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DRAFT WORK PLAN FOR SITE CLOSURE AT TANK FARM 1 NS NEWPORT RI (DRAFT ACTING AS FINAL)
10/1/2006
TETRA TECH EC

TETRA TECH EC, INC.

# Defense Energy Support Center
# Contract No. SPO600-04-D-5403

# Draft
# Work Plan for Site Closure
# Tank Farm 1

## Defense Fuel Support Point – Melville
## Portsmouth, Rhode Island

**October 2006**

*Prepared by:*


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| Revision | Date | Prepared By | Approved By | Pages Affected |
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## ACRONYMS AND ABBREVIATIONS

| | |
|---|---|
| AOC | areas of concern |
| AOPEC | Area of Potential Environmental Concern |
| AST | aboveground storage tank |
| bgs | below ground surface |
| BTEX | benzene, toluene, ethylbenzene, and xylenes |
| CAP | Corrective Action Plan |
| COC | Chain of Custody |
| CSM | Conceptual Site Model |
| DESC | Defense Energy Support Center |
| DFSP | Defense Fuel Support Point |
| DNAPL | dense non-aqueous phase liquid |
| DRO | diesel range organics |
| EPA | U.S. Environmental Protection Agency |
| FID | flame ionization detector |
| GAC | granular activated carbon |
| GPS | Global Positioning System |
| GRO | gasoline range organics |
| GZA | GZA GeoEnvironmental, Inc. |
| IAS | Initial Assessment Study |
| JP | jet propulsion |
| LEL | lower explosivity level |
| LNAPL | light non-aqueous phase liquids |
| MLW | mean low water |
| MS | matrix spike |
| MSD | matrix spike duplicate |
| NAPL | non-aqueous phase liquid |
| NETC | Naval Education and Training Center |
| NUSC | Naval Underwater Systems Center |
| PAH | polyaromatic hydrocarbon |
| PCB | polychlorinated biphenyl |
| PID | photoionization detector |
| PPE | personal protective equipment |
| ppm | parts per million |
| QA | quality assurance |
| QC | quality control |
| RIDEM | Rhode Island Department of Environmental Management |
| RIPDES | Rhode Island Pollutant Discharge Elimination System |
| SAPA | Stereoscopic Aerial Photography Analysis |
| SDWA | Safe Drinking Water Act |
| SVOC | semivolatile organic compound |
| TPH | total petroleum hydrocarbons |
| TtEC | Tetra Tech EC, Inc. |
| TVPH | total volatile petroleum hydrocarbon |
| UCL | Upper Concentration Limit |
| UST | Underground Storage Tank |
| VOC | volatile organic compound |

# 1.0 INTRODUCTION

This Work Plan for Site Closure has been prepared on behalf of Defense Energy Support Center (DESC) for Tank Farm 1 at the former Defense Fuel Support Point (DFSP) Melville, RI. The objective of this Work Plan is to present information pertaining to Tank Farm 1 (hereinafter referred to as "the site") including data collection, data evaluation, and data gap analysis in order to convey the property to the United States Department of the Navy (the Navy) for re-use. Specifically, this Work Plan seeks to address the requirements of the Rhode Island Department of Environmental Management (RIDEM) relative to the activities associated with the storage and transfer of petroleum products.

Previous site investigations, analytical results, and other documents pertaining to Tank Farm 1 have been obtained and a compilation of past activities and site characterization results have been undertaken. From this compilation, the current condition of the site, with respect to soil, groundwater, and non-aqueous phase liquid (NAPL), has been adequately assessed. This current condition was determined by reviewing the most recent data collection that has occurred on-site, comparing any detected contaminants with the appropriate RIDEM criteria for each media, and by determining the presence of NAPL. A historical aerial analysis of the former tank farms has been conducted and used to identify areas likely to have been impacted by releases to the environment as indicated by staining, material storage, and site activity.

This review has led to the identification of apparent data gaps, questions, and potential issues relative to the site related to DESC's use of the property since the early 1970s. In order to answer these questions and address these issues, additional sampling is proposed as part of this plan. In addition, remedial measures will be taken, where possible, to address areas of contamination during the supplementary site investigation described in Section 5.0. Once these data needs are assessed and filled, the site conditions will be re-assessed, any required responses will be performed, and the site will be conveyed back to the Navy for re-use.

## 1.1 Purpose

In April 2002, DESC provided RIDEM with a letter outlining our approach towards closure of DFSP Melville. Specifically, this letter described our overall approach for each of the sites (Tank Farms 1, 2, and 3 and the Fuel Loading Area).

Tetra Tech EC, Inc. (TtEC) expects a risk-based closure will ultimately be utilized by the Navy prior to redevelopment at each site, with site-specific criteria developed for contaminants of concern and the current and foreseeable use of each site. The use of this approach is consistent with both the RIDEM Underground Storage Tank and the Remediation Regulations. DESC's intent is to return the property to the Navy as an industrial/commercial property and understands that this may not meet RIDEM requirements for overall site closure. Any environmental issues not related to DESC use of the property as a petroleum storage facility will be the responsibility of the Navy.

# 2.0 SITE BACKGROUND

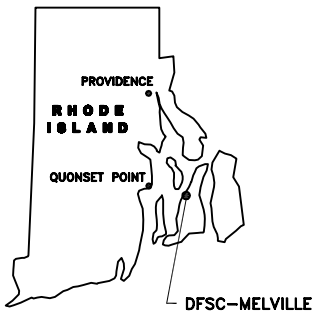
## 2.1 Site Description and Surrounding Area Description

Tank Farm 1 is located in the Melville section of Portsmouth, Rhode Island, (see Figure 2-1). The approximate 50-acre site is bordered by railroad tracks and the former Fuel Loading Area to the west, Melville Pond to the north, the Melville Public Fishing and Camping Area to the north and east, a Navy Fire Department building and an electrical substation to the southeast, and vacant Navy land to the south. Tank Farm 2 is located approximately 200 feet southeast of the site. Other nearby features include the East Passage Yachting Center located approximately 200 feet to the west, the Ted Hood Marine Complex located approximately 600 feet to the southwest, and a boat basin and Narragansett Bay located approximately 600 feet to the west and 800 feet to the northwest. In addition, an underground water storage reservoir located 200 feet to the northwest has a 1 million gallon capacity and is used by the Navy to store potable water for the base's water service system. It is reported that this tank has a groundwater under-drainage system to control groundwater uplift pressures when the tank is not full. The bottom of this tank is reported to be at an elevation of 150 feet mean low water (MLW) datum.

Tank Farm 1 consists of two 2.56 million gallon concrete partial underground storage tanks (USTs) (Tanks 9 and 10); two 2.35 million gallon aboveground storage tanks (ASTs – Tanks 11 and 12); and six 1.12 million gallon steel USTs (Tanks 13-18) (see Figure 2-2). Tanks 9 and 10 are rectangular in shape with dimensions of 145 feet by 127 feet and 22 feet deep. Tanks 11 and 12 are surrounded by earthen dikes and area cylindrical in shape with dimensions of 112 feet in diameter and 32 feet high. Tanks 13 through 18 are buried approximately 5 feet below grade and are 100 feet in diameter and 20 feet tall (see Figure 2-2 for locations). Underground petroleum distribution lines connect the USTs to the Fuel Loading Area. Petroleum distribution lines interconnect the underground storage tanks and are located approximately 4 feet below ground surface. Underground distribution lines and tanks have been cleaned and closed in place. All USTs have been cleaned and reballasted with water.

Ring drains are located around each of the USTs, which function as a groundwater under-drainage system to prevent excessive hydrostatic uplift pressure on the bottom of the tanks. These 10-inch diameter ring drains are reportedly located 7 feet above the bottom of the tanks. Ring drain and storm water collected from the Fuel Loading Area and Tank Farms 1 and 2 are directed to Tanks 9 and 10, which act as gross oil/water separators prior to discharge to oil/water separator #3 in the Fuel Loading Area. The separator and Tanks 9 and 10 reportedly discharge to Narragansett Bay through outfall #008 as defined in the site's Rhode Island Pollutant Discharge Elimination System (RIPDES) permit.

The ground surface of Tank Farm 1 is overgrown with dense vegetation, paved access roads, and miscellaneous aboveground transfer pump and control chambers. An inactive ethyl blending plant is located in the southeast portion of the site. An inactive fuel unloading area was located on the northeast portion of the site, and a former gasoline/water separator was located on the west side of the site. Also, two transformer vaults are present on-site.




0 2000 4000
SCALE IN FEET

**FIGURE 2-1**

**DEFENSE FUEL SUPPORT POINT MELVILLE**
**PORTSMOUTH, RHODE ISLAND**

# SITE LOCATION MAP

SCALE: AS SHOWN

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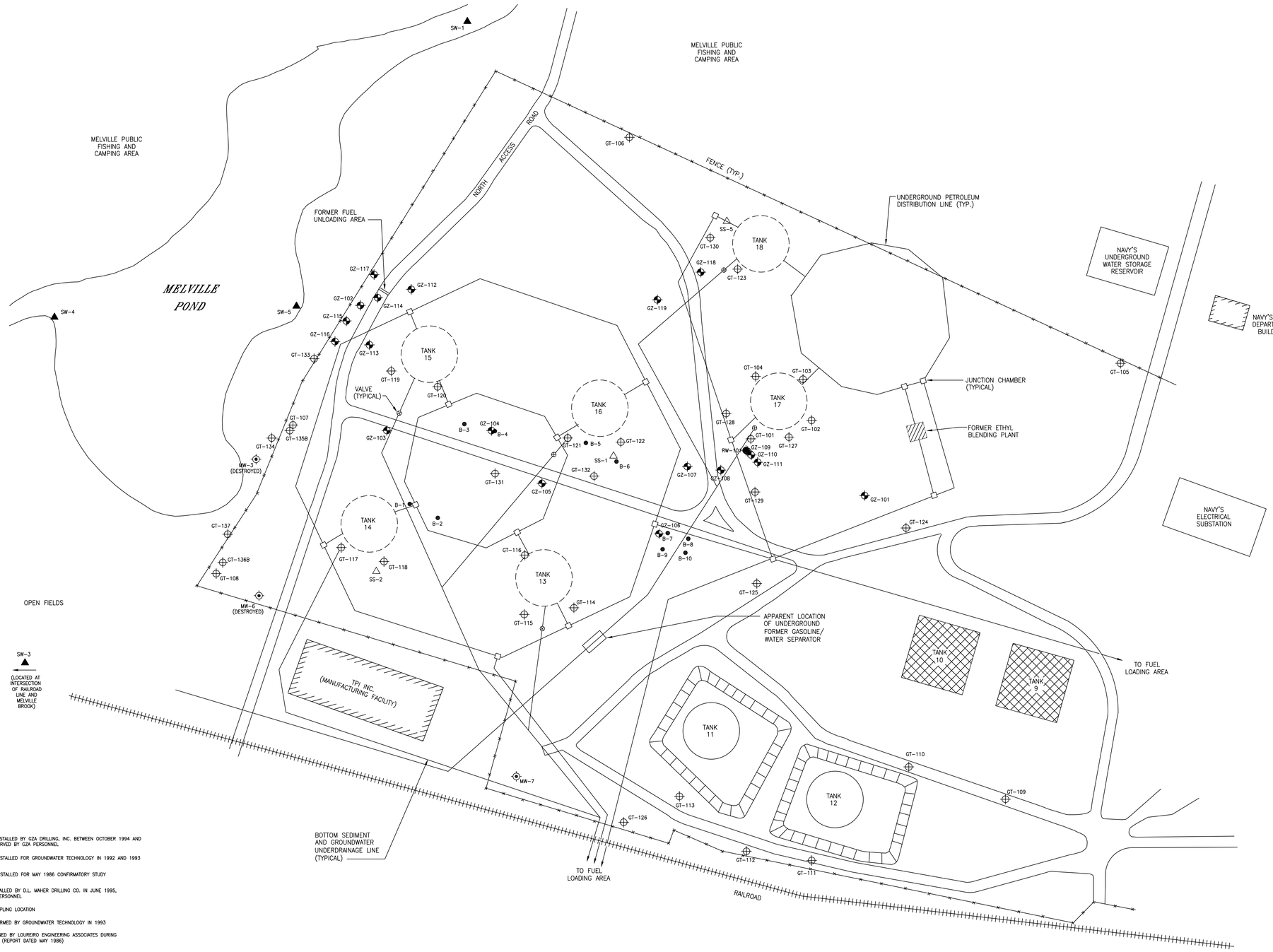


LEGEND:

- GZ-117 — MONITORING WELLS INSTALLED BY GZA DRILLING, INC. BETWEEN OCTOBER 1994 AND OCTOBER 1995, OBSERVED BY GZA PERSONNEL
- GT-133 — MONITORING WELLS INSTALLED FOR GROUNDWATER TECHNOLOGY IN 1992 AND 1993
- MW-6 — MONITORING WELLS INSTALLED FOR MAY 1986 CONFIRMATORY STUDY
- RW-101 — RECOVERY WELL INSTALLED BY D.L. MAHER DRILLING CO. IN JUNE 1995, OBSERVED BY GZA PERSONNEL
- SW-4 — SURFACE WATER SAMPLING LOCATION
- B-3 — SOIL BORINGS PERFORMED BY GROUNDWATER TECHNOLOGY IN 1993
- SS-2 — SOIL SAMPLES OBTAINED BY LOUREIRO ENGINEERING ASSOCIATES DURING CONFIRMATION STUDY (REPORT DATED MAY 1986)
- TANK 10 — PARTIAL UNDERGROUND TANK
- TANK 11 — ABOVE GROUND STORAGE TANK
- TANK 13 — UNDERGROUND STORAGE TANK

ENGINEER SEAL

| | |
|---|---|
| Date: | JUNE 2006 |
| Scale: | AS SHOWN |
| Designed by: | E. KURJA |
| Drawn by: | F. MENICHELLI |
| Checked by: | J. DEASCENTIS |
| Approved by: | |

| REV | DESCRIPTION | DATE | APP. |
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DEFENSE FUEL SUPPORT POINT MELVILLE
PORTSMOUTH, RHODE ISLAND

# TANK FARM 1 SITE PLAN

PROJECT NO: 2854.1011.0000.00000

CADD FILE NO: 28541011-A003.DWG

DRAWING NO.
FIGURE 2-2
SHEET 1 OF 1

## 2.2 Topography

The topography of Tank Farm 1 slopes toward the northwest from approximate elevation 150 feet MLW in the southeast of the site to 45 feet MLW in the north end of the site near Melville Pond and 30 feet MLW in the west end of the site near the railroad tracks. The groundwater flow beneath most of the site is to the west and northwest towards the East Passage Yachting Center's harbor. The direction of groundwater flow in the vicinity of the former fuel unloading area is to the north towards the eastern portion of Melville Pond.

## 2.3 Generalized Geology and Hydrogeology

The geology at Tank Farm 1 is generally typified by highly fractured shale bedrock, overlain by varying thicknesses of glacial till. The bedrock is Pennsylvanian in age and exhibits relatively horizontal bedding in the area of the site. Thickness of the overburden glacial material ranges from 2 to 20 feet in thickness. Bedrock outcrops were not observed at the site.

The construction of the Tank Farm involved "cut and cover" construction techniques, involving the removal of the bedrock material at the planned location of each underground storage tank. This material was either excavated or blasted to create a depression, and each tank constructed in place within this depression. Bedrock spoil material was usually placed around the constructed tank after construction, and additional fill material imported to cover each tank. The completed tank is not visible at grade and the upper portion lies approximately 5 feet below grade. Only the valve house, pump house, and vents are visible at grade.

The groundwater at the site predominately lies in the Pennsylvanian bedrock. It is recognized that rainwater and surface water infiltrate the overburden material, however a saturated zone is not present within this material. The saturated zone within the bedrock material ranges from 1 to 14 feet beneath grade. Groundwater fluctuates approximately 4 feet at the site during the year. RIDEM has classified all groundwater beneath the site as GB – Commercial/Industrial use.

In conjunction with the Tank Farm construction, each UST has a ring drain system to prevent hydraulic uplift forces on the UST. These ring drains encircle the bottom of each tank and are located approximately 7 feet above the bottom of the tank. These ring drains operate via gravity, as the Tank Farm lies at a relatively higher elevation compared to the surrounding topography. Ring drain and storm water are directed via gravity flow from Tank Farm 1 and Tank Farm 2 to the terminal (fuel loading) area. Water is then pumped to Tank 9 and 10 in Tank Farm 1 which act as gross oil water separators. Outflow from Tank 9 and 10 is controlled by the Navy and directed to an OWS separator in the terminal area prior to being discharged to a RIPDES-permitted outfall to Narragansett Bay.

In order to evaluate the extent of contamination on-site, a Conceptual Site Model (CSM) approach was used. The CSM is used to gain a better understanding of the source, pathway, and receptor analysis that are needed to evaluate releases to the environment. A cross-sectional pictorial CSM of Tank Farm 1 showing a "cut and cover" tank and typical site geology is presented in Figure 2-3.

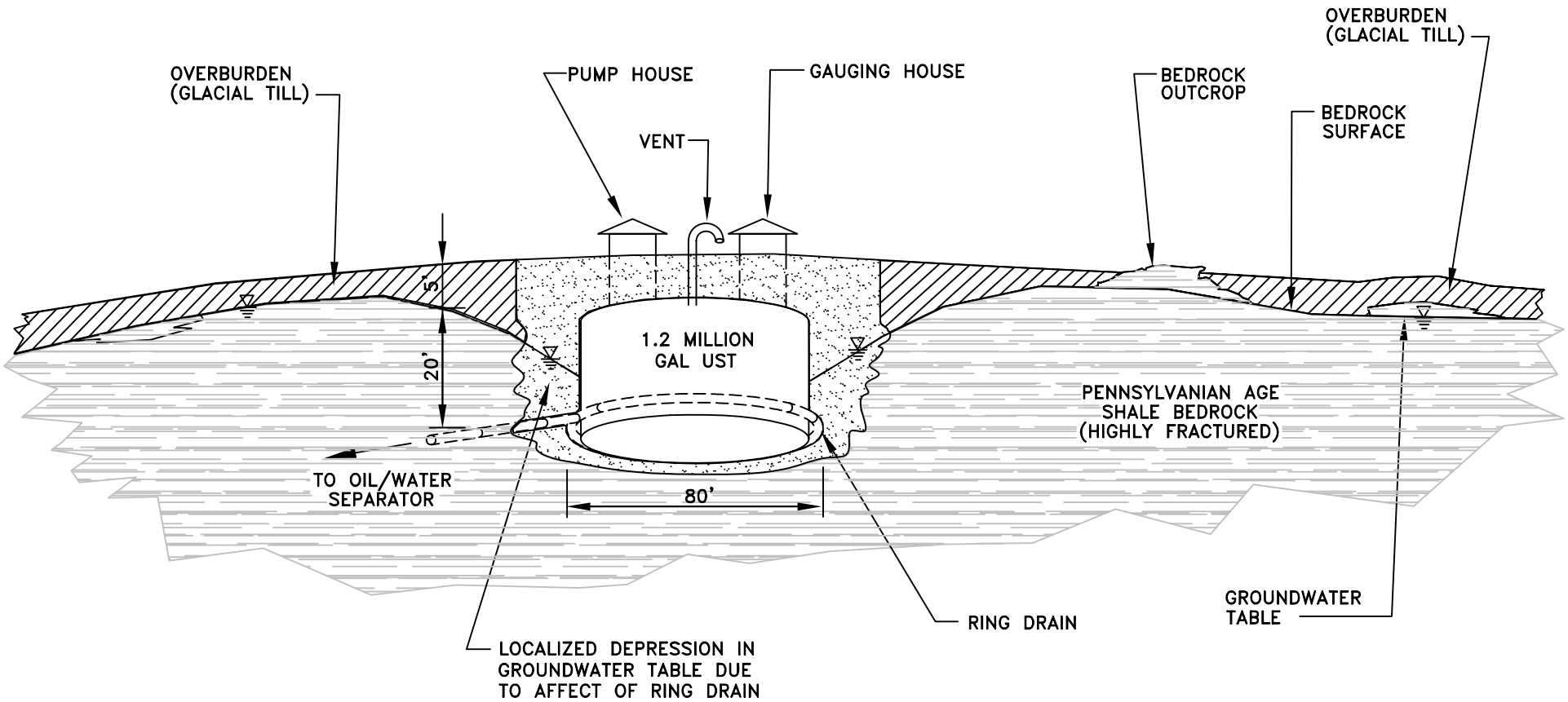



**FIGURE 2-3**

**DEFENSE FUEL SUPPORT POINT MELVILLE**
**PORTSMOUTH, RHODE ISLAND**

**TANK FARM 1**
**CONCEPTUAL SITE MODEL**

**NOT TO SCALE**

CADDFILE: 28541011-A005.DWG

Figure 2-3 suggests that the ring drain, when operational, affects the local groundwater flow at the site. The observed groundwater levels at the site are constantly depressed, with a localized sink created around each UST. The CSM also suggests that these rings would convey any free liquids and dissolved contamination from around each tank and into the oil/water separator system on-site. The ring drain system has acted to minimize potential contamination from the site on a continuing basis.

Melville Pond is located just to the north of Tank Farm 1 and also discharges to Narragansett Bay. Melville Pond is denoted as "Lower" Melville Pond on more recent maps and is part of the Melville Pond Nature Preserve, maintained by the Town of Portsmouth. Trails for nature access have been established around this waterbody and therefore this area is considered accessible for both adults and children.

A wetland survey (The Environmental Company, 2003) did not identify any "waters of the U.S." at the site.

## 2.4 Current/Future Land Use

The current land use of the site is industrial/commercial. The tanks at the site have been cleaned and certified gas free between 2000 and 2002. Presently, DESC has ceased operation and vacated the site. Future Navy re-use scenarios are not clear to DESC at this time.

## 2.5 Regulatory Setting

### 2.5.1 Regulatory Jurisdiction

The Tank Farm 1 property is owned by the Navy and since 1974 DESC (formerly DFSC) has leased the property. Conditions of the lease stipulate that DESC meets all local, state, and federal requirements for cleanup and closure of petroleum-related releases prior to conveyance of the property back to the Navy. As mentioned above, the Navy will be responsible for any non-petroleum contamination that may exist on the site under the CERCLA program.

## 2.6 Environmental Setting

### 2.6.1 Groundwater Classification

The groundwater beneath the site has been classified by RIDEM as GB, as per the state's Groundwater Classification and Wellhead Protection Area Map (RIDEM, 2004). This designation is assigned to groundwater resources that are not suitable for public or private drinking water use because they are known or believed to be degraded due to the nature of the area. Groundwater directly north of the site is classified as GA. This higher classification is defined as groundwater resources that are known or presumed to be suitable for drinking water use without treatment.

### 2.6.2 Surface Water Classification

The closest surface water feature, Melville Pond, is located 50 to 100 feet north of the site. A classification for this pond was not specifically found on the state's on-line Geographic Data Viewer (RIDEM, 2005); therefore, RIDEM presumes the pond is classified as Class A by default. Class A

surface waterbodies are suitable for drinking water supplies and all other water uses. Narragansett Bay is located approximately 600 feet west and 800 feet northwest of the site. The portion of the bay to the northwest of the site is classified by RIDEM as SA, while the portion of the bay to the west of the site is classified as SC (RIDEM, 2004). Class SA salt water bodies are suitable for bathing and shellfish harvesting, while Class SC salt water bodies are suitable as fish and shellfish habitat, but not suitable for bathing or shellfish harvesting.

## 2.7 Screening Criteria

In order to attain site closure, applicable soil and groundwater criteria will apply. These criteria are defined in RIDEM's *Remediation Regulations*.

### 2.7.1 Soil

The RIDEM *Remediation Regulations* specify that any soil contaminated as a result of a release of hazardous materials is to be remediated in accordance with the applicable Direct Exposure and Leachability Criteria. The Method 1 Industrial/Commercial Direct Exposure Criteria was used to compare to the analytical data obtained from soil samples taken across the site. This criteria was applicable because (Rule 8.02 A, *i*, 2a-c):

- *the site is currently limited to industrial/commercial activity;*
- *access to the property is limited to individuals working or temporarily visiting the site; and*
- *the current and reasonably foreseeable future human exposure to soils is not expected to occur beyond a depth of 2 feet below ground surface (bgs).*

Based on current site usage, the Method 1 Industrial/Commercial Direct Exposure Objectives are applicable to Tank Farm 1. However, sample results are compared to both the Residential and Industrial/ Commercial Objectives per RIDEM's request. As further described in Section 4.0 of this report, the Method 1 Residential and Industrial/Commercial Direct Exposure Objective and the Method 1 GB Leachability Criteria were compared to the historical analytical data from the soil samples collected on-site and summarized in Figure 4-1. As further described in that section, soil data exceeded criteria for arsenic and TPH.

### 2.7.2 Groundwater

As stated in RIDEM's *Remediation Regulations*, groundwater contaminated as a result of a release of hazardous materials located in a GB area shall be remediated to a concentration that meets GB criteria. Historical sampling round results did exceed GB criteria for benzene. As part of this Work Plan, a complete round of groundwater sampling is proposed. Samples collected will be analyzed for TPH (diesel range and gasoline range), volatile organic compounds (VOCs), and semivolatile organic compounds (SVOCs) by U.S. Environmental Protection Agency (EPA) Methods 8015, 8260 and 8270, respectively. Remedial alternatives will be evaluated based on current groundwater conditions after sampling.

# 3.0 FACILITY DESCRIPTION AND HISTORY

## 3.1 Facility History

The Navy has owned the property since the 1920s. Tank Farm 1 was operated by the Navy from the 1920s until 1974, when DESC took over control. Tanks 9 and 10 were installed in the early 1920s and Tanks 11 through 18 were installed in the early 1940s. Presently, DESC maintains contractual control of the facility, but has ceased operation at the property.

Below is an inventory of tanks present at the site, listing each tank's capacity, former use, and current status. In sum, these tanks ranged in capacity from 1.12 to 2.56 million gallons, and historically stored a variety of fuel oils including Nos. 2, 5, and 6, JP-4, -5, and -8, diesel, aviation gasoline, and motor gasoline. Currently, all USTs are cleaned and have been ballasted with water. The two partial USTs are still present and are used as detention basins.

- **Tanks 9 and 10** (each 2.56 gallon partial USTs) – Formally stored fuel oil. Currently used as a detention basin for temporary storage of storm water and groundwater from under-drainage systems from Tank Farm 2.
- **Tank 11** (2.3 million gallon AST) – Formerly stored Nos. 2, 5, and 6 fuel oil, JP-5 in the 1960s, and has been inactive since 1992.
- **Tank 12** (2.3 million gallon ASTs) – Formerly stored Nos. 5 and 6 fuel oil, JP-5 in 1977, and JP-8 in 1994.
- **Tank 13** (1.12 million gallon UST) – Formerly stored diesel and switched to either aviation gasoline or motor gasoline. It was cleaned and filled with water in the mid-1970s.
- **Tank 14** (1.12 million gallon UST) – Formerly stored diesel fuel aviation gasoline, and JP-4 at various points. In April of 1994, it was cleaned and inspected and since the inspection indicated that the roof was in poor condition, it was kept inactive.
- **Tank 15** (1.12 million gallon UST) – Formerly stored diesel fuel, aviation gasoline, and motor gasoline at various points. In 1988, it was emptied and cleaned and then inactivated due to poor condition.
- **Tank 16** (1.12 million gallon UST) – Formerly stored diesel fuel, aviation gasoline, and JP-4 at various points. In 1987, the tank was cleaned and the floor was epoxy coated. The tank was inspected in April 1994 and became inactive due to groundwater entering the floor.
- **Tank 17** (1.12 million gallon UST) – Formerly stored aviation gasoline, then JP-4 in the late 1970s. In March of 1992, the tank was pumped free of product and was inactive.
- **Tank 18** (1.12 million gallon UST) – Formerly stored aviation or motor gasoline. It was cleaned and filled with water in the mid-1970s.

## 3.2 Spills and Releases

Spills and releases have been documented at the site through various site investigations. Below is a summary of these documented spills and releases. Further details are provided in the specific reports listed under Section 3.3.

The Final Initial Assessment Study (Envirodyne Engineers, Inc., 1983) documented that tank bottom sludge, generated from cleaning the tanks, was placed in a pit approximately 20 feet long, 10 feet wide, and 4 feet deep. These disposal pits were simply dug in the general vicinity of the tank being cleaned. Sludge was placed in the pits and allowed to weather for a few weeks, then covered and marked with signs warning of tetraethyl lead contamination. Historical aerial photographs in the Study Area Screening Evaluation Work Plan (TRC, 1992) and the Stereoscopic Aerial Photography Analysis (SAPA) presented in Section 3.5 shows ground scars, pits, and areas of staining that could be indicative of sludge disposal pits. For example, a 1951 aerial photograph showed "two ground scars, possibly indicative of sludge disposal pits or surface drainage diversion berms…..in the vicinity of Tank 13" (TRC, 1992). In the 1963 aerial photograph, site conditions were similar to the 1951 coverage, "however, a single ground scar was evident.....in the vicinity of Tank 15."

The Study Area Screening Evaluation Work Plan (TRC, 1992) also documented "an April 3, 1981 DEM Spill Inspection Report that notes an unknown quantity of gasoline and oily waste spilled to Melville Pond from leaching of disposed waste from a disposal pit from cleaning Tank 17." The details of a Navy incident report differ from the DEM report. The Navy report indicates that 100 gallons of No. 4 fuel oil was found in a storm drain located below and off-site of the former Fuel Loading Area, the material was removed, the material originated from Tank 9, and no material was discharged to Narragansett Bay.

## 3.3 Previous Investigations Performed at Tank Farm 1

Previous environmental investigations have been conducted at Tank Farm 1 by Envirodyne Engineers, Inc. in 1983, Loureiro Engineering Associates in 1984, TRC Environmental Consultants, Inc. in 1992, Groundwater Technology in 1993, GZA GeoEnvironmental, Inc. (GZA) between 1994 and 1998, and TtEC in 1999. The results of each of these investigations are summarized below.

### 3.3.1 Final Initial Assessment Study of the Naval Education and Training Center (Envirodyne Engineers, Inc., 1983)

An Initial Assessment Study (IAS) was performed at the Naval Education and Training Center (NETC) in Newport, Rhode Island to identify and evaluate past hazardous waste disposal practices and to assess the potential for environmental contamination. Based on a variety of information sources (historical records, aerial photographs, field inspections, and personnel interviews) several potentially contaminated sites, including Tank Farm 1, were identified as necessitating further environmental investigation. Tank Farm 1 was recommended for further environmental investigation based on the historical presence of sludge pits. Tank bottom sludge, generated from cleaning the tanks, was placed in a pit approximately 20 feet long, 10 feet wide, and 4 feet deep. These disposal pits were simply dug in the general vicinity of the tank being cleaned. Sludge was placed in the pits and allowed to weather for a few weeks, then covered and

marked with signs warning of tetraethyl lead contamination. Due to the shallow depth of groundwater, it was noted that contaminants from the sludge pits may have impacted vertically into groundwater.

### 3.3.2 Verification Step for Confirmation Study on Hazardous Waste Site at NETC (Loureiro Engineering Associates, 1984)

The goal of the confirmation study was to confirm or refute the existence of contamination at Tank Farm 1, and if contamination was present, to quantify the extent of the problem. Soil samples were collected from a depth of 3 feet at three locations where sludge from storage tanks had reportedly been disposed of in pits and covered. Groundwater samples were collected from two locations at Tank Farm 1, one at a 36-inch diameter groundwater observation pit near the south bank of Melville Pond and the other from a groundwater collection pipe system that normally discharges into an oil-water separator (which was bypassed during sampling). Soil samples were laboratory analyzed for oil and grease, while groundwater samples were laboratory analyzed for benzene, toluene, ethylbenzene, and xylenes (BTEX), petroleum based hydrocarbons, and lead.

The analytical data on all samples collected indicated the presence of oil or gasoline contaminants in the soil and groundwater at Tank Farm 1. This judgment was based on the magnitude of the oil and grease concentrations in soil samples and the BTEX concentrations in groundwater samples. Although some lead was found in the soil samples, the concentrations were relatively low and no lead was found in groundwater. The concentrations of BTEX and petroleum based hydrocarbons in the groundwater samples were high. BTEX contamination indicates pollutants from light oils such as gasoline.

This report suggested that further studies be conducted to define the specific location(s) of sources of BTEX and petroleum based hydrocarbons entering the groundwater. Groundwater samples were recommended to be collected from the two sampling locations to better characterize the types and levels of contamination. In addition, the installation of monitoring wells installed downgradient of the site (north and west) was recommended to determine whether or not pollutants are migrating off-site with the groundwater.

### 3.3.3 Study Area Screening Evaluation Work Plan (TRC Environmental Consultants, Inc., 1992)

In July 1992, TRC Environmental Consultants, Inc. prepared a Work Plan for the environmental investigation of six sites on the U.S. Navy NETC and Naval Underwater Systems Center (NUSC) in Newport, Rhode Island. Tank Farm 1 was one of the study areas discussed.

The objectives of the investigation of Tank Farm 1 (Study Area 07) was to assess if any petroleum releases occurred at the site and if environmental contamination was present as a result of any such releases. On March 25, 1992, TRC visited the site and observed an open excavation, reportedly to access a manhole for tank cleaning at Tank 15. Excavated soils from the top of the tank consisted of a grey silty material with shale fragments. No evidence of contaminated soil warning signs was observed at the site. In addition, Tank 17 was being inspected for a suspected leak. The tank had been taken off-line, cleaned and was undergoing inspection. A review of historic aerial photographs of the site taken from 1942 to 1988 identified features possibly indicative of sludge disposal, such as ground scars and areas of dark soil

material. [Note that these features were also identified in TtEC's aerial photography analysis, as described in further detail in Section 3.5.]

The proposed site investigation components contained in this document include reconnaissance surveys, geophysical surveys, a soil gas survey, soil and groundwater sampling, surface water and sediment sampling of Melville Pond north of the site, and a land survey.

### 3.3.4 Progress Report – March 1993 (Groundwater Technology, 1993)

This progress report summarized a variety of field activities performed in the spring 1993.

Ten soil borings (B-1 through B-10) were installed in the five ground scar areas identified in the 1992 TRC Work Plan (based upon the review of the historical aerial photographs). Two soil borings were drilled within each ground scar with soil samples collected continuously from grade to the surface of bedrock or to a depth of 11 or 12 feet and analyzed for lead and arsenic. Detected lead concentrations (2.4 to 38 mg/kg) and arsenic concentrations (2.4 to 33 mg/kg) were within expected background ranges for the eastern United States.

In addition, 11 soil borings were advanced (GT-127 to GT-137 and GT-112) and completed as monitoring wells. Soil samples were collected at 5-foot depth intervals in the monitoring wells and screened for flame-ionizable compounds. The two soil samples with the highest FID readings from nine monitoring wells (GT-127 to GT-134 and GT-137) were submitted for laboratory analysis of BTEX. Also, those samples with the highest screening value were submitted for petroleum compound analysis. The results of these analyses showed low concentrations of BTEX and insufficient hydrocarbons in each sample.

On March 18 and 19, 1993, water samples were collected from each of the 11 new monitoring wells (GT-127 to GT-137 and GT-112) and analyzed for BTEX. BTEX levels in these wells were <2 ug/L in all wells except GT-128, which contained 180 ug/L of BTEX and reportedly had a sheen during sampling. Groundwater samples were also collected from perimeter wells (GT-133, GT-134, GT-137, GT-135B, and GT-136B) to determine the concentration at the northern boundary of the site. Samples were analyzed for VOCs, SVOCs, polychlorinated biphenyls (PCBs), and metals. No detectable concentrations of VOCs were present except in well GT-135B, which showed low concentrations of VOCs (aggregate concentration of 33.1 ug/L). No detectable levels of PCB or SVOCs were detected in any of the wells sampled during this event.

The monitoring wells were gauged weekly during the month of March (1993). Wells GT-101, GT-121, and GT-122 all contained some measure of liquid-phase petroleum. The maximum product thickness was .56 feet in GT-101. Based on the historically consistent, but limited extent of petroleum observed on the water table, RIDEM (in a meeting on March 23, 1993) recommended the continued weekly monitoring and bailing of monitoring wells.

### 3.3.5 Progress Reports – Tank Farm #1 (GZA, March 1994 to June 1996)

Monthly Progress Reports were submitted to DESC by GZA over a two-year period. The reports on file were available from March 1994 through June 1996 (April, June, and December 1994 reports were not available). Table 3-1 presents a brief summary of each of the available progress reports. In sum, groundwater monitoring wells were originally gauged on a weekly basis, but were subsequently reduced to a monthly basis in May 1994, as verbally approved by RIDEM. Water level and product thickness measurements were made using an electrically operated oil/water interface probe. The maximum product thickness reported in these progress reports is 0.07 feet measured in GT-101 in July 1994. In addition to monitoring well gauging, two surface water reference points (SW-2 and SW-4) were set in October 1995 and subsequently gauged on a monthly basis until June 1996.

Some Progress Reports also included results from site activities that were part of the Site Investigation, (1995), Supplemental Site Investigation (1996), and Corrective Action Plan (CAP) (1996). These activities included the installation of the GZ-series monitoring wells, performance of an aquifer pump test, and installation of a passive product recovery system. These reports are described in detail later in this section of this report.

