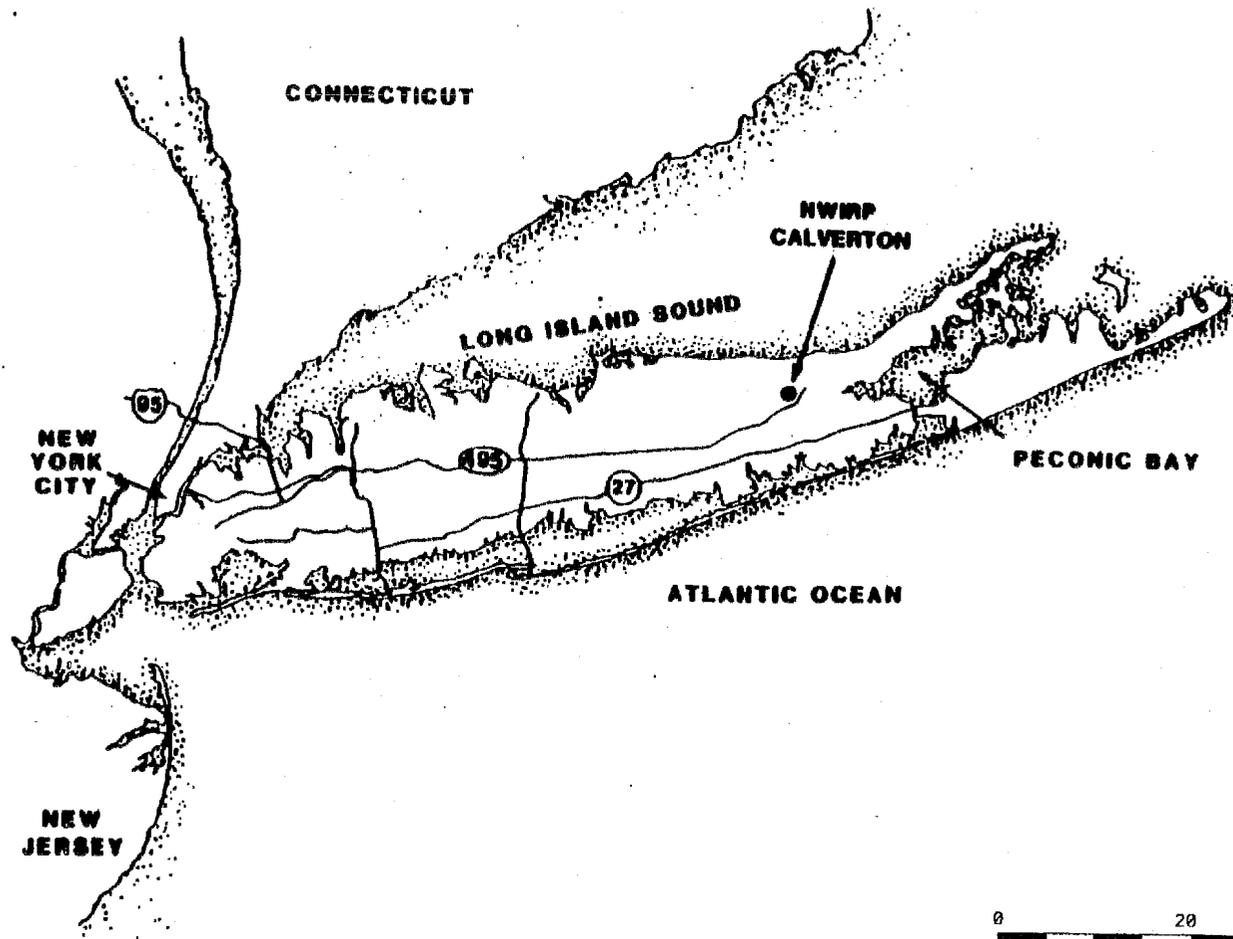
Approximately 3,000 acres of undeveloped land outside of the fenced areas was transferred to the Veterans Administration and NYSDEC in 1999.

## **1.5 REPORT FORMAT**

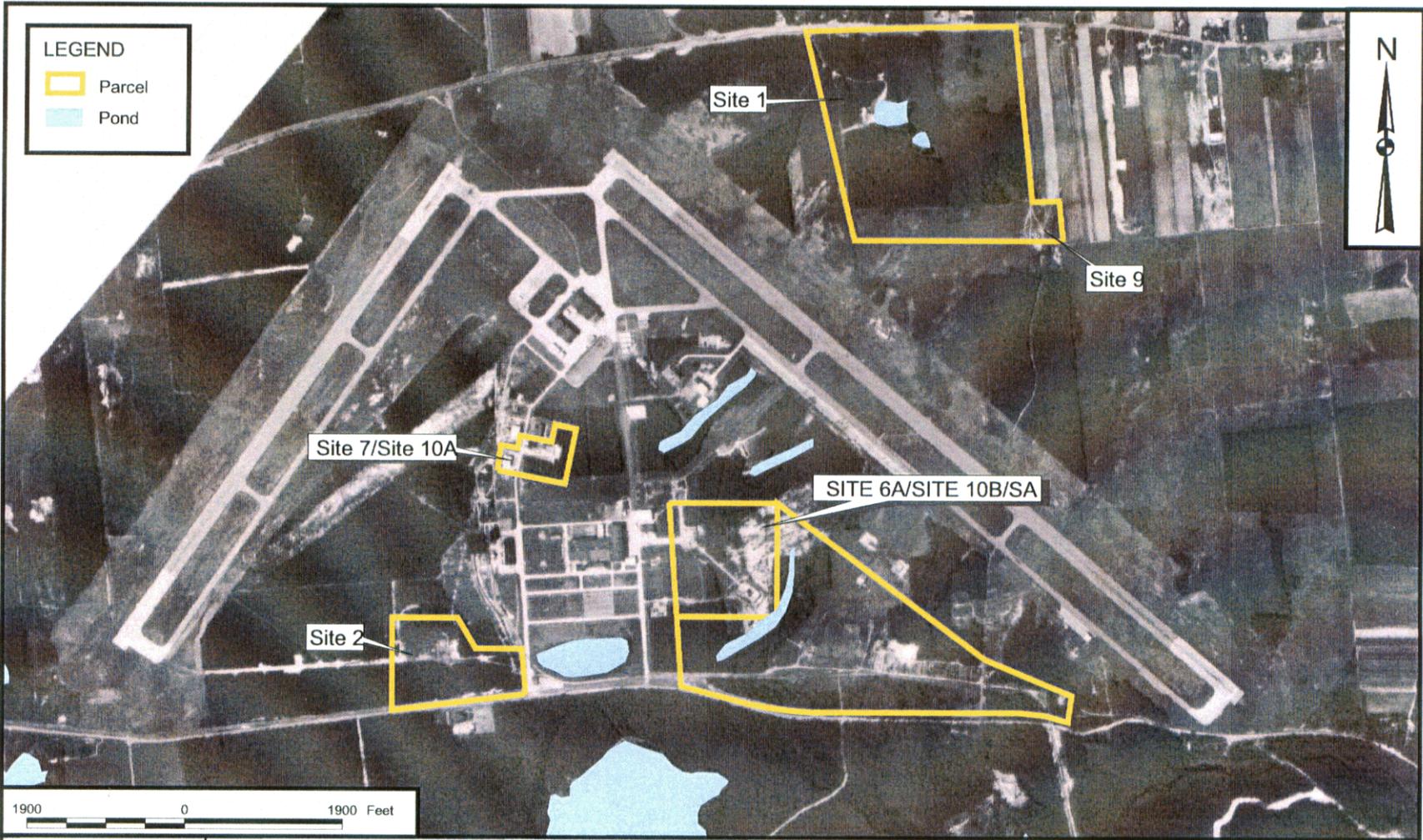
Section 1.0 of this report presents this introduction. Section 2.0 describes the field tasks. Section 3.0 presents the analytical results. Section 4.0 presents the conclusions and recommendations.

## **1.6 SCHEDULE**

Sample collection was conducted in May 2005.



DRAWN BY DLT 12/22/99	DATE 12/22/99	 Tetra Tech NUS, Inc.	CONTRACT NO. 7398	OWNER NO. 0270
CHECKED BY	DATE		APPROVED BY	DATE
COST/SCHED-AREA	GENERAL LOCATION MAP NWRP CALVERTON, NEW YORK		APPROVED BY	DATE
SCALE AS NOTED			DRAWING NO. FIGURE 1-1	REV. 0



**LEGEND**

- Parcel
- Pond



DRAWN BY	DATE
J. LAMEY	11/22/99
CHECKED BY	DATE
COST/SCHEDULE-AREA	
SCALE AS NOTED	

**Tetra Tech NUS, Inc.**

CONTRACT NUMBER 7398		OWNER NUMBER 0270	
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Figure 1-2		0	

**SITE LOCATION MAP  
NWIRP CALVERTON, NEW YORK**

## 2.0 FIELD INVESTIGATION

Site 2 - Fire Training Area is divided into three areas of investigation: (1) soil sampling at the petroleum-contaminated soil area; (2) soil sampling at the concrete pit (former burn pit); and (3) soil sampling beyond the perimeter of the petroleum-contaminated soil area. The field tasks for each of the sample areas are presented in Sections 2.1.1, 2.1.2 and 2.1.3.

Table 2-1 provides a summary of soil boring identification numbers, sample identification numbers, sample depths, and analyses including quality assurance (QA) and quality control (QC) samples. Figure 2-1 presents the investigation area and sample locations. Soil boring logs are provided in Appendix A. Chain of Custody forms are provided in Appendix B.

Prior to mobilization for the May 2005 sampling event, three surface water samples were collected in March 2005 from water located within the concrete pit. The samples were submitted for laboratory analysis. The purpose of the sampling was to determine if draining the water from the concrete pit and onto the site was acceptable. Results from the sampling indicated that no contamination was present in the water.

Also, during the field investigation, inventory was taken on the type of debris present at Site 2 from previous operations, including the AS/SVE system. A summary of the inventory is presented in Section 4.