As documented in the June 1996 progress report, in accordance with the Order of Conditions approved by RIDEM, subsequent monitoring activities would be provided quarterly (see Quarterly Reports later in this section).

### 3.3.6 Site Investigation Report (GZA, 1995)

A Site Investigation was performed by GZA at Tank Farm 1 upon request from RIDEM. The purpose of this investigation was to: (1) evaluate the nature and extent of contamination at Tank Farm 1; (2) identify threats to public health and the environment; and (3) evaluate the need for additional studies on corrective actions.

Eight monitoring wells (GZ-101 to GZ-108) were installed between October 17 and 25, 1994. GZ-101 is located downgradient of the former ethyl blending plant, GZ-102 is located downgradient of the former fuel unloading area, GZ-103 is located downgradient of well GT-120, and GZ-104 to GZ-108 are located in the vicinity of GT-101, GT-121, and GT-122. Soil samples were collected at 5-foot intervals during the drilling of the wells. They were screened for total VOCs using a photoionization detector (PID) and a flame ionization detector (FID). One soil sample from each boring with the highest VOC reading was submitted for analysis for VOCs, total volatile petroleum hydrocarbons (TVPH), and TPH. Soil samples from GZ-102 to GZ-105 and GZ-107 had low levels of VOCs (toluene, ethylbenzene, and xylenes). The TVPH tests revealed that gasoline was found in GZ-102 and fuel oil was found in the remaining four borings. TPH results were low in all soil samples except for GZ-103 which had a concentration (1,100 ppm) that exceeded the RIDEM Industrial Direct Contact Criteria. Also, sample GZ-101 (S-2) was analyzed for metals. The results showed low but detectable levels of arsenic, barium, chromium, and lead.

**Table 3-1**
**Summary of Progress Reports**
**March 1994 – June 1996**

| Date of Progress Report | No. of Wells Gauged | Wells with Measurable Product | Other Activities/ Notes |
|---|---|---|---|
| March 1994 | 39 | 3 [GT-101, GT-121] | Wells gauged weekly. |
| May 1994 | 39 | 1 [GT-101] | Well gauging reduced to monthly. |
| July 1994 | 39 | 2 [GT-101, GT-121] | |
| August 1994 | 39 | 3 [GT-101, GT-121, GT-122] | |
| September 1994 | 39 | 3 [GT-101, GT-121, GT-128] | |
| October 1994 | 39 | 2 [GT-101, GT-121] | Monitoring well installation and sampling (GZ-101 to GZ-108). [SI] |
| November 1994 | 47 | 1 [GT-121] | Analytical results from Oct. 1994 well installation [SI] |
| January 1995 | 47 | None | Analytical results from Oct. 1994 well installation. Surface water (SW-1 through SW-3) analytical results. [SI] |
| February 1995 | 47 | 1 [GZ-107, GZ-108] | Elevation survey performed found previously reported elevations 1.93 feet lower that MLW datum. |
| March 1995 | 47 | None | |
| April 1995 | 47 | None | |
| May 1995 | 47 | 1 [GT-121] | |
| June 1995 | 47 | None | Pump test (RW-101) and monitoring well (GZ-109 to GZ-111) installation and sampling. Aquifer pump test [CAP] |
| July 1995 | 46 | None | |
| August 1995 | 46 | None | |
| September 1995 | 49 | None | |
| October 1995 | 57 | None | Monitoring well installation (GZ-112 to GZ-119). Elevation and sampling of surface water (SW-5) [SSI] |
| November 1995 | 58 | None | |
| December 1995 | 57 | None | Groundwater analytical results from Oct. 1995 well installation [SSI] |
| January 1996 | 58 | None | |
| February 1996 | 57 | None | |
| March 1996 | 57 | None | |
| April 1996 | 57 | None | |
| May 1996 | 57 | None | CAP activities: Passive product recovery installation with weekly inspection. No floating product present. First quarterly round of groundwater samples collected [CAP] |
| June 1996 | 57 | None | No floating product present in passive recovery canisters. This is last monthly status report. |

CAP – Corrective Action Plan, 1996
MLW – Mean Low Water
SI – Subsurface Investigation, 1995
SSI – Supplemental Investigation, 1996

Groundwater samples were collected from the newly installed wells GZ-101 to GZ-108 and from thirteen existing wells (GT-101, GT-119 to GT-122, GT-127 to GT-129, GT-131 to GT-134, and GT-135B). All groundwater samples were analyzed for VOCs, TVPH, and TPH. Seventeen of the 21 samples collected indicated low levels of VOCs, including methyl-t-butyl ether, benzene, toluene, ethylbenzene, and xylene. The sample from GZ-102 exhibited the highest VOC concentrations. The methyl-t-butyl ether concentration in GZ-102 (370 ppb) did not exceed the current RIDEM GB Groundwater Objective of 5000 ppb. The benzene concentrations in wells GZ-102 and GT-101 exceeded the benzene GB standard of 140 ppb. TVPH was detected in 18 of the 21 groundwater samples. Most concentrations were less than 2.1 ppm, with well GZ-102 having 8.9 ppm and those wells with intermittent product ranging from 2 to 38 ppm. The identification of the TVPH was gasoline in all wells except for GT-121 and GT-131, which was fuel oil. TPH was detected in 11 of the 21 groundwater samples, with concentrations similar or less than the TVPH concentrations. Wells GT-101 and GT-121 exhibited slightly higher TPH concentrations of 110 and 41 ppm, respectively.

In addition, between January 12 and 18, 1995, groundwater samples were collected from GZ-101, GT-106, GT-110, GT-118, GT-120, GT-126, GT-132, GT-134, and MW-6 and analyzed for metals. Low but detectable levels of barium, chromium, and arsenic were detected in all samples. All concentrations were below their respective GB Groundwater Objectives for drinking water.

On January 26, 1995, surface water samples were collected at two locations (SW-1 and SW-2) off-site in Melville Pond and one location (SW-3) along a stream that flows out of Melville Pond. These samples were analyzed for VOCs, TPH, TVPH, and Safe Drinking Water Act (SDWA) metals. No VOCs, TPH, or TVPH were detected in any surface water sample. Metals were detected at relatively low levels in the upstream and downstream samples.

The site investigation also included monitoring well gauging and recording of the thickness of separate phase (if exists) as well as an elevation survey to evaluate the direction of groundwater flow. Based on the data collected, GZA concluded a seasonally fluctuating separate phase of floating petroleum product present on the groundwater table on the northwest side of Tanks 16 and 17. This product extended approximately 200 feet downgradient of Tank 17 and less than 100 feet downgradient of Tank 16. The maximum measured amount of product in well GT-101 was 0.8 feet, in GT-121 was 0.2 feet, and in GT-122 was 0.04 feet. Dates of these maximum product thicknesses were not provided and they were not included in the data summary of the report.

Based on the data collected, the following conclusions and recommendations were given:

- There is no evidence of significant soil contamination above the seasonal high water table, except for isolated areas of petroleum contaminated soil. It was GZA's opinion that these limited areas of soil contamination did not adversely affect the groundwater quality beneath the site.
- A separate phase of floating petroleum product is intermittently present on the groundwater table downgradient of Tanks 16 and 17. GZA stated that the product is either an aviation gasoline or a jet fuel that apparently leaked from Tanks 16 and 17. GZA stated that the current monitoring well network adequately defined the extent of floating product in this area.

- A separate area of contamination was characterized in the groundwater downgradient of the former fuel unloading area and Tank 18. GZA stated that the extent and impacts of contamination in this area has not yet been defined and additional tasks are necessary.
- Groundwater VOC, TPH, and TVPH concentrations are relatively low in the remaining areas of the site and are consistent with the GB classification.
- A CAP was suggested to be prepared to address the separate phase of petroleum product downgradient of Tanks 16 and 17, based on the free phase product present on the groundwater table.
- Additional monitoring well installation in the vicinity of the former fuel unloading area and Tank 18 to evaluate the extent of VOC-contaminated groundwater was recommended.
- To check whether VOC-contaminated groundwater is infiltrating into the groundwater underdrainage lines beneath the site, water samples were suggested to be taken from the line where the drainage pipe discharges into the downgradient oil/water separator.

### 3.3.7 Corrective Action Plan (CAP) (GZA, 1996)

A CAP was completed on behalf of DESC with the intent to remediate the separate phase petroleum product located downgradient of Tanks 16 and 17. Two aquifer pump tests were performed to evaluate relevant hydrogeologic properties of the bedrock aquifer near Tank 17 to assess the feasibility of product recovery. The pump test included: (1) the installation of a groundwater recovery well (RW-101) and three adjoining monitoring wells (GZ-109 to GZ-111); (2) the performance of a 30-hour pump test followed by a 40-hour recovery test using the groundwater recovery well as the extraction well; (3) analytical testing of the pumped groundwater to evaluate water quality; and (4) the performance of a short duration pump test using one of the monitoring wells as an extraction well.

Both pump tests revealed that the bedrock aquifer is irregular, in that some bedrock fractures interconnect between wells and some show little or no interconnection. Based on the above findings, GZA concluded that the irregular fracturing in the bedrock and the relatively low aquifer transmissivity at Tank Farm 1 contributed to the apparent immobility of the separate phase product downgradient of Tanks 16 and 17. Product is most likely trapped in the bedrock fractures and, given the results of the product thickness measurements, it did not appear that the product was available in enough quantity to be recoverable during pumping. The CAP proposed to recover the floating product in the wells downgradient of Tanks 16 and 17 via the following methods:

- Equip wells GT-101, GT-121, GT-122, GZ-107, and GZ-108 with passive floating product recovery skimmers and collection systems. These wells have either shown the thickest floating product (GT-101, GT-121, and GT-122) or have had a slight amount of product measured (GZ-107 and GZ-108).
- Product will be collected and stored in the skimmer canister and manually drained into a collection/transfer container, a tank located in the fuel loading area, by GZA weekly.

### 3.3.8 Supplemental Site Investigation (GZA, 1996)

A Supplemental Site Investigation was performed at Tank Farm 1 to further evaluate the extent of VOC-contaminated groundwater in the vicinity of the former fuel unloading area and downgradient of Tank 18. Also, this investigation evaluated whether the subsurface conditions in these areas were impacting the Melville Pond Public Fishing and Camping Area. The scope of this investigation included:

- Installation of eight groundwater monitoring wells (GZ-112 to GZ-119) and collection of associated borings;
- Screening and analysis of soil samples collected during drilling for VOCs;
- Recording groundwater level data from monitoring wells and performing an elevation survey to evaluate the direction of the groundwater flow;
- Collecting groundwater samples from the eight new wells and four existing wells and analyzing them for VOCs;
- Collecting a surface water sample from Melville Pond, downgradient of the former fuel unloading area, and analyzing it for VOCs; and
- Collecting a water sample from the groundwater underdrainage line from Tank Farm 1 and analyzing it for VOCs.

Between September 29 and October 10, 1995, borings were advanced for the installation of monitoring wells GZ-112 to GZ-119. Well GZ-112 is located upgradient of the former fuel unloading area, GZ-113 to GZ-117 are located downgradient of the former fuel unloading area, and wells GZ-118 and GZ-119 are located downgradient of Tank 18.

Soil cuttings generated during the drilling were field-screened for total VOCs. Soil samples were collected during the drilling of the wells at 5-foot intervals. Samples were screened for total VOCs. Five soil samples with the highest VOC readings (from GZ-112 and GZ-114 to GZ-117) were sent to a lab and analyzed for VOCs. No VOCs were detected in these soil samples.

On October 27, 1995, a surface water sample (SW-5) was collected from Melville Pond in a location directly downgradient from the former fuel unloading area. This sample was analyzed for VOCs. No VOCs were detected in this surface water sample. A water sample was also collected from the ringdrain underdrainage line network at Tank Farm 1. This water sample was located downstream of the oil/water separator that received groundwater discharge from the ring drains (800 feet west of Tanks 9 and 10). This sample was analyzed for VOCs. Low levels (i.e., < 6 ppb) of ethyl benzene and xylene were found.

On December 8, 1995, groundwater samples were collected from the eight newly installed wells (GZ-112 to GZ-119) and from four existing wells (GT-123, GT-130, GT-133, and GZ-102). All samples were analyzed for VOCs. Low levels of VOCs were present in 10 of the 12 groundwater samples. The detected compounds included: methyl-t-butyl ether, benzene, toluene, ethylbenzene, and xylenes. In the vicinity of the former fuel unloading area, the highest aggregate groundwater VOC concentration was 554 ppb in well GZ-112, which is located upgradient of this area. The aggregate groundwater VOC concentrations decreased steadily with distance from this well to a low of 7 ppb in GT-133. The source of

this underground VOC contamination, according to GZA, is the underground petroleum pipeline located upgradient of GZ-112. In the vicinity of Tank 18, the highest aggregate VOC concentration was 239 ppb at well GT-123. These VOC concentrations decreased downgradient and no VOCs were detected in GZ 119.

GZA concluded that low level groundwater VOC contamination was present downgradient of Tank 18 and in the vicinity of the former fuel unloading area. The source of the VOCs in the vicinity of the former fuel unloading areas is apparently the underground petroleum pipeline located upgradient of GZ-112, which was at the time, inactive and planned to be formally closed later that year. The source of the VOCs downgradient from Tank 18 was apparently the tank itself, which at the time was inactive and planned to be closed later that year. Based on this Supplemental Site Investigation, GZA did not recommend additional investigations in these two areas. GZA recommended additional sampling of surface water in Melville Pond to support the opinion that the pond was not impacted. A review of available reports for the site did not indicate that this surface waterbody sampling was completed.

### 3.3.9 Quarterly Monitoring Report #1– Tank Farm 1 (GZA, 1996)

Quarterly Monitoring Report #1 documented activities associated with the Order of Approval, which required monthly water level and product thickness measurements, weekly inspections of the passive recovery canisters, and quarterly groundwater sampling and analysis. The monitoring report documented the following:

- Fifty-eight groundwater monitoring wells and two surface water locations were gauged in April, May, and June 1996. Water level and product thickness measurements were made. None of the wells were found to contain measurable thickness of product.
- Passive product recovery canisters were installed in five wells (GT-101, GT-121, GT-122, GZ-107, and GZ-108) in May 1996. No floating product was present in the wells.
- Quarterly groundwater samples were collected from seven wells (GT-103, GT-129, GT-131, GT-132, and GZ-104 to GZ-106) on May 17, 1996. They were analyzed for VOCs and TPH. No VOCs or TPH was detected in any of these wells.

### 3.3.10 Quarterly Monitoring Report #7 – Tank Farm 1 (GZA, 1998)

Quarterly Monitoring Report No. 7 documented activities associated with the Order of Approval. The monitoring report documented the following:

- Fifty-eight groundwater monitoring wells and two surface water locations were gauged in October, November, and December 1997. Water level and product thickness measurements were made. One well (GT-127) was found to contain a measurable thickness of product in October and November 1997.
- Due to lack of recoverable product, the canisters were removed from four wells (GZ-107, GZ 108, GT-121, and GT-122). The canister in GT-101 was inspected for product weekly from October to December and no product was found.

- Quarterly groundwater samples were collected from seven wells (GT-103, GT-129, GT-131, GT-132, and GZ-104 to GZ-106) on December 2, 1997. They were analyzed for VOCs and TPH. Low concentrations of VOCs (ranging from 1.4 to 39.5 ppb) were present in the groundwater samples collected from wells GT-103, GZ-104, and GT-132. Low concentrations of TPH (ranging from 0.32 to 1.1 ppm) were present in groundwater samples collected from four of the seven wells (GZ-104, GZ-105, GT-131, and GT-132).

### 3.3.11 Quarterly Monitoring Report #8 – Tank Farm 1 (GZA, 1998)

Quarterly Monitoring Report No. 8 documented activities associated with the Order of Approval. The monitoring report documented the following:

- Fifty-eight groundwater monitoring wells and two surface water locations were gauged in January, February and March 1998. Water level and product thickness measurements were made. None of the wells were found to contain measurable thickness of product.
- The canister in GT-101 was inspected for product weekly from January through March and no product was found. Due to the lack of recoverable product, GZA amended canister inspection from weekly to every two weeks until significant product reappeared in the well.
- Quarterly groundwater samples were collected from seven wells (GT-103, GT-129, GT-131, GT-132, and GZ-104 to GZ-106) on February 27, 1998. They were analyzed for VOCs and TPH. A low concentration of aggregate VOCs (2.8 ppb) was present in the groundwater sample collected from well GT-131.

### 3.3.12 Tank Closure Assessment Report – Tank Farm 1 (GZA, 1998)

Tank Farm 1 tank closure activities were conducted between June 1996 and January 1997. The closure activities were associated with Tanks 11 and 13 through 18. Tanks 9, 10, and 12 and associated piping and vaults were not cleaned due to their use as either: 1) storage of water collected from the ring drains (Tanks 9 and 10); or 2) lower fuel loading area or storage of JP-5 (Tank 12). Before the tanks were cleaned, representative samples were collected from Tanks 11 and 13 through 18 for waste characterization. Tank 11 was found to contain approximately 65,000 gallons of oil-contaminated water. Tanks 13 through 18 were found to contain variable quantities of residual JP-4 fuel oil and water.

Tanks found to contain large volumes of water were pumped down to levels sufficient to support tank entry. Recovered water were consolidated in Tanks 13 and 18 for treatment with granular activated carbon (GAC) prior to discharge from the site. The water was transferred between tanks using a high volume submersible head pump and reinforced hose. Pumping of water from the tanks was continued until the interface between the water and floating product was encountered or the tank was emptied. Treated water was discharged from the site to the Narragansett Bay via the existing oil/water separator and affiliated outfall.

After the removal of residual fuels and water, each tank was entered and cleaned with a water soluble, biodegradable degreaser. The surfaces of each tank were washed with water after allowing the degreaser to penetrate. Also, along with cleaning the tanks, all accessible appurtenances associated with each tank

(i.e., pumps, interior pipelines, and vaults) were cleaned. The washwater, sludge, oil, and other debris generated during cleaning were removed via pumps and other necessary equipment.

Upon completion of the cleaning activities, each tank was inspected by a marine chemist to certify that each tank was "gas and oil free, safe for workers and hot work, and environmentally safe for closure." Each tank inspected received this certification. Along with these gas and oil free inspections, preliminary structural inspections were also performed. These structural inspections were limited to the interior surfaces of the tank shell and bottom due to inaccessibility (buried) of the exterior structures. Structural inspections were performed on Tanks 14, 15, and 16 only. Inspections were not performed on Tanks 13, 17, and 18 because at the time of the scheduled inspections, the proposed method of tank closure was placement of inert material into the tanks. Tank 11 was not inspected because it was an AST slated for decommissioning. The structural assessment reports revealed that Tanks 14, 15, and 16 had a number of holes in steel plate surfaces and welded seams. In addition, in Tank 16, unusual thinning of the thickness of steel floor plates was observed.

In addition to cleaning and inspecting some of the tanks at Tank Farm 1, the fuel distribution pipelines and accessible sections of ring drains associated with each tank were permanently decommissioned (note that this does not apply to Tanks 9, 10, and 12). The piping was accessed, purged, water washed, and flushed by propelling a styrofoam plug with compressed air or nitrogen. The interior of the pipes were screened with a PID and an explosivity meter (lower explosivity level [LEL]) for the presence of residual VOCs. The cleaning procedures were repeated in sections of the pipes where monitoring readings exceeded 25 ppm on the PID and 0.0% on the LEL. After completion of the pipeline cleaning, openings used to access and clean the pipes were grouted and a blank flange was attached to prevent re-use.

The ring drain system was not cleaned or decommissioned. This cleaning and closure of the ring drains can only be accomplished after the decommissioning and reballasting of the tanks.

A soil gas survey was conducted to evaluate soil conditions proximate to the underground fuel distribution lines designated for decommissioning. The survey consisted of the installation of soil gas probes advanced to 4-4.5 feet below grade at seventy-one locations along the pipelines. Soil gas samples were collected from probes using an air-sampling pump and ¼ Teflon tubing connected to a threaded adaptor which was connected in tandem to a PID/FID for direct reading of VOC concentrations. Of the seventy-one collected samples, only seven samples provided PID and/or FID responses above the instrument detection limit of 0.1 ppm. All but one of these seven samples had generally low reading and did not suggest significant releases of product from the pipelines. The results from one sample (SG-12) were reflective of the presence of light non-aqueous phase liquids (LNAPL) known to be present in the near observation well GT-121.

Groundwater samples were collected from six existing monitoring wells near various tanks (GT-115 near Tank 13; GT-117 near Tank 14; GT-119 near Tank 15; GT-121 near Tank 16; GT-101 near Tank 17; and GT-123 near Tank 18) to evaluate groundwater conditions at the site. Groundwater samples were analyzed for VOCs, (EPA Method 8260), TPH (EPA Method 8100 modified) and polyaromatic hydrocarbons (PAHs) (EPA Method 8270). Target analytes were detected in only three of the six wells sampled (GT-101, GT-121, and GT-123). The detected concentrations were viewed as low and did not exceed applicable RIDEM Groundwater Objectives. The data was deemed consistent with previous

environmental investigations at the site, which had showed floating petroleum product at some monitoring wells.

Based on the information and data obtained during the performance of the Tank Closure Assessment, GZA had the following conclusions and recommendations:

- Tanks 11 and 13 through 18 were emptied and cleaned. No petroleum product has been stored in these tanks since they were cleaned.
- At the time of GZA's departure, water was observed in the majority of the tanks and their associated vaults. Groundwater appears to be reentering the tanks through holes or other structural deficiencies noted in the tank structural reports.
- The underground petroleum distribution lines were cleaned, closed in-place, and capped.
- The tank cleaning operations, soil gas survey, and groundwater sampling did not identify any issues that were not already addressed in GZA's CAP for Tank Farm 1. Continued implementation of the RIDEM approved CAP was recommended.
- Tanks 9, 10, and 12 and their associated piping should be accessed and cleaned.
- The pipelines used to convey fuel oil between Tanks 9, 10, and 12 should be accessed and cleaned. Upon completion, a soil gas survey should be performed to evaluate soil conditions proximate to the pipes.
- The ASTs at the site (Tanks 11 and 12) should be permanently decommissioned in accordance with applicable federal, state, and local regulations.
- Upon completion of the decommissioning and ballasting of the tanks, the ring drain system at Tank Farm 1 should be permanently closed.

### 3.3.13 Results of Groundwater Sampling for Fuel Loading Area and Tank Farms 1, 2, and 3 (FWENC, 1999)

The groundwater sampling program was intended to gather additional data, as necessary to further characterize the nature and extent of hazardous constituents in the groundwater. The information collected during this investigation was to be combined with the results of previous investigations to construct a strategic conceptual model for groundwater and chemical migration on-site and off-site of the facility. The following work was completed:

- Fluid measurements were conducted in all of the existing monitoring wells that could be located and accessed (50 wells) on June 22, 1999. No measurable product was noted in any well. A groundwater contour map was constructed and suggested groundwater flow west to northwest.
- Groundwater sampling was conducted in 19 wells on-site. These wells included: GT-105, GT-106, GT-108 to GT-112, GT-115, GT-117, GT-119, GT-120, GT-126, GT-128, GT-129, GZ-102 to GZ-104, GZ-107, and MW-7. All samples were analyzed for VOCs, SVOCs, and TPH. Wells GT-108, GZ-102, and GZ-107 were also analyzed for total metals, while GT-105 and GT-122 were also analyzed for pesticides/PCBs. TPH was detected in all of the groundwater samples, as well as low concentrations of VOCs and SVOCs. The highest TPH concentrations

were detected in wells GZ-107 (16,000 ppb) and GT-112 (7,300 ppb). Low concentrations of metals were detected in wells GZ-107 and GT-108. No PCBs or pesticides were detected in any sample. No exceedances of the RIDEM Groundwater Objectives were observed.

## 3.4 Previous Response Actions/Closure Activities

The following activities have been conducted in order to facilitate closure of Tank Farm 1.

### 3.4.1 Free Liquid Recovery

As described in Section 3.3 in the Site Investigation Report (1995), GZA concluded that a separate phase of floating product was intermittently present on the groundwater table downgradient of Tanks 16 and 17. Subsequently, the CAP (GZA, 1996) proposed recovery of floating product in the wells downgradient of Tanks 16 and 17 by equipping the five wells impacted with floating product with passive floating product recovery skimmers and collection systems. Passive product recovery canisters were installed in May 1996 and inspected on a weekly basis. Due to lack of recoverable product, all but one canister (GT-101) was removed sometime between October and December 1996. This last canister was inspected through March 1998. GZA concluded that the removal of fuel would only be accomplished through excavation of contaminated soils.

### 3.4.2 Tank Cleaning/Closure

As discussed in Section 3.3, closure activities were conducted between June 1996 and January 1997 by GZA and between 2001 and 2002 by FWENC. Closure activities were associated with Tanks 11 and 13 through 18. Tanks 9, 10, and 12 and associated piping and vaults were not cleaned due to their use as either storage of water collected from the ring drains and lower fuel loading area or storage of JP-5.

Before the tanks were cleaned by GZA in the late 1990s, representative samples were collected from Tanks 11 and 13 through 18 for waste characterization. Tanks 13 through 18 were found to contain variable quantities of residual JP-4 fuel oil and water. Tank 11 was found to contain approximately 65,000 gallons of oil-contaminated water. Tanks found to contain large volumes of water were pumped down to levels sufficient to support tank entry and recovered water was consolidated in Tanks 13 and 18 for treatment with GAC. After the removal of residual fuels and water, each tank was cleaned with a water soluble, biodegradable degreaser. The surfaces of each tank were washed with water after allowing the degreaser to penetrate. All accessible appurtenances associated with each tank (i.e., pumps, interior pipelines, and vaults) were cleaned.

As part of GZA's work, each tank was inspected by a marine chemist to certify that each tank was "gas and oil free, safe for workers and hot work, and environmentally safe for closure." Each tank received this certification. In addition, structural inspections were performed on Tanks 14, 15, and 16, which revealed a number of holes in steel plate surfaces and welded seams. Structural inspections were not performed on Tanks 11, 13, 17, and 18 because they were slated for decommissioning and would not be returned to service.

Between 2001 and 2002 FWENC performed remedial actions at Tanks 13-18 and their associated fuel distribution piping. RIDEM did not concur that the tanks were adequately addressed by GZA in the late

1990s. Between October 2001 and April 2002, the six steel USTs and associated pump chambers were emptied and cleaned. The contents of each UST consisted of primarily water that had infiltrated through cracks in the floor and unsealed access hatches of the tank, although there was some petroleum residue, sludge, and oxidized iron sediment. The interior roof, walls and floors of the USTs were cleaned with a high-pressure water wash, rinsate was removed from the tank with a vacuum truck. Following cleaning, each UST was inspected for any signs of deterioration and/or water or petroleum infiltration through the tank walls, floor, or ceiling, and repaired. Holes were observed in all six tanks, with Tanks 13 and 18 having the most numerous holes and severe infiltration of groundwater. Epoxy grout was used to repair leaks in all tanks to facilitate closure. De-watering was attempted around these two tanks, but was unsuccessful. Based on the condition of Tanks 13 and 18, repair of potential leaks were deemed not possible and no further work was performed. The level of effort and additional cost required to complete repairs on Tanks 13 and 18 caused FWENC, DESC, and RIDEM to agree that ending the remedial activities at this time was an acceptable course of action. No fuel products or water with any petroleum-caused sheens were observed flowing into the tanks from any of the infiltration points. Inspection of all tanks by a marine chemist concluded that all tanks with the exception of Tank 13 met the closure requirements set forth by the NFPA established guidance NFPA 306, Control of Gas Hazards on Vessels. Tank 18 was repaired and accepted safe atmospheres by a marine chemist but continued to leak at the "new" holes.

Approximately 7,085 feet of fuel distribution piping were inspected and re-verified to have been cleaned and decommissioned during previous efforts to clean and close Tank Farm 1. At each pipe junction point, the existing concrete grout was removed from the ends of the piping and the pipe checked for residual liquids, elevated combustible gases, and VOCs. A marine chemist inspected the lines and certified all but four of the lines as clean. Those four lines were pigged and re-inspected (and subsequently certified). Upon certification, the piping was sealed using quick curing marine hydraulic cement.

Approximately 2.5 million gallons of liquid were removed from the USTs, their adjacent pump chambers, and the ring drain systems and treated at the on-site water treatment system. Treated water was used to re-ballast the tanks to equalize the hydrostatic pressure inside and outside the tanks. Liquids that could not be treated, such as sediment laden water and petroleum product, were transported and disposed of off-site.

### 3.4.3 Fuel Distribution Piping and Equipment Cleaning and Decommissioning (FWENC, 2002)

During this effort, a total of 20,650 gallons of residual fuel was removed from pipelines within the Tank Farm 1, 2, 3 and Fuel Loading areas. All pipelines within these areas were checked for liquids including lines previously closed and/or grouted by others. Cleaned pipelines were certified as gas free by a marine chemist.

## 3.5 Stereoscopic Aerial Photography Analysis (SAPA)

In order to accurately identify areas of potential petroleum based contamination on the site, historical aerial photographs were collected and analyzed stereoscopically by a specialty contractor as part of this Work Plan. The full report is provided as Appendix B. The analysis was conducted on aerial photographs dating from 1942 through 1995. Objects and areas determined to be potential sources of

releases were compiled from each of these photographs. The photographs provide locations of past surface soil staining, stockpile areas, and materials storage areas. Forty-five of these areas were identified as areas of concern (AOCs). All AOCs have been georeferenced to be field located with submeter accuracy Global Positioning System (GPS) units. The AOCs will be field delineated and evaluated during a pre-mobilization site survey during which several areas noted as ground scars in the aerial photographs may be determined to be construction related and therefore, removed from the AOC list and would not be investigated during this field event.

**Table 3-2**
**Stereoscopic Aerial Photography Analysis Areas of Concern**

| AOC | Ref. Date | Description |
|---|---|---|
| TF1-001 | 1951 | Staining and liquid inside berm of AST #11. ***Staining/Liquid 1*** |
| TF1-002 | 1951 | Staining and liquid inside berm of AST #11. ***Staining/Liquid 2***<br>1962 Light and dark-toned material inside the berm of AST 11.<br>1972 Excavation w/staining or liquid inside the berm of AST 11<br>1981 Liquid is visible inside the berm of AST 11.<br>1986 Liquid is visible inside the berm of AST 11.<br>1992 Liquid or staining inside berm of AST 11.<br>Remains in 1995. |
| TF1-003 | 1951 | ***Open, square containment structure*** w/dark-toned, possibly oily liquid is west of AST # 12 (possible oil/water separator for AST 11 and 12). Remains until 1975.<br>1975 Staining west of AST 12 in and around the containment structure (possible OWS). |
| TF1-004 | 1951 | Pipe scar or ditch leads from the Ethyl building to a shallow depression (probable catch basin). Depression contains light-toned material or objects in 1953. Remains in 1962. ***Pipe scar/ditch*** |
| TF1-005 | 1951 | Pipe scar or ditch leads from the Ethyl building to a shallow depression (probable catch basin). Depression contains light-toned material or objects in 1953. Remains in 1962. Light-toned depression in 1972. ***Depression*** |
| TF1-006 | 1951 | Two excavations around and beneath T10. ***Excavation 1*** |
| TF1-007 | 1951 | Two excavations around and beneath T10. ***Excavation 2*** |
| TF1-008 | 1953 | ***Square pit*** northwest of T13. Remains in 1954. |
| TF1-009 | 1953 | ***Round pit*** at T14. |
| TF1-010 | 1953 | ***Round Pit*** at T15. |
| TF1-011 | 1953 | ***Circular ground scar*** at T14 may be covered pit. Remains in 1954. |
| TF1-012 | 1953 | ***Open storage area*** south of AST 12. Remains until 1954. |
| TF1-013 | 1953 | Two drainage ditches/discharge points within berm of T10. ***Ditch 1.*** |
| TF1-014 | 1953 | Two drainage ditches/discharge points within berm of T10. ***Ditch 2.*** |
| TF1-015 | 1954 | ***Dark-liquid or staining*** inside berm of T9 and T10. New ditch constructed in 1979.<br>1979 New ditches have been dug on the west side of T9 and T10. AST T10/T9 ditch. Staining becomes larger in 1980 and 1981. |
| TF1-016 | 1962 | ***Trench*** east of AST 11. |
| TF1-017 | 1962 | ***Excavation*** east of AST 11. |
| TF1-018 | 1962 | ***Pit*** containing light-toned material or liquid is adjacent to the depression from TF1-005. Not visible in 1963. |
| TF1-019 | 1963 | Ground scars at T17 may be from a release. ***Ground scar 1*** |
| TF1-020 | 1963 | Ground scars at T17 may be from a release. ***Ground scar 2*** |
| TF1-021 | 1963 | ***Ground scar*** northwest of T15 |
| TF1-022 | 1964 | Large ground scarred areas northwest from T18. ***Ground scar 1*** |
| TF1-023 | 1964 | Large ground scarred areas northwest from T18. ***Ground scar 2*** |

**Table 3-2 – Cont'd**
**Stereoscopic Aerial Photography Analysis Areas of Concern**

| AOC | Ref. Date | Description |
|---|---|---|
| TF1-024 | 1970 | ***Dark-toned liquid*** on west side of AST 12. |
| TF1-025 | 1970 | ***Excavation*** north of T18. (filled in 1972) |
| TF1-026 | 1970 | ***Drainage ditch*** leading from the access road to the above excavation. (remains in 1972) |
| TF1-027 | 1972 | ***Area of staining*** inside the berm of AST 11. |
| TF1-028 | 1972 | ***Containment structure*** w/staining or liquid is visible south of AST 12 (may be a sump). Remains in 1975, 1976. No longer visible in 1979. |
| TF1-029 | 1975 | ***Dark-toned linear piles and disturbed ground*** at northwest corner of TF1. |
| TF1-030 | 1975 | ***Very large excavation*** containing liquid northeast of T17. A tank truck and truck are adjacent to the excavation. Filled in 1976. A hose is visible between the tank truck and an adjacent structure. Another, much longer hose is between the structure and a pit containing an object. |
| TF1-031 | 1975 | Another, much longer hose is between the structure and ***a pit containing an object.*** |
| TF1-032 | 1979 | ***Mounded material and probable containers*** located east of AST 11. Graded in 1980. |
| TF1-033 | 1979 | New ditches have been dug on the east side of AST 12 and on the west side of T9 and T10. ***AST 12 ditch*** |
| TF1-034 | 1980 | ***Fill area containing debris and dark-toned material*** is in a low area west of (and outside) of the berm of AST 11. Graded in 1981 |
| TF1-035 | 1980 | Dark-toned mounded material south of AST 12. ***Area 1*** |
| TF1-036 | 1980 | Dark-toned mounded material south of AST 12. ***Area 2*** |
| TF1-037 | 1981 | ***Staining*** is evident from a structure to a drainage ditch at T14. |
| TF1-038 | 1981 | Significant amount of ***probable earthen material*** has been placed south of AST 12. |
| TF1-039 | 1986 | Two large stained areas visible at T16. Northern stain leads towards culvert. ***Stain 1*** |
| TF1-040 | 1986 | Two large stained areas visible at T16. Northern stain leads towards culvert***. Stain 2*** |
| TF1-041 | 1986 | Two areas of dark-toned material are at T17. ***Area 1*** |
| TF1-042 | 1986 | Two areas of dark-toned material are at T17. ***Area 2*** |
| TF1-043 | 1988 | Pit located at T15. A hose is located east of the pit leading to a probable stain at the edge of a wooded area. Equipment (probably a tractor) is attached to a probable flat bed loaded with material between the pit and the hose. ***Pit*** |
| TF1-044 | 1988 | Pit located at T15. A hose is located east of the pit leading to a probable stain at the edge of a wooded area. Equipment (probably a tractor) is attached to a probable flat bed loaded with material between the pit and the hose. ***Probable stain*** |
| TF1-045 | 1988 | ***Pit*** located west of AST 11. |

# 4.0 ENVIRONMENTAL STATUS OF POTENTIAL SOURCE AREAS

Potential source area evaluations for AOCs that have been previously addressed are provided in Appendix A. These areas include:

- 1951 Ground Scar
- Former Fuel Unloading Area
- Perimeter of Tank Farm 1
- Melville Pond
- Tanks 9-18

The soil borings and groundwater wells associated with Tank Farm 1 provide the data necessary to evaluate many of these sources areas. By examining each source area evaluation (i.e., soil boring data, groundwater data, and NAPL data), current conditions at the site were identified. The soil data was compared to RIDEM Industrial/Commercial and Residential Direct Exposure Criteria and the GB Leachability Criteria, while the groundwater data was compared to the GB Groundwater Objectives. Since any presence of NAPL is considered a condition that exceeds the Upper Concentration Limits (UCLs), NAPL detection was also reviewed. The following sections describe the current status and data gaps of the site by media.