### 2.1 FIELD PROCEDURES

#### 2.1.1 Soil Sampling at the Petroleum-Contaminated Soil Area

The objectives of the work within the petroleum-contaminated soil area were to confirm the presence of contaminants and to establish the vertical distribution of contaminants. Continuous soil samples were taken using direct-push technology (DPT). A total of four soil borings were installed in this area; three soil borings were installed to 16 feet below ground surface (bgs) (FT-SB-201, FT-SB-202, and FT-SB-204), and one soil boring was installed to 20 feet bgs (FT-SB-203). During installation of each boring, samples were collected from different layers based on field observations [visual and photoionization detector (PID) readings] to reflect both visually clean and contaminated soils. Table 2-1 summarizes the samples and sampling depths for the borings installed in this area. Samples were submitted to an analytical laboratory for total petroleum hydrocarbon (TPH)-diesel range organics (DRO) and -gasoline range organics (GRO) analysis. Some of the samples were also analyzed for volatile organic compounds (VOCs), PAHs, PCBs, pesticides, and Target Analyte List (TAL) metals. The boring locations are identified on Figure 2-1.

### **2.1.2 Soil Sampling at the Concrete Pit (Former Burn Pit)**

The objectives of the work within the concrete pit were to estimate the thickness of the concrete and to determine if petroleum-contaminated soil is present beneath the concrete pit. To establish the thickness of the concrete pit, four holes were drilled through the concrete at boring locations and then the thickness of concrete was measured. Continuous samples were taken using DPT. A total of four soil borings were installed in this area to 16 feet bgs (FT-SB-205 to FT-SB-208). During installation of each boring, samples were collected from different layers based on field observations (visual and PID readings) to reflect both visually clean and contaminated soils. Table 2-1 summarizes the samples and sampling depths for the borings in this area. Samples were submitted to an analytical laboratory for TPH-DRO and -GRO analysis. One sample was also analyzed for VOCs, PAHs, PCBs, pesticides, and TAL metals. The boring locations are identified on Figure 2-1.

### **2.1.3 Soil Sampling Beyond the Perimeter of the Petroleum-Contaminated Soil Area**

The objectives of the work around the perimeter of the suspected petroleum-contaminated soil area were to determine the horizontal limit of the petroleum-contaminated soil, the horizontal extent of PAH-, PCB-, and metals-contaminated soil, and the extent of contamination in the surface soil. Continuous samples were taken using DPT. A total of 30 soil borings were installed in this area, 15 soil borings to a depth of approximately 8 feet bgs (FT-SB-218 to FT-SB-221, FT-SB-227, FT-SB-229, FT-SB-230, and FT-SB-232 to FT-SB-239), five soil borings to a depth of approximately 12 feet bgs (FT-SB-211, FT-SB-214, FT-SB-216, FT-SB-224, and FT-SB-228), nine soil borings to a depth of approximately 16 feet bgs (FT-SB-209, FT-SB-210, FT-SB-212, FT-SB-213, FT-SB-215, FT-SB-217, FT-SB-222, FT-SB-225, and FT-SB-231), and one soil boring to a depth of approximately 20 feet bgs (FT-SB-226). During installation of each boring, samples were collected from different layers based on field observations (visual and PID readings) to reflect both visually clean and contaminated soils. Samples were not collected at several borings installed in the area (FT-SB-216 to FT-SB-218, FT-SB-220, FT-SB-222, and FT-SB-227 to FT-SB-239). These borings were evaluated by visual observation and PID readings for petroleum stains and volatile off-gassing. Remaining samples were submitted to an analytical laboratory for analysis of TPH-DRO and -GRO, VOCs, PAHs, PCBs, pesticides, and TAL metals.

In addition to soil boring samples, a total of five surface soil samples were collected (FT-SS-209, FT-SS-211, FT-SS-212, FT-SS-214, and FT-SS-215) at a depth of 0 to 1 foot bgs. Surface soil samples were submitted to an analytical laboratory for analysis of TPH-DRO and -GRO, VOCs, PAHs, PCBs, pesticides, and TAL metals.

Table 2-1 summarizes the samples and sampling depths for the borings and surface soil samples in this area. The locations of the borings and surface soil samples are identified on Figure 2-1.

#### 2.1.4 Decontamination Procedures

Downhole sampling equipment (i.e., DPT rods) were decontaminated using a high-pressure steam wash prior to commencing drilling, between locations, and prior to leaving the site. All decontamination fluids were collected and stored in the existing holding tanks on site.

### 2.2 SAMPLING AND ANALYSES

#### 2.2.1 Sample Designation and Handling

Samples were assigned a unique sampling number consisting of up to four parts including the site identifier, sample type, boring number, and sample depth. An example sample number is provided below with explanation.

<u>Site</u>	<u>Designation</u>
Site 2 - Fire Training Area	FT

<u>Sample Type</u>	<u>Designation</u>
Subsurface Soil	SB
Surface Soil	SS

<u>Boring Number</u>	<u>Designation</u>
Number	201 - 222, 224 - 239

<u>Sample Depth</u>	<u>Designation</u>
Depth (feet bgs)	0204, 0305, 0406, 0506, 0507, 0608, 1012, 1112, 1416, 1516

#### Example

FT-SB-203-0204, where,

FT = Site identifier (Fire Training Area)

SB = Sample type (subsurface soil)

203 = Boring number

0204 = Collected at 2 to 4 feet bgs

QA samples (trip blanks and field duplicates) were designated by media type and QA type with the date collected and numbered sequentially.

Example

DUP-050405-01 would be the first field duplicate collected on May 4, 2005.

RB-050605 would be the rinsate blank collected on May, 6, 2005.

**2.2.2 Quality Assurance/Quality Control**

**Equipment Calibration**

PIDs were calibrated according to manufacturer's recommendations and at a frequency recommended by the manufacturer.

**QA/QC Samples**

The types of QA/QC samples are summarized in Table 2-1.

**2.2.3 Sample Analysis**

The sample analyses are based on the past contaminant detections and anticipated future land use at Site 2. Samples submitted to the laboratory for analysis were analyzed for the compounds identified on Table 2-1. In addition to the soil samples collected, field blank, field duplicate, rinse blank, and trip blank samples were analyzed for the same parameters as the associated sample(s) for QC purposes. Each sample was analyzed with a 21-day turn-around time; however, the results were not considered final until the data were validated.

All samples were analyzed at Severn Trent Laboratories in Pittsburgh, PA.

TABLE 2-1

**SAMPLE IDENTIFICATION AND ANALYSIS SUMMARY**  
**SOIL INVESTIGATION DATA SUMMARY REPORT**  
**SITE 2 - FIRE TRAINING AREA**  
**MWIRP CALVERTON, NEW YORK**  
**PAGE 1 OF 2**

BORING NUMBER	BORING DEPTH (ft bgs)	SAMPLE IDENTIFICATION	SAMPLE ANALYSIS				
			TPH-DRO/GRO	VOCs	PAHs	Pesticides/PCBs	TAL Metals
<b>Soil Sampling at the Petroleum-Contaminated Soil Area</b>							
FT-SB-201	16	FTSB201-0305	X	X	X	X	X
		FTSB201-1012	X	--	--	--	--
		FTSB201-1516	X	--	--	--	--
FT-SB-202	16	FTSB202-0305	X	X	X	X	X
		FTSB202-1112	X	--	--	--	--
FT-SB-203	20	FTSB203-0204	X	X	X	X	X
		FTSB203-0608	X	--	--	--	--
		FTSB203-1516	X	--	--	--	--
FT-SB-204	16	FTSB204-0204	X	X	X	X	X
		FTSB204-0608	X	--	--	--	--
		FTSB204-1416	X	--	--	--	--
<b>Soil Sampling at the Concrete Pit (Former Burn Pit)</b>							
FT-SB-205	16	FTSB205-0305	X	--	--	--	--
FT-SB-206	16	FTSB206-0506	X	--	--	--	--
		FTSB206-1416	X	--	--	--	--
FT-SB-207	16	FTSB207-0305	X	X	X	X	X
		FTSB207-1012	X	--	--	--	--
		FTSB207-1416	X	--	--	--	--
FT-SB-208	16	FTSB208-0204	X	--	--	--	--
		FTSB208-1416	X	--	--	--	--
<b>Soil Sampling Beyond the Perimeter of the Petroleum-Contaminated Soil Area</b>							
FT-SB-209	16	FTSS209	X	--	X	X	X
		FTSB209-0305	X	X	X	X	X
FT-SB-210	16	FTSB210-0406	X	--	X	X	X
FT-SB-211	12	FTSS211	X	--	X	X	X
		FTSB211-0305	X	X	X	X	X
FT-SB-212	16	FTSS212	X	--	X	X	X
FT-SB-213	16	FTSB213-0305	X	X	X	X	X
FT-SB-214	12	FTSS214	X	--	X	X	X
FT-SB-215	16	FTSS215	X	--	X	X	X
		FTSB215-0305	X	X	X	X	X
FT-SB-216	12	(1)	--	--	--	--	--
FT-SB-217	16	(1)	--	--	--	--	--
FT-SB-218	8	(1)	--	--	--	--	--
FT-SB-219	8	FTSB219-0507	X	--	X	X	X
FT-SB-220	8	(1)	--	--	--	--	--
FT-SB-221	8	FTSB221-0406	X	--	X	X	X
FT-SB-222	16	(1)	--	--	--	--	--
FT-SB-224	12	FTSB224-0305	X	X	X	X	X

TABLE 2-1

**SAMPLE IDENTIFICATION AND ANALYSIS SUMMARY**  
**SOIL INVESTIGATION DATA SUMMARY REPORT**  
**SITE 2 - FIRE TRAINING AREA**  
**MWIRP CALVERTON, NEW YORK**  
**PAGE 2 OF 2**

BORING NUMBER	BORING DEPTH (ft bgs)	SAMPLE IDENTIFICATION	SAMPLE ANALYSIS				
			TPH-DRO/GRO	VOCs	PAHs	Pesticides/PCBs	TAL Metals
<b>Soil Sampling Beyond the Perimeter of the Petroleum-Contaminated Soil Area (Continued)</b>							
FT-SB-225	16	FTSB225-0305	X	X	X	X	X
FT-SB-226	20	FTSB226-0305	X	X	X	X	X
FT-SB-227	8	(1)	--	--	--	--	--
FT-SB-228	12	(1)	--	--	--	--	--
FT-SB-229	8	(1)	--	--	--	--	--
FT-SB-230	8	(1)	--	--	--	--	--
FT-SB-231	16	(1)	--	--	--	--	--
FT-SB-232	8	(1)	--	--	--	--	--
FT-SB-233	8	(1)	--	--	--	--	--
FT-SB-234	8	(1)	--	--	--	--	--
FT-SB-235	8	(1)	--	--	--	--	--
FT-SB-236	8	(1)	--	--	--	--	--
FT-SB-237	8	(1)	--	--	--	--	--
FT-SB-238	8	(1)	--	--	--	--	--
FT-SB-239	8	(1)	--	--	--	--	--

<b>QA/QC Samples</b>							
Duplicate		DUP-050405-01 <sup>(3)</sup>	X	X	X	X	X
Duplicate		DUP-050405-02 <sup>(3)</sup>	X	--	--	--	--
Duplicate		DUP-050605-03 <sup>(3)</sup>	X	X	X	X	X
Field Blank		FB-050505 <sup>(2)</sup>	X	X	X	X	X
Rinsate Blank		RB-050605 <sup>(2)</sup>	X	X	X	X	X
Trip Blank		TB-050405 <sup>(2)</sup>	--	X	--	--	--
Trip Blank		TB-050505 <sup>(2)</sup>	--	X	--	--	--
Trip Blank		TB-050605 <sup>(2)</sup>	--	X	--	--	--

-- Analysis not performed.

1 Samples were not collected for laboratory analysis from this boring. Visual inspection and PID measurements were used to determine if petroleum-stained soil was present.

2 Field blanks, rinsate blanks, and trip blanks were labeled using FB, RB, or TB, respectively, and the date to indicate the day on which the blank was collected (e.g. 050505 represents May 5, 2005).

3 Duplicate samples were labeled using DUP, the date to indicate the day on which the duplicate was collected (e.g., 050405 represents May 4, 2005), and a number to represent the sequential number of duplicate collected (e.g., 01 indicates the first duplicate sample collected). Duplicated samples correspond to the following samples:

DUP-050405-01  
DUP-050405-02  
DUP-050605-03

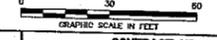
FT-SB-202-0305  
FT-SB-204-1416  
FT-SB-224-0305



**LEGEND:**

- FT-SB-217 SOIL BORING (2005)
- ⊙ FT-MW-01-S MONITORING WELL (1994,1995)
- ⊙ SB-102 SOIL BORING (1994, 1995)
- ⊙ FT-TP-01 TEST PIT (1994, 2001)
- ⊙ FT-SS-06 SURFACE SOIL SAMPLE (1994)
- ⊙ AIR INJECTION WELL (1995)
- ⊙ AIR EXTRACTION WELL (1995)
- UNDERGROUND UTILITIES
- TREE LINE

- NOTES:**
1. TEST PIT LOCATIONS ARE APPROXIMATE.
  2. BORING FT-SB-223 DOES NOT EXIST. THE NUMBER WAS SKIPPED IN THE FIELD.
  3. LOCATION OF SITE STRUCTURES/AIR INJECTION WELLS/AIR EXTRACTION WELLS ARE OFFSET FROM MONITORING WELL LOCATIONS BY FIVE FEET. USE SITE STRUCTURES /AIR INJECTION WELLS/ AIR EXTRACTION WELLS AS REFERENCE POINTS.



DRAWN BY HJB	DATE 7/13/15
CHECKED BY	DATE
REVISED BY	DATE
SCALE AS NOTED	



SAMPLE LOCATIONS  
SITE 2 - FIRE TRAINING AREA  
NWRP CALVERTON, NEW YORK

CONTRACT NO. IGIO	
OWNER NO. 004	
APPROVED BY	DATE
DRAWING NO. FIGURE 2-1	REV. 0

### 3.0 ANALYTICAL RESULTS

Analytical results from the 2005 investigation are presented in this section. A summary of positive detections for surface soil and soil boring samples are presented in Tables 3-1 and 3-2, respectively. Analytical data as received from the laboratory are presented in Appendix C. Data validation letters are provided in Appendix D.

Chemical concentrations identified at Site 2 are compared to values included in the NYSDEC Technical and Administrative Guidance Memorandum (TAGM) No. 4046, Determination of Soil Cleanup Objectives and Cleanup Levels (NYSDEC, 1994). The TAGMs are non-enforceable guidance values intended to be protective of human health and the environment for a direct contact exposure scenario. The TAGM 4046 values were derived based on available chemical-specific toxicity data for carcinogenic and non-carcinogenic health effects.

TAGM 4046 does not provide criteria for TPH-DRO and TPH-GRO. Experience at NWIRP Calverton has indicated that TPH at concentrations less than 1,000 milligrams per kilogram (mg/kg) rarely form a separate free product layer at the groundwater table in sandy soils such as those at Site 2, but TPH may exist as a smear zone on the soils. TPH at concentrations greater than 10,000 mg/kg commonly form a free product layer at the groundwater table and also exist as a smear zone. Therefore, the screening level established for TPH-DRO and TPH-GRO is 1,000 mg/kg.

Also, there are several occurrences of TAGM 4046 values for inorganic chemicals specifying a value based on toxicity or site background as the screening value. In those instances, the greater of the two numbers was used as the screening value. In addition, TAGM 4046 refers to site background values for antimony, cyanide, silver, and selenium. Site background data are not available for those chemicals. Therefore, the screening value used was the United States Environmental Protection Agency (USEPA) Region 3 Risk-Bank Concentration (RBC) values. Residential and industrial RBCs are available criteria. For Site 2, the lesser of the two values was used as the screening criteria for antimony and silver. Cyanide and selenium were not detected at Site 2.

Table 2-1 presents a summary of the samples that were collected for Site 2. Table 2-1 also presents information such as depths and analytical parameters for each sample.

Sample locations and detections of TPH-DRO are presented on Figure 3-1. Also presented on Figure 3-1 are PAH, PCB, and metals exceedances of project-specific screening levels. TPH-DRO and TPH-GRO concentrations that exceed 1,000 mg/kg and concentrations of PAHs, PCBs, and metals that exceed NYSDEC TAGM 4046 criteria are bolded for identification purposes.

### 3.1 SURFACE SOIL

Five surface soil locations (FT-SS-209, FT-SS-211, FT-SS-212, FT-SS-214, FT-SS-215) were sampled and analyzed for TPH-DRO, TPH-GRO, PAHs, pesticides, PCBs, and inorganics. The surface soil sampling was conducted as a general screening tool to determine whether potentially significant levels of chemicals or fuels were present at this site.

As presented in Table 3-1 and Figure 3-1, there were 11 exceedances of seven PAHs [benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenzo(a,h)anthracene, and indeno(1,2,3-cd)pyrene], one PCB (Aroclor-1248) exceedance, and five exceedances of four metals (beryllium, calcium, manganese, and sodium) compared to screening levels. Of the 11 PAH exceedances, six were 10 times or greater than the TAGM 4046 screening level. Two of the metals that exceeded screening criteria (calcium and sodium) are essential nutrients in the environment and are not considered a risk. Excluding the essential nutrients calcium and sodium, there was one exceedance of beryllium in FT-SS-215 at 0.4 mg/kg and one exceedance of manganese in FT-SS-214 at 156 mg/kg. The screening levels for beryllium and manganese are 0.16 mg/kg and 90.8 mg/kg respectively.

### 3.2 SOIL BORINGS

Thirty-eight soil borings were drilled during this field investigation (FT-SB-201 to FT-SB-222 and FT-SB-224 to FT-SB-239). Boring FT-SB-223 does not exist because the number was skipped during field operations. The 38 soil borings were visually inspected and measurements were taken with the PID to determine the presence of petroleum-stained soil. Overall, 15 of the 38 soil borings (FT-SB-201, FT-SB-203, FT-SB-204, FT-SB-206, FT-SB-207, FT-SB-209 to FT-SB-212, FT-SB-214, FT-SB-217, FT-SB-218, FT-SB-225, FT-SB-226, and FT-SB-231) displayed evidence of petroleum-contaminated soil including the presence of black-stained soil, PID measurements in excess of 25 parts per million (ppm), and/or a petroleum odor. Eight soil borings (FT-SB-201, FT-SB-203, FT-SB-206, FT-SB-207, FT-SB-210, FT-SB-211, FT-SB-214, and FT-SB-218) displayed evidence of petroleum-contaminated soil within 0 to 6 feet bgs, and 12 soil borings (FT-SB-201, FT-SB-203, FT-SB-204, FT-SB-207, FT-SB-209, FT-SB-210, FT-SB-212, FT-SB-214, FT-SB-217, FT-SB-225, FT-SB-226, and FT-SB-231) displayed evidence of petroleum-contaminated soil at depths exceeding 6 feet bgs.

At 18 of the 38 soil borings (FT-SB-216 to FT-SB-218, FT-SB-220, FT-SB-222, and FT-SB-227 to FT-SB-239), samples were not submitted for laboratory analysis. One soil boring (FT-SB-218) displayed evidence of petroleum-contaminated soil within 0 to 6 feet bgs, and two soil borings (FT-SB-217 and FT-SB-225) displayed evidence of petroleum-contaminated soil at depths exceeding 6 feet bgs.

A total of 29 samples were collected from 20 borings (FT-SB-201 to FT-SB-215, FT-SB-219, FT-SB-221, and FT-SB-224 to FT-SB-226) from depths ranging from 2 to 16 feet bgs and submitted for laboratory analysis. Refer to Table 2-1 for a complete list of samples collected and analyses performed.

Of the 29 soil boring samples, there were 13 screening level exceedances of TPH-DRO in samples FT-SB-201-0305, FT-SB-201-1012, FT-SB-201-1516, FT-SB-203-0204, FT-SB-203-0608, FT-SB-203-1516, FT-SB-204-1416, FT-SB-205-0305, FT-SB-206-0506, FT-SB-207-0305, FT-SB-207-1012, FT-SB-207-1416, and FT-SB-225-0305. Two of those exceedances (11,000 mg/kg in FT-SB-203-0204 and 13,000 mg/kg in FT-SB-207-1416) were greater than 10 times the screening level. There were several detections of TPH-GRO but no exceedances.