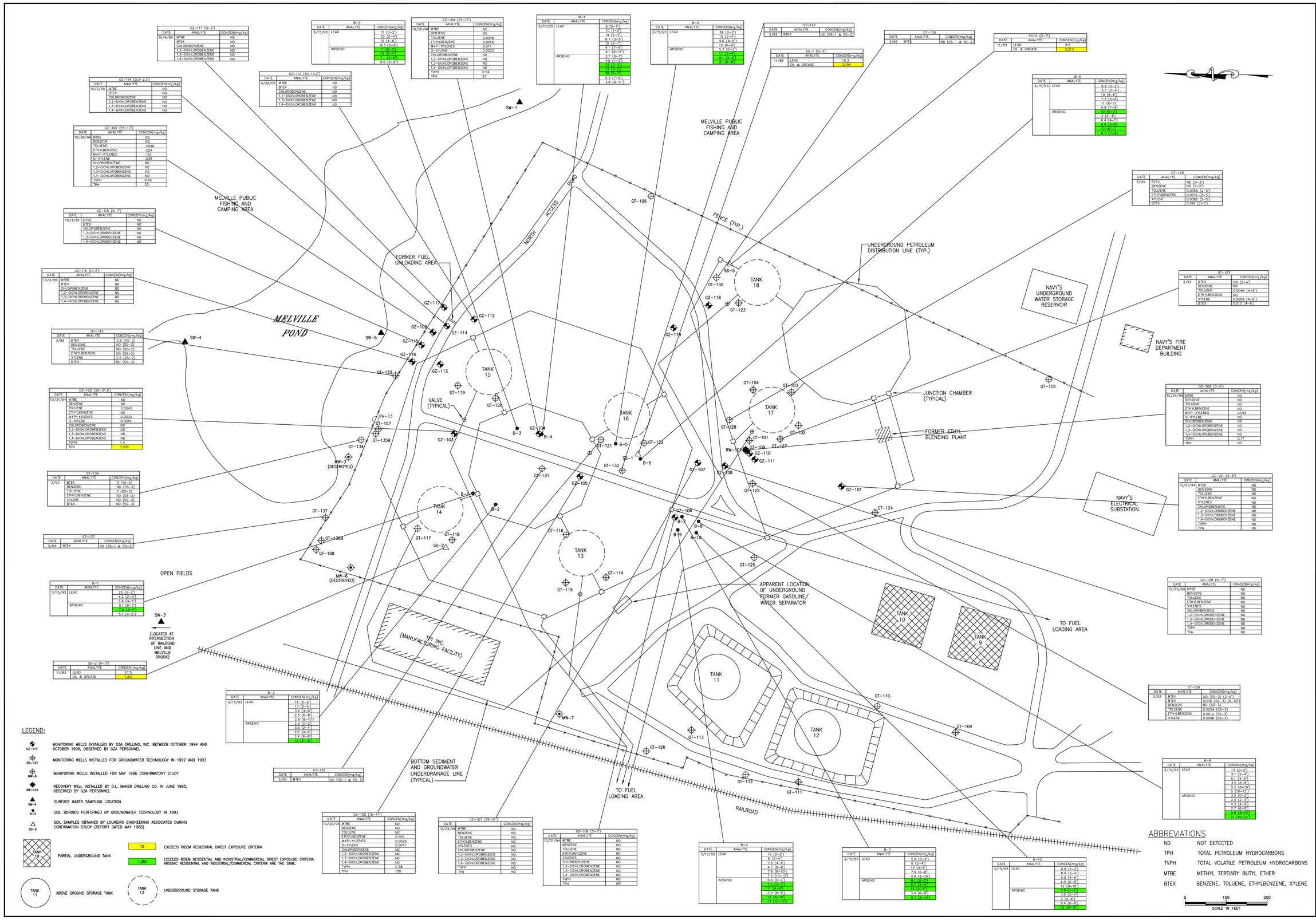
## 4.1 Potential Source Areas Adequately Addressed

### 4.1.1 Soil - Sitewide

Data from each soil boring were compared to the RIDEM Method 1 Residential and Industrial/Commercial Direct Exposure and GB Leachability Criteria. Historical soil sampling summarized on Figure 4-1 show exceedances of criteria for arsenic and TPH. Arsenic exceeded its Residential and Industrial/Commercial Direct Exposure Criteria (both 7.0 ppm) in several samples. Exceedances were noted from surficial soil to depth of 12 feet bgs. The maximum concentration detected was 33 ppm at a depth of 2 to 3 feet bgs in B-4, advanced in March 1993. Note that the criterion for arsenic is based on background data for the state; however, levels of arsenic throughout the tank farm and fuel loading area are well above 7.0 ppm, and it is expected that this is due to specific area geology and not indicative of man-made arsenic contamination. Four soil samples (SS-1, SS-2, SS-5, and GZ-103) exceeded the Residential TPH Direct Exposure Criterion of 500 ppm, however no samples collected to date have exceeded the applicable Industrial/Commercial TPH Direct Exposure Criterion of 2,500 ppm.

### 4.1.2 Groundwater

Since the groundwater on-site is classified as GB, the groundwater data that has been collected was compared to the RIDEM GB Groundwater Objectives. Groundwater was collected most recently in some of the wells at Tank Farm 1 in 1999 by TtEC. No exceedances were noted during that most recent groundwater sampling event. Historical groundwater sampling summarized on Figure 4-2 show exceedances of criteria for benzene. Three wells (GW-03, GZ-102, and GT-101) have historically exceeded the GB Groundwater Objective of 140 µg/L for benzene.




| GZ-117 (0-2') | | |
|---|---|---|
| DATE | ANALYTE | CONCEN(mg/kg) |
| 10/4/95 | MTBE | ND |
| | BTEX | ND |
| | CHLOROBENZENE | ND |
| | 1,2-DICHLOROBENZENE | ND |
| | 1,3-DICHLOROBENZENE | ND |
| | 1,4-DICHLOROBENZENE | ND |

| B-3 | | |
|---|---|---|
| DATE | ANALYTE | CONCEN(mg/kg) |
| 3/15/93 | LEAD | 15 (0-2') |
| | | 32 (2-4') |
| | | 10 (4-6') |
| | | 8.9 (6-8') |
| | ARSENIC | 11 (0-2') |
| | | 19 (2-4') |
| | | 7.1 (4-6') |
| | | 6.8 (6-8') |

| GZ-104 (15-17') | | |
|---|---|---|
| DATE | ANALYTE | CONCEN(mg/kg) |
| 10/20/94 | MTBE | ND |
| | BENZENE | ND |
| | TOLUENE | 0.0018 |
| | ETHYLBENZENE | 0.0018 |
| | M+P-XYLENES | 0.011 |
| | O-XYLENE | 0.0025 |
| | CHLOROBENZENE | ND |
| | 1,2-DICHLOROBENZENE | ND |
| | 1,3-DICHLOROBENZENE | ND |
| | 1,4-DICHLOROBENZENE | ND |
| | TVPH | 0.54 |
| | TPH | 37 |

| B-4 | | |
|---|---|---|
| DATE | ANALYTE | CONCEN(mg/kg) |
| 3/15/93 | LEAD | 6 (0-1') |
| | | 10 (1-2') |
| | | 19 (2-3') |
| | | 6.7 (3-5') |
| | | 12 (5-7') |
| | | 4.1 (7-9') |
| | | 4.1 (9-11') |
| | ARSENIC | 3.7 (0-1') |
| | | 4.6 (1-2') |
| | | 33 (2-3') |
| | | 12 (3-5') |
| | | 16 (5-7') |
| | | 5.3 (7-9') |
| | | 3.8 (9-11') |

| B-5 | | |
|---|---|---|
| DATE | ANALYTE | CONCEN(mg/kg) |
| 3/15/93 | LEAD | 38 (0-2') |
| | | 15 (2-4') |
| | | 9.6 (4-6') |
| | | 15 (6-8') |
| | ARSENIC | 5.3 (0-2') |
| | | 27 (2-4') |
| | | 8.1 (4-6') |
| | | 21 (6-8') |

| GT-132 | | |
|---|---|---|
| DATE | ANALYTE | CONCEN(mg/kg) |
| 3/93 | BTEX | ND (SS-1 & SS-2) |

| SS-1 (0-3') | | |
|---|---|---|
| DATE | ANALYTE | CONCEN(mg/kg) |
| 11/83 | LEAD | 15.3 |
| | OIL & GREASE | 2,194 |

| GT-130 | | |
|---|---|---|
| DATE | ANALYTE | CONCEN(mg/kg) |
| 3/93 | BTEX | ND (SS-1 & SS-2) |

| SS-5 (0-3') | | |
|---|---|---|
| DATE | ANALYTE | CONCEN(mg/kg) |
| 11/83 | LEAD | 8.5 |
| | OIL & GREASE | 2,013 |

| B-6 | | |
|---|---|---|
| DATE | ANALYTE | CONCEN(mg/kg) |
| 3/15/93 | LEAD | 6.9 (0-2') |
| | | 5.7 (2-4') |
| | | 14 (4-6') |
| | | 7.3 (5-6) |
| | | 11 (6-7) |
| | | 9.9 (7-8) |
| | ARSENIC | 16 (0-2') |
| | | 3 (2-4') |
| | | 6.4 (4-5) |
| | | 6.8 (5-6) |
| | | 12 (6-7) |
| | | 9.7 (7-8) |

| GZ-102 (15-17') | | |
|---|---|---|
| DATE | ANALYTE | CONCEN(mg/kg) |
| 10/28/94 | MTBE | ND |
| | BENZENE | ND |
| | TOLUENE | .0086 |
| | ETHYLBENZENE | .024 |
| | M+P-XYLENES | .110 |
| | O-XYLENE | .039 |
| | CHLOROBENZENE | ND |
| | 1,2-DICHLOROBENZENE | ND |
| | 1,3-DICHLOROBENZENE | ND |
| | 1,4-DICHLOROBENZENE | ND |
| | TVPH | 0.64 |
| | TPH | 20 |

| GZ-112 (10-10.2') | | |
|---|---|---|
| DATE | ANALYTE | CONCEN(mg/kg) |
| 9/29/05 | MTBE | ND |
| | BTEX | ND |
| | CHLOROBENZENE | ND |
| | 1,2-DICHLOROBENZENE | ND |
| | 1,3-DICHLOROBENZENE | ND |
| | 1,4-DICHLOROBENZENE | ND |

| GZ-114 (0.3-2.3') | | |
|---|---|---|
| DATE | ANALYTE | CONCEN(mg/kg) |
| 10/2/95 | MTBE | ND |
| | BTEX | ND |
| | CHLOROBENZENE | ND |
| | 1,2-DICHLOROBENZENE | ND |
| | 1,3-DICHLOROBENZENE | ND |
| | 1,4-DICHLOROBENZENE | ND |

| GZ-115 (5-7') | | |
|---|---|---|
| DATE | ANALYTE | CONCEN(mg/kg) |
| 10/3/95 | MTBE | ND |
| | BTEX | ND |
| | CHLOROBENZENE | ND |
| | 1,2-DICHLOROBENZENE | ND |
| | 1,3-DICHLOROBENZENE | ND |
| | 1,4-DICHLOROBENZENE | ND |

| GZ-116 (0-2') | | |
|---|---|---|
| DATE | ANALYTE | CONCEN(mg/kg) |
| 10/3/95 | MTBE | ND |
| | BTEX | ND |
| | CHLOROBENZENE | ND |
| | 1,2-DICHLOROBENZENE | ND |
| | 1,3-DICHLOROBENZENE | ND |
| | 1,4-DICHLOROBENZENE | ND |

| GT-133 | | |
|---|---|---|
| DATE | ANALYTE | CONCEN(mg/kg) |
| 3/93 | BTEX | 2.5 (SS-2) |
| | BENZENE | ND (SS-2) |
| | TOLUENE | ND (SS-2) |
| | ETHYLBENZENE | ND (SS-2) |
| | XYLENE | 2.5 (SS-2) |
| | BTEX | ND (SS-3) |

| GZ-103 (20-21.8') | | |
|---|---|---|
| DATE | ANALYTE | CONCEN(mg/kg) |
| 10/31/94 | MTBE | ND |
| | BENZENE | ND |
| | TOLUENE | 0.0043 |
| | ETHYLBENZENE | ND |
| | M+P-XYLENES | 0.0033 |
| | O-XYLENE | 0.0019 |
| | CHLOROBENZENE | ND |
| | 1,2-DICHLOROBENZENE | ND |
| | 1,3-DICHLOROBENZENE | ND |
| | 1,4-DICHLOROBENZENE | ND |
| | TVPH | 1.4 |
| | TPH | 1,100 |

| GT-134 | | |
|---|---|---|
| DATE | ANALYTE | CONCEN(mg/kg) |
| 3/93 | BTEX | 3 (SS-2) |
| | BENZENE | ND (SS-2) |
| | TOLUENE | 3 (SS-2) |
| | ETHYLBENZENE | ND (SS-2) |
| | XYLENE | ND (SS-2) |
| | BTEX | ND (SS-3) |

| GT-137 | | |
|---|---|---|
| DATE | ANALYTE | CONCEN(mg/kg) |
| 3/93 | BTEX | ND (SS-1 & SS-2) |

| B-1 | | |
|---|---|---|
| DATE | ANALYTE | CONCEN(mg/kg) |
| 3/15/93 | LEAD | 23 (0-2') |
| | | 4.2 (2-4') |
| | | 2.4 (4-6') |
| | ARSENIC | 5.1 (0-2') |
| | | 7.6 (2-4') |
| | | 5.1 (4-6') |

| SS-2 (0-3') | | |
|---|---|---|
| DATE | ANALYTE | CONCEN(mg/kg) |
| 11/83 | LEAD | 27.5 |
| | OIL & GREASE | 1,321 |

| B-2 | | |
|---|---|---|
| DATE | ANALYTE | CONCEN(mg/kg) |
| 3/15/93 | LEAD | 14 (0-2') |
| | | 17 (2-4') |
| | | 3.6 (4-6') |
| | | 2.5 (6-8') |
| | | 2.8 (8-10') |
| | ARSENIC | 3.9 (0-2') |
| | | 3.6 (2-4') |
| | | 2.6 (4-6') |
| | | 2.4 (6-8') |
| | | 12 (8-10') |

| GT-131 | | |
|---|---|---|
| DATE | ANALYTE | CONCEN(mg/kg) |
| 3/93 | BTEX | ND (SS-1 & SS-3) |

| GZ-105 (15-17') | | |
|---|---|---|
| DATE | ANALYTE | CONCEN(mg/kg) |
| 10/20/94 | MTBE | ND |
| | BENZENE | ND |
| | TOLUENE | ND |
| | ETHYLBENZENE | 0.001 |
| | M+P-XYLENES | 0.0025 |
| | O-XYLENE | 0.0017 |
| | CHLOROBENZENE | ND |
| | 1,2-DICHLOROBENZENE | ND |
| | 1,3-DICHLOROBENZENE | ND |
| | 1,4-DICHLOROBENZENE | ND |
| | TVPH | 0.38 |
| | TPH | 180 |

| GZ-107 (19-21') | | |
|---|---|---|
| DATE | ANALYTE | CONCEN(mg/kg) |
| 10/24/94 | MTBE | ND |
| | BENZENE | ND |
| | TOLUENE | ND |
| | ETHYLBENZENE | ND |
| | XYLENES | ND |
| | CHLOROBENZENE | ND |
| | 1,2-DICHLOROBENZENE | ND |
| | 1,3-DICHLOROBENZENE | ND |
| | 1,4-DICHLOROBENZENE | ND |
| | TVPH | ND |
| | TPH | ND |

| GZ-106 (5-7') | | |
|---|---|---|
| DATE | ANALYTE | CONCEN(mg/kg) |
| 10/21/94 | MTBE | ND |
| | BENZENE | ND |
| | TOLUENE | ND |
| | ETHYLBENZENE | ND |
| | XYLENES | ND |
| | CHLOROBENZENE | ND |
| | 1,2-DICHLOROBENZENE | ND |
| | 1,3-DICHLOROBENZENE | ND |
| | 1,4-DICHLOROBENZENE | ND |
| | TVPH | ND |
| | TPH | ND |

| B-9 | | |
|---|---|---|
| DATE | ANALYTE | CONCEN(mg/kg) |
| 3/15/93 | LEAD | 19 (0-2') |
| | | 6 (2-4') |
| | | 7.5 (4-6') |
| | | 4.7 (6-8') |
| | | 7.6 (8-10') |
| | | 7.5 (10-12') |
| | ARSENIC | 5.5 (0-2') |
| | | 7.2 (2-4') |
| | | 11 (4-6') |
| | | 3.9 (6-8') |
| | | 15 (8-10') |
| | | 13 (10-12') |

| B-7 | | |
|---|---|---|
| DATE | ANALYTE | CONCEN(mg/kg) |
| 3/15/93 | LEAD | 5.9 (0-2') |
| | | 8 (2-4') |
| | | 13 (4-6') |
| | | 2.8 (6-8') |
| | | 4.4 (8-10') |
| | ARSENIC | 8.1 (0-2') |
| | | 4.7 (2-4') |
| | | 14 (4-6') |
| | | 3.4 (6-8') |
| | | 8.7 (8-10') |

| B-10 | | |
|---|---|---|
| DATE | ANALYTE | CONCEN(mg/kg) |
| 3/15/93 | LEAD | 6.8 (0-2') |
| | | 6.9 (2-4') |
| | | 5.0 (4-6') |
| | | 6.5 (6-8') |
| | | 12 (8-10') |
| | ARSENIC | 7.8 (0-2') |
| | | 3.6 (2-4') |
| | | 3 (4-6') |
| | | 5.4 (6-8') |
| | | 12 (8-10') |

| GT-128 | | |
|---|---|---|
| DATE | ANALYTE | CONCEN(mg/kg) |
| 3/93 | BTEX | ND (0-2) |
| | BENZENE | ND (2-5) |
| | TOLUENE | 0.0065 (2-5') |
| | ETHYLBENZENE | 0.0016 (2-5') |
| | XYLENE | 0.0082 (2-5') |
| | BTEX | 0.016 (2-5') |

| GT-127 | | |
|---|---|---|
| DATE | ANALYTE | CONCEN(mg/kg) |
| 3/93 | BTEX | ND (2-4') |
| | BENZENE | ND |
| | TOLUENE | 0.0046 (4-6') |
| | ETHYLBENZENE | ND |
| | XYLENE | 0.0058 (4-6') |
| | BTEX | 0.010 (4-6') |

| GZ-109 (0-2') | | |
|---|---|---|
| DATE | ANALYTE | CONCEN(mg/kg) |
| 10/24/94 | MTBE | ND |
| | BENZENE | ND |
| | TOLUENE | ND |
| | ETHYLBENZENE | ND |
| | M+P-XYLENES | 0.019 |
| | O-XYLENE | ND |
| | CHLOROBENZENE | ND |
| | 1,2-DICHLOROBENZENE | ND |
| | 1,3-DICHLOROBENZENE | ND |
| | 1,4-DICHLOROBENZENE | ND |
| | TVPH | 0.17 |
| | TPH | ND |

| GZ-101 (4-6') | | |
|---|---|---|
| DATE | ANALYTE | CONCEN(mg/kg) |
| 10/31/94 | MTBE | ND |
| | BENZENE | ND |
| | TOLUENE | ND |
| | ETHYLBENZENE | ND |
| | XYLENES | ND |
| | CHLOROBENZENE | ND |
| | 1,2-DICHLOROBENZENE | ND |
| | 1,3-DICHLOROBENZENE | ND |
| | 1,4-DICHLOROBENZENE | ND |
| | TVPH | ND |
| | TPH | ND |

| GZ-108 (5-7') | | |
|---|---|---|
| DATE | ANALYTE | CONCEN(mg/kg) |
| 10/25/94 | MTBE | ND |
| | BENZENE | ND |
| | TOLUENE | ND |
| | ETHYLBENZENE | ND |
| | XYLENES | ND |
| | CHLOROBENZENE | ND |
| | 1,2-DICHLOROBENZENE | ND |
| | 1,3-DICHLOROBENZENE | ND |
| | 1,4-DICHLOROBENZENE | ND |
| | TVPH | ND |
| | TPH | ND |

| GT-129 | | |
|---|---|---|
| DATE | ANALYTE | CONCEN(mg/kg) |
| 3/93 | BTEX | ND (SS-2) (2-6') |
| | BTEX | 0.016 (SS-3) (6-10') |
| | BENZENE | ND (SS-3) |
| | TOLUENE | 0.0054 (SS-3) |
| | ETHYLBENZENE | 0.0012 (SS-3) |
| | XYLENE | 0.0098 (SS-3) |

| B-8 | | |
|---|---|---|
| DATE | ANALYTE | CONCEN(mg/kg) |
| 3/15/93 | LEAD | 13 (0-2') |
| | | 5.1 (2-4') |
| | | 6.1 (4-6') |
| | | 3.5 (6-8') |
| | | 5.2 (8-10') |
| | | 5 (10-12') |
| | ARSENIC | 3.5 (0-2) |
| | | 2.4 (2-4') |
| | | 4.3 (4-6') |
| | | 2.7 (6-8') |
| | | 9.8 (8-10') |
| | | 11 (10-12') |

## LEGEND:

- GZ-117 — MONITORING WELLS INSTALLED BY GZA DRILLING, INC. BETWEEN OCTOBER 1994 AND OCTOBER 1995, OBSERVED BY GZA PERSONNEL
- GT-133 — MONITORING WELLS INSTALLED FOR GROUNDWATER TECHNOLOGY IN 1992 AND 1993
- MW-6 — MONITORING WELLS INSTALLED FOR MAY 1986 CONFIRMATORY STUDY
- RW-101 — RECOVERY WELL INSTALLED BY D.L. MAHER DRILLING CO. IN JUNE 1995, OBSERVED BY GZA PERSONNEL
- SW-4 — SURFACE WATER SAMPLING LOCATION
- B-3 — SOIL BORINGS PERFORMED BY GROUNDWATER TECHNOLOGY IN 1993
- SS-2 — SOIL SAMPLES OBTAINED BY LOUREIRO ENGINEERING ASSOCIATES DURING CONFIRMATION STUDY (REPORT DATED MAY 1986)
- TANK 10 — PARTIAL UNDERGROUND TANK
- 12 — EXCEEDS RIDEM RESIDENTIAL DIRECT EXPOSURE CRITERIA
- 1,351 — EXCEEDS RIDEM RESIDENTIAL AND INDUSTRIAL/COMMERCIAL DIRECT EXPOSURE CRITERIA. ARSENIC RESIDENTIAL AND INDUSTRIAL/COMMERCIAL CRITERIA ARE THE SAME.
- TANK 11 — ABOVE GROUND STORAGE TANK
- TANK 13 — UNDERGROUND STORAGE TANK

## ABBREVIATIONS

| | |
|---|---|
| ND | NOT DETECTED |
| TPH | TOTAL PETROLEUM HYDROCARBONS |
| TVPH | TOTAL VOLATILE PETROLEUM HYDROCARBONS |
| MTBE | METHYL TERTIARY BUTYL ETHER |
| BTEX | BENZENE, TOLUENE, ETHYLBENZENE, XYLENE |

0 100 200
SCALE IN FEET

ENGINEER SEAL

| | |
|---|---|
| Date: | JUNE 2006 |
| Scale: | AS SHOWN |
| Designed by: | E. KURJA |
| Drawn by: | F. MENICHELLI |
| Checked by: | J. DEASCENTIS |
| Approved by: | |

| REV | DESCRIPTION | DATE | APP. |
|---|---|---|---|
| | | | |

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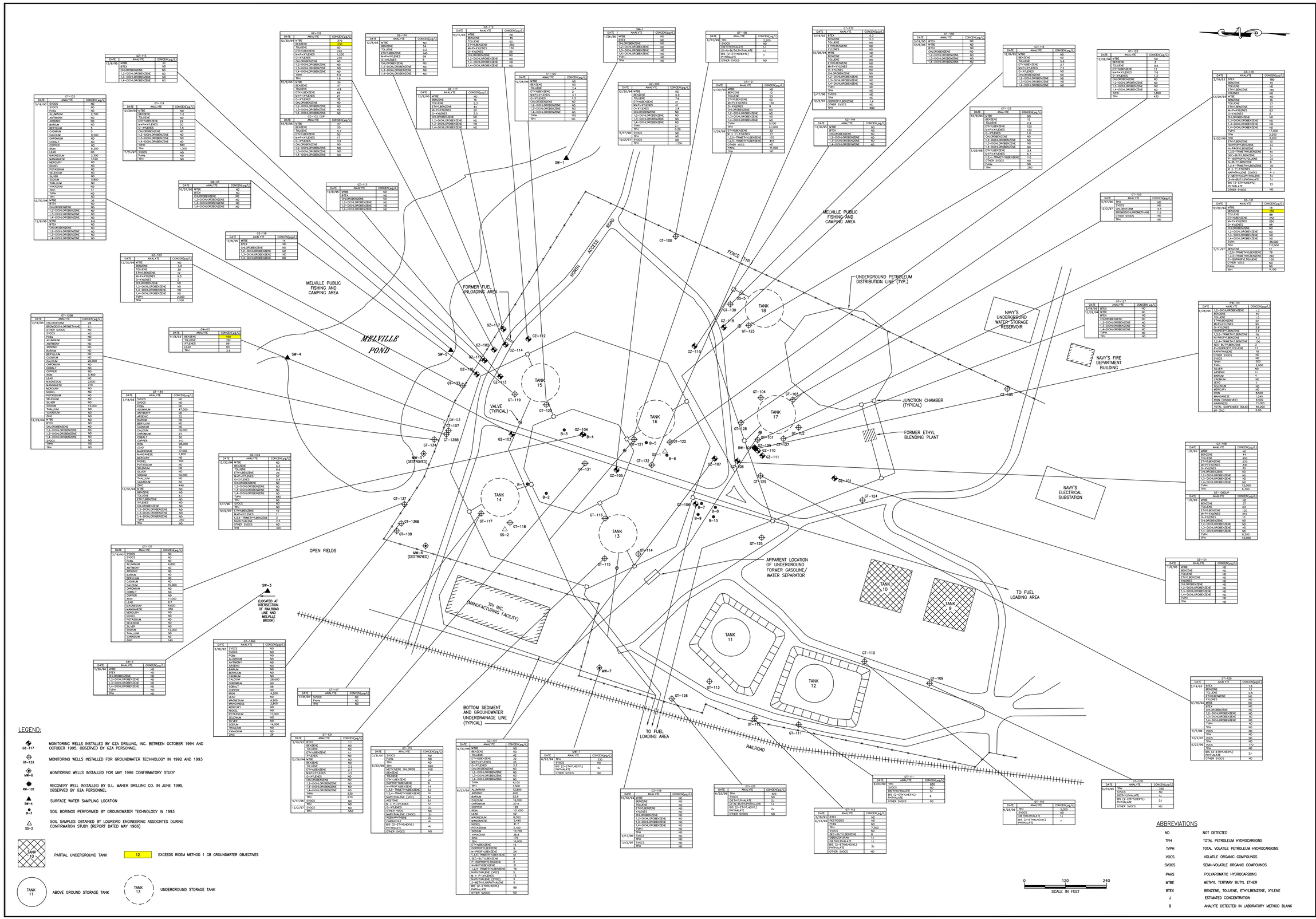
# DEFENSE FUEL SUPPORT POINT MELVILLE
## PORTSMOUTH, RHODE ISLAND

# TANK FARM 1
# SITEWIDE SOIL SAMPLING RESULTS

PROJECT NO: 2854.1011.0000.00000

CADD FILE NO: 28541011-A002.DWG

DRAWING NO.
**FIGURE 4-1**
SHEET 1 OF 1




LEGEND:

- GZ-117 — MONITORING WELLS INSTALLED BY GZA DRILLING, INC. BETWEEN OCTOBER 1994 AND OCTOBER 1995, OBSERVED BY GZA PERSONNEL
- GT-133 — MONITORING WELLS INSTALLED FOR GROUNDWATER TECHNOLOGY IN 1992 AND 1993
- MW-6 — MONITORING WELLS INSTALLED FOR MAY 1986 CONFIRMATORY STUDY
- RW-101 — RECOVERY WELL INSTALLED BY D.L. MAHER DRILLING CO. IN JUNE 1995, OBSERVED BY GZA PERSONNEL
- SW-4 — SURFACE WATER SAMPLING LOCATION
- B-3 — SOIL BORINGS PERFORMED BY GROUNDWATER TECHNOLOGY IN 1993
- SS-2 — SOIL SAMPLES OBTAINED BY LOUREIRO ENGINEERING ASSOCIATES DURING CONFIRMATION STUDY (REPORT DATED MAY 1986)
- TANK 10 — PARTIAL UNDERGROUND TANK
- 12 — EXCEEDS RIDEM METHOD 1 GB GROUNDWATER OBJECTIVES
- TANK 11 — ABOVE GROUND STORAGE TANK
- TANK 13 — UNDERGROUND STORAGE TANK

ABBREVIATIONS

| | |
|---|---|
| ND | NOT DETECTED |
| TPH | TOTAL PETROLEUM HYDROCARBONS |
| TVPH | TOTAL VOLATILE PETROLEUM HYDROCARBONS |
| VOCS | VOLATILE ORGANIC COMPOUNDS |
| SVOCS | SEMI-VOLATILE ORGANIC COMPOUNDS |
| PAHS | POLYAROMATIC HYDROCARBONS |
| MTBE | METHYL TERTIARY BUTYL ETHER |
| BTEX | BENZENE, TOLUENE, ETHYLBENZENE, XYLENE |
| J | ESTIMATED CONCENTRATION |
| B | ANALYTE DETECTED IN LABORATORY METHOD BLANK |

ENGINEER SEAL

| | |
|---|---|
| Date: | JANUARY 2006 |
| Scale: | AS SHOWN |
| Designed by: | E. KURJA |
| Drawn by: | F. MENICHELLI |
| Checked by: | J. DEASCENTIS |
| Approved by: | |

| REV | DESCRIPTION | DATE | APP. |
|---|---|---|---|
| | | | |

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DEFENSE FUEL SUPPORT POINT MELVILLE
PORTSMOUTH, RHODE ISLAND

# TANK FARM 1 GROUNDWATER/SURFACE WATER CONCENTRATIONS

PROJECT NO: 2854.1011.0000.00000

CADD FILE NO: 28541011-A001.DWG

DRAWING NO.
FIGURE 4-2
SHEET 1 OF 1

Well GW-03, located along the northern boundary, detected a concentration (160 µg/L) only slightly above the groundwater objective in 1993. Well GZ-102, also located near the northern boundary, detected an elevated concentration of benzene (230 µg/L) in 1994; however, re-sampling of the well in 1995 produced a much lower result (57 µg/L). Well GT-101, located near Tank 17, had a slight exceedance of the groundwater objective (150 µg/L) in 1994, followed by a much lower result in 1997 (12 µg/L).

Due to the age and limited scope of the 1999 sampling event, a full round of groundwater sampling is recommended as well as a groundwater elevation survey to determine accurate groundwater flow directions on the site. Sampling procedures are described in Section 5.4.

### 4.1.3 Non-Aqueous Phase Liquids

According to RIDEM's *Remediation Regulations*, the presence of NAPL in any environmental medium is considered a condition that exceeds the UCL. Wells have been gauged to determine the presence of NAPL since 1993. Since that time, nine wells (GT-101, GT-121, GT-122, GT-127, GT-128, GZ-107, GZ-108, GZ-109 and recovery well RW-101) have had measurable product. The maximum product thickness reported in these progress reports is 0.56 feet measured in GT-101 in March 1993. As part of the CAP, wells that have either shown the thickest floating product (GZ-107 and GZ-108) or have had a slight amount of product measured (GZ-107 and GZ-108) were equipped with passive floating product recovery skimmers and collection systems in May 1996. Due to lack of recoverable product, all but one canister (GT-101) was removed sometime later that year, between October and December 1996. No measurable product was noted in any well (50 wells) during the latest round of gauging, which occurred in 1999. Figure 4-3 shows the locations that contain NAPL and relative thicknesses.

Due to the age of the existing NAPL information, it is recommended that all available site groundwater monitoring wells be gauged for free product as part of the groundwater sampling program described in Section 5.4.

## 4.2 Potential Source Areas with Outstanding Questions/Issues

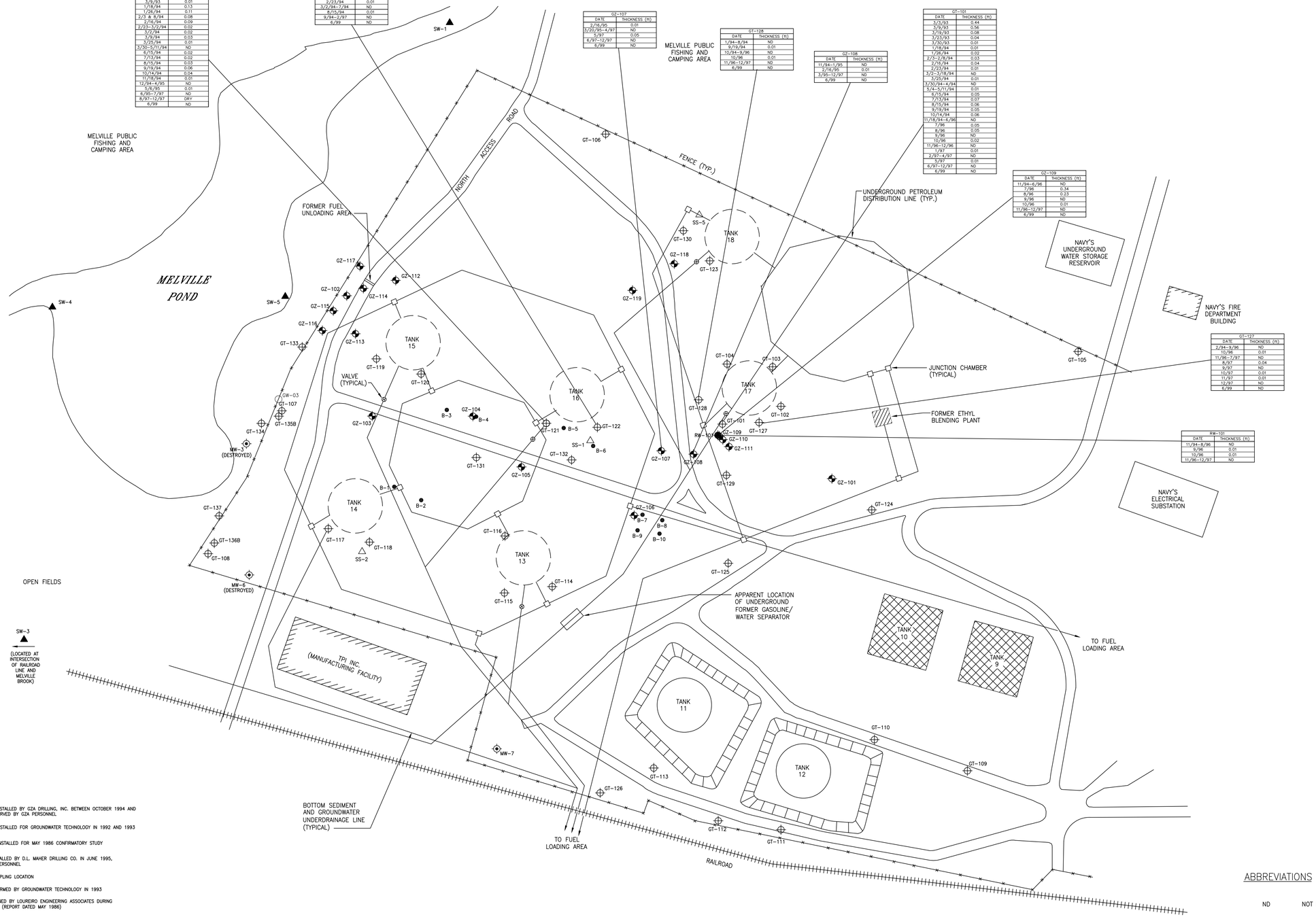
### 4.2.1 Soil

Due to additional AOCs identified in the aerial photography analysis presented in Section 3.5, soil investigation is recommended as described in Section 5.0.

Test pitting of AOCs described in the SAPA, Section 3.5, will be conducted to address the areas of likely contamination based on historical use of the property. Historical soil sampling has not indicated any areas of additional contamination greater than the applicable Industrial/Commercial Direct Contact Criteria with the exception of arsenic, which is believed to be indicative of background levels for the area (see Section 4.1.1).