There were 13 exceedances of four PAHs [benzo(a)anthracene, benzo(a)pyrene, chrysene, and dibenzo(a,h)anthracene] in seven soil boring samples (FT-SB-201-0305, FT-SB-202-0305, FT-SB-203-0204, FT-SB-211-0305, FT-SB-213-0305, FT-SB-225-0305, and FT-SB-226-0305). One of those exceedances, dibenzo(a,h)anthracene at 190 micrograms per kilogram ( $\mu\text{g}/\text{kg}$ ) in FT-SB-203-0204, exceeded 10 times the TAGM 4046 level.

There were no TAGM 4046 exceedances of VOCs or PCBs in the 29 soil boring samples.

Excluding essential nutrients such as calcium, magnesium, potassium, and sodium, there were three exceedances of beryllium in soil boring samples FT-SB-209-0305, FT-SB-211-0305, and FT-SB-226-0305 at concentrations of 0.17 mg/kg, 0.19 mg/kg, and 0.26 mg/kg, respectively. The screening level for beryllium is 0.16 mg/kg.

TABLE 3-1

SUMMARY OF POSITIVE RESULTS - SURFACE SOIL  
SOIL INVESTIGATION DATA SUMMARY REPORT  
SITE 2 - FIRE TRAINING AREA  
NWIRP CALVERTON, NEW YORK  
PAGE 1 OF 2

PARAMETER	Screening Value <sup>(1)</sup>	FT-SS-209	FT-SS-211	FT-SS-212	FT-SS-214	FT-SS-215
<b>Petroleum Hydrocarbons (mg/kg)</b>						
DIESEL RANGE ORGANICS	1000	480	1100	18		
GASOLINE RANGE ORGANICS	1000					
<b>Semivolatile Organics (ug/kg)</b>						
2-METHYLNAPHTHALENE	36400				44	
ACENAPHTHYLENE	41000			4.8 J	35 J	20 J
ANTHRACENE	50000	230	3600 J	2.9 J	1.1 J	3.3 J
BENZO(A)ANTHRACENE	224	730	13000	18	5.6 J	50
BENZO(A)PYRENE	61	700	12000	17	5.3 J	61
BENZO(B)FLUORANTHENE	1100	660	11000	18	17	60
BENZO(G,H,I)PERYLENE	50000	470	7400	15	13	47
BENZO(K)FLUORANTHENE	1100	430	7200	11	7 J	38
CHRYSENE	400	720	12000	17	8.6	51
DIBENZO(A,H)ANTHRACENE	14	160 J	1800 J		7.9	12
FLUORANTHENE	50000	1600	30000	32	10	80
FLUORENE	50000	110 J	2800 J	2.3 J		
INDENO(1,2,3-CD)PYRENE	3200	580	7700	13	18	54
NAPHTHALENE	13000				11 J	
PHENANTHRENE	50000	1100	20000	16	24	30
PYRENE	50000	1200	31000	33	12	100
<b>Pesticides/PCBs (ug/kg)</b>						
4,4'-DDD	2900	4 J		1 J	2.1 J	3.5 J
4,4'-DDE	2100	6.2 J	88 J	1.6 J	1.3 J	9 J
4,4'-DDT	2100			4.3	35	
ALPHA-CHLORDANE	540	6.1 J		1.7 J	1.4 J	13 J
AROCLOR-1248	1000					1100
AROCLOR-1254	1000			67		
AROCLOR-1260	1000	1000	190	40	730	930
ENDOSULFAN II	900			2.5 J		24

TABLE 3-1

SUMMARY OF POSITIVE RESULTS - SURFACE SOIL  
SOIL INVESTIGATION DATA SUMMARY REPORT  
SITE 2 - FIRE TRAINING AREA  
NWIRP CALVERTON, NEW YORK  
PAGE 2 OF 2

PARAMETER	Screening Value <sup>(1)</sup>	FT-SS-209	FT-SS-211	FT-SS-212	FT-SS-214	FT-SS-215
<b>Inorganics (mg/kg)</b>						
ALUMINUM	16800 <sup>(2)</sup>	2300	3380	3580	4720	6120
ANTIMONY	31/410 <sup>(3)</sup>	0.46				
ARSENIC	14 <sup>(2)</sup>	2.1	2.5	0.79	2	5.5
BARIUM	300	21.2	11.3	5.1	15.7	76.2
BERYLLIUM	0.16	0.1			0.15	<b>0.4</b>
CADMIUM	1.9 <sup>(2)</sup>	0.51	0.35	0.039	0.19	0.051
CALCIUM <sup>(4)</sup>	447 <sup>(2)</sup>	192	<b>2130</b>	42.1	153	<b>1040</b>
CHROMIUM	50	13.7	6.8	4.5	9.1	7.7
COBALT	30	0.58	0.88	0.51	3.3	1.6
COPPER	25	10.4	6.8	2.4	6	12.2
IRON	16900 <sup>(2)</sup>	2940	3280	2980	5990	10000
LEAD	48.6 <sup>(2)</sup>	41.4	15.2	5.2	14.3	9.2
MAGNESIUM <sup>(4)</sup>	1560 <sup>(2)</sup>	191	1260	220	811	689
MANGANESE	90.8 <sup>(2)</sup>	21.8	31	15.6	<b>156</b>	41.3
MERCURY	0.1	0.07	0.023	0.012	0.017	0.033
NICKEL	13	1.7	2.4	1.5	5.1	6.4
POTASSIUM <sup>(4)</sup>	348 <sup>(2)</sup>	68.3	83.6	75.5	192	204
SELENIUM	2	0.76	0.75		0.31	0.49
SILVER	390/5,100 <sup>(3)</sup>	0.19	0.27			0.19
SODIUM <sup>(4)</sup>	285 <sup>(2)</sup>	<b>286</b>	259	276	220	241
VANADIUM	150	7.5	7.6	6.9	10.8	29.3
ZINC	38.4 <sup>(2)</sup>	33.6	19	6.1	18.3	11.7

## NOTES:

- Screening values taken from NYSDEC TAGM No. 4046 unless otherwise noted.
- Background value from RCRA Facility Assessment-Sampling Visit (NUS, 1995).
- USEPA Region III RBC (residential/industrial) value (<http://www.epa.gov/reg3hwmd/risk/human/rbc/rbc0405.pdf>). Lesser of two numbers used as screening value.
- Calcium, magnesium, sodium, and potassium are essential nutrients.

Bold indicates exceedance of screening level.

Blank cells indicate result was non-detect.

J = Estimated due to uncertainty near the detection limit.

TABLE 3-2

SUMMARY OF POSITIVE RESULTS - SOIL BORINGS  
 SOIL INVESTIGATION DATA SUMMARY REPORT  
 SITE 2 - FIRE TRAINING AREA  
 NWIRP CALVERTON, NEW YORK  
 PAGE 1 OF 9

PARAMETER	Screening Value <sup>(1)</sup>	FT-SB-201-0305	FT-SB-201-1012	FT-SB-201-1516	FT-SB-202-0305	FT-SB-202-0305-D	FT-SB-202-1112	FT-SB-203-0204	FT-SB-203-0608	FT-SB-203-1516
<b>Petroleum Hydrocarbons (mg/kg)</b>										
DIESEL RANGE ORGANICS	1000	4900	3800	2100			400	11000	2100	8400
GASOLINE RANGE ORGANICS	1000	110	19	120				79		
<b>Volatile Organics (ug/kg)</b>										
1,1-DICHLOROETHANE	200	0.51 J	NS	NS			NS	1 J	NS	NS
2-BUTANONE	300	8.3 J	NS	NS	2.3 J		NS	3.1 J	NS	NS
ACETONE	200	38 J	NS	NS	12 J		NS	13 J	NS	NS
BENZENE	60		NS	NS			NS		NS	NS
CIS-1,2-DICHLOROETHENE	NC	1 J	NS	NS	2.5 J		NS	1.1 J	NS	NS
ETHYLBENZENE	5500	9.9	NS	NS			NS	11	NS	NS
ISOPROPYLBENZENE	NC	8.7	NS	NS			NS	11	NS	NS
METHYL CYCLOHEXANE	NC	1.5 J	NS	NS			NS	8.5	NS	NS
METHYLENE CHLORIDE	100		NS	NS		2.6 J	NS		NS	NS
TOLUENE	1500	36	NS	NS			NS	8.6	NS	NS
TOTAL XYLENES	1200	87	NS	NS			NS	130	NS	NS
TRICHLOROETHENE	700	0.89 J	NS	NS			NS		NS	NS
VINYL CHLORIDE	200		NS	NS			NS		NS	NS
<b>Semivolatile Organics (ug/kg)</b>										
2-METHYLNAPHTHALENE	36400	4100 J	NS	NS			NS	8700	NS	NS
ACENAPHTHENE	50000		NS	NS			NS	380 J	NS	NS
ACENAPHTHYLENE	41000		NS	NS	13 J		NS		NS	NS
ANTHRACENE	50000	10 J	NS	NS	32 J	15 J	NS	110 J	NS	NS
BENZO(A)ANTHRACENE	224	31 J	NS	NS	73 J	35 J	NS	960	NS	NS
BENZO(A)PYRENE	61	39 J	NS	NS	82 J	42 J	NS	610	NS	NS
BENZO(B)FLUORANTHENE	1100	40 J	NS	NS	70 J	41 J	NS	1000	NS	NS
BENZO(G,H,I)PERYLENE	50000	53 J	NS	NS	65 J	32 J	NS	680	NS	NS
BENZO(K)FLUORANTHENE	1100	26 J	NS	NS	40 J	24 J	NS	600	NS	NS
CHRYSENE	400	30 J	NS	NS	71 J		NS	1100	NS	NS
DIBENZO(A,H)ANTHRACENE	14	20 J	NS	NS	6.2 J	6.2 J	NS	190 J	NS	NS
FLUORANTHENE	50000	76 J	NS	NS	170 J	78 J	NS	3200	NS	NS
FLUORENE	50000	160 J	NS	NS	17 J	7.6 J	NS	730	NS	NS
INDENO(1,2,3-CD)PYRENE	3200	60 J	NS	NS	57 J	29 J	NS	600	NS	NS
NAPHTHALENE	13000	1200 J	NS	NS		6.9 J	NS	2200	NS	NS
PHENANTHRENE	50000	290 J	NS	NS	120 J	55 J	NS	2300	NS	NS
PYRENE	50000	78 J	NS	NS	170 J	86 J	NS	3200	NS	NS