### 4.2.2 Groundwater

In order to adequately assess current groundwater conditions at the site, a resampling of all site groundwater wells is recommended as described in Section 5.4.




| GT-121 | |
|---|---|
| DATE | THICKNESS (ft) |
| 3/9/93 | 0.01 |
| 1/18/94 | 0.13 |
| 1/26/94 | 0.11 |
| 2/3 & 8/94 | 0.08 |
| 2/16/94 | 0.09 |
| 2/23–3/2/94 | 0.02 |
| 3/2/94 | 0.02 |
| 3/9/94 | 0.03 |
| 3/25/94 | 0.01 |
| 3/30–5/11/94 | ND |
| 6/15/94 | 0.02 |
| 7/13/94 | 0.02 |
| 8/15/94 | 0.03 |
| 9/19/94 | 0.06 |
| 10/14/94 | 0.04 |
| 11/18/94 | 0.03 |
| 12/94–4/95 | ND |
| 5/8/95 | 0.01 |
| 6/95–7/97 | ND |
| 8/97–12/97 | DRY |
| 6/99 | ND |

| GT-122 | |
|---|---|
| DATE | THICKNESS (ft) |
| 1/18/94–1/26/94 | 0.01 |
| 2/3/94–2/16/94 | ND |
| 2/23/94 | 0.01 |
| 3/2/94–7/94 | ND |
| 8/15/94 | 0.01 |
| 9/94–2/97 | ND |
| 6/99 | ND |

| GZ-107 | |
|---|---|
| DATE | THICKNESS (ft) |
| 2/16/95 | 0.01 |
| 3/20/95–4/97 | ND |
| 5/97 | 0.05 |
| 6/97–12/97 | ND |
| 6/99 | ND |

| GT-128 | |
|---|---|
| DATE | THICKNESS (ft) |
| 1/94–8/94 | ND |
| 9/19/94 | 0.01 |
| 10/94–9/96 | ND |
| 10/96 | 0.01 |
| 11/96–12/97 | ND |
| 6/99 | ND |

| GZ-108 | |
|---|---|
| DATE | THICKNESS (ft) |
| 11/94–1/95 | ND |
| 2/16/95 | 0.01 |
| 3/95–12/97 | ND |
| 6/99 | ND |

| GT-101 | |
|---|---|
| DATE | THICKNESS (ft) |
| 3/3/93 | 0.44 |
| 3/9/93 | 0.56 |
| 3/19/93 | 0.08 |
| 3/23/93 | 0.04 |
| 3/30/93 | 0.01 |
| 1/18/94 | 0.01 |
| 1/26/94 | 0.02 |
| 2/3–2/8/94 | 0.03 |
| 2/16/94 | 0.04 |
| 2/23/94 | 0.01 |
| 3/2–3/18/94 | ND |
| 3/25/94 | 0.01 |
| 3/30/94–4/94 | ND |
| 5/4–5/11/94 | 0.01 |
| 6/15/94 | 0.05 |
| 7/13/94 | 0.07 |
| 8/15/94 | 0.06 |
| 9/19/94 | 0.05 |
| 10/14/94 | 0.06 |
| 11/18/94–6/96 | ND |
| 7/96 | 0.05 |
| 8/96 | 0.05 |
| 9/96 | ND |
| 10/96 | 0.02 |
| 11/96–12/96 | ND |
| 1/97 | 0.01 |
| 2/97–4/97 | ND |
| 5/97 | 0.01 |
| 6/97–12/97 | ND |
| 6/99 | ND |

| GZ-109 | |
|---|---|
| DATE | THICKNESS (ft) |
| 11/94–6/96 | ND |
| 7/96 | 0.54 |
| 8/96 | 0.23 |
| 9/96 | ND |
| 10/96 | 0.01 |
| 11/96–12/97 | ND |
| 6/99 | ND |

| GT-127 | |
|---|---|
| DATE | THICKNESS (ft) |
| 2/94–9/96 | ND |
| 10/96 | 0.01 |
| 11/96–7/97 | ND |
| 8/97 | 0.04 |
| 9/97 | ND |
| 10/97 | 0.01 |
| 11/97 | 0.01 |
| 12/97 | ND |
| 6/99 | ND |

| RW-101 | |
|---|---|
| DATE | THICKNESS (ft) |
| 11/94–8/96 | ND |
| 9/96 | 0.01 |
| 10/96 | 0.01 |
| 11/96–12/97 | ND |

LEGEND:

- GZ-117 — MONITORING WELLS INSTALLED BY GZA DRILLING, INC. BETWEEN OCTOBER 1994 AND OCTOBER 1995, OBSERVED BY GZA PERSONNEL
- GT-133 — MONITORING WELLS INSTALLED FOR GROUNDWATER TECHNOLOGY IN 1992 AND 1993
- MW-6 — MONITORING WELLS INSTALLED FOR MAY 1986 CONFIRMATORY STUDY
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- B-3 — SOIL BORINGS PERFORMED BY GROUNDWATER TECHNOLOGY IN 1993
- SS-2 — SOIL SAMPLES OBTAINED BY LOUREIRO ENGINEERING ASSOCIATES DURING CONFIRMATION STUDY (REPORT DATED MAY 1986)
- TANK 10 — PARTIAL UNDERGROUND TANK
- TANK 11 — ABOVE GROUND STORAGE TANK
- TANK 13 — UNDERGROUND STORAGE TANK

ABBREVIATIONS

ND — NOT DETECTED

ENGINEER SEAL

Date: JUNE 2006
Scale: AS SHOWN
Designed by: E. KURJA
Drawn by: F. MENICHELLI
Checked by: J. DEASCENTIS
Approved by:

| REV | DESCRIPTION | DATE | APP. |
|---|---|---|---|
| | | | |


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DEFENSE FUEL SUPPORT POINT MELVILLE
PORTSMOUTH, RHODE ISLAND

# TANK FARM 1
# NON-AQUEOUS PHASE LIQUIDS MONITORING DATA

PROJECT NO: 2854.1011.0000.00000
CADD FILE NO: 28541011-A003.DWG

DRAWING NO.
FIGURE 4-3
SHEET 1 OF 1

### 4.2.3 Non-Aqueous Phase Liquids (NAPL)

Sampling for NAPL will be conducted concurrent with the groundwater sampling event. Procedures for NAPL sampling are provided in Section 5.4.

# 5.0 SUPPLEMENTAL INVESTIGATION

In order to provide accurate current information for site soil and groundwater conditions, areas described in Section 4.2 will be further investigated by the following methods.

## 5.1 Test Pit Approach

A focused approach will be applied to the test pits to be evaluated at each AOC identified by the aerial photography analysis in Section 3.5, Table 3-2. As noted and evaluated in Section 3.5, these AOCs will be field delineated and if determined to be construction-related, will be removed from the AOC list. The high level of accuracy associated with the GIS system used to locate the AOCs precludes the need to randomly test pit these areas.

The test pit(s) will extend 5 feet beyond the boundaries depicted for each area in Figure 5-1 to transect the AOC. A single test pit will be placed to traverse the long axis of each AOC beginning at the point of likeliest contamination (i.e., end of hose). The pit will terminate where field conditions dictate. Test pitting for areas associated with surficial staining or other surface features will extend to 2 feet below grade and will be bucket width (approximately 3 feet). Areas defined as pits or excavations on the SAPA will be excavated to a minimum of 5 feet below grade or to bedrock, whichever is shallower. It should be noted that many of the areas to be investigated are likely to encounter shallow bedrock or rock outcroppings. If the path of a test trench intercepts an outcropping, the excavation will continue on line once the outcropping is passed. Per RIDEM's request, a magnetometer will be used to screen AOCs and additional test pitting may be directed by results of the magnetometer surveys.

### 5.1.1 Soil Surrounding Bulk Storage USTs

Soils surrounding the bulk storage USTs will be assessed by excavating one test pit on the downgradient side of each of the tanks directly adjacent to the exterior of each tank wall. The USTs are located 5 feet below ground surface. Test pits will be a minimum of 10 feet in depth and 10 feet in length tangential to the tank wall. One base and four sidewall samples will be collected from each pit for Petroflag™ screening and laboratory analysis, if necessary, as outlined in Section 5.2.

### 5.1.2 Drainage Features

One surface soil sample will be collected for Petroflag™ analysis at the outlet of each drainage swale location identified during the field reconnaissance. In addition, one sample will be analyzed from the base of each storm drain and catch basin. Bottoms of storm drains will be tapped with a steel rod to determine if a solid base exists. Petroflag™ screening and sample analysis will be conducted as outlined in Section 5.2.

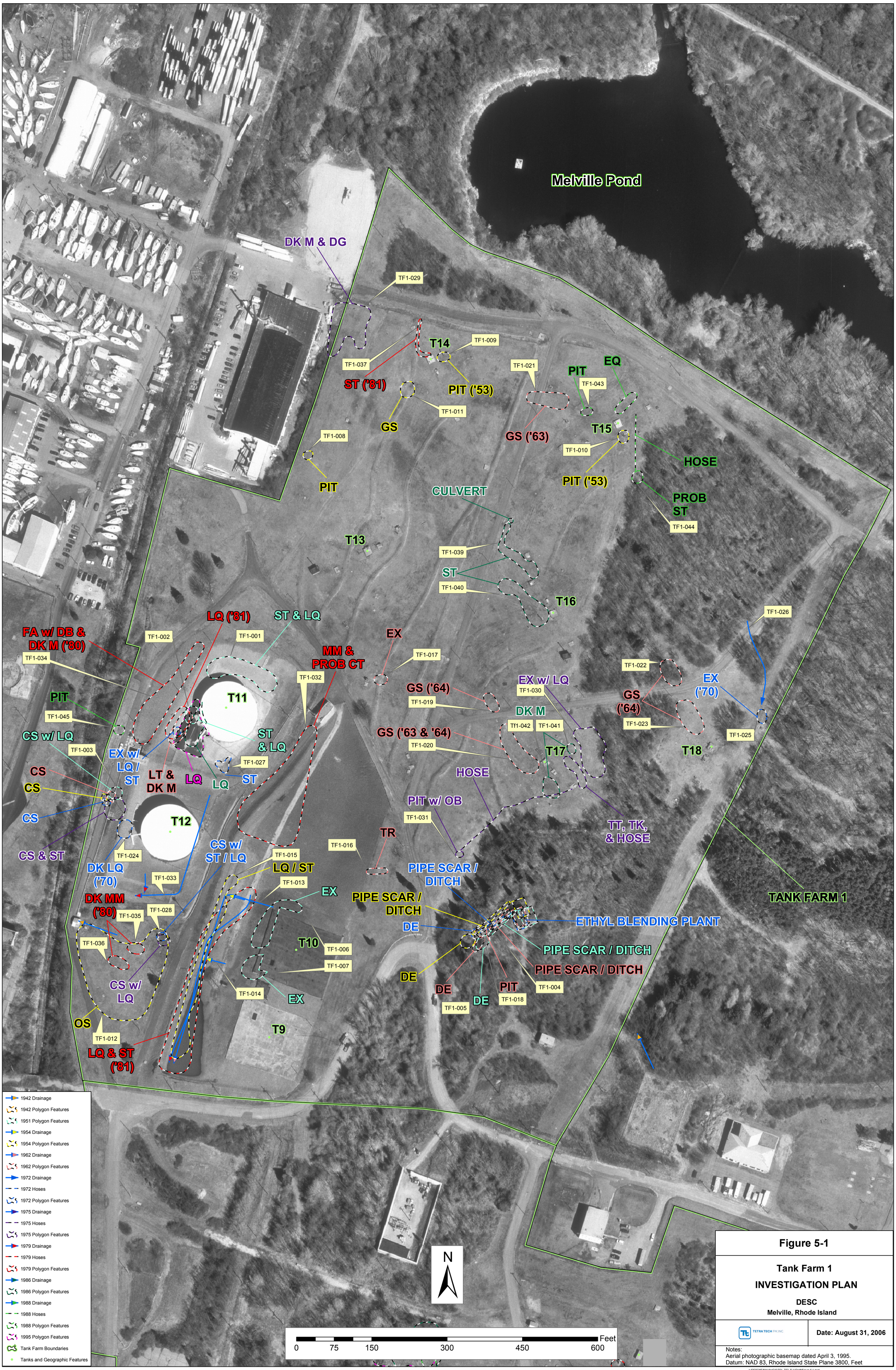


**Figure 5-1**

**Tank Farm 1**

**INVESTIGATION PLAN**

**DESC**

**Melville, Rhode Island**

TETRA TECH FW, INC.

**Date: August 31, 2006**

Notes:
Aerial photographic basemap dated April 3, 1995.
Datum: NAD 83, Rhode Island State Plane 3800, Feet

p:/DESCNE/Melville/GIS/TF1_TF2_FLA/Draft/Figure 5-1.mxd

## 5.2 Test Pit Sampling

Petroflag™ testing will be conducted once every 50 linear feet of test pit floor. Samples will be collected using disposable sampling equipment to eliminate rinsate generation. If the test pit is less than 50 feet in length, one centrally located base sample will be taken. Petroflag™ samples will not be composited. Sidewall samples will be placed away from the floor sample and from each other in order to cover the most exposed area. Sidewall samples will be taken at mid depth of the test pit, one per sidewall. All of the Petroflag™ samples will be preferentially collected from areas of staining and/or where olfactory evidence of petroleum is encountered.

Samples that exceed 100 ppm by Petroflag™ will be sent for off-site analysis by EPA Method 8015 for diesel and gasoline range organics (DRO/GRO). Laboratory TPH screening by EPA Method 8015 may be substituted for Petroflag™ sampling where visual or olfactory evidence of contamination is present. If laboratory results for TPH are less than or equal to 100 ppm, no further action is required and the sample will not be analyzed for VOCs or SVOCs. If the laboratory results for TPH exceed 100 ppm and are less than 2,500 ppm, the samples will be analyzed for VOCs by EPA Method 8260 and SVOCs by EPA Method 8270 to be compared to RIDEM Residential and Industrial/Commercial soil criteria. Areas which exceed RIDEM Industrial/Commercial soil standards will be excavated. Petroflag™ screening will be used to direct the excavation. Confirmatory samples will be collected from mid depth of each of the excavated sidewalls and from the center of the base of the excavation for confirmatory TPH, VOC and SVOC analysis. Based on the results of these supplemental investigations and the comparisons to these criteria, DESC will identify and evaluate appropriate response actions. These options may include the removal of additional soil.

If a test pit is not immediately sampled, samples from the sidewall or the base will be collected 8 to 12 inches below or in front of the current contour (unless there is field evidence of contamination at the current contour). In addition, since Petroflag™ is sensitive to moisture, samples will not be collected during a rain event, from flooded test pits or from soils, which contain greater than 20 percent moisture. Should these conditions exist, samples could be collected once the pit has had an opportunity to dry out.

Per RIDEM request, if a test pit sample is found to be within 100 ppm of the TPH residential criteria, either an additional bucket of dirt will be removed at that location or a 1-foot hole will be dug, and the soils will be examined for field evidence of contamination. If there is no field evidence of contamination, no further action is required. In addition, any excavated soils will be inspected, and if field evidence of contamination is found in the excavated soils, but not in the test pits, a sample will be collected from the excavated soils.

## 5.3 Excavated Soils

All soils will be staged adjacent to their respective test pit area on the ground surface. If analytical results are above the Industrial/Commercial criteria, additional soil from the area will be excavated to a labeled soil stockpile and covered until the area is remediated. Soils will then be characterized for off-site disposal. If the confirmatory analysis indicates soils are below the Industrial/Commercial standard, stockpiled soils from the area will be returned to the excavation as fill.

DESC is aware that the Navy may wish to redevelop this site for residential use in the future; therefore, an attempt will be made to remediate soils above the Industrial/Commercial criteria to residential levels in order to facilitate the Navy reaching closure. It should be noted that DESC's responsibility to the Navy is only to remediate fuel related contamination to Industrial/Commercial standards.

## 5.4 Groundwater Sampling

All monitoring wells and recovery wells will be sampled using for VOCs, SVOCs, and TPH by EPA Methods 8260B, 8270C, and 8015 DRO/GRO, respectively. Groundwater well purging and sampling will be conducted using dedicated bailers. Results of groundwater sampling will be compared to the RIDEM GA and GB Groundwater Objectives; however, the GB criteria applicable to the site. Please see Figure 2-2 for the site groundwater monitoring well locations.

### 5.4.1 NAPL Sampling

Prior to any sampling activity, water level measurements will be made of all serviceable groundwater wells currently located within Tank Farm 2 (approximately 50). Water level measurements will be made using an electronic oil-water interface probe that signals contact with NAPL and will be measured to the nearest .01 foot and recorded in the field logbook. The procedure will include measurement of LNAPL and dense non-aqueous phase liquid (DNAPL) at the top and bottom of the groundwater column in the well prior to any bailing using the interface probe. If the probe indicates that LNAPL or DNAPL are present, the measured NAPL will be sampled accordingly and the well will not be sampled for dissolved phase contaminants. If no product is measured with the interface probe, then a bailer will be lowered to intercept the groundwater surface and be retrieved and emptied into a 5-gallon bucket and observed for sheen and noted. The next bailer will be lowered to the bottom of the well and retrieved and inspected for the presence of DNAPL prior to purging the remaining well volumes of water required for sampling.

## 5.5 Ring Drain Water

Sampling points for individual tank ring drains will be investigated during the fieldwork. If sampling points can be found, samples will be retrieved and analyzed for DRO/GRO by EPA Method 8015.

# 6.0 SAMPLE MANAGEMENT

The sample identification system to be used during this investigation will assign a unique sample identifier to each sample collected. Data management will be consistent with this sample identification system. The protocols for assigning field sample numbers are described below. Each sample collected will have its own identifier, which will apply for the duration of the project. The sample identifier will consist of an alpha-numeric code that will identify the site designation, sample type, sample number, and quality control (QC) sample designation (if applicable). The QC sample identifier will also consist of an alpha-numeric code that will identify the QC sample designation, sampling date, and sample number (if applicable).

Note: All sample identifiers and their corresponding locations will be logged in the field notebook and may be identified on figures or drawings.

| | | |
|---|---|---|
| Site Identification: | TF1 | Tank Farm 1 |
| Sample types: | GZ-209 | Former GZA soil boring location |
| QC sample designations: | D<br>MS/MSD | Duplicate Sample<br>Matrix Spike/Matrix Spike Duplicate |
| Sampling Depth | 5 | 5-ft sampling depth |

**Trip Blank Collected on August 28, 2007**: TB082807

**Equipment Rinsate Collected on August 28, 2007**: ER082807

**MS/MSD**: indicate on chain of custody (COC) form under remarks section

Field personnel will complete sample labels using indelible ink. Labels will include the project identification, sample identification, date and time of collection, sampler's initials, sample matrix, type of sample (grab or composite), analyses to be performed, and preservative used (if applicable).

## 6.1 Sample Packing and Shipping

Samples for off-site laboratory analysis will be shipped via Federal Express or by courier for overnight delivery in waterproof coolers using the procedures outlined below. The samples taken for this project shall be considered low-level or environmental samples for packaging and shipping purposes. The sample packing procedures are as follows:

- Fill out the pertinent information on the sample label and ensure agreement with the COC.
- Place about 3 inches of cushioning material, such as vermiculite or bubblepack, in the bottom of the cooler.
- Wrap the sample containers in bubblepack. Place containers in the cooler in such as way that they will not touch during shipment.
- Put in additional packing material to partially cover sample containers (more than halfway).

- Place ice, sealed in plastic bags, around and on top of the containers. The temperature of the samples should be maintained at 4°C +2°C during shipment to the laboratory.
- Fill cooler with cushioning material.
- Close cooler and place signed custody seals on both ends of the cooler.

If a laboratory courier will pick up the cooler, the cooler may be closed and transferred to the courier. The courier will sign the COC as a record of receipt, returning one signed copy to the sampler. If samples are to be shipped via Federal Express or other delivery service, the following steps will be taken:

- Put COC record in a waterproof plastic bag and tape it to the inside lid of the cooler.
- Tape the drain shut.
- Secure the lid by wrapping the cooler completely with nylon strapping tape or duct tape at a minimum of two locations.
- Attach completed shipping label to top of the cooler and place signed custody seals on both ends of the cooler.

From the time of sample collection, samples for off-site analysis will be stored on ice. The laboratory will record the temperature of the samples upon arrival at the facility.

## 6.2 Sample Chain of Custody

To maintain and document sample possession, COC records will be kept. These procedures are necessary to ensure sample integrity from the collection time through data reporting. The COC protocol provides the ability to trace sample possession and handling. A sample is considered under custody if it is/was:

- In a person's possession;
- In a person's view after being in possession;
- In a person's possession and locked up; or
- In a designated secure area.

Personnel collecting samples are responsible for sample care and integrity until the samples are properly transferred or dispatched. The number of people handling a sample will be kept to a minimum.

The sampler(s) will initially complete the COC records which shall accompany the samples at all times. The following information shall be indicated on the COC record:

- Project identification;
- Signature of samplers;
- Sample identification, sample matrix, date and time of collection, grab or composite sample designation, number of containers corresponding to that sample identification, analyses required, remarks or sample location (if applicable), and preservation method(s);
- Signature of the individual relinquishing the samples; and
- Name of the individual(s) receiving the samples and air bill number, if applicable.

The COC preparer will then check the sample label and COC record for accuracy and completeness.

## 6.3 Sampling Wastestream Disposal

Waste generated during site activities will be sampled in order to characterize the waste for disposal. Anticipated wastestreams include decontamination rinsate and soil potentially contaminated with TPH, VOCs, or SVOCs. Sampling equipment, latex gloves, glass jars, sampling scoops, and glassware will be combined and disposed with any contaminated soil, or if no contaminated soil is encountered, drummed. For liquid waste, a drum thief will be slowly lowered into the drum and the contents will be placed into the appropriate labeled sample bottle. The drum thief will ensure that the sample is taken over the entire depth of the drum. The sample will be analyzed to satisfy the requirements of the chosen disposal facility accepting the waste.

A composite sample will be taken of contaminated soil and sampling wastes as described in Section 6.0. Due to the low levels of contamination and minimal exposure, personal protective equipment (PPE) will be considered non-contaminated waste and will be disposed of with the site debris.

## 6.4 Sample Quality Assurance/Quality Control (QA/QC)

For every 20 confirmatory samples collected, one field duplicate sample, one matrix spike (MS) sample, and one matrix spike duplicate (MSD) sample will be collected and analyzed for the appropriate criteria. For every 20 exploratory samples collected, one equipment rinsate sample will be collected and analyzed for the appropriate criteria.

Appropriate QA/QC procedures will be implemented throughout the sampling and analyses programs. All laboratory certifications are required to remain current throughout the duration of the project. All QA/QC samples will be indicated as such on the COC. TtEC will perform a QA/QC screening on laboratory data to ensure against bias and error.

Sample holding times are identified in Table 6-1.

**Table 6-1**
**Sample Containers, Preservatives, and Holding Times**

| Analysis | Container | Preservative | Holding Time[1] |
|---|---|---|---|
| | Soil | Soil | |
| VOC | 3 x 40 ml VOC vial + 1 2 oz. Jar (% moisture) | 2 w/MeOH and 1 w/$NaHSO_4$ | 14 days |
| SVOC (including PAHs) | 8 oz. (or larger) glass | Cool 4°C | 7 days to extraction, 40 days to analysis |
| Metals | 8 oz. (or larger) glass | Cool 4°C | 6 months |
| TPH | Min. 4 oz. Jar glass | Cool 4°C | 14 days |

[1] Holding times are from time of sample collection

Soil samples for VOCs will be collected in accordance with the following procedure for VOC samples with sodium bisulfate and methanol preservation/extraction.

## 6.5 VOC Sampling Procedure

1. Use a small electronic balance or manual scale to measure the weight of the small coring device (syringe sampler).
2. Obtain the soil sample by inserting the clean coring device into the soil. Wipe excess soil from the outside of the sampler.
3. Weigh the soil sample/syringe core sampler. A target weight of 5 +/- 1 grams (i.e., between 4 and 6 grams) must be obtained. If necessary, additional samples shall be collected or a portion of the core soil shall be extruded from the device, to obtain the target weight. Record the weight of the sample in the field logbook and on the COC form.
4. Open the sample containers, which has been pre-preserved by the subcontractor laboratory with sodium bisulfate (2 x 40 ml vials) and methanol (1 x 40 ml vial), and immediately but slowly extrude the soil core into the container. Avoid splashing preservative out of the bottle and do not immerse the coring device into the methanol. Also, do not leave sample containers open to the atmosphere before or after addition of soil as this will result in loss of preservative and invalidation of sample.
5. Remove any soil particles from the threads and/or top of the sample bottle container, to ensure a proper seal and no loss of preservative.
6. After securing the lid, gently swirl the sample to mix the soil and preservative solution. Do not shake the bottle.
7. An additional aliquot of soil (approximately 15 grams) shall be collected from each sample location in a separate glass jar, not preserved, for percent moisture determination. A clean stainless steel spoon, spatula or trowel may be used to collect this soil sample.
8. Complete sample logs, labels, custody seals, and COC forms. Do not attach any additional labels or tape to the sample containers. Record sample information in the field notebook.
9. Place the analytical samples in a cooler for shipment and chill to 4°C ± 2°C.

## 7.0 REFERENCES


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# Appendix A

# Summary Evaluations
# for Areas of Potential Environmental Concern

## SECTION 1 POSSIBLE SOURCE AREA IDENTIFICATION

**SITE** Tank Farm 1

**POSSIBLE SOURCE AREA** Tank 9

**FIGURE/MAP** Figure 2-2

**SIZE (approx.)**
**Length** 145 ft **Width** 127 ft **Depth** 22 ft
**Area** 18,415 $ft^2$ 0.42 acres

**DESCRIPTION OF AREA AND PAST OPERATIONS**

- 2,560,000-gallon concrete tank installed in 1931.
- Used as a temporary detention basin for storage of stormwater and groundwater (from Tank Farm 2 underdrainage systems) prior to discharge through oil/water separators.
- Formally used to store fuel oil.
- Two oil/water separators are located 800-feet west of Tank 9. They were installed in the 1970s and receive groundwater underdrainage flow from Tank Farm 1.

**DISTANCE TO PROPERTY LINES (approx.)**

| | |
|---|---|
| North | 1,400 ft |
| South | 400 ft |
| East | 650 ft |
| West | 400 ft |

**REFERENCES**

1. Site Investigation Report, DFSC Melville – Tank Farm 1. May 1995.
2. Study Area Screening Evaluation Work Plan - Naval Education and Training Center. July 1992.

**HAZARDOUS SUBSTANCES ASSOCIATED WITH THE POSSIBLE SOURCE AREA / PAST CONTENTS OF TANKS**

1. _____ ☐ JP-4
2. _____ ☐ JP-5
3. _____ ☐ JP-8
4. _____ ☑ Fuel Oil
5. _____ ☑ Other: stormwater/groundwater

**RELEASE STATUS** ☐ Confirmed Release ☑ Potential for Release

**RELEASE SUMMARY (if applicable)**

- Tank bottom sludge generated during cleaning of the tank was reportedly disposed of in on-site shallow (4-ft deep) trenches over the Site.
- Possibly release of fuel oil or stormwater from Tank storage.
- In 1981, a letter from the Navy to RIDEM stated that a release of 100 gallons of No. 4 fuel oil was found in a storm drain below and off-site of the Fuel Loading Area. This letter also stated that the material was removed, none entered Narragansett Bay, and the case was closed. This report indicated that the material originated from terminal water runoff from Tank 9, although this differs from a RIDEM report about the same incident stating an unknown quantity of gasoline and oily waste spilled into Melville Pond was from “leaching of disposed waste” from a “disposal pit from cleaning Tank 17”.

# SECTION 2 SUMMARY OF PAST INVESTIGATIONS AND SAMPLING

## SECTION 2.1 SOIL

**Number of Soil Samples** **Surface (0'-2' bgs)** N/A
**Subsurface (vadose zone)** N/A

**Predominant Soil Type in the Vadose Zone** Brown, coarse to fine sand; fine gravel; trace silt

**Groundcover Type** Grass/Gravel

**Potential for Wind / Water Erosion** ☑ Yes ☐ No

**Surface Soil Sampling Summary (0'-2' bgs)**

N/A

**Subsurface Soil Sampling Summary (vadose zone)**

N/A

## SECTION 2.2 GROUNDWATER

**Groundwater Classification** ☐ GA/GAA ☐ GA/GAA Non-Attainment ☑ GB

**Number of Groundwater Sampling Locations** **Upgradient** N/A
**Downgradient** 1 (GT-109)

**Depth to Groundwater** **Minimum** 8.54 (3/30/94) ft bgs
**Average** 10.72 ft bgs
**Maximum** 12.91 (11/18/94) ft bgs

**Depth to Bedrock** None found

**Preferential Pathways for Groundwater Migration** ☐ Yes ☐ No
**Describe**: _____

**Predominant Soil Type in the Saturated Zone** Medium to Fine Sand

**Groundwater Sampling Summary**

| | ANALYTES | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Well Designation | TPH | TVPH | BETX | VOCs | PAHs | SVOCs | PCBs/Pest | Metals | Base Neutrals/ Acids | Oil and Grease | Aliphatic ($C_4$-$C_{12}$) | Aromatic ($C_8$-$C_{10}$) | Notes |
| GT-109 | 6/99 | | | 6/99 | | 6/99 | | | | | | | |

## SECTION 2.3 FREE LIQUID

**Free Liquids Present on the Surface** ☐ Yes ☑ No

**Non-Aqueous Phase Liquid Present in Any Environmental Medium** ☐ Yes ☑ No
(**NOTE**: Considered a condition that exceeds the UCLs)

**Historical Thickness of Free Liquid**

| | |
|---|---|
| **Minimum** | N/A |
| **Maximum** | N/A |
| **Most Recent** | N/A |

**Free Liquid Gauging Summary**

N/A

## SECTION 2.4 SOIL GAS

**Soil Gas Sampled in this Area** ☐ Yes ☑ No

**Number of Soil Gas Samples** N/A

**Soil Gas Sampling Summary**

N/A

## SECTION 2.5 SURFACE WATER

**Surface Water Classification** N/A

**Number of Surface Water Sampling Locations**

| | |
|---|---|
| **Upstream** | N/A |
| **Downstream** | N/A |

**Average Depth of Flow** N/A

**Surface Water Sampling Summary**

N/A

## SECTION 2.6 SEDIMENT

**Number of Sediment Samples**

| | |
|---|---|
| **Surface (0”-6” depth)** | N/A |
| **Subsurface (> 6” depth)** | N/A |

**Sediment Sampling Summary (0”-6” depth)**

N/A

**Sediment Sampling Summary (> 6” depth)**

N/A

## SECTION 2.7 MAN-MADE STRUCTURES

**Any Occupiable Enclosed Structures in this Area** ☐ Yes ☑ No

**Man-Made Structures Sampled in this Area** ☐ Yes ☑ No

- ☐ Buildings
- ☐ Vaults
- ☐ Tanks
- ☐ Pits

**Man-Made Structure Sampling Summary**

N/A

**If an Underground Storage Tank** **Date Cleaned** N/A
**Date Closed** N/A

**If Underground Distribution Lines** **Date Cleaned** N/A
**Date Plugged** N/A

**Notes**

_____
_____
_____
_____
_____
_____

## SECTION 2.8 OTHER

**Odors Present** ☐ Yes ☑ No

**Stained Soil Present** ☐ Yes ☑ No

**Stressed Vegetation Present** ☐ Yes ☑ No

**Excavated or Stockpiled Material Present** ☐ Yes ☑ No
**If so, Estimated Volume** _____ CY

## SECTION 3 SUMMARY OF CURRENT CONDITIONS

| Source Area | Well / Boring Associated with Source Area | Media | Concentration | Notes |
|---|---|---|---|---|
| Tank 9 | GT-109 | Groundwater | TPH – 350 ug/L; Diethylphthalate – 1J ug/L; bis(2-ethylhexyl)phthalate – 2J ug/L; VOCs - ND | No exceedances of the GB Groundwater Objectives or Leaching Criteria |
| | | Free Product | ND | |
| NOTES:<br>TPH = Total Petroleum Hydrocarbon<br>VOC = Volatile Organic Compound<br>ND = Not Detected | | | | |

**Upper Concentration Limits Exceeded for Any Hazardous Substances** ☐ Yes ☑ No

**Soil** ☐ Yes ☐ No If so, which HS? _____
_____
_____

**Groundwater** ☐ Yes ☐ No If so, which HS? _____
_____
_____

## SECTION 1 POSSIBLE SOURCE AREA IDENTIFICATION

**SITE** Tank Farm 1

**POSSIBLE SOURCE AREA** Tank 10

**FIGURE/MAP** Figure 2-2

**SIZE (approx.)**
**Length** 145 ft **Width** 127 ft **Depth** 22 ft
**Area** 18,415 $ft^2$ 0.42 acres

**DESCRIPTION OF AREA AND PAST OPERATIONS**

- 2,560,000-gallon concrete tank installed in 1931.
- Used as a temporary detention basin for storage of stormwater and groundwater (from Tank Farm 2 underdrainage systems) prior to discharge through oil/water separators.
- Formally used to store fuel oil.
- Two oil/water separators are located 800-feet west of Tank 10. They were installed in the 1970s and receive groundwater underdrainage flow from Tank Farm 1.

**DISTANCE TO PROPERTY LINES (approx.)**

| | |
|---|---|
| North | 1,200 ft |
| South | 600 ft |
| East | 650 ft |
| West | 400 ft |

**REFERENCES**

1. Site Investigation Report, DFSC Melville – Tank Farm 1. May 1995.
2. Study Area Screening Evaluation Work Plan - Naval Education and Training Center. July 1992.

**HAZARDOUS SUBSTANCES ASSOCIATED WITH THE POSSIBLE SOURCE AREA / PAST CONTENTS OF TANKS**

| | | |
|---|---|---|
| 1. | _____ | ☐ JP-4 |
| 2. | _____ | ☐ JP-5 |
| 3. | _____ | ☐ JP-8 |
| 4. | _____ | ☑ Fuel Oil |
| 5. | _____ | ☑ Other: stormwater/groundwater |

**RELEASE STATUS** ☐ Confirmed Release ☑ Potential for Release

**RELEASE SUMMARY (if applicable)**

- Tank bottom sludge generated during cleaning of the tank was reportedly disposed of in on-site shallow (4-ft deep) trenches over the Site.
- Possibly release of fuel oil or stormwater from Tank storage.

# SECTION 2 SUMMARY OF PAST INVESTIGATIONS AND SAMPLING

## SECTION 2.1 SOIL

**Number of Soil Samples** **Surface (0'-2' bgs)** N/A
**Subsurface (vadose zone)** N/A

**Predominant Soil Type in the Vadose Zone** Brown, coarse to fine gravel and sand

**Groundcover Type** Grass/Gravel

**Potential for Wind / Water Erosion** ☑ Yes ☐ No

**Surface Soil Sampling Summary (0'-2' bgs)**

N/A

**Subsurface Soil Sampling Summary (vadose zone)**

N/A

## SECTION 2.2 GROUNDWATER

**Groundwater Classification** ☐ GA/GAA ☐ GA/GAA Non-Attainment ☑ GB

**Number of Groundwater Sampling Locations** **Upgradient** N/A
**Downgradient** 1 (GT-110)

**Depth to Groundwater** **Minimum** 7.66 (3/30/94) ft bgs
**Average** 10.03 ft bgs
**Maximum** 12.40 (11/18/94) ft bgs

**Depth to Bedrock** 13.5 feet

**Preferential Pathways for Groundwater Migration** ☐ Yes ☐ No
**Describe**: _____

**Predominant Soil Type in the Saturated Zone** Coarse to fine gravel

**Groundwater Sampling Summary**

| | ANALYTES | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Well Designation | TPH | TVPH | BETX | VOCs | PAHs | SVOCs | PCBs/Pest | Metals | Base Neutrals/ Acids | Oil and Grease | Aliphatic ($C_4$-$C_{12}$) | Aromatic ($C_8$-$C_{10}$) | Notes |
| GT-110 | 6/99 | | | 6/99 | | 6/99 | | | | | | | |

## SECTION 2.3 FREE LIQUID

**Free Liquids Present on the Surface** ☐ Yes ☑ No

**Non-Aqueous Phase Liquid Present in Any Environmental Medium** ☐ Yes ☑ No
(**NOTE**: Considered a condition that exceeds the UCLs)

**Historical Thickness of Free Liquid**

| | |
|---|---|
| **Minimum** | N/A |
| **Maximum** | N/A |
| **Most Recent** | N/A |

**Free Liquid Gauging Summary**

N/A

## SECTION 2.4 SOIL GAS

**Soil Gas Sampled in this Area** ☐ Yes ☑ No

**Number of Soil Gas Samples** N/A

**Soil Gas Sampling Summary**

N/A

## SECTION 2.5 SURFACE WATER

**Surface Water Classification** N/A

**Number of Surface Water Sampling Locations**

| | |
|---|---|
| **Upstream** | N/A |
| **Downstream** | N/A |

**Average Depth of Flow** N/A

**Surface Water Sampling Summary**

N/A

## SECTION 2.6 SEDIMENT

**Number of Sediment Samples**

| | |
|---|---|
| **Surface (0”-6” depth)** | N/A |
| **Subsurface (> 6” depth)** | N/A |

**Sediment Sampling Summary (0”-6” depth)**

N/A

**Sediment Sampling Summary (> 6” depth)**

N/A

## SECTION 2.7 MAN-MADE STRUCTURES

**Any Occupiable Enclosed Structures in this Area** ☐ Yes ☑ No

**Man-Made Structures Sampled in this Area** ☐ Yes ☑ No

- ☐ Buildings
- ☐ Vaults
- ☐ Tanks
- ☐ Pits

**Man-Made Structure Sampling Summary**

N/A

**If an Underground Storage Tank** **Date Cleaned** N/A
**Date Closed** N/A

**If Underground Distribution Lines** **Date Cleaned** N/A
**Date Plugged** N/A

**Notes**

_____
_____
_____
_____
_____
_____

## SECTION 2.8 OTHER

**Odors Present** ☐ Yes ☑ No

**Stained Soil Present** ☐ Yes ☑ No

**Stressed Vegetation Present** ☐ Yes ☑ No

**Excavated or Stockpiled Material Present** ☐ Yes ☑ No
**If so, Estimated Volume** _____ CY

## SECTION 3 SUMMARY OF CURRENT CONDITIONS

| Source Area | Well / Boring Associated with Source Area | Media | Concentration | Notes |
|---|---|---|---|---|
| Tank 10 | GT-110 | Groundwater | TPH – 2,000 ug/L; Diethylphthalate – 1J ug/L; bis(2-ethylhexyl)phthalate – 7 ug/L; VOCs – ND | No exceedances of the GB Groundwater Objectives or Leaching Criteria |
| | | Free Product | ND | |
| NOTES:<br>TPH = Total Petroleum Hydrocarbon<br>VOC = Volatile Organic Hydrocarbon<br>ND = Not Detected | | | | |

**Upper Concentration Limits Exceeded for Any Hazardous Substances** ☐ Yes ☑ No

**Soil** ☐ Yes ☐ No If so, which HS? _____
_____
_____

**Groundwater** ☐ Yes ☐ No If so, which HS? _____
_____
_____

## SECTION 1 POSSIBLE SOURCE AREA IDENTIFICATION

**SITE** Tank Farm 1

**POSSIBLE SOURCE AREA** Tank 11

**FIGURE/MAP** Figure 2-2

**SIZE (approx.)**
**Diameter** 112 ft **Depth** 32 ft
**Total Surface Area** $3.096 \times 10^4$ $ft^2$ 0.71 acres

**DESCRIPTION OF AREA AND PAST OPERATIONS**

- 2,350,000-gallon steel tank installed in 1941.
- Formally used to store Nos. 2, 5, and 6 fuel oil.
- Surrounded by earthen dikes.