TABLE 3-2

SUMMARY OF POSITIVE RESULTS - SOIL BORINGS  
SOIL INVESTIGATION DATA SUMMARY REPORT  
SITE 2 - FIRE TRAINING AREA  
NWIRP CALVERTON, NEW YORK  
PAGE 2 OF 9

PARAMETER	Screening Value <sup>(1)</sup>	FT-SB-201-0305	FT-SB-201-1012	FT-SB-201-1516	FT-SB-202-0305	FT-SB-202-0305-D	FT-SB-202-1112	FT-SB-203-0204	FT-SB-203-0608	FT-SB-203-1516
<b>Pesticides/PCBs (ug/kg)</b>										
4,4'-DDD	2900	1.5 R	NS	NS	8.2	5.8	NS	4.3 R	NS	NS
4,4'-DDE	2100	4.5	NS	NS	1.7 J	1.1 J	NS	7.2 J	NS	NS
4,4'-DDT	2100		NS	NS	1 R	0.63 R	NS		NS	NS
ALPHA-CHLORDANE	540	4.9	NS	NS			NS		NS	NS
AROCLOR-1248	10000		NS	NS			NS		NS	NS
AROCLOR-1260	10000	510	NS	NS			NS	1800	NS	NS
DIELDRIN	44	2.5 J	NS	NS	0.29 R	0.33 J	NS	3.1 R	NS	NS
ENDOSULFAN II	900		NS	NS			NS		NS	NS
ENDOSULFAN SULFATE	1000	5	NS	NS			NS		NS	NS
ENDRIN	100		NS	NS	0.21 R		NS		NS	NS
ENDRIN ALDEHYDE	0		NS	NS			NS		NS	NS
GAMMA-CHLORDANE	540	2.1 R	NS	NS	1.1 J	0.9 J	NS	2.8 R	NS	NS
<b>Inorganics (mg/kg)</b>										
ALUMINUM	16800 <sup>(2)</sup>	2810	NS	NS	2240	2120	NS	2710	NS	NS
ANTIMONY	31/410 <sup>(3)</sup>		NS	NS			NS		NS	NS
ARSENIC	14 <sup>(2)</sup>	0.76	NS	NS	0.69	0.65	NS	0.57	NS	NS
BARIUM	300	11	NS	NS	11	10.1	NS	13.9	NS	NS
BERYLLIUM	0.16		NS	NS			NS		NS	NS
CADMIUM	1.9 <sup>(2)</sup>	0.19	NS	NS	0.06	0.082	NS	0.053	NS	NS
CALCIUM <sup>(4)</sup>	447 <sup>(2)</sup>	311	NS	NS	1220	1110	NS	549	NS	NS
CHROMIUM	50	5.7	NS	NS	4.1	4	NS	3.5	NS	NS
COBALT	30	0.44	NS	NS	0.41	0.33	NS	0.3	NS	NS
COPPER	25	3.3	NS	NS	2.4	2.5	NS	2.5	NS	NS
IRON	16900 <sup>(2)</sup>	1660	NS	NS	1650	1580	NS	1460	NS	NS
LEAD	48.6 <sup>(2)</sup>	14.8	NS	NS	3.4	3.8	NS	13.4	NS	NS
MAGNESIUM <sup>(4)</sup>	1560 <sup>(2)</sup>	119	NS	NS	305	254	NS	119	NS	NS
MANGANESE	90.8 <sup>(2)</sup>	9.5	NS	NS	21.8	17.3	NS	11	NS	NS
MERCURY	0.1	0.019	NS	NS	0.0093	0.0059	NS	0.016	NS	NS
NICKEL	13	1.2	NS	NS	1.3	1.2	NS	1.2	NS	NS
POTASSIUM <sup>(4)</sup>	348 <sup>(2)</sup>	65.7	NS	NS	52.1	53.7	NS	66.1	NS	NS
SELENIUM	2	0.3	NS	NS	0.58	0.67	NS		NS	NS
SILVER	390/5,100 <sup>(3)</sup>	0.17	NS	NS			NS		NS	NS
SODIUM <sup>(4)</sup>	285 <sup>(2)</sup>	322	NS	NS	330	277	NS	275	NS	NS
VANADIUM	150	7	NS	NS	5.9	5.5	NS	7.5	NS	NS
ZINC	38.4 <sup>(2)</sup>	22.3	NS	NS	6.6	5.8	NS	11.9	NS	NS



TABLE 3-2

**SUMMARY OF POSITIVE RESULTS - SOIL BORINGS**  
**SOIL INVESTIGATION DATA SUMMARY REPORT**  
**SITE 2 - FIRE TRAINING AREA**  
**NWIRP CALVERTON, NEW YORK**  
**PAGE 4 OF 9**

PARAMETER	Screening Value <sup>(1)</sup>	FT-SB-204-0204	FT-SB-204-0608	FT-SB-204-1416	FT-SB-204-1416-D	FT-SB-205-0305	FT-SB-206-0506	FT-SB-206-1416	FT-SB-207-0305	FT-SB-207-1012
<b>Pesticides/PCBs (ug/kg)</b>										
4,4'-DDD	2900		NS	NS	NS	NS	NS	NS	4.8	NS
4,4'-DDE	2100	1.3 J	NS	NS	NS	NS	NS	NS	4.6	NS
4,4'-DDT	2100	14	NS	NS	NS	NS	NS	NS		NS
ALPHA-CHLORDANE	540		NS	NS	NS	NS	NS	NS		NS
AROCLOR-1248	10000		NS	NS	NS	NS	NS	NS	67	NS
AROCLOR-1260	10000	41	NS	NS	NS	NS	NS	NS	140	NS
DIELDRIN	44		NS	NS	NS	NS	NS	NS	1.5 R	NS
ENDOSULFAN II	900		NS	NS	NS	NS	NS	NS		NS
ENDOSULFAN SULFATE	1000		NS	NS	NS	NS	NS	NS	3.8 J	NS
ENDRIN	100		NS	NS	NS	NS	NS	NS		NS
ENDRIN ALDEHYDE	0		NS	NS	NS	NS	NS	NS		NS
GAMMA-CHLORDANE	540		NS	NS	NS	NS	NS	NS	1 R	NS
<b>Inorganics (mg/kg)</b>										
ALUMINUM	16800 <sup>(2)</sup>	1870	NS	NS	NS	NS	NS	NS	1780	NS
ANTIMONY	31/410 <sup>(3)</sup>		NS	NS	NS	NS	NS	NS		NS
ARSENIC	14 <sup>(2)</sup>	0.74	NS	NS	NS	NS	NS	NS	0.65	NS
BARIUM	300	7.2	NS	NS	NS	NS	NS	NS	11.8	NS
BERYLLIUM	0.16		NS	NS	NS	NS	NS	NS		NS
CADMIUM	1.9 <sup>(2)</sup>	0.12	NS	NS	NS	NS	NS	NS	0.31	NS
CALCIUM <sup>(4)</sup>	447 <sup>(2)</sup>	107	NS	NS	NS	NS	NS	NS	1680	NS
CHROMIUM	50	3.1	NS	NS	NS	NS	NS	NS	8.6	NS
COBALT	30	0.49	NS	NS	NS	NS	NS	NS	5.7	NS
COPPER	25	2.2	NS	NS	NS	NS	NS	NS	6.9	NS
IRON	16900 <sup>(2)</sup>	1410	NS	NS	NS	NS	NS	NS	1780	NS
LEAD	48.6 <sup>(2)</sup>	4.6	NS	NS	NS	NS	NS	NS	18.1	NS
MAGNESIUM <sup>(4)</sup>	1560 <sup>(2)</sup>	91.6	NS	NS	NS	NS	NS	NS	268	NS
MANGANESE	90.8 <sup>(2)</sup>	13.1	NS	NS	NS	NS	NS	NS	28.1	NS
MERCURY	0.1	0.0043	NS	NS	NS	NS	NS	NS	0.028	NS
NICKEL	13	1.4	NS	NS	NS	NS	NS	NS	1.1	NS
POTASSIUM <sup>(4)</sup>	348 <sup>(2)</sup>	54.7	NS	NS	NS	NS	NS	NS	103	NS
SELENIUM	2	0.39	NS	NS	NS	NS	NS	NS		NS
SILVER	390/5,100 <sup>(3)</sup>		NS	NS	NS	NS	NS	NS		NS
SODIUM <sup>(4)</sup>	285 <sup>(2)</sup>	277	NS	NS	NS	NS	NS	NS	448	NS
VANADIUM	150	4.5	NS	NS	NS	NS	NS	NS	5.6	NS
ZINC	38.4 <sup>(2)</sup>	9	NS	NS	NS	NS	NS	NS	18.2	NS

TABLE 3-2

SUMMARY OF POSITIVE RESULTS - SOIL BORINGS  
SOIL INVESTIGATION DATA SUMMARY REPORT  
SITE 2 - FIRE TRAINING AREA  
NWIRP CALVERTON, NEW YORK  
PAGE 5 OF 9