**DISTANCE TO PROPERTY LINES (approx.)**

| | |
|---|---|
| North | 900 ft |
| South | 800 ft |
| East | 90 ft |
| West | 250 ft |

**REFERENCES**

1. Site Investigation Report, DFSC Melville – Tank Farm 1. May 1995.
2. Study Area Screening Evaluation Work Plan - Naval Education and Training Center. July 1992.
3. Tank Closure Assessment Report – Tank Farm 1. October 1998.
4. Supplemental Site Investigation – Tank Farm 1. June 1996.

**HAZARDOUS SUBSTANCES ASSOCIATED WITH THE POSSIBLE SOURCE AREA / PAST CONTENTS OF TANKS**

1. _____ ☐ JP-4
2. _____ ☑ JP-5
3. _____ ☑ JP-8
4. _____ ☑ Fuel Oil : Nos. 2, 5, and 6
5. _____ ☐ Other

**RELEASE STATUS** ☐ Confirmed Release ☑ Potential for Release

**RELEASE SUMMARY (if applicable)**

- Tank bottom sludge generated during cleaning of the tank was reportedly disposed of in on-site shallow (4-ft deep) trenches over the Site.

# SECTION 2 SUMMARY OF PAST INVESTIGATIONS AND SAMPLING

## SECTION 2.1 SOIL

**Number of Soil Samples** **Surface (0'-2' bgs)** N/A
**Subsurface (vadose zone)** N/A

**Predominant Soil Type in the Vadose Zone** Black, medium to fine sand and silt; trace fine gravel

**Groundcover Type** Grass/Gravel

**Potential for Wind / Water Erosion** ☑ Yes ☐ No

**Surface Soil Sampling Summary (0'-2' bgs)**

N/A

**Subsurface Soil Sampling Summary (vadose zone)**

N/A

## SECTION 2.2 GROUNDWATER

**Groundwater Classification** ☐ GA/GAA ☐ GA/GAA Non-Attainment ☑ GB

**Number of Groundwater Sampling Locations** **Upgradient** N/A
**Downgradient** 2 (GT-113; GT-126)

**Depth to Groundwater** **Minimum** 7.66 (3/30/94) ft bgs
**Average** 10.03 ft bgs
**Maximum** 12.40 (11/18/94) ft bgs

**Depth to Bedrock** 18 feet

**Preferential Pathways for Groundwater Migration** ☐ Yes ☐ No
**Describe**: _____

**Predominant Soil Type in the Saturated Zone** Black, medium to find sand and silt; trace gravel

**Groundwater Sampling Summary**

| | ANALYTES | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Well Designation | TPH | TVPH | BETX | VOCs | PAHs | SVOCs | PCBs/Pest | Metals | Base Neutrals/ Acids | Oil and Grease | Aliphatic ($C_4$-$C_{12}$) | Aromatic ($C_8$-$C_{10}$) | Notes |
| GT-126 | 6/99 | | | 6/99 | | 6/99 | | | | | | | |

## SECTION 2.3 FREE LIQUID

**Free Liquids Present on the Surface** ☐ Yes ☑ No

**Non-Aqueous Phase Liquid Present in Any Environmental Medium** ☐ Yes ☑ No
(**NOTE**: Considered a condition that exceeds the UCLs)

| | | |
|---|---|---|
| **Historical Thickness of Free Liquid** | **Minimum** | N/A |
| | **Maximum** | N/A |
| | **Most Recent** | N/A |

**Free Liquid Gauging Summary**

N/A

## SECTION 2.4 SOIL GAS

**Soil Gas Sampled in this Area** ☐ Yes ☑ No

**Number of Soil Gas Samples** N/A

**Soil Gas Sampling Summary**

N/A

## SECTION 2.5 SURFACE WATER

**Surface Water Classification** N/A

| | | |
|---|---|---|
| **Number of Surface Water Sampling Locations** | **Upstream** | N/A |
| | **Downstream** | N/A |
| **Average Depth of Flow** | N/A | |

**Surface Water Sampling Summary**

N/A

## SECTION 2.6 SEDIMENT

| | | |
|---|---|---|
| **Number of Sediment Samples** | **Surface (0”-6” depth)** | N/A |
| | **Subsurface (> 6” depth)** | N/A |

**Sediment Sampling Summary (0”-6” depth)**

N/A

**Sediment Sampling Summary (> 6” depth)**

N/A

## SECTION 2.7 MAN-MADE STRUCTURES

**Any Occupiable Enclosed Structures in this Area** ☐ Yes ☑ No

**Man-Made Structures Sampled in this Area** ☑ Yes ☐ No

- ☐ Buildings
- ☐ Vaults
- ☑ Tanks
- ☐ Pits

**Man-Made Structure Sampling Summary**

| Tank Number | Contents | Water Level (ft) | Sludge Layer (ft) | Product Layer (ft) | Date Sampled |
|---|---|---|---|---|---|
| 11 | JP-4 | 0.83 | - | - | 6/96 |

**If an Underground Storage Tank** **Date Cleaned** 6/24/96 – 6/25/96
**Date Closed** N/A

**If Underground Distribution Lines** **Date Cleaned** June 1996 to January 1997
**Date Plugged** June 1996 to January 1997

**Notes**

_____
_____
_____
_____
_____

**SECTION 2.8 OTHER**

**Odors Present** ☐ Yes ☑ No

**Stained Soil Present** ☐ Yes ☑ No

**Stressed Vegetation Present** ☐ Yes ☑ No

**Excavated or Stockpiled Material Present** ☐ Yes ☑ No
**If so, Estimated Volume** _____ CY

## SECTION 3 SUMMARY OF CURRENT CONDITIONS

| Source Area | Well / Boring Associated with Source Area | Media | Concentration | Notes |
|---|---|---|---|---|
| Tank 11 | GT-113; GT-126 | Groundwater | **GT-126, 6/99:** TPH – 420 ug/L; Diethylphthalate – 2J ug/L; bis(2-ethylhexyl)phthalate – 2J ug/L; Di-n-butylphthalate – 1J ug/L; VOCs - ND | No exceedances of the GB Groundwater Objectives or Leaching Criteria |
| | | Free Product | ND | |
| NOTES:<br>TPH – Total Petroleum Hydrocarbon<br>VOC = Volatile Organic Compound<br>ND = Not Detected | | | | |

**Upper Concentration Limits Exceeded for Any Hazardous Substances** ☐ Yes ☑ No

**Soil** ☐ Yes ☐ No If so, which HS? _____
_____
_____

**Groundwater** ☐ Yes ☐ No If so, which HS? _____
_____
_____

## SECTION 1 POSSIBLE SOURCE AREA IDENTIFICATION

**SITE** Tank Farm 1

**POSSIBLE SOURCE AREA** Tank 12

**FIGURE/MAP** Figure 2-2

**SIZE (approx.)**
**Diameter** 112 ft **Depth** 32 ft
**Total Surface Area** $3.096 \times 10^4$ $ft^2$ 0.71 acres

**DESCRIPTION OF AREA AND PAST OPERATIONS**

- 2,350,000-gallon steel tank installed in 1941.
- Formally used to store Nos. 2, 5, and 6 fuel oil.
- Surrounded by earthen dikes.

**DISTANCE TO PROPERTY LINES (approx.)**

| | |
|---|---|
| North | 1,200 ft |
| South | 550 ft |
| East | 950 ft |
| West | 150 ft |

**REFERENCES**

1. Site Investigation Report, DFSC Melville – Tank Farm 1. May 1995.
2. Study Area Screening Evaluation Work Plan - Naval Education and Training Center. July 1992.
3. Tank Closure Assessment Report – Tank Farm 1. October 1998.
4. Supplemental Site Investigation – Tank Farm 1. June 1996.

**HAZARDOUS SUBSTANCES ASSOCIATED WITH THE POSSIBLE SOURCE AREA / PAST CONTENTS OF TANKS**

1. _____ ☐ JP-4
2. _____ ☑ JP-5
3. _____ ☑ JP-8
4. _____ ☑ Fuel Oil : Nos. 2, 5, and 6
5. _____ ☐ Other

**RELEASE STATUS** ☐ Confirmed Release ☑ Potential for Release

**RELEASE SUMMARY (if applicable)**

- Tank bottom sludge generated during cleaning of the tank was reportedly disposed of in on-site shallow (4-ft deep) trenches over the Site.

# SECTION 2 SUMMARY OF PAST INVESTIGATIONS AND SAMPLING

## SECTION 2.1 SOIL

**Number of Soil Samples** **Surface (0'-2' bgs)** N/A
**Subsurface (vadose zone)** N/A

**Predominant Soil Type in the Vadose Zone** Brown, medium to fine sand; trace fine gravel

**Groundcover Type** Grass/Gravel

**Potential for Wind / Water Erosion** ☑ Yes ☐ No

**Surface Soil Sampling Summary (0'-2' bgs)**

N/A

**Subsurface Soil Sampling Summary (vadose zone)**

N/A

## SECTION 2.2 GROUNDWATER

**Groundwater Classification** ☐ GA/GAA ☐ GA/GAA Non-Attainment ☑ GB

**Number of Groundwater Sampling Locations** **Upgradient** N/A
**Downgradient** 2 (GT-111; GT-112)

**Depth to Groundwater** **Minimum** 5.78 (GT-111; 3/30/94) ft bgs
**Average** 8.38 ft bgs
**Maximum** 10.99 (GT-112; 10/27/97) ft bgs

**Depth to Bedrock** Not recorded

**Preferential Pathways for Groundwater Migration** ☐ Yes ☐ No
**Describe**: _____

**Predominant Soil Type in the Saturated Zone** Black, coarse to fine sand and silt; trace fine gravel

**Groundwater Sampling Summary**

| | ANALYTES | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Well Designation | TPH | TVPH | BETX | VOCs | PAHs | SVOCs | PCBs/Pest | Metals | Base Neutrals/ Acids | Oil and Grease | Aliphatic ($C_4$-$C_{12}$) | Aromatic ($C_8$-$C_{10}$) | Notes |
| GT-111 | 6/99 | | | 6/99 | | 6/99 | | | | | | | |
| GT-112 | 6/99 | | 3/93 | 6/99 | | 6/99 | 6/99 | | | | | | |

## SECTION 2.3 FREE LIQUID

**Free Liquids Present on the Surface** ☐ Yes ☑ No

**Non-Aqueous Phase Liquid Present in Any Environmental Medium** ☐ Yes ☑ No

(**NOTE**: Considered a condition that exceeds the UCLs)

| | | |
|---|---|---|
| **Historical Thickness of Free Liquid** | **Minimum** | N/A |
| | **Maximum** | N/A |
| | **Most Recent** | N/A |

**Free Liquid Gauging Summary**

N/A

## SECTION 2.4 SOIL GAS

**Soil Gas Sampled in this Area** ☐ Yes ☑ No

**Number of Soil Gas Samples** N/A

**Soil Gas Sampling Summary**

N/A

## SECTION 2.5 SURFACE WATER

**Surface Water Classification** N/A

| | | |
|---|---|---|
| **Number of Surface Water Sampling Locations** | **Upstream** | N/A |
| | **Downstream** | N/A |

**Average Depth of Flow** N/A

**Surface Water Sampling Summary**

N/A

## SECTION 2.6 SEDIMENT

| | | |
|---|---|---|
| **Number of Sediment Samples** | **Surface (0”-6” depth)** | N/A |
| | **Subsurface (> 6” depth)** | N/A |

**Sediment Sampling Summary (0”-6” depth)**

N/A

**Sediment Sampling Summary (> 6” depth)**

N/A

## SECTION 2.7 MAN-MADE STRUCTURES

**Any Occupiable Enclosed Structures in this Area** ☐ Yes ☑ No

**Man-Made Structures Sampled in this Area** ☐ Yes ☑ No

- ☐ Buildings
- ☐ Vaults
- ☐ Tanks
- ☐ Pits

**Man-Made Structure Sampling Summary**

N/A

**If an Underground Storage Tank** **Date Cleaned** N/A
**Date Closed** N/A

**If Underground Distribution Lines** **Date Cleaned** N/A
**Date Plugged** N/A

**Notes**

_____
_____
_____
_____
_____
_____

## SECTION 2.8 OTHER

**Odors Present** ☐ Yes ☑ No

**Stained Soil Present** ☐ Yes ☑ No

**Stressed Vegetation Present** ☐ Yes ☑ No

**Excavated or Stockpiled Material Present** ☐ Yes ☑ No
**If so, Estimated Volume** _____ CY

## SECTION 3 SUMMARY OF CURRENT CONDITIONS

| Source Area | Well / Boring Associated with Source Area | Media | Concentration | Notes |
|---|---|---|---|---|
| Tank 12 | GT-111; GT-112 | Groundwater | **GT-111, 6/99**: TPH – 830 ug/L; Diethylphthalate – 1J ug/L; bis(2-ethylhexyl)phthalate – 6 ug/L; VOCs - ND<br>**GT-112, 6/99**: TPH: 7,300 ug/L; sec-butylbenzene – 8 ug/L; Dibenzofuran – 1J ug/L; Diethylphthalate – 1J ug/L; bis(2-ethylhexyl)phthalate – 3J ug/L; Pest/PCBs - ND | No RIDEM GB GW Objectives or Leaching Criteria for these chemicals |
| | | Free Product | ND | |

NOTES:
TPH – Total Petroleum Hydrocarbon ND = Not Detected
VOC = Volatile Organic Compound
PEST/PCB = Pesticide/Polychlorinated Biphenyl

**Upper Concentration Limits Exceeded for Any Hazardous Substances** ☐ Yes ☑ No

**Soil** ☐ Yes ☐ No If so, which HS? _____
_____

**Groundwater** ☐ Yes ☐ No If so, which HS? _____

## SECTION 1 POSSIBLE SOURCE AREA IDENTIFICATION

**SITE** Tank Farm 1

**POSSIBLE SOURCE AREA** Tank 13

**FIGURE/MAP** Figure 2-2

**SIZE (approx.)**
**Diameter** 100 ft **Depth** 20 ft
**Total Surface Area** $2.20 \times 10^4$ $ft^2$ 0.50 acres

**DESCRIPTION OF AREA AND PAST OPERATIONS**

- 1,176,000-gallon steel underground storage tank installed in the early 1940s.
- Formally used to store diesel fuel, aviation gasoline, and motor gasoline.
- Buried 5 feet below grade.

**DISTANCE TO PROPERTY LINES (approx.)**

| | |
|---|---|
| North | 550 ft |
| South | 1,150 ft |
| East | 800 ft |
| West | 300 ft |

**REFERENCES**

1. Site Investigation Report, DFSC Melville – Tank Farm 1. May 1995.
2. Study Area Screening Evaluation Work Plan - Naval Education and Training Center. July 1992.
3. Tank Closure Assessment Report – Tank Farm 1. October 1998.
4. Supplemental Site Investigation – Tank Farm 1. June 1996.

**HAZARDOUS SUBSTANCES ASSOCIATED WITH THE POSSIBLE SOURCE AREA / PAST CONTENTS OF TANKS**

1. _____ ☑ JP-4
2. _____ ☐ JP-5
3. _____ ☐ JP-8
4. _____ ☐ Fuel Oil : Nos. 2, 5, and 6
5. _____ ☑ Other: Diesel Fuel; Aviation Gasoline; Motor Gasoline

**RELEASE STATUS** ☐ Confirmed Release ☑ Potential for Release

**RELEASE SUMMARY (if applicable)**

- Tank bottom sludge generated during cleaning of the tank was reportedly disposed of in on-site shallow (4-ft deep) trenches over the Site.

# SECTION 2 SUMMARY OF PAST INVESTIGATIONS AND SAMPLING

## SECTION 2.1 SOIL

**Number of Soil Samples** **Surface (0'-2' bgs)** N/A
**Subsurface (vadose zone)** N/A

**Predominant Soil Type in the Vadose Zone** Brown, medium to fine sand and silt; trace fine to coarse gravel

**Groundcover Type** Grass/Gravel

**Potential for Wind / Water Erosion** ☑ Yes ☐ No

**Surface Soil Sampling Summary (0'-2' bgs)**

N/A

**Subsurface Soil Sampling Summary (vadose zone)**

N/A

## SECTION 2.2 GROUNDWATER

**Groundwater Classification** ☐ GA/GAA ☐ GA/GAA Non-Attainment ☑ GB

**Number of Groundwater Sampling Locations** **Upgradient** 1 (GT-116)
**Downgradient** 2 (GT-114; GT-115)

**Depth to Groundwater** **Minimum** 7.92 (GT-115; 12/21/95) ft bgs
**Average** 13.01 ft bgs
**Maximum** 18.23 (GT-114; 11/18/94) ft bgs

**Depth to Bedrock** 8 – 9 ft

**Preferential Pathways for Groundwater Migration** ☐ Yes ☐ No
**Describe**: _____

**Predominant Soil Type in the Saturated Zone** Bedrock

**Groundwater Sampling Summary**

| | ANALYTES | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Well Designation | TPH | TVPH | BETX | VOCs | PAHs | SVOCs | PCBs/Pest | Metals | Base Neutrals/ Acids | Oil and Grease | Aliphatic ($C_4$-$C_{12}$) | Aromatic ($C_8$-$C_{10}$) | Notes |
| GT-115 | 6/99 | | | 6/99 | 7/97 | 6/99 | | | | | | | |

Note:
Shaded boxes indicate that there were other sampling events, with this being the most recent event.

## SECTION 2.3 FREE LIQUID

**Free Liquids Present on the Surface** ☐ Yes ☑ No

**Non-Aqueous Phase Liquid Present in Any Environmental Medium** ☐ Yes ☑ No
(**NOTE**: Considered a condition that exceeds the UCLs)

**Historical Thickness of Free Liquid**

| | |
|---|---|
| **Minimum** | N/A |
| **Maximum** | N/A |
| **Most Recent** | N/A |

**Free Liquid Gauging Summary**

N/A

## SECTION 2.4 SOIL GAS

**Soil Gas Sampled in this Area** ☐ Yes ☑ No

**Number of Soil Gas Samples** N/A

**Soil Gas Sampling Summary**

N/A

## SECTION 2.5 SURFACE WATER

**Surface Water Classification** N/A

**Number of Surface Water Sampling Locations**

| | |
|---|---|
| **Upstream** | N/A |
| **Downstream** | N/A |

**Average Depth of Flow** N/A

**Surface Water Sampling Summary**

N/A

## SECTION 2.6 SEDIMENT

**Number of Sediment Samples**

| | |
|---|---|
| **Surface (0”-6” depth)** | N/A |
| **Subsurface (> 6” depth)** | N/A |

**Sediment Sampling Summary (0”-6” depth)**

N/A

**Sediment Sampling Summary (> 6” depth)**

N/A

## SECTION 2.7 MAN-MADE STRUCTURES

**Any Occupiable Enclosed Structures in this Area** ☐ Yes ☑ No

**Man-Made Structures Sampled in this Area** ☑ Yes ☐ No
- ☐ Buildings
- ☐ Vaults

☑ Tanks
☐ Pits

**Man-Made Structure Sampling Summary**

| Tank Number | Contents | Water Level (ft) | Sludge Layer (ft) | Product Layer (ft) | Date Sampled |
|---|---|---|---|---|---|
| 13 | Water | 13.05 | - | 0.01 | 6/96 |

**If an Underground Storage Tank** **Date Cleaned** 1/2/97 – 1/24/97
**Date Closed** N/A

**If Underground Distribution Lines** **Date Cleaned** October to November 1996
**Date Plugged** October to November 1996

**Notes**

_____
_____
_____
_____
_____
_____

## SECTION 2.8 OTHER

**Odors Present** ☐ Yes ☑ No

**Stained Soil Present** ☐ Yes ☑ No

**Stressed Vegetation Present** ☐ Yes ☑ No

**Excavated or Stockpiled Material Present** ☐ Yes ☑ No
**If so, Estimated Volume** _____ CY

## SECTION 3 SUMMARY OF CURRENT CONDITIONS

| Source Area | Well / Boring Associated with Source Area | Media | Concentration (ug/L) | Notes |
|---|---|---|---|---|
| Tank 12 | GT-114, GT-115, GT-116 | Groundwater | **GT-115, 6/99:** TPH – 640; Methylene Chloride – 4JB; Benzene – 6; Toluene – 7; Ethylbenzene – 22; Isopropylbenzene – 6; N-propylbenzene – 14; 1,3,5-Trimethylbezene – 3J; 1,2,4-Trimethylbenzene – 14; Naphthalene (VOC)– 4J; Acetone – 6J; m+p-xylene – 12; o-xylene – 2J; Naphthalene (SVOC) – 3J; Acenaphthene – 2J; Carbazole – 4J; bis(2-ethylhexyl)phthalate – 4J | No exceedances of GB GW Objectives or Leaching Criteria |
| | | Free Product | ND | |

NOTES:
TPH = Total Petroleum Hydrocarbon
VOC = Volatile Organic Compound

**Upper Concentration Limits Exceeded for Any Hazardous Substances** ☐ Yes ☑ No
**Soil** ☐ Yes ☐ No If so, which HS? _____

**Groundwater** ☐ Yes ☐ No If so, which HS? _____
_____
_____
_____
_____

## SECTION 1 POSSIBLE SOURCE AREA IDENTIFICATION

**SITE** Tank Farm 1

**POSSIBLE SOURCE AREA** Tank 14

**FIGURE/MAP** Figure 2-2

**SIZE (approx.)**
**Diameter** 100 ft **Depth** 20 ft
**Total Surface Area** $2.20 \times 10^4$ $ft^2$ 0.50 acres

**DESCRIPTION OF AREA AND PAST OPERATIONS**

- 1,176,000-gallon steel underground storage tank installed in the early 1940s.
- Formally used to store diesel fuel, aviation gasoline, and motor gasoline.
- Buried 5 feet below grade.

**DISTANCE TO PROPERTY LINES (approx.)**

| | |
|---|---|
| North | 200 ft |
| South | 1,500 ft |
| East | 800 ft |
| West | 200 ft |

**REFERENCES**

1. Site Investigation Report, DFSC Melville – Tank Farm 1. May 1995.
2. Study Area Screening Evaluation Work Plan - Naval Education and Training Center. July 1992.
3. Tank Closure Assessment Report – Tank Farm 1. October 1998.
4. Supplemental Site Investigation – Tank Farm 1. June 1996.

**HAZARDOUS SUBSTANCES ASSOCIATED WITH THE POSSIBLE SOURCE AREA / PAST CONTENTS OF TANKS**

1. _____ ☑ JP-4
2. _____ ☐ JP-5
3. _____ ☐ JP-8
4. _____ ☐ Fuel Oil : Nos. 2, 5, and 6
5. _____ ☑ Other: Diesel Fuel; Aviation Gasoline; Motor Gasoline

**RELEASE STATUS** ☐ Confirmed Release ☑ Potential for Release

**RELEASE SUMMARY (if applicable)**

- Tank bottom sludge generated during cleaning of the tank was reportedly disposed of in on-site shallow (4-ft deep) trenches over the Site.

# SECTION 2 SUMMARY OF PAST INVESTIGATIONS AND SAMPLING

## SECTION 2.1 SOIL

**Number of Soil Samples** **Surface (0'-2' bgs)** 2
**Subsurface (vadose zone)** 7

**Predominant Soil Type in the Vadose Zone** Black medium to fine sand and silt; trace fine to coarse gravel

**Groundcover Type** Grass/Gravel

**Potential for Wind / Water Erosion** ☑ Yes ☐ No

**Surface Soil Sampling Summary (0'-2' bgs)**

| | | | | ANALYTES | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Source Area | Boring Designation | Sample ID | Sample Depth (ft) | TPH | TVPH | BETX | VOCs | PAHs | SVOCs | PCBs/ Pest | Lead | Arsenic | Oil and Grease | Aliphatic ($C_4$-$C_{12}$) | Aromatic ($C_8$-$C_{10}$) | Notes |
| Tank 14 | B-1 | SS-1 | 0-2 | - | - | - | - | - | - | - | Mar-93 | Mar-93 | - | - | - | |
| | B-2 | SS-1 | 0-2 | - | - | - | - | - | - | - | Mar-93 | Mar-93 | - | - | - | |

**Subsurface Soil Sampling Summary (vadose zone)**

| | | | | ANALYTES | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Source Area | Boring Designation | Sample ID | Sample Depth (ft) | TPH | TVPH | BETX | VOCs | PAHs | SVOCs | PCBs/ Pest | Lead | Arsenic | Oil and Grease | Aliphatic ($C_4$-$C_{12}$) | Aromatic ($C_8$-$C_{10}$) | Notes |
| Tank 14 | B-1 | SS-2 | 2-4 | - | - | - | - | - | - | - | Mar-93 | Mar-93 | - | - | - | |
| | | SS-3 | 4-6 | - | - | - | - | - | - | - | Mar-93 | Mar-93 | - | - | - | |
| | B-2 | SS-2 | 2-4 | - | - | - | - | - | - | - | Mar-93 | Mar-93 | - | - | - | |
| | | SS-3 | 4-6 | - | - | - | - | - | - | - | Mar-93 | Mar-93 | - | - | - | |
| | | SS-4 | 6-8 | - | - | - | - | - | - | - | Mar-93 | Mar-93 | - | - | - | |
| | | SS-5 | 8-10 | - | - | - | - | - | - | - | Mar-93 | Mar-93 | - | - | - | |
| | SS-2 | - | 0-3 | - | - | - | - | - | - | - | Nov-83 | - | Nov-83 | - | - | |

## SECTION 2.2 GROUNDWATER

**Groundwater Classification** ☐ GA/GAA ☐ GA/GAA Non-Attainment ☑ GB

**Number of Groundwater Sampling Locations** **Upgradient** 0
**Downgradient** 2 (GT-117; GT-118)

**Depth to Groundwater** **Minimum** 10.66 (GT-117; 4/12/96 ft bgs
**Average** 15.76 ft bgs
**Maximum** 20.86 (GT-118; 10/27/97) ft bgs

**Depth to Bedrock** 4 – 19 ft

**Preferential Pathways for Groundwater Migration** ☐ Yes ☐ No
**Describe**: _____
_____

**Predominant Soil Type in the Saturated Zone** Black, medium to fine sand; fine coarse gravel; trace silt

**Groundwater Sampling Summary**

| | ANALYTES | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Well Designation | TPH | TVPH | BETX | VOCs | PAHs | SVOCs | PCBs/Pest | Metals | Base Neutrals/ Acids | Oil and Grease | Aliphatic ($C_4$-$C_{12}$) | Aromatic ($C_8$-$C_{10}$) | Notes |
| GT-117 | 7/97 | | | 7/97 | 7/97 | | | | | | | | |

## SECTION 2.3 FREE LIQUID

**Free Liquids Present on the Surface** ☐ Yes ☑ No

**Non-Aqueous Phase Liquid Present in Any Environmental Medium** ☐ Yes ☑ No
(**NOTE**: Considered a condition that exceeds the UCLs)

**Historical Thickness of Free Liquid**
**Minimum** N/A
**Maximum** N/A
**Most Recent** N/A

**Free Liquid Gauging Summary**

N/A

## SECTION 2.4 SOIL GAS

**Soil Gas Sampled in this Area** ☐ Yes ☑ No

**Number of Soil Gas Samples** N/A

**Soil Gas Sampling Summary**

N/A

## SECTION 2.5 SURFACE WATER

**Surface Water Classification** N/A

**Number of Surface Water Sampling Locations**
**Upstream** N/A
**Downstream** N/A

**Average Depth of Flow** N/A

**Surface Water Sampling Summary**

N/A

## SECTION 2.6 SEDIMENT

**Number of Sediment Samples**
**Surface (0”-6” depth)** N/A
**Subsurface (> 6” depth)** N/A

**Sediment Sampling Summary (0”-6” depth)**

N/A

**Sediment Sampling Summary (> 6" depth)**

N/A

## SECTION 2.7 MAN-MADE STRUCTURES

**Any Occupiable Enclosed Structures in this Area** ☐ Yes ☑ No

**Man-Made Structures Sampled in this Area** ☑ Yes ☐ No

- ☐ Buildings
- ☐ Vaults
- ☑ Tanks
- ☐ Pits

**Man-Made Structure Sampling Summary**

| Tank Number | Contents | Water Level (ft) | Sludge Layer (ft) | Product Layer (ft) | Date Sampled |
|---|---|---|---|---|---|
| 14 | JP-4 | 0.50 | - | - | 6/96 |

**If an Underground Storage Tank** **Date Cleaned** 6/26/96 – 7/3/96
**Date Closed** N/A

**If Underground Distribution Lines** **Date Cleaned** October to November 1996
**Date Plugged** October to November 1996

**Notes**

_____
_____
_____
_____
_____
_____

## SECTION 2.8 OTHER

**Odors Present** ☐ Yes ☑ No

**Stained Soil Present** ☐ Yes ☑ No

**Stressed Vegetation Present** ☐ Yes ☑ No

**Excavated or Stockpiled Material Present** ☐ Yes ☑ No
**If so, Estimated Volume** _____ CY

## SECTION 3 SUMMARY OF CURRENT CONDITIONS

| Source Area | Well / Boring Associated with Source Area | Media | Concentration | Notes |
|---|---|---|---|---|
| Tank 14 | B-1, B-2, SS-2, GT-117, GT-118 | Soil (0-2) | Arsenic – 5.1 mg/kg (B-1, 3/93); Lead – 23 mg/kg (B-1, 3/93); Arsenic – 3.9 mg/kg (B-2, 3/93); Lead – 14 mg/kg (B-2, 3/93) | No Direct Contact Value Exceedances |
| | | Soil (0-3) | Lead – 27.5 mg/kg (SS-2, 11/83; Oil and Grease – 1,321 mg/kg (SS-2, 11/83) | No Direct Contact Value Exceedances |
| | | Soil (2-4) | Arsenic – 7 mg/kg (B-1, 3/93); Lead – 4.2 mg/kg (B-1, 3/93); Arsenic – 3.6 mg/kg (B-2, 3/93); Lead – 17 mg/kg (B-2, 3/93) | Exceedance of Direct Contact Value of 7 mg/kg for Arsenic (Residential and Commercial/Industrial) |
| | | Soil (4-6) | Arsenic – 5.1 mg/kg (B-1, 3/93); Lead – 2.4 mg/kg (B-1, 3/93); Arsenic – 2.6 mg/kg (B-2, 3/93); Lead – 3.6 mg/kg (B-2, 3/93) | No Direct Contact Value Exceedances |
| | | Soil (6-8) | Arsenic – 2.4 mg/kg (B-2, 3/93); Lead – 2.5 mg/kg (B-2, 3/93) | No Direct Contact Value Exceedances |
| | | Soil (8-10) | Arsenic – 12 mg/kg (B-2, 3/93); Lead – 2.8 mg/kg (B-2, 3/93) | Exceedance of Direct Contact Value of 7 mg/kg for Arsenic (Residential and Commercial/Industrial) |
| | | Groundwater | **GT-117, 7/97;** VOCs – ND; PAHs - ND; TPH – ND | |
| | | Free Product | ND | |

NOTE:
VOC = Volatile Organic Compound TPH = Total Petroleum Hydrocarbon
PAHS = Polyaromatic Hydrocarbon

**Upper Concentration Limits Exceeded for Any Hazardous Substances** ☐ Yes ☑ No

**Soil** ☐ Yes ☐ No If so, which HS? _____

**Groundwater** ☐ Yes ☐ No If so, which HS? _____

## SECTION 1 POSSIBLE SOURCE AREA IDENTIFICATION

**SITE** Tank Farm 1

**POSSIBLE SOURCE AREA** Tank 15

**FIGURE/MAP** Figure 2-2

**SIZE (approx.)**
**Diameter** 100 ft **Depth** 20 ft
**Total Surface Area** $2.20 \times 10^4$ $ft^2$ 0.50 acres

**DESCRIPTION OF AREA AND PAST OPERATIONS**

- 1,176,000-gallon steel underground storage tank installed in the early 1940s.
- Formally used to store diesel fuel, aviation gasoline, and motor gasoline.
- Buried 5 feet below grade.

**DISTANCE TO PROPERTY LINES (approx.)**

| | |
|---|---|
| North | 100 ft |
| South | 1,500 ft |
| East | 500 ft |
| West | 500 ft |

**REFERENCES**

1. Site Investigation Report, DFSC Melville – Tank Farm 1. May 1995.
2. Study Area Screening Evaluation Work Plan - Naval Education and Training Center. July 1992.
3. Tank Closure Assessment Report – Tank Farm 1. October 1998.
4. Supplemental Site Investigation – Tank Farm 1. June 1996.

**HAZARDOUS SUBSTANCES ASSOCIATED WITH THE POSSIBLE SOURCE AREA / PAST CONTENTS OF TANKS**

1. _____ ☑ JP-4
2. _____ ☐ JP-5
3. _____ ☐ JP-8
4. _____ ☐ Fuel Oil : Nos. 2, 5, and 6
5. _____ ☑ Other: Diesel Fuel; Aviation Gasoline; Motor Gasoline

**RELEASE STATUS** ☐ Confirmed Release ☑ Potential for Release

**RELEASE SUMMARY (if applicable)**

- Tank bottom sludge generated during cleaning of the tank was reportedly disposed of in on-site shallow (4-ft deep) trenches over the Site.