PARAMETER	Screening Value <sup>(1)</sup>	FT-SB-207-1416	FT-SB-208-0204	FT-SB-208-1416	FT-SB-209-0305	FT-SB-210-0406	FT-SB-211-0305	FT-SB-213-0305	FT-SB-215-0305	FT-SB-219-0507
<b>Petroleum Hydrocarbons (mg/kg)</b>										
DIESEL RANGE ORGANICS	1000	1300		30		290	990	21		32
GASOLINE RANGE ORGANICS	1000	130					64			
<b>Volatile Organics (ug/kg)</b>										
1,1-DICHLOROETHANE	200	NS	NS	NS		NS				NS
2-BUTANONE	300	NS	NS	NS		NS	8.8			NS
ACETONE	200	NS	NS	NS		NS	25			NS
BENZENE	60	NS	NS	NS		NS				NS
CIS-1,2-DICHLOROETHENE	NC	NS	NS	NS		NS				NS
ETHYLBENZENE	5500	NS	NS	NS		NS	11			NS
ISOPROPYLBENZENE	NC	NS	NS	NS		NS	7.2			NS
METHYL CYCLOHEXANE	NC	NS	NS	NS		NS	7.5			NS
METHYLENE CHLORIDE	100	NS	NS	NS		NS				NS
TOLUENE	1500	NS	NS	NS		NS	0.99 J			NS
TOTAL XYLENES	1200	NS	NS	NS		NS	98			NS
TRICHLOROETHENE	700	NS	NS	NS		NS				NS
VINYL CHLORIDE	200	NS	NS	NS		NS				NS
<b>Semivolatile Organics (ug/kg)</b>										
2-METHYLNAPHTHALENE	36400	NS	NS	NS	4.9 J				5.5 J	
ACENAPHTHENE	50000	NS	NS	NS						
ACENAPHTHYLENE	41000	NS	NS	NS						
ANTHRACENE	50000	NS	NS	NS		5.3 J	26	12 J		2.5 J
BENZO(A)ANTHRACENE	224	NS	NS	NS		30	73	84		11
BENZO(A)PYRENE	61	NS	NS	NS		27	80	100		15
BENZO(B)FLUORANTHENE	1100	NS	NS	NS		30		97		12
BENZO(G,H,I)PERYLENE	50000	NS	NS	NS		51	120	79		21
BENZO(K)FLUORANTHENE	1100	NS	NS	NS		19	43	62		7.4
CHRYSENE	400	NS	NS	NS		30	68	82		11
DIBENZO(A,H)ANTHRACENE	14	NS	NS	NS		11	19 J	25		5.9 J
FLUORANTHENE	50000	NS	NS	NS		63	170	150	1.6 J	18
FLUORENE	50000	NS	NS	NS			12 J	9.1 J		2.1 J
INDENO(1,2,3-CD)PYRENE	3200	NS	NS	NS		31	59	86		19
NAPHTHALENE	13000	NS	NS	NS						
PHENANTHRENE	50000	NS	NS	NS	3.3 J	38	130	69	5 J	11
PYRENE	50000	NS	NS	NS	0.6 J	62	160	160	1.2 J	21

TABLE 3-2

SUMMARY OF POSITIVE RESULTS - SOIL BORINGS  
SOIL INVESTIGATION DATA SUMMARY REPORT  
SITE 2 - FIRE TRAINING AREA  
NWIRP CALVERTON, NEW YORK  
PAGE 6 OF 9

PARAMETER	Screening Value <sup>(1)</sup>	FT-SB-207-1416	FT-SB-208-0204	FT-SB-208-1416	FT-SB-209-0305	FT-SB-210-0406	FT-SB-211-0305	FT-SB-213-0305	FT-SB-215-0305	FT-SB-219-0507
<b>Pesticides/PCBs (ug/kg)</b>										
4,4'-DDD	2900	NS	NS	NS		0.48 R	2.9	0.39 R		
4,4'-DDE	2100	NS	NS	NS	0.25 R		0.51 J	0.39 J		
4,4'-DDT	2100	NS	NS	NS	3		2.8	2.5		1.6 J
ALPHA-CHLORDANE	540	NS	NS	NS	0.72 J	4.9	3.5	0.69 J		0.66 R
AROCLOR-1248	10000	NS	NS	NS						
AROCLOR-1260	10000	NS	NS	NS		170		4.8 J		28 J
DIELDRIN	44	NS	NS	NS		4.4				
ENDOSULFAN II	900	NS	NS	NS	0.77 J	6.5		0.68 J		0.92 J
ENDOSULFAN SULFATE	1000	NS	NS	NS			0.3 R			0.82 J
ENDRIN	100	NS	NS	NS	0.27 R	4.8 R	0.83 J	0.37 J		0.49 R
ENDRIN ALDEHYDE	0	NS	NS	NS		1.1 R				
GAMMA-CHLORDANE	540	NS	NS	NS	0.92 J	1.6 R	0.7 J	0.46 J		0.57 J
<b>Inorganics (mg/kg)</b>										
ALUMINUM	16800 <sup>(2)</sup>	NS	NS	NS	3590	1420	2180	2050	1660	3450
ANTIMONY	31/410 <sup>(3)</sup>	NS	NS	NS		0.43				
ARSENIC	14 <sup>(2)</sup>	NS	NS	NS	0.97	0.65	1	0.47	0.63	0.83
BARIUM	300	NS	NS	NS	5.7	5.3	16.1	3.2	3.5	5.4
BERYLLIUM	0.16	NS	NS	NS	0.17	0.095	0.19	0.092	0.096	0.12
CADMIUM	1.9 <sup>(2)</sup>	NS	NS	NS		0.18	0.094			
CALCIUM <sup>(4)</sup>	447 <sup>(2)</sup>	NS	NS	NS	38.4	35	913	45.7	26.1	52.5
CHROMIUM	50	NS	NS	NS	4.6	8.2	7.1	4.2	3.7	5
COBALT	30	NS	NS	NS	1.1	0.62	0.55	0.61	0.68	0.94
COPPER	25	NS	NS	NS	1.8	2.4	2.6	1.7	1.7	2
IRON	16900 <sup>(2)</sup>	NS	NS	NS	3620	2140	1920	1740	1590	3240
LEAD	48.6 <sup>(2)</sup>	NS	NS	NS	2.2	14.4	6.2	1.8	1.6	3.3
MAGNESIUM <sup>(4)</sup>	1560 <sup>(2)</sup>	NS	NS	NS	327	179	149	113	141	403
MANGANESE	90.8 <sup>(2)</sup>	NS	NS	NS	23.2	10.9	19.4	11.9	14.5	23.3
MERCURY	0.1	NS	NS	NS	0.0079	0.013	0.028	0.011		0.0071
NICKEL	13	NS	NS	NS	1.6	1.2	1.4	1.1	0.96	1.8
POTASSIUM <sup>(4)</sup>	348 <sup>(2)</sup>	NS	NS	NS	101	86.7	62	58.8	68.2	112
SELENIUM	2	NS	NS	NS	0.19		0.38		0.32	
SILVER	390/5,100 <sup>(3)</sup>	NS	NS	NS			0.055	0.052	0.048	
SODIUM <sup>(4)</sup>	285 <sup>(2)</sup>	NS	NS	NS		15.8	26.9	12.5	16.3	
VANADIUM	150	NS	NS	NS	7.8	4.4	5.8	4	3.8	6.8
ZINC	38.4 <sup>(2)</sup>	NS	NS	NS	6.8	8.3	16.4	3.2	2.9	9.4

TABLE 3-2

SUMMARY OF POSITIVE RESULTS - SOIL BORINGS  
SOIL INVESTIGATION DATA SUMMARY REPORT  
SITE 2 - FIRE TRAINING AREA  
NWIRP CALVERTON, NEW YORK  
PAGE 7 OF 9

PARAMETER	Screening Value <sup>(1)</sup>	FT-SB-219-0507	FT-SB-221-0406	FT-SB-224-0305	FT-SB-224-0305-D	FT-SB-225-0305	FT-SB-226-0305
<b>Petroleum Hydrocarbons (mg/kg)</b>							
DIESEL RANGE ORGANICS	1000	32			6.4 J	1200	46
GASOLINE RANGE ORGANICS	1000						
<b>Volatile Organics (ug/kg)</b>							
1,1-DICHLOROETHANE	200	NS	NS				
2-BUTANONE	300	NS	NS				
ACETONE	200	NS	NS				11 J
BENZENE	60	NS	NS				
CIS-1,2-DICHLOROETHENE	NC	NS	NS				
ETHYLBENZENE	5500	NS	NS				
ISOPROPYLBENZENE	NC	NS	NS				
METHYL CYCLOHEXANE	NC	NS	NS				
METHYLENE CHLORIDE	100	NS	NS		2.5 J		
TOLUENE	1500	NS	NS				
TOTAL XYLENES	1200	NS	NS				
TRICHLOROETHENE	700	NS	NS				
VINYL CHLORIDE	200	NS	NS				
<b>Semivolatile Organics (ug/kg)</b>							
2-METHYLNAPHTHALENE	36400		8 J			53	
ACENAPHTHENE	50000						
ACENAPHTHYLENE	41000						7.9 J
ANTHRACENE	50000	2.5 J					71
BENZO(A)ANTHRACENE	224	11		1.2 J	1.4 J	9	190
BENZO(A)PYRENE	61	15		1.5 J	1.6 J	17	180
BENZO(B)FLUORANTHENE	1100	12		2.1 J	1.8 J	32	160
BENZO(G,H,I)PERYLENE	50000	21		2 J	4.2 J	97	110
BENZO(K)FLUORANTHENE	1100	7.4		1.2 J	0.88 J	11	110
CHRYSENE	400	11		1.3 J	2.1 J	9.7	180
DIBENZO(A,H)ANTHRACENE	14	5.9 J				15	27 J
FLUORANTHENE	50000	18		3.5 J	4 J		460
FLUORENE	50000	2.1 J					53
INDENO(1,2,3-CD)PYRENE	3200	19		1.2 J	2.1 J	45	130
NAPHTHALENE	13000					11 J	
PHENANTHRENE	50000	11	3.2 J	4.3 J	3.4 J	20	380
PYRENE	50000	21		3.9 J	4.1 J	22	490

TABLE 3-2

SUMMARY OF POSITIVE RESULTS - SOIL BORINGS  
SOIL INVESTIGATION DATA SUMMARY REPORT  
SITE 2 - FIRE TRAINING AREA  
NWIRP CALVERTON, NEW YORK  
PAGE 8 OF 9