## SECTION 2 SUMMARY OF PAST INVESTIGATIONS AND SAMPLING

### SECTION 2.1 SOIL

**Number of Soil Samples** **Surface (0'-2' bgs)** 3
**Subsurface (vadose zone)** 10

**Predominant Soil Type in the Vadose Zone** Black/brown medium to fine sand and silt; trace fine to coarse gravel

**Groundcover Type** Grass/Gravel

**Potential for Wind / Water Erosion** ☑ Yes ☐ No

**Surface Soil Sampling Summary (0'-2' bgs)**

| | | | | ANALYTES | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Source Area | Boring Designation | Sample ID | Sample Depth (ft) | TPH | TVPH | BETX | VOCs | PAHs | SVOCs | PCBs/ Pest | Lead | Arsenic | Oil and Grease | Aliphatic ($C_4$-$C_{12}$) | Aromatic ($C_8$-$C_{10}$) | Notes |
| Tank 15 | B-3 | SS-1 | 0-2 | - | - | - | - | - | - | - | Mar-93 | Mar-93 | - | - | - | |
| | B-4 | SS-1 | 0-1 | - | - | - | - | - | - | - | Mar-93 | Mar-93 | - | - | - | |
| | | SS-2 | 1-2 | - | - | - | - | - | - | - | Mar-93 | Mar-93 | - | - | - | |

**Subsurface Soil Sampling Summary (vadose zone)**

| | | | | ANALYTES | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Source Area | Boring Designation | Sample ID | Sample Depth (ft) | TPH | TVPH | BETX | VOCs | PAHs | SVOCs | PCBs/ Pest | Lead | Arsenic | Oil and Grease | Aliphatic ($C_4$-$C_{12}$) | Aromatic ($C_8$-$C_{10}$) | Notes |
| Tank 15 | B-3 | SS-2 | 2-4 | - | - | - | - | - | - | - | Mar-93 | Mar-93 | - | - | - | |
| | | SS-3 | 4-6 | - | - | - | - | - | - | - | Mar-93 | Mar-93 | - | - | - | |
| | | SS-4 | 6-8 | - | - | - | - | - | - | - | Mar-93 | Mar-93 | - | - | - | |
| | B-4 | SS-3 | 2-3 | - | - | - | - | - | - | - | Mar-93 | Mar-93 | - | - | - | |
| | | SS-4 | 3-5 | - | - | - | - | - | - | - | Mar-93 | Mar-93 | - | - | - | |
| | | SS-5 | 5-7 | - | - | - | - | - | - | - | Mar-93 | Mar-93 | - | - | - | |
| | | SS-6 | 7-9 | - | - | - | - | - | - | - | Mar-93 | Mar-93 | - | - | - | |
| | | SS-7 | 9-11 | - | - | - | - | - | - | - | Mar-93 | Mar-93 | - | - | - | |
| | GZ-103 | S-5 | 20-21.8 | 10/94 | 10/94 | - | 10/94 | - | - | - | - | - | - | - | - | |
| | GZ-104 | S-4 | 15-17 | 10/94 | 10/94 | - | 10/94 | - | - | - | - | - | - | - | - | |

### SECTION 2.2 GROUNDWATER

**Groundwater Classification** ☐ GA/GAA ☐ GA/GAA Non-Attainment ☑ GB

**Number of Groundwater Sampling Locations** **Upgradient** 4 (GT-119, GT-1120, GZ-103, GZ-104)
**Downgradient** 0

**Depth to Groundwater** **Minimum** 6.82 (GT-120; 3/30/94 ft bgs
**Average** 12.22 ft bgs
**Maximum** 17.63 (GZ-104; 10/18/95) ft bgs

**Depth to Bedrock** 4 – 21.5 ft

**Preferential Pathways for Groundwater Migration** ☐ Yes ☐ No
**Describe**: _____

**Predominant Soil Type in the Saturated Zone** Black, medium to fine sand; fine to coarse gravel; trace grey silt

**Groundwater Sampling Summary**

| | ANALYTES | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Well Designation | TPH | TVPH | BETX | VOCs | PAHs | SVOCs | PCBs/Pest | Metals | Base Neutrals/ Acids | Oil and Grease | Aliphatic ($C_4$-$C_{12}$) | Aromatic ($C_8$-$C_{10}$) | Notes |
| GT-119 | 7/97 | 12/94 | - | 7/97 | 7/97 | - | - | - | - | - | - | - | |
| GT-120 | 12/94 | 12/94 | - | 12/94 | - | - | - | - | - | - | - | - | |
| GZ-103 | 12/94 | 12/94 | - | 12/94 | - | - | - | - | - | - | - | - | |
| GZ-104 | 12/97 | 12/94 | - | 12/97 | - | - | - | - | - | - | - | - | |

Note:
Shaded boxes indicate that there were other sampling events, with this being the most recent event

## SECTION 2.3 FREE LIQUID

**Free Liquids Present on the Surface** ☐ Yes ☑ No

**Non-Aqueous Phase Liquid Present in Any Environmental Medium** ☐ Yes ☑ No
(**NOTE**: Considered a condition that exceeds the UCLs)

**Historical Thickness of Free Liquid**
**Minimum** N/A
**Maximum** N/A
**Most Recent** N/A

**Free Liquid Gauging Summary**

N/A

## SECTION 2.4 SOIL GAS

**Soil Gas Sampled in this Area** ☐ Yes ☑ No

**Number of Soil Gas Samples** N/A

**Soil Gas Sampling Summary**

N/A

## SECTION 2.5 SURFACE WATER

**Surface Water Classification** N/A

**Number of Surface Water Sampling Locations**
**Upstream** N/A
**Downstream** N/A

**Average Depth of Flow** N/A

**Surface Water Sampling Summary**

N/A

## SECTION 2.6 SEDIMENT

**Number of Sediment Samples** **Surface (0”-6” depth)** N/A
**Subsurface (> 6” depth)** N/A

**Sediment Sampling Summary (0”-6” depth)**

N/A

**Sediment Sampling Summary (> 6” depth)**

N/A

## SECTION 2.7 MAN-MADE STRUCTURES

**Any Occupiable Enclosed Structures in this Area** ☐ Yes ☑ No

**Man-Made Structures Sampled in this Area** ☑ Yes ☐ No

- ☐ Buildings
- ☐ Vaults
- ☑ Tanks
- ☐ Pits

**Man-Made Structure Sampling Summary**

| Tank Number | Contents | Water Level (ft) | Sludge Layer (ft) | Product Layer (ft) | Date Sampled |
|---|---|---|---|---|---|
| 15 | JP-4 | 1.29 | - | 0.01 | 6/96 |

**If an Underground Storage Tank** **Date Cleaned** 6/28/96 – 7/8/96
**Date Closed** N/A

**If Underground Distribution Lines** **Date Cleaned** October to November 1996
**Date Plugged** October to November 1996

**Notes**

_____
_____
_____
_____
_____
_____

## SECTION 2.8 OTHER

**Odors Present** ☐ Yes ☑ No

**Stained Soil Present** ☐ Yes ☑ No

**Stressed Vegetation Present** ☐ Yes ☑ No

**Excavated or Stockpiled Material Present** ☐ Yes ☑ No
**If so, Estimated Volume** _____ CY

## SECTION 3 SUMMARY OF CURRENT CONDITIONS

| Source Area | Well / Boring Associated with Source Area | Media | Concentration | Notes |
|---|---|---|---|---|
| Tank 15 | B-3, B-4, GT-119, GT-120, GZ-103, GZ-104, GZ-112, GZ-113, GZ-114 | Soil (0-1) | Arsenic – 3.7 mg/kg (B-4, 3/93); Lead – 6 mg/kg (B-4, 3/93) | No Direct Contact Value Exceedances |
| | | Soil (1-2) | Arsenic – 4.6 mg/kg (B-4, 3/93); Lead – 10 mg/kg (B-4, 3/93) | No Direct Contact Value Exceedances |
| | | Soil (0-2) | Arsenic – 11 mg/kg (B-3, 3/93); Lead – 15 mg/kg (B-3, 3/93) | Exceedance of Direct Contact Value of 7 mg/kg for Arsenic (Residential and Commercial/Industrial) |
| | | Soil (2-3) | Arsenic – 33 mg/kg (B-4, 3/93); Lead – 19 mg/kg (B-4, 3/93) | Exceedance of Direct Contact Value of 7 mg/kg for Arsenic (Residential and Commercial/Industrial) |
| | | Soil (3-5) | Arsenic – 13 mg/kg (B-4, 3/93); Lead – 6.7 mg/kg (B-4, 3/93) | Exceedance of Direct Contact Value of 7 mg/kg for Arsenic (Residential and Commercial/Industrial) |
| | | Soil (2-4) | Arsenic – 13 mg/kg (B-3, 3/93); Lead – 33 mg/kg (B-3, 3/93) | Exceedance of Direct Contact Value of 7 mg/kg for Arsenic (Residential and Commercial/Industrial) |
| | | Soil (4-6) | Arsenic – 7.1 mg/kg (B-3, 3/93); Lead – 10 mg/kg (B-3, 3/93) | Exceedance of Direct Contact Value of 7 mg/kg for Arsenic (Residential and Commercial/Industrial) |
| | | Soil (5-7) | Arsenic – 18 mg/kg (B-4, 3/93); Lead – 12 mg/kg (B-4, 3/93) | Exceedance of Direct Contact Value of 7 mg/kg for Arsenic (Residential and Commercial/Industrial) |
| | | Soil (6-8) | Arsenic – 6.8 mg/kg (B-3, 3/93); Lead – 8.3 mg/kg (B-3, 3/93) | No Direct Contact Value Exceedances |
| | | Soil (7-9) | Arsenic – 5.3 mg/kg (B-4, 3/93); Lead – 4.1 mg/kg (B-4, 3/93) | No Direct Contact Value Exceedances |
| | | Soil (9-11) | Arsenic – 3.8 mg/kg (B-4, 3/93); Lead – 4.1 mg/kg (B-4, 3/93) | No Direct Contact Value Exceedances |
| | | Soil (15-17) | Toluene – 0.0018 mg/kg (GZ-104, 10/94); Ethylbenzne – 0.0018 mg/kg (GZ-104, 10/94); m+p-xylene – 0.011 mg/kg (GZ-104, 10/94); o-xylene – 0.0025 mg/kg (GZ-104, 10/94); TVPH – 0.54 mg/kg (GZ-104, 10/94); TPH – 37 mg/kg (GZ-104, 10/94) | No Direct Contact Value Exceedances |
| | | Soil (20-21.8) | Toluene – 0.0043 mg/kg (GZ-103, 10/94); m+p-xylene – 0.0033 mg/kg (GZ-103, 10/94); o-xylene – 0.0019 mg/kg (GZ-103, 10/94); TVPH – 1.4 mg/kg (GZ-103, 10/94); TPH – 1,100 mg/kg (GZ-103, 10/94) | No Direct Contact Value Exceedances |
| | | Groundwater | **GT-119, 7/97**: VOCs – ND; PAHs – ND; TPH - ND<br>**GT-120, 12/94**: Toluene – 2.4 ug/L; Ethylbenzene – 2 ug/L; m+p-xylene – 3.7 ug/L; o-xylene – 1.3 ug/L; TPH – 110 ug/L; TPH - ND<br>**GZ-103, 12/94:** Benzene – 3.9 ug/L; Toluene – 39 ug/L; Ethylbenzne – 12 ug/L; m+p xylene – 9.5 ug/L; o-xylene – 2 ug/L; TVPH – 2,000 ug/L; TPH – | No GB Groundwater Objective or Leaching Criteria Exceedances |

| Source Area | Well / Boring Associated with Source Area | Media | Concentration | Notes |
|---|---|---|---|---|
| | | | 1,100 ug/L<br>**GZ-104, 12/97:** Ethylbenzene – 10 ug/L; m+p-xylene – 11 ug/L; 1,3,5-Trimethylbenzene – 2 ug/L; Naphthalene – 2.5 ug/L; TPH – 320 ug/L | |
| | | Free Product | ND | |

NOTES:
TPH = Total Petroleum Hydrocarbon PAH = Polyaromatic Hydrocarbon ND = Not Detected
VOC = Volatile Organic Compound TVPH = Total Volatile Petroleum Hydrocarbon

**Upper Concentration Limits Exceeded for Any Hazardous Substances** ☐ Yes ☑ No

**Soil** ☐ Yes ☐ No If so, which HS? _____

**Groundwater** ☐ Yes ☐ No If so, which HS? _____

## SECTION 1 POSSIBLE SOURCE AREA IDENTIFICATION

**SITE** Tank Farm 1

**POSSIBLE SOURCE AREA** Tank 16

**FIGURE/MAP** Figure 2-2

**SIZE (approx.)**
**Diameter** 100 ft **Depth** 20 ft
**Total Surface Area** $2.20 \times 10^4$ $ft^2$ 0.50 acres

**DESCRIPTION OF AREA AND PAST OPERATIONS**

- 1,176,000-gallon steel underground storage tank installed in the early 1940s.
- Formally used to store diesel fuel, aviation gasoline, and motor gasoline.
- Buried 5 feet below grade.

**DISTANCE TO PROPERTY LINES (approx.)**

| | |
|---|---|
| North | 475 ft |
| South | 1,200 ft |
| East | 450 ft |
| West | 525 ft |

**REFERENCES**

1. Site Investigation Report, DFSC Melville – Tank Farm 1. May 1995.
2. Study Area Screening Evaluation Work Plan - Naval Education and Training Center. July 1992.
3. Tank Closure Assessment Report – Tank Farm 1. October 1998.
4. Supplemental Site Investigation – Tank Farm 1. June 1996.

**HAZARDOUS SUBSTANCES ASSOCIATED WITH THE POSSIBLE SOURCE AREA / PAST CONTENTS OF TANKS**

1. _____ ☑ JP-4
2. _____ ☐ JP-5
3. _____ ☐ JP-8
4. _____ ☐ Fuel Oil : Nos. 2, 5, and 6
5. _____ ☑ Other: Diesel Fuel; Aviation Gasoline; Motor Gasoline

**RELEASE STATUS** ☐ Confirmed Release ☑ Potential for Release

**RELEASE SUMMARY (if applicable)**

- Tank bottom sludge generated during cleaning of the tank was reportedly disposed of in on-site shallow (4-ft deep) trenches over the Site. One tetraethyl sign still remains near Tank 16, indicating burial of sludge.

# SECTION 2 SUMMARY OF PAST INVESTIGATIONS AND SAMPLING

## SECTION 2.1 SOIL

**Number of Soil Samples** **Surface (0'-2' bgs)** 5
**Subsurface (vadose zone)** 11

**Predominant Soil Type in the Vadose Zone** Black/brown medium to fine sand and silt; trace fine to coarse gravel

**Groundcover Type** Grass/Gravel

**Potential for Wind / Water Erosion** ☑ Yes ☐ No

**Surface Soil Sampling Summary (0'-2' bgs)**

| | | | | ANALYTES | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Source Area | Boring Designation | Sample ID | Sample Depth (ft) | TPH | TVPH | BETX | VOCs | PAHs | SVOCs | PCBs/ Pest | Lead | Arsenic | Oil and Grease | Aliphatic ($C_4$-$C_{12}$) | Aromatic ($C_8$-$C_{10}$) | Notes |
| Tank 16 | B-5 | SS-1 | 0-2 | - | - | - | - | - | - | - | Mar-93 | Mar-93 | - | - | - | |
| | B-6 | SS-1 | 0-2 | - | - | - | - | - | - | - | Mar-93 | Mar-93 | - | - | - | |
| | SS-1 | - | 0-3 | - | - | - | - | - | - | - | Nov-93 | - | Nov-93 | - | - | |
| | GT-131 | S-1 | 0-2 | - | - | Mar-93 | - | - | - | - | - | - | - | - | - | |
| | GT-132 | S-1 | 0-1 | - | - | Mar-93 | - | - | - | - | - | - | - | - | - | |

**Subsurface Soil Sampling Summary (vadose zone)**

| | | | | ANALYTES | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Source Area | Boring Designation | Sample ID | Sample Depth (ft) | TPH | TVPH | BETX | VOCs | PAHs | SVOCs | PCBs/ Pest | Lead | Arsenic | Oil and Grease | Aliphatic ($C_4$-$C_{12}$) | Aromatic ($C_8$-$C_{10}$) | Notes |
| Tank 16 | B-5 | SS-2 | 2-4 | - | - | - | - | - | - | - | Mar-93 | Mar-93 | - | - | - | |
| | | SS-3 | 4-6 | - | - | - | - | - | - | - | Mar-93 | Mar-93 | - | - | - | |
| | | SS-4 | 6-8 | - | - | - | - | - | - | - | Mar-93 | Mar-93 | - | - | - | |
| | B-6 | SS-2 | 2-4 | - | - | - | - | - | - | - | Mar-93 | Mar-93 | - | - | - | |
| | | SS-3 | 4-5 | - | - | - | - | - | - | - | Mar-93 | Mar-93 | - | - | - | |
| | | SS-4 | 5-6 | - | - | - | - | - | - | - | Mar-93 | Mar-93 | - | - | - | |
| | | SS-5 | 6-7 | - | - | - | - | - | - | - | Mar-93 | Mar-93 | - | - | - | |
| | GT-131 | SS-3 | 6-10 | - | - | Mar-93 | - | - | - | - | - | - | - | - | - | |
| | GT-132 | SS-2 | 1-5 | - | - | Mar-93 | - | - | - | - | - | - | - | - | - | |
| | GZ-105 | S-4 | 15-17 | 10/94 | 10/94 | - | 10/94 | - | - | - | - | - | - | - | - | |

## SECTION 2.2 GROUNDWATER

**Groundwater Classification** ☐ GA/GAA ☐ GA/GAA Non-Attainment ☑ GB

**Number of Groundwater Sampling Locations** **Upgradient** 0
**Downgradient** 5 (GT-121, GT-122, GT-131, GT-132, GZ-105)

**Depth to Groundwater** **Minimum** 10.25 (GT-131; 11/22/97 ft bgs
**Average** 15.02 ft bgs
**Maximum** 19.80 (GT-121; 3/18/94) ft bgs

**Depth to Bedrock** 8 - 20 ft

**Preferential Pathways for Groundwater Migration** ☐ Yes ☐ No
**Describe**: _____

**Predominant Soil Type in the Saturated Zone** Medium, dense, grey, coarse to fine sand and shale; Trace silt; Bedrock

**Groundwater Sampling Summary**

| Well Designation | ANALYTES | | | | | | | | | | | | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | TPH | TVPH | BETX | VOCs | PAHs | SVOCs | PCBs/Pest | Metals | Base Neutrals/ Acids | Oil and Grease | Aliphatic ($C_4$-$C_{12}$) | Aromatic ($C_8$-$C_{10}$) | |
| GT-121 | 1/98 | 12/94 | - | 1/98 | 1/98 | - | - | - | - | - | - | - | |
| GT-122 | 12/94 | 12/94 | - | 12/94 | - | - | - | - | - | - | - | - | |
| GT-131 | 12/97 | 12/94 | 3/93 | 12/97 | - | - | - | - | - | - | - | - | |
| GT-132 | 12/97 | 12/94 | 3/93 | 12/97 | - | - | - | - | - | - | - | - | |
| GZ-105 | 12/97 | 12/94 | - | 12/97 | - | - | - | - | - | - | - | - | |

Note:
Shaded boxes indicate that there were other sampling events, with this being the most recent event

## SECTION 2.3 FREE LIQUID

**Free Liquids Present on the Surface** ☐ Yes ☑ No

**Non-Aqueous Phase Liquid Present in Any Environmental Medium** ☑ Yes ☐ No
(**NOTE**: Considered a condition that exceeds the UCLs)

**Historical Thickness of Free Liquid**
**Minimum** 0.01 (GT-121, GT-122)
**Maximum** 0.13 (GT-121, 1/18/94)
**Most Recent** Non-Detect

**Free Liquid Gauging Summary**

| Source Area | Well / Boring Associated with Source Area | Free Product Thickness (ft) | Date Measured |
|---|---|---|---|
| Tank 16 | GT-121 | 0.01 | 3/9/93 |
| | | 0.13 | 1/18/94 |
| | | 0.11 | 1/26/94 |
| | | 0.08 | 2/3/94 and 2/8/94 |
| | | 0.09 | 2/16/94 |
| | | 0.02 | 2/23/94 and 3/2/94 |
| | | 0.03 | 3/9/94 |
| | | 0.01 | 3/25/94 |
| | | ND | 3/30/94 – 5/94 |
| | | 0.02 | 6/15/94 and 7/13/94 |
| | | 0.03 | 8/15/94 |
| | | 0.06 | 9/19/94 |
| | | 0.04 | 10/14/94 |
| | | 0.01 | 11/18/94 |
| | | ND | 12/94 to 4/95 |
| | | 0.01 | 5/6/95 |
| | | ND | 6/95 to 7/97 |
| | | DRY | 8/97 to 12/97 |
| | | ND | 6/99 |
| | GT-122 | 0.01 | 1/94 |
| | | ND | 2/3/94 to 2/16/94 |
| | | 0.01 | 2/23/94 |
| | | ND | 3/94 to 7/94 |
| | | 0.01 | 8/15/94 |
| | | ND | 9/94 to 12/97; 6/99 |

| Source Area | Well / Boring Associated with Source Area | Free Product Thickness (ft) | Date Measured |
|---|---|---|---|
| NOTES:<br>ND = Not Dectected | | | |

## SECTION 2.4 SOIL GAS

**Soil Gas Sampled in this Area** ☐ Yes ☑ No

**Number of Soil Gas Samples** N/A

**Soil Gas Sampling Summary**

N/A

## SECTION 2.5 SURFACE WATER

**Surface Water Classification** N/A

**Number of Surface Water Sampling Locations** **Upstream** N/A
**Downstream** N/A

**Average Depth of Flow** N/A

**Surface Water Sampling Summary**

N/A

## SECTION 2.6 SEDIMENT

**Number of Sediment Samples** **Surface (0”-6” depth)** N/A
**Subsurface (> 6” depth)** N/A

**Sediment Sampling Summary (0”-6” depth)**

N/A

**Sediment Sampling Summary (> 6” depth)**

N/A

## SECTION 2.7 MAN-MADE STRUCTURES

**Any Occupiable Enclosed Structures in this Area** ☐ Yes ☑ No

**Man-Made Structures Sampled in this Area** ☑ Yes ☐ No

- ☐ Buildings
- ☐ Vaults
- ☑ Tanks
- ☐ Pits

**Man-Made Structure Sampling Summary**

| Tank Number | Contents | Water Level (ft) | Sludge Layer (ft) | Product Layer (ft) | Date Sampled |
|---|---|---|---|---|---|
| 16 | JP-4 | 0.90 | - | - | 6/96 |

**If an Underground Storage Tank** **Date Cleaned** 7/6/96 – 7/17/96
**Date Closed** N/A

**If Underground Distribution Lines** **Date Cleaned** October to November 1996
**Date Plugged** October to November 1996

**Notes**

_____
_____
_____
_____
_____
_____

**SECTION 2.8 OTHER**

**Odors Present** ☐ Yes ☑ No

**Stained Soil Present** ☐ Yes ☑ No

**Stressed Vegetation Present** ☐ Yes ☑ No

**Excavated or Stockpiled Material Present** ☐ Yes ☑ No
**If so, Estimated Volume** _____ CY

## SECTION 3 SUMMARY OF CURRENT CONDITIONS

| Source Area | Well / Boring Associated with Source Area | Media | Concentration | Notes |
|---|---|---|---|---|
| Tank 16 | B-5, B-6, SS-1, GT-121, GT-122, GT-131, GT-132, GZ-105 | Soil (0-2) | Arsenic – 5.3 mg/kg (B-5, 3/93); Lead – 38 mg/kg (B-5, 3/93); Arsenic – 10 mg/kg (B-6, 3/93); Lead – 6.9 mg/kg (B-6, 3/93); BTEX – ND (GT-131 and GT-132, 3/93) | Exceedance of Direct Contact Value of 7 mg/kg for Arsenic (Residential and Commercial/Industrial) |
| | | Soil (0-3) | Lead – 15.3 mg/kg (SS-1, 11/83); Oil and Grease – 2,194 mg/kg (SS-1, 11/83) | No Direct Contact Value Exceedances |
| | | Soil (1-5) | BTEX – ND (GT-132, 3/93) | No Direct Contact Value Exceedances |
| | | Soil (2-4) | Arsenic – 17 mg/kg (B-5, 3/93); Lead – 15 mg/kg (B-5, 3/93); Arsenic – 3 mg/kg (B-6, 3/93); Lead – 5.7 mg/kg (B-6, 3/93) | Exceedance of Direct Contact Value of 7 mg/kg for Arsenic (Residential and Commercial/Industrial) |
| | | Soil (4-6) | Arsenic – 8.1 mg/kg (B-5, 3/93); Lead – 9.6 mg/kg (B-5, 3/93) | Exceedance of Direct Contact Value of 7 mg/kg for Arsenic (Residential and Commercial/Industrial) |
| | | Soil (4-5) | Arsenic – 6.4 mg/kg (B-6, 3/93); Lead – 14 mg/kg (B-6, 3/93) | |
| | | Soil (5-6) | Arsenic – 8.8 mg/kg (B-6, 3/93); Lead – 7.3 mg/kg (B-6, 3/93) | Exceedance of Direct Contact Value of 7 mg/kg for Arsenic (Residential and Commercial/Industrial) |
| | | Soil (6-7) | Arsenic – 12 mg/kg (B-6, 3/93); Lead – 11 mg/kg (B-6, 3/93) | Exceedance of Direct Contact Value of 7 mg/kg for Arsenic (Residential and Commercial/Industrial) |
| | | Soil (6-8) | Arsenic – 21 mg/kg (B-5, 3/93); Lead – 15 mg/kg (B-5, 3/93) | Exceedance of Direct Contact Value of 7 mg/kg for Arsenic (Residential and Commercial/Industrial) |

| Source Area | Well / Boring Associated with Source Area | Media | Concentration | Notes |
|---|---|---|---|---|
| Tank 16 | | Soil (7-8) | Arsenic – 9.7 mg/kg (B-6, 3/93); Lead – 9.9 mg/kg (B-6, 3/93) | Exceedance of Direct Contact Value of 7 mg/kg for Arsenic (Residential and Commercial/Industrial) |
| | | Soil (6-10) | BTEX – ND (GT-131, 3/93) | No Direct Contact Value Exceedances |
| | | Groundwater | **GT-121, 1/98**: Ethylbenzene – 32 ug/L; m+p-xylene – 77 ug/L; 1,3,5-Trimethylbenzene – 170 ug/L; 1,2,4-Trimethylbenzene – 410 ug/L; TPH – 11,000 ug/L; PAHs - ND<br>**GT-122, 12/94**: Benzene – 3 ug/L; Toluene – 9.6 ug/L; Ethylbenzene – 12 ug/L; m+p-xylene – 7.6 ug/L; o-xylene – 1.3 ug/L<br>**GT-131, 12/97:** VOCs – ND; TPH – 550 ug/L<br>**GT-132, 12/97:** Isopropylbenzene – 1.4 ug/L; TPH – 890 ug/L<br>**GZ-105, 12/97:** VOCs – ND; TPH – 1,100 ug/L | No exceedances of GB Groundwater Objectives or Leaching Criteria |
| | | Free Product | ND – GT-121, GT-122 (6/99) | |
| NOTE:<br>TPH = Total Petroleum Hydrocarbon<br>PAH = Polyaromatic Hydrocarbon | | | VOC = Volatile Organic Compound<br>ND = Not Detected | |

**Upper Concentration Limits Exceeded for Any Hazardous Substances** ☐ Yes ☑ No

**Soil** ☐ Yes ☐ No If so, which HS? _____

**Groundwater** ☐ Yes ☐ No If so, which HS? _____

## SECTION 1 POSSIBLE SOURCE AREA IDENTIFICATION

**SITE** Tank Farm 1

**POSSIBLE SOURCE AREA** Tank 17

**FIGURE/MAP** Figure 2-2

**SIZE (approx.)**
**Diameter** 100 ft **Depth** 20 ft
**Total Surface Area** $2.20 \times 10^4$ $ft^2$ 0.50 acres

**DESCRIPTION OF AREA AND PAST OPERATIONS**

- 1,176,000-gallon steel underground storage tank installed in the early 1940s.
- Formally used to store diesel fuel, aviation gasoline, and motor gasoline.
- Buried 5 feet below grade.

**DISTANCE TO PROPERTY LINES (approx.)**

| | |
|---|---|
| North | 750 ft |
| South | 925 ft |
| East | 350 ft |
| West | 800 ft |

**REFERENCES**

1. Site Investigation Report, DFSC Melville – Tank Farm 1. May 1995.
2. Study Area Screening Evaluation Work Plan - Naval Education and Training Center. July 1992.
3. Tank Closure Assessment Report – Tank Farm 1. October 1998.
4. Supplemental Site Investigation – Tank Farm 1. June 1996.

**HAZARDOUS SUBSTANCES ASSOCIATED WITH THE POSSIBLE SOURCE AREA / PAST CONTENTS OF TANKS**

1. _____ ☑ JP-4
2. _____ ☐ JP-5
3. _____ ☐ JP-8
4. _____ ☐ Fuel Oil : Nos. 2, 5, and 6
5. _____ ☑ Other: Diesel Fuel; Aviation Gasoline; Motor Gasoline

**RELEASE STATUS** ☐ Confirmed Release ☑ Potential for Release

**RELEASE SUMMARY (if applicable)**

- Tank bottom sludge generated during cleaning of the tank was reportedly disposed of in on-site shallow (4-ft deep) trenches over the Site.
- On April 3, 1981, a RIDEM spill inspection report stated that an unknown quantity of gasoline and oily waste spilled into Melville Pond from “leaching of disposed waste” from a “disposal pit from cleaning Tank 17”.

•

## SECTION 2 SUMMARY OF PAST INVESTIGATIONS AND SAMPLING

### SECTION 2.1 SOIL

**Number of Soil Samples** **Surface (0'-2' bgs)** 2
**Subsurface (vadose zone)** 7

**Predominant Soil Type in the Vadose Zone** Black/brown/dark gray fine sand and silt; trace fine to coarse gravel; Medium grained, fractured granite and shale

**Groundcover Type** Grass/Gravel

**Potential for Wind / Water Erosion** ☑ Yes ☐ No

**Surface Soil Sampling Summary (0'-2' bgs)**

| | | | | ANALYTES | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Source Area | Boring Designation | Sample ID | Sample Depth (ft) | TPH | TVPH | BETX | VOCs | PAHs | SVOCs | PCBs/ Pest | Lead | Arsenic | Oil and Grease | Aliphatic ($C_4$-$C_{12}$) | Aromatic ($C_8$-$C_{10}$) | Notes |
| Tank 17 | GT-128 | S-1 | 0-2 | - | - | Mar-93 | - | - | - | - | - | - | - | - | - | |
| | GZ-109 | S-1 | 0-2 | Oct-94 | Oct-94 | - | Oct-94 | - | - | - | - | - | - | - | - | |

**Subsurface Soil Sampling Summary (vadose zone)**

| | | | | ANALYTES | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Source Area | Boring Designation | Sample ID | Sample Depth (ft) | TPH | TVPH | BETX | VOCs | PAHs | SVOCs | PCBs/ Pest | Lead | Arsenic | Oil and Grease | Aliphatic ($C_4$-$C_{12}$) | Aromatic ($C_8$-$C_{10}$) | Notes |
| Tank 17 | GZ-127 | SS-2 | 2-4 | - | - | Mar-93 | - | - | - | - | - | - | - | - | - | |
| | | SS-3 | 4-6 | - | - | Mar-93 | - | - | - | - | - | - | - | - | - | |
| | GZ-128 | SS-2 | 2-5 | - | - | Mar-93 | - | - | - | - | - | - | - | - | - | |
| | GZ-129 | SS-2 | 2-6 | - | - | Mar-93 | - | - | - | - | - | - | - | - | - | |
| | | SS-3 | 6-10 | - | - | Mar-93 | - | - | - | - | - | - | - | - | - | |
| | GZ-107 | S-5 | 19-21 | Oct-94 | Oct-94 | - | Oct-94 | - | - | - | - | - | - | - | - | |
| | GZ-108 | S-2 | 5-7 | Oct-94 | Oct-94 | - | Oct-94 | - | - | - | - | - | - | - | - | |

### SECTION 2.2 GROUNDWATER

**Groundwater Classification** ☐ GA/GAA ☐ GA/GAA Non-Attainment ☑ GB

**Number of Groundwater Sampling Locations** **Upgradient** 3 (GT-103, GT-104, GT-128)
**Downgradient** 9 (GT-101, GT-102, GT-127, GT-129, GZ-107 to GZ-111, RW-101)

**Depth to Groundwater** **Minimum** 1.19 (GT-104; 4/12/96) ft bgs
**Average** 13.87 ft bgs
**Maximum** 26.56 (RW-101; 6/20/96) ft bgs

**Depth to Bedrock** 7- 15 ft

**Preferential Pathways for Groundwater Migration** ☐ Yes ☐ No
**Describe**: _____

**Predominant Soil Type in the Saturated Zone** Bedrock; Moderately weathered shale

**Groundwater Sampling Summary**

| | ANALYTES | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Well Designation | TPH | TVPH | BETX | VOCs | PAHs | SVOCs | PCBs/Pest | Metals | Base Neutrals/ Acids | Oil and Grease | pH | Total Suspended Solids | Notes |
| GT-101 | 7/97 | 12/94 | - | 7/97 | 7/97 | - | - | - | - | - | - | - | |
| GT-103 | 12/97 | - | - | 12/97 | - | - | - | - | - | - | - | - | |
| GT-127 | 12/94 | 12/94 | 3/93 | 12/94 | - | - | - | - | - | - | - | - | |
| GT-128 | 6/99 | 12/94 | 3/93 | 6/99 | - | 6/99 | - | - | - | - | - | - | |
| GZ-129 | 6/99 | 12/94 | 3/93 | 6/99 | - | 6/99 | - | - | - | - | - | - | |
| GZ-107 | 6/99 | 12/94 | - | 6/99 | - | 6/99 | - | - | - | - | - | - | |
| GZ-108 | 1/95 | 1/95 | - | 1/95 | - | - | - | - | - | - | - | - | |
| RW-101 | 6/95 | 6/95 | - | 6/95 | - | 6/95 | - | 6/95 | - | - | 6/95 | 6/95 | |

Note:
Shaded boxes indicate that there were other sampling events, with this being the most recent event

## SECTION 2.3 FREE LIQUID

**Free Liquids Present on the Surface** ☐ Yes ☑ No

**Non-Aqueous Phase Liquid Present in Any Environmental Medium** ☑ Yes ☐ No
(**NOTE**: Considered a condition that exceeds the UCLs)

**Historical Thickness of Free Liquid**

**Minimum** 0.01 (GT-101, GT-127, GT-128, GZ-107 to GZ-109)
**Maximum** 0.56 (GT-101, 9/9/93)
**Most Recent** Non-Detect (6/99)

**Free Liquid Gauging Summary**

| Source Area | Well / Boring Associated with Source Area | Free Product Thickness (ft) | Date Measured |
|---|---|---|---|
| Tank 17 | GT-101 | 0.44 | 3/3/93 |
| | | 0.56 | 3/9/93 |
| | | 0.08 | 3/19/93 |
| | | 0.04 | 3/23/93 |
| | | 0.01 | 3/30/93; 1/18/94 |
| | | 0.02 | 1/26/94 |
| | | 0.03 | 2/3/94 and 2/8/94 |
| | | 0.04 | 2/16/94 |
| | | 0.01 | 2/23/94 |
| | | ND | 3/2/94 and 3/8/94 |
| | | 0.01 | 3/25/94 |
| | | ND | 3/30/94 to 4/94 |
| | | 0.01 | 5/4/94 and 5/11/94 |
| | | 0.05 | 6/15/94 |
| | | 0.07 | 7/13/94 |
| | | 0.06 | 8/15/94 |
| | | 0.05 | 9/19/94 |
| | | 0.06 | 10/14/94 |
| | | ND | 11/94 to 6/96 |
| | | 0.05 | 7/96 and 8/96 |
| | | ND | 9/96 |
| | | 0.02 | 10/96 |
| | | ND | 11/96 and 12/96 |
| | | 0.01 | 1/97 |
| | | ND | 2/97 to 4/97 |
| | | 0.01 | 5/97 |
| | | ND | 6/97 to 12/97; 6/99 |

| Source Area | Well / Boring Associated with Source Area | Free Product Thickness (ft) | Date Measured |
|---|---|---|---|
| Tank 17 | GT-127 | ND<br>0.01 | 2/94 to 9/96<br>10/96 |
| | | ND | 11/96 to 7/97 |
| | | 0.04 | 8/97 |
| | | ND | 9/97 |
| | | 0.01 | 10/97 and 11/97 |
| | | ND | 12/97 |
| | | ND | 6/99 |
| | GT-128 | ND | 1/94 to 8/94 |
| | | 0.01 | 9/19/94 |
| | | ND | 10/94 to 9/96 |
| | | 0.01 | 10/96 |
| | | ND | 11/96 to 12/97; 6/99 |
| | | 0.01 | 11/18/94 |
| | | ND | 12/94 to 4/95 |
| | | 0.01 | 5/6/95 |
| | | ND | 6/95 to 7/97 |
| | | DRY | 8/97 to 12/97 |
| | | ND | 6/99 |
| | GZ-107 | 0.01 | 2/16/95 |
| | | ND | 3/20/95 to 4/97 |
| | | 0.05 | 5/97 |
| | | ND | 6/97 to 12/97; 6/99 |
| | GZ-108 | ND | 1/94 to 1/95 |
| | | 0.01 | 2/16/95 |
| | | ND | 3/95 to 12/97; 6/99 |
| | GZ-109 | ND | 11/94 to 6/96 |
| | | 0.34 | 7/96 |
| | | 0.23 | 8/96 |
| | | ND | 9/96 |
| | | 0.01 | 10/96 |
| | | ND | 11/96 to 12/97; 6/99 |
| | RW-101 | ND | 11/94 to 8/96 |
| | | 0.01 | 9/96 and 10/96 |
| | | ND | 11/96 to 12/97 |
| NOTES:<br>ND = Not Detected | | | |

## SECTION 2.4 SOIL GAS

**Soil Gas Sampled in this Area** ☐ Yes ☑ No

**Number of Soil Gas Samples** N/A

**Soil Gas Sampling Summary**

N/A

## SECTION 2.5 SURFACE WATER

**Surface Water Classification** N/A

**Number of Surface Water Sampling Locations** **Upstream** N/A
**Downstream** N/A

**Average Depth of Flow** N/A

**Surface Water Sampling Summary**

N/A

## SECTION 2.6 SEDIMENT

**Number of Sediment Samples** **Surface (0”-6” depth)** N/A
**Subsurface (> 6” depth)** N/A

**Sediment Sampling Summary (0”-6” depth)**

N/A

**Sediment Sampling Summary (> 6” depth)**

N/A

## SECTION 2.7 MAN-MADE STRUCTURES

**Any Occupiable Enclosed Structures in this Area** ☐ Yes ☑ No

**Man-Made Structures Sampled in this Area** ☑ Yes ☐ No

- ☐ Buildings
- ☐ Vaults
- ☑ Tanks
- ☐ Pits

**Man-Made Structure Sampling Summary**

| Tank Number | Contents | Water Level (ft) | Sludge Layer (ft) | Product Layer (ft) | Date Sampled |
|---|---|---|---|---|---|
| 17 | JP-4 | 2.15 | - | - | 6/96 |

**If an Underground Storage Tank** **Date Cleaned** 11/26/96 – 12/12/96
**Date Closed** N/A

**If Underground Distribution Lines** **Date Cleaned** October to November 1996
**Date Plugged** October to November 1996

**Notes**

_____
_____
_____
_____
_____
_____

## SECTION 2.8 OTHER

**Odors Present** ☐ Yes ☑ No

**Stained Soil Present** ☐ Yes ☑ No

**Stressed Vegetation Present** ☐ Yes ☑ No

**Excavated or Stockpiled Material Present** ☐ Yes ☑ No
**If so, Estimated Volume** _____ CY

## SECTION 3 SUMMARY OF CURRENT CONDITIONS

| Source Area | Well / Boring Associated with Source Area | Media | Concentration | Notes |
|---|---|---|---|---|
| Tank 17 | GT-101 to GT-104, GT-127 to GT-129, GZ-107 to GZ-111, RW-101 | Soil (0-2) | BTEX – ND (GT-128, 3/93); m+p-xylene – 0.019 mg/kg (GZ-109, 10/94); TVPH – 0.17 mg/kg (GZ-109, 10/94); TPH – ND (GZ-109, 10/94) | |
| | | Soil (2-4) | BTEX – ND (GT-127, 3/93) | |
| | | Soil (2-5) | Toluene – 0.0065 mg/kg (GT-128, 3/93); Ethylbenzene – 0.0016 mg/kg (GT-128, 3/93); xylene – 0.0082 mg/kg (GT-128, 3/93) | |
| | | Soil (2-6) | BTEX – ND (GT-129, 3/93) | |
| | | Soil (4-6) | Toluene – 0.0046 mg/kg (GT-127, 3/93); Xylene – 0.0058 mg/kg (GT-127, 3/93) | |
| | | Soil (5-7) | VOCs – ND (GZ-108, 10/94); TVPH – ND (GZ-108, 10/94); TPH – ND (GZ-108, 10/94) | |
| | | Soil (6-10) | Toluene – 0.0054 mg/kg (GT-129, 3/93); Ethylbenzene – 0.0012 mg/kg (GT-129, 3/93); Xylene – 0.0098 mg/kg (GT-129, 3/93) | |
| | | Soil (19-21) | VOCs – ND (GZ-107, 10/94); TVPH – ND (GZ-107, 10/94); TPH – ND (GZ-107, 10/94) | |
| | | Groundwater | **GT-101, 7/97**: Benzene – 12 ug/L; 1,3,5-Trimethylbenzene – 78 ug/L; 1,2,4-Trimethylbenzene – 240 ug/L; p-isopropyltoluene – 100 ug/L; TPH – 4,100 ug/L; PAHs - ND<br>**GT-103, 12/97**: Chloroform – 4.5 ug/L; Bromodichloromethane – 1.5 ug/L; TPH – ND<br>**GT-127, 12/94;** VOCs – ND; TPH – ND; TVPH - ND<br>**GT-128, 6/99:** Ethylbenzene – 10 ug/L; Isopropylbenzene – 4J ug/L; N-propylbenzene – 9 ug/L; 1,3,5-Trimethylbenzene – 14 ug/L; sec-butylbenzene – 3J ug/L; p-isopropyltoluene – 3J; N-butylbenzene – 8 ug/L; 1,2,4-Trimethybenzene – 30 ug/L; m+p-xylene – 5 ug/L; Naphthalene (SVOC) – 4J ug/L; 2-Methylnaphthalene – 4J ug/L; Di-n-butylphthalate – 1J ug/L; bis02-ethylhexyl)phthalate – 13 ug/L; TPH – 2,200 ug/L<br>**GT-129, 6/99:** TPH – 170 ug/L; VOCs – ND; bis(2-ethylhexyl)phthalate – 2J ug/L<br>**GZ-107, 6/99:** Aluminum – 13,800 ug/L; Arsenic – 400 ug/L; Barium – 52.6 ug/L; Calcium – 16,100 ug/L; Chromium – 27.4 ug/L; Copper – 128 ug/L; Iron – 101,000 ug/L; Lead – 52 ug/L; Magnesium – 8,050 ug/L; Manganese – 2,440 ug/L; Nickel – 41.7 ug/L; Potassium – 2,100 ug/L; Sodium – 10,700 ug/L; Vanadium – 36.8 ug/L; Zinc – 179 ug/L; TPH – 16,000 ug/L; Ethylbenzene – 16 ug/L; Isopropylbenzene – 9 ug/L; N-propylbenzene – 24 ug/L; 1,3,5-Trimethylbenzene – 51 ug/L; sec-butylbenzene – 8 ug/L; p-isopropyltoluene – 6 ug/L; N-butylbenzene – 21 ug/L; 1,2,4-Trimethylbenzene – 76 ug/L; Naphthalene (SVOC) – 6 ug/L; 2-Methylnaphthalene – 6 ug/L; bis(2-ethylhexyl)phthalate – 8B ug/L<br>**GZ-108, 1/95:** Benzene – 37 ug/L; Toluenen – 400 ug/L; Ethylbenzene – 270 ug/L; m+p-xylene – 330 ug/L; o-xylene – 33 ug/L; TVPH – 12,000 ug/L; TPH – 6,300 ug/L<br>**GZ-108D (GT-140), 1/95:** Benzene – 37 ug/L; Toluene – 37 ug/L; Ethylbenzene – 120 ug/L; m+p-xylene – 210 ug/L; o-xylene – 10 ug/L; TVPH – 8,200 ug/L; TPH – 12,000 ug/L | No exceedances of GB Groundwater Objectives or Leaching Criteria |

| Source Area | Well / Boring Associated with Source Area | Media | Concentration | Notes |
|---|---|---|---|---|
| | | | **RW-101, 6/95**: 1,2-Dichloroethane – 1.3 ug/L; Benzene – 40 ug/L; Toluene – 1.5 ug/L; Ethylbenzene – 22 ug/L; m+p-xylene – 90 ug/L; o-xylene – 3.8 ug/L; Isopropylbenzene – 3.4 ug/L; 1,3,5-Trimethylbenzene – 78 ug/L; n-propylbenzene – 4.3 ug/L; 1,2,4-Trimethylbenzene – 150 ug/L; sec-butylbenzene – 2 ug/L; p-isopropyltoluene – 17 ug/L; Naphthalene – 18 ug/L; SVOCs – ND; TPH – 500 ug/L; TVPH – 2,900 ug/L; Arsenic – 11 ug/L; Barium – 4 ug/L; Lead – 7 ug/L; Iron – 8,500 ug/L; Manganese – 1,240 ug/L; Iron (Dissolved) – 6,500 ug/L; Hardness – 71,000; Total Suspended Solids – 46,000; pH – 6.83 | |
| | | Free Product | ND – GT-101, GT-127, GT-128, GZ-107 to GZ-109 (6/99) | |

NOTE:

TPH = Total Petroleum Hydrocarbon
VOC = Volatile Organic Compound
TVPH = Total Volatile Petroleum Hydrocarbon
PAH = Polyaromatic Hydrocarbon
ND = Not Detected
SVOC = Semi-Volatile Organic Compound

**Upper Concentration Limits Exceeded for Any Hazardous Substances** ☐ Yes ☑ No

**Soil** ☐ Yes ☐ No If so, which HS? _____

**Groundwater** ☐ Yes ☐ No If so, which HS? _____

## SECTION 1 POSSIBLE SOURCE AREA IDENTIFICATION

**SITE** Tank Farm 1

**POSSIBLE SOURCE AREA** Tank 18

**FIGURE/MAP** Figure 2-2

**SIZE (approx.)**
**Diameter** 100 ft **Depth** 20 ft
**Total Surface Area** $2.20 \times 10^4$ $ft^2$ 0.50 acres

**DESCRIPTION OF AREA AND PAST OPERATIONS**

- 1,176,000-gallon steel underground storage tank installed in the early 1940s.
- Formally used to store diesel fuel, aviation gasoline, and motor gasoline.
- Buried 5 feet below grade.

**DISTANCE TO PROPERTY LINES (approx.)**

| | |
|---|---|
| North | 600 ft |
| South | 905 ft |
| East | 100 ft |
| West | 1,050 ft |

**REFERENCES**

1. Site Investigation Report, DFSC Melville – Tank Farm 1. May 1995.
2. Study Area Screening Evaluation Work Plan - Naval Education and Training Center. July 1992.
3. Tank Closure Assessment Report – Tank Farm 1. October 1998.
4. Supplemental Site Investigation – Tank Farm 1. June 1996.

**HAZARDOUS SUBSTANCES ASSOCIATED WITH THE POSSIBLE SOURCE AREA / PAST CONTENTS OF TANKS**

1. _____ ☑ JP-4
2. _____ ☐ JP-5
3. _____ ☐ JP-8
4. _____ ☐ Fuel Oil : Nos. 2, 5, and 6
5. _____ ☑ Other: Diesel Fuel; Aviation Gasoline; Motor Gasoline

**RELEASE STATUS** ☐ Confirmed Release ☑ Potential for Release

**RELEASE SUMMARY (if applicable)**

- Tank bottom sludge generated during cleaning of the tank was reportedly disposed of in on-site shallow (4-ft deep) trenches over the Site.

# SECTION 2 SUMMARY OF PAST INVESTIGATIONS AND SAMPLING

## SECTION 2.1 SOIL

**Number of Soil Samples** **Surface (0'-2' bgs)** 2
**Subsurface (vadose zone)** 1

**Predominant Soil Type in the Vadose Zone** Black/light brown, moist medium to fine sand and silt; trace fine to coarse gravel; Medium dense brown/gray weathered shale/siltstone

**Groundcover Type** Grass/Gravel

**Potential for Wind / Water Erosion** ☑ Yes ☐ No

**Surface Soil Sampling Summary (0'-2' bgs)**

| | | | | ANALYTES | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Source Area | Boring Designation | Sample ID | Sample Depth (ft) | TPH | TVPH | BETX | VOCs | PAHs | SVOCs | PCBs/ Pest | Lead | Arsenic | Oil and Grease | Aliphatic ($C_4$-$C_{12}$) | Aromatic ($C_8$-$C_{10}$) | Notes |
| Tank 18 | SS-5 | - | 0-3 | - | - | - | - | - | - | - | Nov-83 | - | Nov-83 | - | - | |
| | GT-130 | S-1 | 0-2 | - | - | Mar-93 | - | - | - | - | - | - | - | - | - | |

**Subsurface Soil Sampling Summary (vadose zone)**

| | | | | ANALYTES | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Source Area | Boring Designation | Sample ID | Sample Depth (ft) | TPH | TVPH | BETX | VOCs | PAHs | SVOCs | PCBs/ Pest | Lead | Arsenic | Oil and Grease | Aliphatic ($C_4$-$C_{12}$) | Aromatic ($C_8$-$C_{10}$) | Notes |
| Tank 18 | GT-130 | S-2 | 2-6 | - | - | Mar-93 | - | - | - | - | - | - | - | - | - | |

## SECTION 2.2 GROUNDWATER

**Groundwater Classification** ☐ GA/GAA ☐ GA/GAA Non-Attainment ☑ GB

**Number of Groundwater Sampling Locations** **Upgradient** 0
**Downgradient** 4 (GT-123, GT-130, GZ-118, GZ-119)

**Depth to Groundwater** **Minimum** 7.21 (GZ-119; 4/12/96) ft bgs
**Average** 14.35 ft bgs
**Maximum** 21.49 (GT-123; 6/22/99) ft bgs

**Depth to Bedrock** 3 - 8 ft

**Preferential Pathways for Groundwater Migration** ☐ Yes ☐ No
**Describe**: _____

**Predominant Soil Type in the Saturated Zone** Bedrock; Soft, light gray, moderately weathered shale/siltstone

**Groundwater Sampling Summary**

| Well Designation | ANALYTES | | | | | | | | | | | | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | TPH | TVPH | BETX | VOCs | PAHs | SVOCs | PCBs/Pest | Metals | Base Neutrals/ Acids | Oil and Grease | pH | Total Suspended Solids | |
| GT-123 | 1/98 | - | - | 1/98 | 1/98 | - | - | - | - | - | - | - | |
| GT-130 | - | - | 3/93 | 12/95 | - | - | - | - | - | - | - | - | |
| GZ-118 | - | - | - | 12/95 | - | - | - | - | - | - | - | - | |
| GZ-119 | - | - | - | 12/95 | - | - | - | - | - | - | - | - | |

Note:
Shaded box indicates that there were other sampling events, with this being the most recent event

## SECTION 2.3 FREE LIQUID

**Free Liquids Present on the Surface** ☐ Yes ☑ No

**Non-Aqueous Phase Liquid Present in Any Environmental Medium** ☐ Yes ☑ No
(**NOTE**: Considered a condition that exceeds the UCLs)

**Historical Thickness of Free Liquid**
**Minimum** N/A
**Maximum** N/A
**Most Recent** N/A

**Free Liquid Gauging Summary**

N/A

## SECTION 2.4 SOIL GAS

**Soil Gas Sampled in this Area** ☐ Yes ☑ No

**Number of Soil Gas Samples** N/A

**Soil Gas Sampling Summary**

N/A

## SECTION 2.5 SURFACE WATER

**Surface Water Classification** N/A

**Number of Surface Water Sampling Locations**
**Upstream** N/A
**Downstream** N/A

**Average Depth of Flow** N/A

**Surface Water Sampling Summary**

N/A

## SECTION 2.6 SEDIMENT

**Number of Sediment Samples**
**Surface (0”-6” depth)** N/A
**Subsurface (> 6” depth)** N/A

**Sediment Sampling Summary (0”-6” depth)**

N/A

**Sediment Sampling Summary (> 6" depth)**

N/A

## SECTION 2.7 MAN-MADE STRUCTURES

**Any Occupiable Enclosed Structures in this Area** ☐ Yes ☑ No

**Man-Made Structures Sampled in this Area** ☑ Yes ☐ No

- ☐ Buildings
- ☐ Vaults
- ☑ Tanks
- ☐ Pits

**Man-Made Structure Sampling Summary**

| Tank Number | Contents | Water Level (ft) | Sludge Layer (ft) | Product Layer (ft) | Date Sampled |
|---|---|---|---|---|---|
| 18 | Water | 19.68 | - | - | 6/96 |

**If an Underground Storage Tank** **Date Cleaned** 12/16/96 – 1/13/97
**Date Closed** N/A

**If Underground Distribution Lines** **Date Cleaned** October to November 1996
**Date Plugged** October to November 1996

**Notes**

_____
_____
_____
_____
_____
_____

## SECTION 2.8 OTHER

**Odors Present** ☐ Yes ☑ No

**Stained Soil Present** ☐ Yes ☑ No

**Stressed Vegetation Present** ☐ Yes ☑ No

**Excavated or Stockpiled Material Present** ☐ Yes ☑ No
**If so, Estimated Volume** _____ CY

## SECTION 3 SUMMARY OF CURRENT CONDITIONS

| Source Area | Well / Boring Associated with Source Area | Media | Concentration | Notes |
|---|---|---|---|---|
| Tank 18 | SS-5, GT-123, GT-130, GZ-118, GZ-119 | Soil (0-2) | BTEX – ND (GT-130, 3/93) | |
| | | Soil (0-3) | Lead – 8.5 mg/kg (SS-5, 11/83); Oil and Grease – 2,013 mg/kg (SS-5, 11/83) | |
| | | Soil (2-6) | BTEX – ND (GT-130, 3/93) | |
| | | Groundwater | **GT-123, 1/98**: Ethylbenzene – 3.4 ug/L; m+p-xylene – 6.7 ug/L; 1,2,4-Trimethylbenzene – 10 ug/L; TPH – 280 ug/L; PAHs - ND<br>**GT-130, 12/95:** VOCs - ND<br>**GZ-118, 12/95:** Toluene – 5.8 ug/L; Ethylbenzene – 3.7 ug/L; m+p-xylene – 7.2 ug/L<br>**GZ-119, 12/95:** VOCs – ND | No exceedances of GB Groundwater Objectives or Leaching Criteria |
| | | Free Product | ND | |
| NOTE:<br>TPH = Total Petroleum Hydrocarbon<br>PAH = Polyaromatic Hydrocarbon | | | VOC = Volatile Organic Compound<br>ND = Not Detected | |

**Upper Concentration Limits Exceeded for Any Hazardous Substances** ☐ Yes ☑ No

**Soil** ☐ Yes ☐ No If so, which HS? _____

**Groundwater** ☐ Yes ☐ No If so, which HS? _____

## SECTION 1 POSSIBLE SOURCE AREA IDENTIFICATION

**SITE** Tank Farm 1

**POSSIBLE SOURCE AREA** 1951 Ground Scar

**FIGURE/MAP** Figure 2-2

**SIZE (approx.)** N/A

**DESCRIPTION OF AREA AND PAST OPERATIONS**

- Possible location of a ground scar.
- Potential burying of sludge in this area

**REFERENCES**

1. Site Investigation Report, DFSC Melville – Tank Farm 1. May 1995.
2. Study Area Screening Evaluation Work Plan - Naval Education and Training Center. July 1992.
3. Tank Closure Assessment Report – Tank Farm 1. October 1998.
4. Supplemental Site Investigation – Tank Farm 1. June 1996.

**HAZARDOUS SUBSTANCES ASSOCIATED WITH THE POSSIBLE SOURCE AREA / PAST CONTENTS OF TANKS**

1. _____ ☑ JP-4
2. _____ ☑ JP-5
3. _____ ☑ JP-8
4. _____ ☑ Fuel Oil
5. _____ ☑ Other: Tetraethyl Lead

**RELEASE STATUS** ☐ Confirmed Release ☑ Potential for Release

**RELEASE SUMMARY (if applicable)**

- Tank bottom sludge generated during cleaning of the tanks was reportedly disposed of in on-site shallow (4-ft deep) trenches over the Site.

# SECTION 2 SUMMARY OF PAST INVESTIGATIONS AND SAMPLING

## SECTION 2.1 SOIL

**Number of Soil Samples** **Surface (0'-2' bgs)** 0
**Subsurface (vadose zone)** 1

**Predominant Soil Type in the Vadose Zone** Brown, dense fine to coarse sand; trace silt and gravel; weathered shale and sandstone

**Groundcover Type** Grass/Gravel

**Potential for Wind / Water Erosion** ☑ Yes ☐ No

**Surface Soil Sampling Summary (0'-2' bgs)**

N/A

**Subsurface Soil Sampling Summary (vadose zone)**

| | | | | ANALYTES | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Source Area | Boring Designation | Sample ID | Sample Depth (ft) | TPH | TVPH | BETX | VOCs | PAHs | SVOCs | PCBs/ Pest | Lead | Arsenic | Oil and Grease | Aliphatic ($C_4$-$C_{12}$) | Aromatic ($C_8$-$C_{10}$) | Notes |
| Former Ethylblending Plant | GZ-101 | S-2 | 4-6 | Oct-94 | Oct-94 | - | Oct-94 | - | - | - | - | - | - | - | - | |

## SECTION 2.2 GROUNDWATER

**Groundwater Classification** ☐ GA/GAA ☐ GA/GAA Non-Attainment ☑ GB

**Number of Groundwater Sampling Locations** **Upgradient** 0
**Downgradient** 2 (GT-124, GZ-101)

**Depth to Groundwater** **Minimum** 18.80 (GZ-101; 4/12/96) ft bgs
**Average** 12.96 ft bgs
**Maximum** 34.74 (GZ-101; 10/27/97) ft bgs

**Depth to Bedrock** 7 ft

**Preferential Pathways for Groundwater Migration** ☐ Yes ☐ No
**Describe**: _____

**Predominant Soil Type in the Saturated Zone** Dense, light gray shale; Dense gray/tan weathered schist

**Groundwater Sampling Summary**

| | ANALYTES | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Well Designation | TPH | TVPH | BETX | VOCs | PAHs | SVOCs | PCBs | Metals | Lead | Oil and Grease | pH | Total Suspended Solids | Notes |
| GZ-101 | 10/95 | 10/95 | - | 10/95 | - | - | - | - | - | - | - | - | |

## SECTION 2.3 FREE LIQUID

**Free Liquids Present on the Surface** ☐ Yes ☑ No

**Non-Aqueous Phase Liquid Present in Any Environmental Medium** ☐ Yes ☐ No
(**NOTE**: Considered a condition that exceeds the UCLs)

**Historical Thickness of Free Liquid**

| | |
|---|---|
| **Minimum** | N/A |
| **Maximum** | N/A |
| **Most Recent** | N/A |

**Free Liquid Gauging Summary**

N/A

## SECTION 2.4 SOIL GAS

**Soil Gas Sampled in this Area** ☐ Yes ☑ No

**Number of Soil Gas Samples** N/A

**Soil Gas Sampling Summary**

N/A

## SECTION 2.5 SURFACE WATER

**Surface Water Classification** N/A

**Number of Surface Water Sampling Locations**

| | |
|---|---|
| **Upstream** | N/A |
| **Downstream** | N/A |

**Average Depth of Flow** N/A

**Surface Water Sampling Summary**

N/A

## SECTION 2.6 SEDIMENT

**Number of Sediment Samples**

| | |
|---|---|
| **Surface (0”-6” depth)** | N/A |
| **Subsurface (> 6” depth)** | N/A |

**Sediment Sampling Summary (0”-6” depth)**

N/A

**Sediment Sampling Summary (> 6” depth)**

N/A

## SECTION 2.7 MAN-MADE STRUCTURES

**Any Occupiable Enclosed Structures in this Area** ☐ Yes ☑ No

**Man-Made Structures Sampled in this Area** ☐ Yes ☑ No

- ☐ Buildings
- ☐ Vaults
- ☐ Tanks
- ☐ Pits

**Man-Made Structure Sampling Summary**

N/A

**If an Underground Storage Tank** **Date Cleaned** N/A
**Date Closed** N/A

**If Underground Distribution Lines** **Date Cleaned** October to November 1996
**Date Plugged** October to November 1996

**Notes**

_____

_____

## SECTION 2.8 OTHER

**Odors Present** ☐ Yes ☑ No

**Stained Soil Present** ☐ Yes ☑ No

**Stressed Vegetation Present** ☐ Yes ☑ No

**Excavated or Stockpiled Material Present** ☐ Yes ☑ No
**If so, Estimated Volume** _____ CY

## SECTION 3 SUMMARY OF CURRENT CONDITIONS

| Source Area | Well / Boring Associated with Source Area | Media | Concentration | Notes |
|---|---|---|---|---|
| Former Ethylblending Plant | GZ-101, GT-124 | Soil (4-6) | VOCs – ND, TPH – ND, TVPH – ND (GZ-101, 10/94) | |
| | | Groundwater | **GZ-101, 1/95:** VOCs – ND, TPH – ND, TVPH - ND | No exceedances of GB Groundwater Objectives or Leaching Criteria. |
| | | Free Product | ND | |

NOTE:
TPH = Total Petroleum Hydrocarbon
VOC = Volatile Organic Compound
TVPH = Total Volatile Petroleum Hydrocarbon
ND = Not Detected

**Upper Concentration Limits Exceeded for Any Hazardous Substances** ☐ Yes ☑ No

**Soil** ☐ Yes ☐ No If so, which HS? _____
_____
_____

**Groundwater** ☐ Yes ☐ No If so, which HS? _____

## SECTION 1 POSSIBLE SOURCE AREA IDENTIFICATION

**SITE** Tank Farm 1

**POSSIBLE SOURCE AREA** Former Ethyl Blending Plant

**FIGURE/MAP** Figure 2-2

**SIZE (approx.)** N/A

**DESCRIPTION OF AREA AND PAST OPERATIONS**

- Possible location of a ground scar.
- Potential burying of sludge in this area

**REFERENCES**

1. Site Investigation Report, DFSC Melville – Tank Farm 1. May 1995.
2. Study Area Screening Evaluation Work Plan - Naval Education and Training Center. July 1992.
3. Tank Closure Assessment Report – Tank Farm 1. October 1998.
4. Supplemental Site Investigation – Tank Farm 1. June 1996.

**HAZARDOUS SUBSTANCES ASSOCIATED WITH THE POSSIBLE SOURCE AREA / PAST CONTENTS OF TANKS**

1. _____ ☑ JP-4
2. _____ ☑ JP-5
3. _____ ☑ JP-8
4. _____ ☑ Fuel Oil
5. _____ ☑ Other: Tetraethyl Lead

**RELEASE STATUS** ☐ Confirmed Release ☑ Potential for Release

**RELEASE SUMMARY (if applicable)**

- Tank bottom sludge generated during cleaning of the tanks was reportedly disposed of in on-site shallow (4-ft deep) trenches over the Site.

# SECTION 2 SUMMARY OF PAST INVESTIGATIONS AND SAMPLING

## SECTION 2.1 SOIL

**Number of Soil Samples** **Surface (0'-2' bgs)** 0
**Subsurface (vadose zone)** 1

**Predominant Soil Type in the Vadose Zone** Brown, dense fine to coarse sand; trace silt and gravel; weathered shale and sandstone

**Groundcover Type** Grass/Gravel

**Potential for Wind / Water Erosion** ☑ Yes ☐ No

**Surface Soil Sampling Summary (0'-2' bgs)**

N/A

**Subsurface Soil Sampling Summary (vadose zone)**

| | | | | ANALYTES | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Source Area | Boring Designation | Sample ID | Sample Depth (ft) | TPH | TVPH | BETX | VOCs | PAHs | SVOCs | PCBs/ Pest | Lead | Arsenic | Oil and Grease | Aliphatic ($C_4$-$C_{12}$) | Aromatic ($C_8$-$C_{10}$) | Notes |
| Former Ethylblending Plant | GZ-101 | S-2 | 4-6 | Oct-94 | Oct-94 | - | Oct-94 | - | - | - | - | - | - | - | - | |

## SECTION 2.2 GROUNDWATER

**Groundwater Classification** ☐ GA/GAA ☐ GA/GAA Non-Attainment ☑ GB

**Number of Groundwater Sampling Locations** **Upgradient** 0
**Downgradient** 2 (GT-124, GZ-101)

**Depth to Groundwater** **Minimum** 18.80 (GZ-101; 4/12/96) ft bgs
**Average** 12.96 ft bgs
**Maximum** 34.74 (GZ-101; 10/27/97) ft bgs

**Depth to Bedrock** 7 ft

**Preferential Pathways for Groundwater Migration** ☐ Yes ☐ No
**Describe**: _____

**Predominant Soil Type in the Saturated Zone** Dense, light gray shale; Dense gray/tan weathered schist

**Groundwater Sampling Summary**

| | ANALYTES | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Well Designation | TPH | TVPH | BETX | VOCs | PAHs | SVOCs | PCBs | Metals | Lead | Oil and Grease | pH | Total Suspended Solids | Notes |
| GZ-101 | 10/95 | 10/95 | - | 10/95 | - | - | - | - | - | - | - | - | |

## SECTION 2.3 FREE LIQUID

**Free Liquids Present on the Surface** ☐ Yes ☑ No

**Non-Aqueous Phase Liquid Present in Any Environmental Medium** ☐ Yes ☐ No
(**NOTE**: Considered a condition that exceeds the UCLs)

**Historical Thickness of Free Liquid**

| | |
|---|---|
| **Minimum** | N/A |
| **Maximum** | N/A |
| **Most Recent** | N/A |

**Free Liquid Gauging Summary**

N/A

## SECTION 2.4 SOIL GAS

**Soil Gas Sampled in this Area** ☐ Yes ☑ No

**Number of Soil Gas Samples** N/A

**Soil Gas Sampling Summary**

N/A

## SECTION 2.5 SURFACE WATER

**Surface Water Classification** N/A

**Number of Surface Water Sampling Locations**

| | |
|---|---|
| **Upstream** | N/A |
| **Downstream** | N/A |

**Average Depth of Flow** N/A

**Surface Water Sampling Summary**

N/A

## SECTION 2.6 SEDIMENT

**Number of Sediment Samples**

| | |
|---|---|
| **Surface (0”-6” depth)** | N/A |
| **Subsurface (> 6” depth)** | N/A |

**Sediment Sampling Summary (0”-6” depth)**

N/A

**Sediment Sampling Summary (> 6” depth)**

N/A

## SECTION 2.7 MAN-MADE STRUCTURES

**Any Occupiable Enclosed Structures in this Area** ☐ Yes ☑ No

**Man-Made Structures Sampled in this Area** ☐ Yes ☑ No

- ☐ Buildings
- ☐ Vaults
- ☐ Tanks
- ☐ Pits

**Man-Made Structure Sampling Summary**

N/A

**If an Underground Storage Tank** **Date Cleaned** N/A
**Date Closed** N/A

**If Underground Distribution Lines** **Date Cleaned** October to November 1996
**Date Plugged** October to November 1996

**Notes**

_____

_____

## SECTION 2.8 OTHER

**Odors Present** ☐ Yes ☑ No

**Stained Soil Present** ☐ Yes ☑ No

**Stressed Vegetation Present** ☐ Yes ☑ No

**Excavated or Stockpiled Material Present** ☐ Yes ☑ No
**If so, Estimated Volume** _____ CY

## SECTION 3 SUMMARY OF CURRENT CONDITIONS

| Source Area | Well / Boring Associated with Source Area | Media | Concentration | Notes |
|---|---|---|---|---|
| Former Ethylblending Plant | GZ-101, GT-124 | Soil (4-6) | VOCs – ND, TPH – ND, TVPH – ND (GZ-101, 10/94) | |
| | | Groundwater | **GZ-101, 1/95:** VOCs – ND, TPH – ND, TVPH - ND | No exceedances of GB Groundwater Objectives or Leaching Criteria. |
| | | Free Product | ND | |
| NOTE: TPH = Total Petroleum Hydrocarbon; ND = Not Detected | | | VOC = Volatile Organic Compound | TVPH = Total Volatile Petroleum Hydrocarbon |

**Upper Concentration Limits Exceeded for Any Hazardous Substances** ☐ Yes ☑ No

**Soil** ☐ Yes ☐ No If so, which HS? _____

_____

_____

**Groundwater** ☐ Yes ☐ No If so, which HS?

## SECTION 1 POSSIBLE SOURCE AREA IDENTIFICATION

**SITE** Tank Farm 1

**POSSIBLE SOURCE AREA** Former Fuel Unloading Area

**FIGURE/MAP** Figure 2-2

**SIZE (approx.)** N/A

**DESCRIPTION OF AREA AND PAST OPERATIONS**

- Wells/borings placed near the Former Fuel Unloading Area.
- Located in the northeast portion of the site.

**REFERENCES**

1. Site Investigation Report, DFSC Melville – Tank Farm 1. May 1995.
2. Study Area Screening Evaluation Work Plan - Naval Education and Training Center. July 1992.
3. Tank Closure Assessment Report – Tank Farm 1. October 1998.
4. Supplemental Site Investigation – Tank Farm 1. June 1996.

**HAZARDOUS SUBSTANCES ASSOCIATED WITH THE POSSIBLE SOURCE AREA / PAST CONTENTS OF TANKS**

1. _____ ☑ JP-4
2. _____ ☑ JP-5
3. _____ ☑ JP-8
4. _____ ☑ Fuel Oil : Nos. 2, 5, and 6
5. _____ ☑ Other: Diesel Fuel; Aviation Gasoline; Motor Gasoline

**RELEASE STATUS** ☐ Confirmed Release ☑ Potential for Release

**RELEASE SUMMARY (if applicable)**

- Tank bottom sludge generated during cleaning of the tanks was reportedly disposed of in on-site shallow (4-ft deep) trenches over the Site.

# SECTION 2 SUMMARY OF PAST INVESTIGATIONS AND SAMPLING

## SECTION 2.1 SOIL

**Number of Soil Samples** **Surface (0'-2' bgs)** 3
**Subsurface (vadose zone)** 3

**Predominant Soil Type in the Vadose Zone** Brown medium, dense fine to coarse sand; trace silt; weathered shale

**Groundcover Type** Grass/Gravel

**Potential for Wind / Water Erosion** ☑ Yes ☐ No

**Surface Soil Sampling Summary (0'-2' bgs)**

| | | | | ANALYTES | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Source Area | Boring Designation | Sample ID | Sample Depth (ft) | TPH | TVPH | BETX | VOCs | PAHs | SVOCs | PCBs/ Pest | Lead | Arsenic | Oil and Grease | Aliphatic ($C_4$-$C_{12}$) | Aromatic ($C_8$-$C_{10}$) | Notes |
| Former | GZ-114 | S-1 | 0.3-2.3 | | | | Oct-95 | | | | | | | | | |
| Fuel | GZ-116 | S-1 | 0-2 | - | - | - | Oct-95 | - | - | - | - | - | - | - | - | |
| Unloading Area | GZ-117 | S-1 | 0-2 | - | - | - | Oct-95 | - | - | - | - | - | - | - | - | |

**Subsurface Soil Sampling Summary (vadose zone)**

| | | | | ANALYTES | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Source Area | Boring Designation | Sample ID | Sample Depth (ft) | TPH | TVPH | BETX | VOCs | PAHs | SVOCs | PCBs/ Pest | Lead | Arsenic | Oil and Grease | Aliphatic ($C_4$-$C_{12}$) | Aromatic ($C_8$-$C_{10}$) | Notes |
| Former | GZ-102 | S-5 | 15-17 | Oct-94 | Oct-94 | - | Oct-94 | - | - | - | - | - | - | - | - | |
| Fuel | GZ-112 | S-3 | 10-10.2 | - | - | - | Oct-95 | - | - | - | - | - | - | - | - | |
| Unloading Area | GZ-115 | S-2 | 5-7 | - | - | - | Oct-95 | - | - | - | - | - | - | - | - | |

## SECTION 2.2 GROUNDWATER

**Groundwater Classification** ☐ GA/GAA ☐ GA/GAA Non-Attainment ☑ GB

**Number of Groundwater Sampling Locations** **Upgradient** 3 (GZ-112 to GZ-114)
**Downgradient** 4 (GZ-102, GZ-115, GZ-116, GZ-117)

**Depth to Groundwater** **Minimum** 9.47 (GZ-102; 2/16/95) ft bgs
**Average** 12.96 ft bgs
**Maximum** 16.45 (GZ-115; 10/18/95) ft bgs

**Depth to Bedrock** 3 – 14 ft

**Preferential Pathways for Groundwater Migration** ☐ Yes ☐ No
**Describe**: _____
_____

**Predominant Soil Type in the Saturated Zone** Dense, light gray shale; Dense gray/tan weathered schist

**Groundwater Sampling Summary**

| | ANALYTES | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Well Designation | TPH | TVPH | BETX | VOCs | PAHs | SVOCs | PCBs | Metals | Lead | Oil and Grease | pH | Total Suspended Solids | Notes |
| GZ-102 | 1/94 | 1/94 | - | 12/95 | - | - | - | - | - | - | - | - | |
| GZ-102D | - | - | - | 12/95 | - | - | - | - | - | - | - | - | |
| GZ-112 | - | - | - | 12/95 | - | - | - | - | - | - | - | - | |
| GZ-113 | - | - | - | 12/95 | - | - | - | - | - | - | - | - | |
| GZ-114 | - | - | - | 12/95 | - | - | - | - | - | - | - | - | |
| GZ-115 | - | - | - | 12/95 | - | - | - | - | - | - | - | - | |
| GZ-116 | - | - | - | 12/95 | - | - | - | - | - | - | - | - | |
| GZ-117 | - | - | - | 12/95 | - | - | - | - | - | - | - | - | |

Note:
Shaded box indicates that there were other sampling events, with this being the most recent event

## SECTION 2.3 FREE LIQUID

**Free Liquids Present on the Surface** ☐ Yes ☑ No

**Non-Aqueous Phase Liquid Present in Any Environmental Medium** ☐ Yes ☐ No
(**NOTE**: Considered a condition that exceeds the UCLs)

**Historical Thickness of Free Liquid**
**Minimum** N/A
**Maximum** N/A
**Most Recent** N/A

**Free Liquid Gauging Summary**

N/A

## SECTION 2.4 SOIL GAS

**Soil Gas Sampled in this Area** ☐ Yes ☑ No

**Number of Soil Gas Samples** N/A

**Soil Gas Sampling Summary**

N/A

## SECTION 2.5 SURFACE WATER

**Surface Water Classification** N/A

**Number of Surface Water Sampling Locations**
**Upstream** N/A
**Downstream** N/A

**Average Depth of Flow** N/A

**Surface Water Sampling Summary**

N/A

## SECTION 2.6 SEDIMENT

**Number of Sediment Samples** **Surface (0”-6” depth)** N/A
**Subsurface (> 6” depth)** N/A

**Sediment Sampling Summary (0”-6” depth)**

N/A

**Sediment Sampling Summary (> 6” depth)**

N/A

## SECTION 2.7 MAN-MADE STRUCTURES

**Any Occupiable Enclosed Structures in this Area** ☐ Yes ☑ No

**Man-Made Structures Sampled in this Area** ☐ Yes ☑ No

- ☐ Buildings
- ☐ Vaults
- ☐ Tanks
- ☐ Pits

**Man-Made Structure Sampling Summary**

N/A

**If an Underground Storage Tank** **Date Cleaned** N/A
**Date Closed** N/A

**If Underground Distribution Lines** **Date Cleaned** October to November 1996
**Date Plugged** October to November 1996

**Notes**

_____
_____
_____
_____
_____
_____

## SECTION 2.8 OTHER

**Odors Present** ☐ Yes ☑ No

**Stained Soil Present** ☐ Yes ☑ No

**Stressed Vegetation Present** ☐ Yes ☑ No

**Excavated or Stockpiled Material Present** ☐ Yes ☑ No
**If so, Estimated Volume** _____ CY

## SECTION 3 SUMMARY OF CURRENT CONDITIONS

| Source Area | Well / Boring Associated with Source Area | Media | Concentration | Notes |
|---|---|---|---|---|
| Former Fuel Unloading Area | GZ-102, GZ-106 and GZ-112 to GZ-117 | Soil (0-2) | VOCs – ND (GZ-116, 10/95); VOCs – ND (GZ-117, 10/95) | |
| | | Soil (0.3-2.3) | VOCs – ND (GZ-114, 10/95) | |
| | | Soil (5-7) | VOCs – ND (GZ-115, 10/95) | |
| | | Soil (10-10.2) | VOCs – ND (GZ-112, 10/95) | |
| | | Soil (15-17) | Toluene – 0.0086 mg/kg (GZ-102, 10/94); Ethylbenzene – 0.024 mg/kg (GZ-102, 10/94); m+p-xylene – 0.11 mg/kg (GZ-102, 10/94); o-xylene – 0.039 mg/kg (GZ-102, 10/94); TVPH – 0.64 mg/kg (GZ-102, 10/94); TPH – 20 mg/kg (GZ-102, 10/94) | |
| | | Groundwater | **GZ-102, 12/95:** MTBE – 34 ug/L; Benzene – 57 ug/L; Toluene – 4.9 ug/L; Ethylbenzene – 66 ug/L; m+p-xylene – 21 ug/L; o-xylene – 3.8 ug/L<br>**GZ-102D, 12/95:** MBTE – 27 ug/L; Benzene – 55 ug/L; Toluene – 5.7 ug/L; Ethylbenzene – 50 ug/L; m+p-xylene – 17 ug/L; o-xylene – 3.6 ug/L<br>**GZ-112, 12/95:** Benzene – 45 ug/L; Toluene – 50 ug/L; Ethylbenzene – 250 ug/L; m+p-xylene – 150 ug/L; o-xylene – 59 ug/L<br>**GZ-114, 12/95:** Benzene – 54 ug/L; Toluene – 9.2 ug/L; Ethylbenzene – 140 ug/L; m+p-xylene – 99 ug/L; o-xylene – 8 ug/L<br>**GZ-115, 10/95:** MTBE – 30 ug/L<br>**GZ-116, 10/95:** MTBE – 14 ug/L<br>**GZ-117, 10/95:** Benzene – 16 ug/L; Toluene – 5.3 ug/L; Ethylbenzene – 44 ug/L; m+p-xylene – 20 ug/L; o-xylene – 35 ug/L | No exceedances of GB Groundwater Objectives or Leaching Criteria. |
| | | Free Product | ND | |

NOTE:

TPH = Total Petroleum Hydrocarbon
VOC = Volatile Organic Compound
TVPH = Total Volatile Petroleum Hydrocarbon
ND = Not Detected
MTBE = Methyl-tert-butyl ether

**Upper Concentration Limits Exceeded for Any Hazardous Substances** ☐ Yes ☑ No

**Soil** ☐ Yes ☐ No If so, which HS? _____

**Groundwater** ☐ Yes ☐ No If so, which HS? _____

## SECTION 1 POSSIBLE SOURCE AREA IDENTIFICATION

**SITE** Tank Farm 1

**POSSIBLE SOURCE AREA** Perimeter of Tank Farm 1

**FIGURE/MAP** Figure 2-2

**SIZE (approx.)** N/A

**DESCRIPTION OF AREA AND PAST OPERATIONS**

- Wells placed on the perimeter of the Site to detect off-site migration into the Melville Pond, the Melville Public Fishing and Camping Area, and west of the Site.