PARAMETER	Screening Value <sup>(1)</sup>	FT-SB-219-0507	FT-SB-221-0406	FT-SB-224-0305	FT-SB-224-0305-D	FT-SB-225-0305	FT-SB-226-0305
<b>Pesticides/PCBs (ug/kg)</b>							
4,4'-DDD	2900		0.25 R			0.38 R	0.73 J
4,4'-DDE	2100			0.53 J	0.52 J	1.3 J	2.5
4,4'-DDT	2100	1.6 J		0.56 R	0.35 R		5.5
ALPHA-CHLORDANE	540	0.66 R	0.32 J	0.68 J	0.77 J	0.82 R	
AROCLOR-1248	10000						
AROCLOR-1260	10000	28 J				46	
DIELDRIN	44				0.24 J	0.3 R	
ENDOSULFAN II	900	0.92 J	0.37 J		0.28 R		
ENDOSULFAN SULFATE	1000	0.82 J		0.34 J	0.25 J	0.51 J	
ENDRIN	100	0.49 R	0.24 R	0.24 J	0.28 J	4	0.22 R
ENDRIN ALDEHYDE	0		0.74 J			2 R	
GAMMA-CHLORDANE	540	0.57 J		0.7 J	0.71 J	0.95 R	0.76 R
<b>Inorganics (mg/kg)</b>							
ALUMINUM	16800 <sup>(2)</sup>	3450	4530	1510	1640	2600	3130
ANTIMONY	31/410 <sup>(3)</sup>						
ARSENIC	14 <sup>(2)</sup>	0.83	1.1	0.4	0.44	0.7	1.9
BARIUM	300	5.4	7.9	2.5	2.8	18.1	20.3
BERYLLIUM	0.16	0.12	0.16	0.11	0.11	0.13	0.26
CADMIUM	1.9 <sup>(2)</sup>		0.067			0.44	0.044
CALCIUM <sup>(4)</sup>	447 <sup>(2)</sup>	52.5	54	40.9	40.3	66.1	652
CHROMIUM	50	5	5.4	2.5	2.8	10.5	4.2
COBALT	30	0.94	0.96	0.83	0.78	0.92	0.91
COPPER	25	2	2.2	1.2	1.3	3.1	7.2
IRON	16900 <sup>(2)</sup>	3240	4210	1530	1570	1550	2450
LEAD	48.6 <sup>(2)</sup>	3.3	3	1.5	1.8	31	4.8
MAGNESIUM <sup>(4)</sup>	1560 <sup>(2)</sup>	403	376	107	118	287	181
MANGANESE	90.8 <sup>(2)</sup>	23.3	19.6	26.4	24.4	12.5	20.1
MERCURY	0.1	0.0071	0.02	0.0047	0.0054	0.024	0.018
NICKEL	13	1.8	2	0.77	0.83	1.5	2
POTASSIUM <sup>(4)</sup>	348 <sup>(2)</sup>	112	108	72	70.9	107	74.5
SELENIUM	2		0.28			0.22	0.35
SILVER	390/5,100 <sup>(3)</sup>			0.049	0.059	0.067	0.071
SODIUM <sup>(4)</sup>	285 <sup>(2)</sup>		14.7	17	14.6		25
VANADIUM	150	6.8	7.8	3.5	3.9	5.3	7.4
ZINC	38.4 <sup>(2)</sup>	9.4	8.1	3	3.1	22.8	7.2

TABLE 3-2

SUMMARY OF POSITIVE RESULTS - SOIL BORINGS  
SOIL INVESTIGATION DATA SUMMARY REPORT  
SITE 2 - FIRE TRAINING AREA  
NWIRP CALVERTON, NEW YORK  
PAGE 9 OF 9

NOTES:

- 1 Screening values taken from NYSDEC TAGM No. 4046 unless otherwise noted.
- 2 Background value from RCRA Facility Assessment-Sampling Visit (NUS, 1995).
- 3 USEPA Region III RBC (residential/industrial) value (<http://www.epa.gov/reg3hwmd/risk/human/rbc/rbc0405.pdf>).  
Lesser of two numbers used as screening value.
- 4 Calcium, magnesium, sodium, and potassium are essential nutrients.

Bold indicates exceedance of screening level.

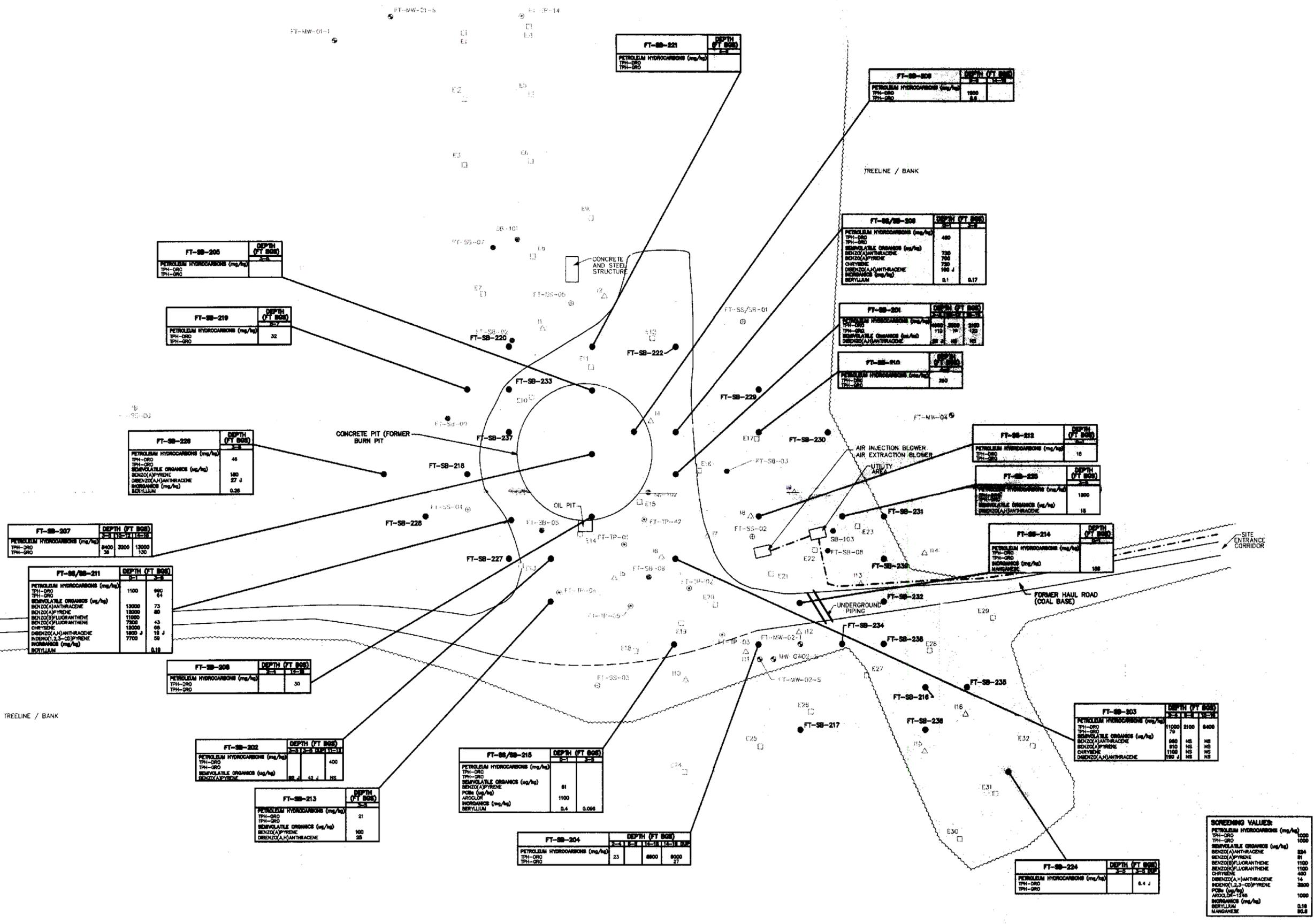
Blank cells indicate result was non-detect.

J = Estimated due to uncertainty near the detection limit.

NC = No criteria.

NS = Not sampled.

R = Rejected.



**LEGEND:**

- SOIL BORING (2006)
- MONITORING WELL (1994,1995)
- SOIL BORING (1994, 1995)
- ⊙ TEST PIT (1994, 2001)
- ⊕ SURFACE SOIL SAMPLE (1994)
- △ AIR INJECTION WELL (1995)
- AIR EXTRACTION WELL (1995)
- BLANK NOT DETECTED
- BOLD EXCEEDS SCREENING VALUE
- NS NOT SAMPLED
- FT FEET
- SGS BELOW GROUND SURFACE
- DUP DUPLICATE
- J ESTIMATED
- MG/KG MILLIGRAMS PER KILOGRAM
- UG/KG MICROGRAMS PER KILOGRAM
- UNDERGROUND UTILITIES
- TREE LINE

**NOTE:**  
TAGS SHOW ALL TPH DATA AND ORGANICS/METALS THAT EXCEED TAGM.

**SCREENING VALUES:**

PETROLEUM HYDROCARBONS (mg/kg)	1000
TPH-DRO	1000
TPH-GRO	1000
SEMIVOLATILE ORGANICS (ug/kg)	334
BENZ(A)ANTHRACENE	81
BENZ(A)FLUORANTHENE	1100
BENZ(A)PYRENE	1100
BENZ(B)FLUORANTHENE	400
CHRYSENE	14
DIBENZO(A,H)ANTHRACENE	3000
BENZO(G,H)PERYLENE	1000
PCB (ug/kg)	1000
AROLDIN-1248	1000
MORGANIDES (mg/kg)	0.18
BERYLLIUM	0.01
MANGANESE	0.01

DRAWN BY HJB DATE 7/13/15  
 CHECKED BY DATE  
 REVISED BY DATE  
 SCALE AS NOTED



SURFACE SOIL AND SOIL BORING TAG MAP  
 SITE 2 - FIRE TRAINING AREA  
 NWRP CALVERTON, NEW YORK

CONTRACT NO. IG10  
 OWNER NO. 004  
 APPROVED BY DATE  
 DRAWING NO. FIGURE 3-1  
 REV. 0

## 4.0 CONCLUSIONS AND RECOMMENDATIONS

### 4.1 CONCLUSIONS

Previous investigations at Site 2 identified an area of shallow petroleum-contaminated soils (1 to 5 feet bgs) located south of the fire training ring and floating free product located near the water table (approximately 14 feet bgs) south and east of the fire training ring. The purpose of the May 2005 field investigation was to better define subsurface conditions.

Based on site data and potential remedial options, the waste/contaminated materials at Site 2 - Fire Training Area are divided into five categories as follows:

- Shallow petroleum-contaminated soil
- Deep petroleum-contaminated soil
- Contaminated surface soil (coal)
- Other contaminated subsurface soil
- Debris (e.g. concrete, steel, and plastic)

#### **Shallow Petroleum-Contaminated Soil**

Shallow petroleum-contaminated soil is located underneath, south, and southeast of the fire training ring. This area may represent a former earthen depression that was used for fire training activities and that was later backfilled with petroleum-contaminated soil. Spills and leaks may have also accumulated in this area. Debris including wood and bricks is present in this material. This material is mostly continuous over a 0.5-acre area, but the area may contain some pockets of clean fill. The material extends from near the surface to a maximum depth of approximately 5 feet. The thickness of the material varies from approximately 1 foot around the edges to 5 feet in the middle.

The horizontal extent of petroleum-contaminated soil in the 1- to 6-foot bgs range is presented on Figure 4-1. TPH concentrations greater than 1,000 mg/kg and 10,000 mg/kg are estimated. Also included is the limit of petroleum-contaminated soil. Figure 4-2 presents PAH concentrations greater than the TAGM 4046 value and greater than 10 times the TAGM 4046 value in the 1- to 6-foot bgs range.

The shallow petroleum-contaminated soil has an average TPH-DRO concentration of 3,100 mg/kg (0.31 percent), and a maximum TPH-DRO concentration of 11,000 mg/kg (1.1 percent). PCBs were detected in five of seven samples with a maximum concentration of 1.8 mg/kg. PAHs were detected in the soils at concentrations greater than TAGM 4046 values in three of seven samples.

### **Deep Petroleum-Contaminated Soil**

Deep petroleum-contaminated soil is located underneath, south, and southeast of the fire training ring. This area was likely formed from free petroleum product migrating from the surface to the water table and then spreading out along the water table. The water table at the site averages approximately 14 feet bgs and has been measured to vary by approximately 3 feet.

The fluctuations in the water table would cause the free product to create a smear zone near and below the average water table. The deep petroleum-contaminated soil covers an area of approximately 0.5 acre, but may not be completely delineated to the southeast. The contamination is centered near the water table and has an approximate average thickness of 1 foot.

The horizontal extent of petroleum-contaminated soil at depths greater than 14 feet bgs is presented on Figure 4-3. TPH concentrations greater than 1,000 mg/kg and 10,000 mg/kg are estimated. Also included is the limit of petroleum-contaminated soil.

The deep petroleum-contaminated soil has an average TPH-DRO concentration of 8,100 mg/kg (0.81 percent), and a maximum TPH-DRO concentration of 13,000 mg/kg (1.3 percent). The samples were not analyzed for other chemical constituents but likely contain low levels of PCBs and PAHs at concentrations similar to that observed in the shallow petroleum-contaminated soils.

### **Contaminated Surface Soil (Coal)**

Some of the surface soil at the site contains residual petroleum contamination. Material in this category includes pea-sized coal that was used as a road base material. The surface soil would have been impacted by historical leaks and spills at the site and may have been treated with oil to suppress dust. The material is relatively loose, with minimal natural organics and/or vegetation.

The material is mostly continuous over a 0.8-acre area, of which 0.5 acre is included in the shallow petroleum-contaminated soil area. There may also be some pockets of clean fill in this area. The material extends from near the surface to a maximum depth of approximately 12 inches.

The contaminated surface soil has an average TPH-DRO concentration of 360 mg/kg (0.036 percent) and a maximum TPH-DRO concentration of 1,100 mg/kg (0.11 percent). PCBs were detected in five of five samples with a maximum concentration of 2.03 mg/kg. PAHs were detected in the soils at concentrations greater than TAGM 4046 values in two of five samples.

### **Other Contaminated Soil**

Other contaminated soil at the site includes material that is not included in the shallow or deep petroleum-contaminated soil or the contaminated surface soil areas. This material includes soil that is beyond the horizontal extent or between the shallow and deep petroleum-contaminated soils.

This other contaminated soil is mostly clean, coarse-grained sands that continue to be impacted by shallow petroleum-contaminated soils. It is also characterized by one or more, 3- to 6-inch-thick layers of black-stained soils. Based on the horizontal layout, the thin layer may represent a historical water table elevation. One continuous thin layer of black-stained soil is present at a depth ranging from 7 to 12 feet bgs. The areal extent of this layer is similar to that of the shallow petroleum-contaminated soil (0.5 acre). Other less extensive, thin black-stained layers or pockets of contamination are also present at the site.

The other contaminated soil has an overall average TPH-DRO concentration of 620 mg/kg (0.064 percent). However, the average TPH-DRO concentration is 3,000 mg/kg (0.3 percent) within the thin black-stained soil and 68 mg/kg (0.0068 percent) elsewhere. PCBs were detected in three of eight samples with a maximum concentration of 0.17 mg/kg. PAHs were detected in the soils at concentrations greater than TAGM 4046 values in two of eight samples.

### **Debris**

Debris at the site consists of concrete and steel present in the fire training ring, a secondary containment structure for a 1,000-gallon aboveground fuel tank, plastic pipe used in the AS/SVE system, plastic sheeting around the SVE wells, AS/SVE blowers, a 30-gallon moisture separator, a wooden stockade fence, miscellaneous electrical fuse boxes and control panels, and a buried underground electrical line.

## **4.2 RECOMMENDATIONS**

Now that the horizontal and vertical limit of petroleum-contaminated soil is adequately defined, it is recommended that an Engineering Evaluation/Cost Analysis be conducted to evaluate remedial alternatives at Site 2.



**LEGEND:**

- FT-SB-217 SOIL BORING (2005)
- ⊕ FT-MW-01-S MONITORING WELL (1994,1995)
- SB-102 SOIL BORING (1994, 1995)
- ⊕ FT-TP-01 TEST PIT (1994, 2001)
- ⊕ FT-SS-06 SURFACE SOIL SAMPLE (1994)
- △ I1 AIR INJECTION WELL (1995)
- E1 AIR EXTRACTION WELL (1995)
- LIMIT OF TPH AT CONCENTRATIONS OF 10,000 mg/kg
- LIMIT OF TPH AT CONCENTRATIONS OF 1,000 mg/kg
- LIMIT OF SOIL WITH FIELD EVIDENCE OF PETROLEUM CONTAMINATION
- mg/kg MILLIGRAMS PER KILOGRAM
- BGS BELOW GROUND SURFACE
- - - UNDERGROUND UTILITIES
- ~~~~~ TREE LINE

0 30 60  
GRAPHIC SCALE IN FEET

DRAWN BY HJB	DATE 8/3/05
CHECKED BY	DATE
REVISED BY	DATE
SCALE AS NOTED	



TPH ISOCONCENTRATION MAP  
DEPTH 0 TO 6 FEET BGS  
SITE 2 - FIRE TRAINING AREA  
NWIRP CALVERTON, NEW YORK

CONTRACT NO. 1610	
OWNER NO. 004	
APPROVED BY	DATE
DRAWING NO. FIGURE 4-1	REV. 0



**LEGEND:**

- FT-SB-217 SOIL BORING (2005)
- ⊕ FT-MW-01-S MONITORING WELL (1994,1995)
- SB-102 SOIL BORING (1994, 1995)
- ⊕ FT-TP-01 TEST PIT (1994, 2001)
- ⊕ FT-SS-06 SURFACE SOIL SAMPLE (1994)
- △ I1 AIR INJECTION WELL (1995)
- E1 AIR EXTRACTION WELL (1995)
- LIMIT OF PAHs AT CONCENTRATIONS GREATER THAN 10 TIMES TAGM 4046
- - - LIMIT OF PAHs AT CONCENTRATIONS GREATER THAN TAGM 4046 (DASHED WHERE ESTIMATED)
- - - UNDERGROUND UTILITIES
- ~~~~~ TREE LINE

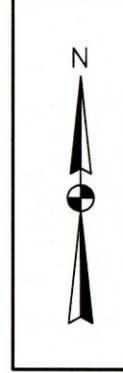
GRAPHIC SCALE IN FEET  
0 30 60

DRAWN BY HJB	DATE 7/13/15
CHECKED BY	DATE
REVISED BY	DATE
SCALE AS NOTED	



PAH ISOCONCENTRATION MAP  
DEPTH 0 TO 6 FEET BGS  
SITE 2 - FIRE TRAINING AREA  
NWIRP CALVERTON, NEW YORK

CONTRACT NO. IGIO	
OWNER NO. 004	
APPROVED BY	DATE
DRAWING NO. <b>FIGURE 4-2</b>	REV. <b>0</b>



**LEGEND:**

- SOIL BORING (2005)
- FT-SB-217
- ⊕ MONITORING WELL (1994,1995)
- ⊕ FT-MW-01-S
- SB-102
- SOIL BORING (1994, 1995)
- ⊕ FT-TP-01
- ⊕ TEST PIT (1994, 2001)
- ⊕ FT-SS-06
- ⊕ SURFACE SOIL SAMPLE (1994)
- △ I1
- △ AIR INJECTION WELL (1995)
- AIR EXTRACTION WELL (1995)
- E1
- LIMIT OF TPH AT CONCENTRATIONS OF 10,000 mg/kg
- LIMIT OF TPH AT CONCENTRATIONS OF 1,000 mg/kg
- LIMIT OF SOIL WITH FIELD EVIDENCE OF PETROLEUM CONTAMINATION (DASHED WHERE ESTIMATED)
- mg/kg MILLIGRAMS PER KILOGRAM
- BGS BELOW GROUND SURFACE
- - - UNDERGROUND UTILITIES
- ~~~~~ TREE LINE

0 30 60  
GRAPHIC SCALE IN FEET

DRAWN BY HJB	DATE 8/4/05
CHECKED BY	DATE
REVISED BY	DATE
SCALE AS NOTED	



TPH ISOCONCENTRATION MAP  
DEPTH GREATER THAN 14 FEET BGS  
SITE 2 - FIRE TRAINING AREA  
NWIRP CALVERTON, NEW YORK

CONTRACT NO. 1610	
OWNER NO. 004	
APPROVED BY	DATE
DRAWING NO. <b>FIGURE 4-3</b>	REV. 0

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