**REFERENCES**

1. Site Investigation Report, DFSC Melville – Tank Farm 1. May 1995.
2. Study Area Screening Evaluation Work Plan - Naval Education and Training Center. July 1992.
3. Tank Closure Assessment Report – Tank Farm 1. October 1998.
4. Supplemental Site Investigation – Tank Farm 1. June 1996.

**HAZARDOUS SUBSTANCES ASSOCIATED WITH THE POSSIBLE SOURCE AREA / PAST CONTENTS OF TANKS**

1. _____ ☑ JP-4
2. _____ ☑ JP-5
3. _____ ☑ JP-8
4. _____ ☑ Fuel Oil : Nos. 2, 5, and 6
5. _____ ☑ Other: Diesel Fuel; Aviation Gasoline; Motor Gasoline

**RELEASE STATUS** ☐ Confirmed Release ☑ Potential for Release

**RELEASE SUMMARY (if applicable)**

- Tank bottom sludge generated during cleaning of the tank was reportedly disposed of in on-site shallow (4-ft deep) trenches over the Site.
- On April 3, 1981, a RIDEM spill inspection report stated that an unknown quantity of gasoline and oily waste spilled into Melville Pond from “leaching of disposed waste” from a “disposal pit from cleaning Tank 17”.

•

## SECTION 2 SUMMARY OF PAST INVESTIGATIONS AND SAMPLING

### SECTION 2.1 SOIL

**Number of Soil Samples** **Surface (0'-2' bgs)** 1
**Subsurface (vadose zone)** 5

**Predominant Soil Type in the Vadose Zone** Black/brown medium to fine sand and silt; trace fine to coarse gravel

**Groundcover Type** Grass/Gravel

**Potential for Wind / Water Erosion** ☑ Yes ☐ No

**Surface Soil Sampling Summary (0'-2' bgs)**

| | | | | ANALYTES | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Source Area | Boring Designation | Sample ID | Sample Depth (ft) | TPH | TVPH | BETX | VOCs | PAHs | SVOCs | PCBs/ Pest | Lead | Arsenic | Oil and Grease | Aliphatic ($C_4$-$C_{12}$) | Aromatic ($C_8$-$C_{10}$) | Notes |
| Perimeter | GT-137 | SS-1 | 0-1 | - | - | Mar-93 | - | - | - | - | - | - | - | - | - | |

**Subsurface Soil Sampling Summary (vadose zone)**

| | | | | ANALYTES | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Source Area | Boring Designation | Sample ID | Sample Depth (ft) | TPH | TVPH | BETX | VOCs | PAHs | SVOCs | PCBs/ Pest | Lead | Arsenic | Oil and Grease | Aliphatic ($C_4$-$C_{12}$) | Aromatic ($C_8$-$C_{10}$) | Notes |
| Perimeter | GT-137 | SS-2 | 1-4 | - | - | Mar-93 | - | - | - | - | - | - | - | - | - | |
| | GT-133 | SS-2 | 2-6 | - | - | Mar-93 | - | - | - | - | - | - | - | - | - | |
| | | SS-3 | 6-9 | - | - | Mar-93 | - | - | - | - | - | - | - | - | - | |
| | GT-134 | SS-2 | 1-5 | - | - | Mar-93 | - | - | - | - | - | - | - | - | - | |
| | | SS-3 | 5-10 | - | - | Mar-93 | - | - | - | - | - | - | - | - | - | |

### SECTION 2.2 GROUNDWATER

**Groundwater Classification** ☐ GA/GAA ☐ GA/GAA Non-Attainment ☑ GB

**Number of Groundwater Sampling Locations** **Upgradient** 2 (GT-106, MW-7)
**Downgradient** 6 (GT-133, GT-134, GT-135B, GT-136B, GT-137, GW-03)

**Depth to Groundwater** **Minimum** 0.31 (GT-136B; 3/3/93) ft bgs
**Average** 8.61 ft bgs
**Maximum** 16.90 (GT-133; 3/23/93) ft bgs

**Depth to Bedrock** 8 - 10ft

**Preferential Pathways for Groundwater Migration** ☐ Yes ☐ No
**Describe**: _____

**Predominant Soil Type in the Saturated Zone** Bedrock

**Groundwater Sampling Summary**

| Well Designation | ANALYTES | | | | | | | | | | | | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | TPH | TVPH | BETX | VOCs | PAHs | SVOCs | PCBs | Metals | Lead | Oil and Grease | pH | Total Suspended Solids | |
| GT-106 | 6/99 | - | - | 6/99 | - | 6/99 | - | - | - | - | - | - | |
| GT-133 | 12/94 | 12/94 | - | 12/95 | - | 3/93 | 3/93 | 3/93 | - | - | - | - | |
| GT-134 | 12/94 | 12/94 | - | 12/94 | - | 3/93 | 3/93 | 3/93 | - | - | - | - | |
| GT-135B | 12/94 | 12/94 | - | 12/94 | - | 3/93 | 3/93 | 3/93 | - | - | - | - | |
| GZ-136B | - | - | - | 3/93 | - | 3/93 | 3/93 | 3/93 | - | - | - | - | |
| GT-137 | - | - | - | 3/93 | - | 3/93 | 3/93 | 3/93 | - | - | - | - | |
| MW-7 | 6/99 | - | - | 6/99 | - | 6/99 | - | - | - | - | - | - | |
| GW-03 | 11/83 | - | 11/83 | - | - | - | - | - | 11/83 | - | - | - | |

Note:
Shaded boxes indicate that there were other sampling events, with this being the most recent event

## SECTION 2.3 FREE LIQUID

**Free Liquids Present on the Surface** ☐ Yes ☑ No

**Non-Aqueous Phase Liquid Present in Any Environmental Medium** ☐ Yes ☐ No
(**NOTE**: Considered a condition that exceeds the UCLs)

**Historical Thickness of Free Liquid**
**Minimum** N/A
**Maximum** N/A
**Most Recent** N/A

**Free Liquid Gauging Summary**

N/A

## SECTION 2.4 SOIL GAS

**Soil Gas Sampled in this Area** ☐ Yes ☑ No

**Number of Soil Gas Samples** N/A

**Soil Gas Sampling Summary**

N/A

## SECTION 2.5 SURFACE WATER

**Surface Water Classification** N/A

**Number of Surface Water Sampling Locations**
**Upstream** N/A
**Downstream** N/A

**Average Depth of Flow** N/A

**Surface Water Sampling Summary**

N/A

## SECTION 2.6 SEDIMENT

**Number of Sediment Samples** **Surface (0”-6” depth)** N/A
**Subsurface (> 6” depth)** N/A

**Sediment Sampling Summary (0”-6” depth)**

N/A

**Sediment Sampling Summary (> 6” depth)**

N/A

## SECTION 2.7 MAN-MADE STRUCTURES

**Any Occupiable Enclosed Structures in this Area** ☐ Yes ☑ No

**Man-Made Structures Sampled in this Area** ☐ Yes ☑ No

- ☐ Buildings
- ☐ Vaults
- ☐ Tanks
- ☐ Pits

**Man-Made Structure Sampling Summary**

N/A

**If an Underground Storage Tank** **Date Cleaned** N/A
**Date Closed** N/A

**If Underground Distribution Lines** **Date Cleaned** October to November 1996
**Date Plugged** October to November 1996

**Notes**

_____
_____
_____
_____
_____
_____

## SECTION 2.8 OTHER

**Odors Present** ☐ Yes ☑ No

**Stained Soil Present** ☐ Yes ☑ No

**Stressed Vegetation Present** ☐ Yes ☑ No

**Excavated or Stockpiled Material Present** ☐ Yes ☑ No
**If so, Estimated Volume** _____ CY

## SECTION 3 SUMMARY OF CURRENT CONDITIONS

| Source Area | Well / Boring Associated with Source Area | Media | Concentration | Notes |
|---|---|---|---|---|
| Perimeter | GT-106, GT-133, GT-134, GT-135B, GT-136B, GT-137, MW-7, GW-03 | Soil (0-1) | BTEX – ND (GT-137, 3/93) | |
| | | Soil (1-4) | BTEX – ND (GT-137, 3/93) | |
| | | Soil (1-5) | Toluene – 3 mg/kg (GT-134, 3/93) | |
| | | Soil (2-6) | Xylene – 0.0025 mg/kg (GT-133, 3/93) | |
| | | Soil (6-9) | BTEX – ND (GT-133, 3/93) | |
| | | Soil (5-10) | BTEX – ND (GT-134, 3/93) | |
| | | Groundwater | **GT-106, 6/99**: TPH – 2,200 ug/L; VOCs – ND; Diethylphthalate – 1J ug/L; Di-n-butylphthalate – 1J ug/L; bis(2-ethylhexyl)phthalate – 7 ug/L<br>**GT-133, 3/93:** Aluminum – 2,700 ug/L; Beryllium – 5 ug/L; Cadmium – 5 ug/L; Calcium – 9,200 ug/L; Iron – 6,200 ug/L; Magnesium – 3,300 ug/L; Manganese – 1,110 ug/L; Sodium – 5,800 ug/L; Zinc – 41 ug/L; SVOCs – ND; PCBs – ND<br>**GT-133, 12/94:** TVPH – ND; TPH - ND<br>**GT-133, 12/95:** MTBE – 6.6 ug/L<br>**GT-134, 3/93;** Aluminum – 47,000 ug/L; Arsenic – 32 ug/L; Calcium – 19,000 ug/L; Chromium – 97 ug/L; Cobalt – 50 ug/L; Copper – 110 ug/L; Iron – 98,000 ug/L; Lead – 76 ug/L; Magnesium – 17,000 ug/L; Manganese – 1,800 ug/L; Nickel – 100 ug/L; Sodium – 14,000 ug/L; Vanadium – 50 ug/L; Zinc – 440 ug/L; SVOCs – ND; PCBs – ND<br>**GT-134, 12/94:** Toluene – 5 ug/L; TVPH – 240 ug/L; TPH - ND<br>**GT-135B, 3/93:** Calcium – 26,000 ug/L; Iron – 5,400 ug/L; Magnesium – 2,600 ug/L; Manganese – 210 ug/L; Sodium – 13,000 ug/L; SVOCs – ND; PCBs – ND<br>**GT-135B; 12/94:** VOCs – ND; TVPH – ND; TPH - ND<br>**GT-136B, 3/93:** Calcium – 28,000 ug/L; Cobalt – 56 ug/L; Iron – 4,200 ug/L; Magnesium – 4,900 ug/L; Manganese – 2,800 ug/L; Potassium – 11,000 ug/L; Sodium – 14,000 ug/L; Zinc – 26 ug/L; VOCs – ND; SVOCs – ND; PCBs - ND<br>**GT-137, 3/93:** Aluminum – 4,800 ug/L; Calcium – 15,000 ug/L; Iron – 11,000 ug/L; Lead – 8.7 ug/L; Magnesium – 4,600 ug/L; Manganese – 450 ug/L; Sodium – 12,000 ug/L; Zinc – 140 ug/L; VOCs – ND; SVOCs – ND; PCBs – ND<br>**MW-7, 6/99:** TPH – 330 ug/L; VOCs – ND; bis-(2-ethylhexyl)phthalate – 4J ug/L<br>**GW-03, 11/83:** Benzene – 160 ug/L; Toluene – 281 ug/L; Xylenes – 561 ug/L; TPH – 3.9 ug/L | No exceedances of GB Groundwater Objectives or Leaching Criteria other than for Benzene in sample GW-3, whose GB GW Objective value is 140 ug/L. |
| | | Free Product | ND | |

NOTE:

TPH = Total Petroleum Hydrocarbon
VOC = Volatile Organic Compound
TVPH = Total Volatile Petroleum Hydrocarbon
PCB = Polychlorinated Biphenyl
MTBE = Methyl-tert-butyl ether
PAH = Polyaromatic Hydrocarbon
ND = Not Detected
SVOC = Semi-Volatile Organic Compound

**Upper Concentration Limits Exceeded for Any Hazardous Substances** ☐ Yes ☑ No

**Soil** ☐ Yes ☐ No If so, which HS? _____

**Groundwater** ☐ Yes ☐ No If so, which HS? _____

## SECTION 1 POSSIBLE INVESTIGATION AREA IDENTIFICATION

**SITE** Tank Farm 1

**INVESTIGATION AREA** Melville Pond

**FIGURE/MAP** Figure 2-2

**SIZE (approx.)**
**Length** _____ ft **Width** _____ ft **Depth** _____ ft
**Area** _____ $ft^2$ _____ acres

**DESCRIPTION OF AREA**

- Located northeast of the site
- Presumed a Class A water body since RIDEM has not classified. Class a surface water bodies are suitable for drinking water supplies.

**DISTANCE TO PROPERTY LINES (approx.)**
North _____ ft
South _____ ft
East _____ ft
West _____ ft

**REFERENCES**

1. Site Investigation Report, DFSC Melville – Tank Farm 1. May 1995.
2. Study Area Screening Evaluation Work Plan - Naval Education and Training Center. July 1992.
3. Tank Closure Assessment Report – Tank Farm 1. October 1998.
4. Supplemental Site Investigation – Tank Farm 1. June 1996.

**HAZARDOUS SUBSTANCES ASSOCIATED WITH THE INVESTIGATION AREA**

1. _____ ☐ JP-4
2. _____ ☐ JP-5
3. _____ ☐ JP-8
4. _____ ☐ No. 6 Fuel Oil
5. _____ ☐ Other

## SECTION 2 SUMMARY OF PAST INVESTIGATIONS AND SAMPLING

### SECTION 2.1 SOIL

**Number of Soil Samples** **Surface (0'-2' bgs)** N/A
**Subsurface (vadose zone)** N/A

**Predominant Soil Type in the Vadose Zone** N/A

**Groundcover Type** N/A

**Potential for Wind / Water Erosion (circle)** ☐ Yes ☑ No

**Surface Soil Sampling Summary (0'-2' bgs)**

N/A

**Subsurface Soil Sampling Summary (vadose zone)**

N/A

## SECTION 2.2 GROUNDWATER

**Groundwater Classification** ☐ GA/GAA ☐ GA/GAA Non-Attainment ☑ GB

**Number of Groundwater Sampling Locations**
**Upgradient** N/A
**Downgradient** N/A

**Depth to Groundwater**
**Minimum** N/A
**Average** N/A
**Maximum** N/A

**Depth to Bedrock** N/A

**Preferential Pathways for Groundwater Migration** Yes No
**Describe**: _____
_____

**Predominant Soil Type in the Saturated Zone** _____

**Groundwater Sampling Summary**

N/A

## SECTION 2.3 FREE LIQUID

**Free Liquids Present on the Surface** ☐ Yes ☑ No

**Non-Aqueous Phase Liquid Present in Any Environmental Medium** ☐ Yes ☑ No
(**NOTE**: Considered a condition that exceeds the UCLs)

**Historical Thickness of Free Liquid**
**Minimum** N/A
**Maximum** N/A
**Most Recent** N/A

**Free Liquid Gauging Summary**

N/A

## SECTION 2.4 SOIL GAS

**Soil Gas Sampled in this Area** ☐ Yes ☑ No

**Number of Soil Gas Samples** N/A

**Soil Gas Sampling Summary**

N/A

## SECTION 2.5 SURFACE WATER

**Surface Water Classification** Class A, since RIDEM has not classified it

**Number of Surface Water Sampling Locations** **Upstream** 1
**Downstream** 2

**Average Depth of Flow** _____ ft

**Surface Water Sampling Summary**

| | | ANALYTES | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Source Area | Samples Associated with Source Area | TPH | TVPH | BETX | VOCs | PAHs | SVOCs | PCBs/ Pest | Metals | Base Neutrals/ Acids | Oil and Grease | Aliphatic ($C_4$-$C_{12}$) | Aromatic ($C_8$-$C_{10}$) |
| Surface Water | SW-1 | Jan-95 | Jan-95 | - | Jan-95 | - | - | - | - | - | - | - | - |
| | SW-2 | Jan-95 | Jan-95 | - | Jan-95 | - | - | - | - | - | - | - | - |
| | SW-5 | Oct-95 | Oct-95 | - | Oct-95 | - | - | - | - | - | - | - | - |

## SECTION 2.6 SEDIMENT

**Number of Sediment Samples** **Surface (0”-6” depth)** N/A
**Subsurface (> 6” depth)** N/A

**Sediment Sampling Summary (0”-6” depth)**

N/A

**Sediment Sampling Summary (> 6” depth)**

N/A

## SECTION 2.7 MAN-MADE STRUCTURES

**Any Occupiable Enclosed Structures in this Area** ☐ Yes ☑ No

**Man-Made Structures Sampled in this Area** ☐ Yes ☑ No

- ☐ Buildings
- ☐ Vaults
- ☐ Tanks
- ☐ Pits
- ☐ Other _____

**Man-Made Structure Sampling Summary**

N/A

**If an Underground Storage Tank** **Date Cleaned** _____
**Date Closed** _____

**If Underground Distribution Lines** **Date Cleaned** _____
**Date Plugged** _____

**Notes**

_____
_____
_____
_____
_____
_____

**SECTION 2.8 OTHER**

**Odors Present** ☐ Yes ☑ No

**Stained Soil Present** ☐ Yes ☑ No

**Stressed Vegetation Present** ☐ Yes ☑ No

**Excavated or Stockpiled Material Present** ☐ Yes ☑ No
**If so, Estimated Volume** _____ CY

## SECTION 3 SUMMARY OF CURRENT CONDITIONS

| Source Area | Well / Boring Associated with Source Area | Media | Concentration | Notes |
|---|---|---|---|---|
| Surface Water | SW-1, SW-2, SW-5 | Surface Water | VOCs – ND; TVPH – ND; TPH – ND (SW-1, SW-2, SW-5) | |
| NOTES:<br>ND = Not Detected | | VOC – Volatile Organic Compound | TPH – Total Petroleum Hydrocarbon<br>TVPH – Total Volatile Petroleum Hydrocarbon | |

**Upper Concentration Limits Exceeded for Any Hazardous Substances** ☐ Yes ☑ No

**Soil** Yes No If so, which HS? _____
_____
_____

**Groundwater** Yes No If so, which HS? _____
_____
_____

# Appendix B

# Stereoscopic Aerial Photography Analysis Report

## INTRODUCTION

Environmental Research, Inc. (ERI) performed the following aerial photograph analysis of Defense Fuel Support, Point Melville, for Tetra Tech FWI, Inc., to support an ongoing investigation being conducted by Tetra Tech FWI, Inc. The installation is located in Portsmouth, Rhode Island.

Aerial photographs spanning the period from 1938 to 1995 were stereoscopically analyzed to locate potential contamination sources. Analysis findings are keyed to aerial photographs spanning the study period. The following report describes the analysis findings. Digital files of the geo-referenced aerial photographs with analysis findings have been written to compact disc (CD). The CD contains the hard copy report, the ArcGIS project, and all raster data, vector data, and metadata documents containing pertinent information. The ArcGIS project can be used alone or in combination with the hard copy report. Images are in U.S. State Plane NAD 83, Rhode Island 3800, feet. Hard copy annotated photographs are also included with the report. A References section is included on Pages 10-13 of the report, listing the aerial photographs, digital data, and maps used in the analysis and in the creation of the ArcGIS project. A Legend of Symbols is included on Page 14 of the report and should be used with the hard copy and/or the ArcGIS project.

## QUALIFICATIONS AND EXPERIENCE

As the lead imagery analyst conducting the analysis for this report, Mary Sitton has twenty years experience in aerial photographic research, acquisition, and analysis, focusing on military and industrial operations and environmental conditions. Ms. Sitton is currently President of ERI, an aerial photography analysis firm based in Linden, VA, which specializes in analysis of aerial photography for environmental investigations and litigation support. In this capacity, Ms. Sitton provides analysis services on projects involving environmental remediation and investigation to a variety of federal, state, local, and private agencies. Prior to her involvement with ERI, Ms. Sitton worked as an independent environmental consultant for the U.S. Department of Justice and as an onsite imagery analyst/geologist contractor for the U.S. Environmental Protection Agency's Environmental Photographic Interpretation Center (EPIC). To date, she has completed approximately 190 military and industrial aerial analysis projects and has performed quality control on numerous others.

Linley A. (Hank) Malcom performed the aerial photograph and editorial quality control analysis for this report. Mr. Malcom has 30 years experience as an imagery intelligence analyst dealing with military forces issues. For the past year he has been involved with analysis of industrial and military-related topics at ERI.

## METHODOLOGY

A search of government and commercial archives was undertaken to obtain aerial photographs covering the period from 1938 to 1995. The analysis was performed by viewing illuminated transparencies of aerial photographs through a zoom stereoscope. Stereoscopic viewing creates a three-dimensional effect which, when combined with viewing at various magnifications, enables the photographic analyst to identify signatures associated with different features and environmental conditions. The term "signature" refers to a combination of visible characteristics (such as color, tone, shadow, texture, size, shape, pattern and association), which permits a specific object or condition to be identified on aerial photographs. The academic and professional training, photo interpretation experience gained through repetitive observations of similar features or activities, and deductive logic of the analyst, as well as background information from collateral sources (e.g., site maps, geological reports, and soil surveys) are critical factors employed in the photograph analysis.

Enlargement prints covering the site were reproduced to illustrate the findings from the analysis. The analyst's findings are annotated on the enlargement prints, with additional comments and/or descriptions included in the accompanying text. Significant features identified in the analysis will be annotated until they are no longer visible unless otherwise specified. A legend is included to define the abbreviations and symbols annotated on the overlays. Due to factors inherent in the photographic reproduction process, the prints do not exhibit the level of detail that is visible in the original aerial photographs; therefore, some features identified from the aerial photographs may not be clearly discernible, or even visible, on the photographic prints presented in this report.

Objects and features are identified in the graphics and text according to the analyst's degree of confidence in the evidence. A distinction is made between certain, probable and possible identifications. When the analyst believes the identification is unmistakable, no qualifier is used. Probable is used when a limited number of discernible characteristics allow the analyst to be reasonably certain of a particular identification. Probable identifications are "more likely than not" and at a level of confidence at greater than 50 percent. Possible is used when only a few characteristics are discernible or these characteristics are not unique to a given feature.

**Aerial Photograph Analysis**
**Defense Fuel Support Point Melville**
**Portsmouth, Rhode Island**

| Date[1] | Tank Farm 1 | Tank Farm 2 | Tank Farm 3 | Fuel Loading Area |
|---|---|---|---|---|
| **12-13-38** | T9, T10, T11, and T12 are present. The remaining area of TF1 is farmland. | TF2 not yet constructed. | TF3 not yet constructed. | T1, T2, T3, T5 and another vertical tank (ID number unknown) and three horizontal tanks (not annotated) are present in the northwest portion of the fuel loading area. |
| **09-23-42*** | TF1 and the military installation are under construction including construction of Melville Pond. An impoundment north of T15 may be related to construction. | The majority of the tanks at TF2 are visible and under construction. | TF3 not yet constructed. | Staining is present in several locations in the southern portion of the fuel loading area. |
| **06-27-44** | The impoundment north of T15 appears inactive. A former building located here in 1942 has been removed. Surface drainage from TF1 leads to East Passage (see 1942 for location annotation). | No significant findings. | Sand burn pit at northwest corner of TF3. This feature remains until 1976. | Two additional tanks (ID numbers unknown) have been added in the northwest portion of the area (see 1951). |
| **09-28-51** | The impoundment north of T15 has revegetated. Staining and liquid are inside the berm of AST #11. An open, square containment structure with dark-toned, possibly oily liquid is west of AST #12 (possible oil/water separator for AST #11 and #12). This feature remains until 1975. Excavating is evident around and beneath T10. A pipe scar or ditch leads from the Ethyl Building to a shallow depression (probable catch basin). | Open burning is evident at T21. A large linear ground scar is at T19. | Large ground scarred area at T32 and T33. | An oil/water separator has been constructed northwest of T3. This feature remains until 1980 and will continue to be annotated, but no longer discussed. |

[1] An asterisk (*) indicates those dates where a photograph is included with this report. For 1942, a photograph is not included for Tank Farm 3 because it was not yet constructed.

| Date[1] | Tank Farm 1 | Tank Farm 2 | Tank Farm 3 | Fuel Loading Area |
|---|---|---|---|---|
| **10-21-51*** | See September 28, 1951 (features remain the same). | Open burning is no longer evident at T21. The linear ground scar remains at T-19. | The large ground scarred areas at T32 and T33 remain. | See September 28, 1951 (features remain the same). |
| **10-14-53** | A square pit is northwest of T13. Round pits are at T14 and T15. A circular ground scar at T14 may be a covered pit. An open storage area is south AST #12. Two drainage ditches or discharge points are within the berm of T10. The pipe scar or ditch from the Ethyl Building leading to a shallow depression remains. The depression contains light-toned material or objects. | No significant findings. | Two large tanks are under construction at TF3. Ground scarred areas remain at T32 and T33. A significant amount of debris is located in the southern portion of TF3. | Staining is visible within the T3 berm. Staining is adjacent to a probable maintenance building (next to the bay doors) at the southwest portion of the area. Open storage of vehicles, equipment and other materials are within the lot near the maintenance building. |
| **04-22-54*** | The pit north of T13, the circular ground scar at T14 and the open storage area south of AST #12 remain. Dark liquid or staining is inside the berms of T9 and T10. The pipe scar or ditch and depression remain near the Ethyl Building. | Open burning and staining are at T19. Significant staining is at T22 and T27. | Two tanks still under construction at TF3. Ring drain visible at T69. Pipe leads to surface drain to Lawton Brook. Large ground scarred areas remain at T33. The debris remains in the southern portion of the site. | Staining remains within the T3 berm. Staining is also visible in several areas to the south. Staining remains adjacent to a probable maintenance building. Open storage remains. |
| **02-06-62*** | Light and dark-toned material is inside the tank berm of AST #11. A trench and an excavation are east of AST #11. The pipe scar or ditch leading to the depression remains near the Ethyl Building. A pit containing light-toned material or liquid is adjacent to the depression. | Medium-toned material or liquid is east of T19. Staining is at T22, T28 and T29. Staining and dark-toned material are at T27. Two pits are southwest of T26. Open storage of thousands of containers is located east of TF2 (present location of the Melville Recreational Area). Containers are also stored northeast of TF2 south of the landfill (landfill not annotated). | Sand burn pit contains probable liquid. Surface drainage has been added to the 1962 photograph. | A pit and staining are noted within the T3 berm. Staining is evident near the fuel loading area near the center of the area. The majority of the lot in the southern portion of the area is heavily stained and was likely oiled. |

| Date[1] | Tank Farm 1 | Tank Farm 2 | Tank Farm 3 | Fuel Loading Area |
|---|---|---|---|---|
| | | | | |
| **09-27-63** | Ground scars at T15 and T17 may be from a release (see 1962 for location annotation). The pit is no longer visible near the Ethyl Building. The pipe scar or ditch and depression remain. | Open storage of thousands of containers remains east and northeast of TF2. | Access roads lead to circular ground scars northeast and southeast of T36 and east of Tank 69. (See 1972 for annotated location.) | The pit within the T3 berm remains. |
| **10-31-64** | Large ground scarred areas are evident extending northwest from T17 and T18 (see 1962 for location annotation). | Open storage of thousands of containers remains east and northeast of TF2. A large scarred and/or graded area borders the north side of the containers to the northeast. Access roads lead to two circular ground scars east of T26 may be covered pits. (See 1962 for location annotation). | Ground scarred area northwest of T69 (along the eastern bank of the surface drainage leading to Lawton Brook). Ground scars northeast and southeast of T36 and east of T69 remain. (See 1972 for annotated location). | Probable staining is noted within the sediments (low tide) adjacent to the oil/water separator. The pit and staining remain within the T3 berm. Staining is adjacent to the fuel loading dock near the center of the area (see 1962 for location annotations). |
| **03-09-70** | Dark-toned liquid is on the west side of AST #12. An excavation is north of T18. A drainage ditch leads from the access road toward the excavation. (See 1972 for location annotation). | Open storage of thousands of containers remains east and northeast of TF2. A ground scar is visible in the wooded area at west central portion of TF2 (see 1972 for location annotation). | Sand pit contains probable liquid. | The pit and staining remain within the T3 berm. Two horizontal tanks have been removed from the area near the fuel loading dock. The lot in the southern portion of the area is heavily stained and was likely oiled. Numerous probable drums are stored in an open area in the north central portion of the area. |
| **04-29-72*** | An excavation with staining or liquid and an area of staining are inside the berm of AST #11. A containment structure with staining or liquid is visible south of AST #12 and may be a sump. The excavation seen near T18 has been filled. The drainage ditch from the access road remains. A light-toned depression | Staining is evident near T19. Open storage of thousands of stacked cylindrical containers is visible near the center of TF2 (within the circular access road west of T27 and T28). Open storage of containers visible since 1962 remain east and northeast of TF2. Two flat | The sand pit contains liquid. An access road leads to an area of disturbed ground in the central portion of TF3. Two probable pits are located on the north side of the disturbed ground. Staining is visible adjacent to the pits. A hose leads from a structure at T32 to the area of staining. Two other | Light-toned square objects are visible along the shore adjacent to and south of the oil/water separator. A horizontal tank has been removed from near the fuel loading dock. The pit previously located within the T3 berm is no longer visible. Staining is evident in several areas within the fuel |

| Date[1] | Tank Farm 1 | Tank Farm 2 | Tank Farm 3 | Fuel Loading Area |
|---|---|---|---|---|
| | is visible south of the Ethyl Building. | bed trucks with smaller containers are located near the group located east of TF2 (present location of Melville Recreational Area). | hoses lead from T33. One of the hoses leads to the western probable pit. The other hose leads past an object to the south side of the disturbed ground. Ground scarring and/or liquid flow patterns are visible at T32 and T33. | loading area. Liquid is evident adjacent to a structure or container in the southern portion of the area. The probable drums remain in open storage in the north central portion of the area. Debris is located in the western portion of the area. |
| **04-14-75*** | Dark-toned linear piles and disturbed ground are at the far northwest corner of TF1. Staining is west of AST #12 in and around the containment structure (possible oil/water separator). The containment structure/possible sump located south of AST #12 remains. A very large excavation containing liquid is northeast of T17. A tank truck and a truck are adjacent to the excavation. A hose is visible between the tank truck and an adjacent structure (structure not annotated). Another, much longer hose is between the structure and a pit containing an object. | Open storage of thousands of stacked containers remains near the center of TF2. The containers located east and northeast of TF2 have been removed. Two scarred or cleared areas are visible in the wooded area west of T25. A ground scar and/or liquid are located east of T19. | Sand pit remains and contains medium-toned liquid or material. Staining near the center of TF3 and at T35 and T36 and may be due to releases. Staining is evident adjacent to a probable container south of T36. A ground-scarred area surrounds a manhole west of T36. There are several other manholes present at TF3; however, this is the only one that appeared scarred (The scarred area remains throughout the study period and it will no longer be annotated or discussed). A ground scar or graded area is located west of T69. A pipe scar leads from a structure to a drainage ditch that leads to Lawton Brook.<br>Ground scars are located around T70. A probable hose leads to one of the scarred areas. | Staining is evident within the T3 berm, east of the fuel loading area and at the southeast portion of the fuel loading area. |
| **05-05-76** | The excavation noted at T17 in 1975 has been filled. The containment structure/possible sump located south of AST #12 remains. | The open storage of containers remains. | No significant findings. | Staining is evident within the T3 berm and north and east of the fuel loading docks. |

| Date[1] | Tank Farm 1 | Tank Farm 2 | Tank Farm 3 | Fuel Loading Area |
|---|---|---|---|---|
| **03-28-79*** | Mounded material and probable containers are located east of AST#11. New ditches have been dug on the east side of AST #12 and on the west side of T9 and T10. The containment structure/possible sump located south of AST# 12 is no longer visible. | The open storage of containers remains. A low area containing probable liquid is north of the containers. A hose leads from a structure to a discharge point at T23. Large stained areas are west of the hose and discharge point. | The sand burn pit has been filled and covered. A new pit with a square structure has been built to the east (oil/water separator). An area of disturbed ground with probable staining is visible near the center of TF3. An excavation or shallow pit is located west of T36. Staining remains around a probable container south of T36. The open structure surrounded by a ground scar remains west of T36. Ground scars/probable discharge points are at T69 and T70. | Staining is evident within the T1, T2, and T3 berms, adjacent to to and east of the fuel loading dock and in the eastern portion of the fuel loading area. Several buildings have been removed since 1976. Medium-toned probable earthen material or gravel has been added to the lot where staining was noted in the southern portion of the fuel loading area. Numerous vehicle tracks are visible within the material. Debris is visible near the material. The probable maintenance building located west of the material has been removed. |
| **03-10-80** | Staining is evident in and adjacent to the ditch west of T10. The area east of AST #11 has been graded (previously contained mounded material and probable containers). A fill area containing debris and dark-toned material is in a low area west of (and outside) of the berm of AST #11. Dark-toned mounded material is south of AST #12. (See 1979 for location annotation.) | Fewer containers are present at open storage area. A low area containing liquid is visible at the north end of open storage area. | Staining remains around a probable container south of T36. The open structure surrounded by a ground scar remains west of T36. | A crane and a large square pit containing liquid are present in a lot in the southern portion of the area. |
| **04-13-81** | Staining is evident from a structure to a drainage ditch at T14. Liquid and staining are noted in the ditch west of T9 and T10. Liquid is visible inside the berm of AST #11. The low area located west of AST #11 (previously containing debris | A hose or pipe leads from a structure to a pit at T20 and T21. | Staining or dark-toned material is visible at T35. (See 1979 for annotated location.) Staining remains around a probable container south of T36. The open structure surrounded by a ground scar remains west of T36. | The oil/water separator and the three small tanks to the east are no longer present at the northwest corner of the area. Berm repair (not annotated) is evident around the majority of the remaining tank areas within the fuel loading area. |

| Date[1] | Tank Farm 1 | Tank Farm 2 | Tank Farm 3 | Fuel Loading Area |
|---|---|---|---|---|
| | and dark-toned material) has been filled and graded. A significant amount of probable earthen material has been placed south of AST #12. (See 1979 for location annotation.) | | | An impoundment (surge pool) has been constructed south of a razed building (see 1988 for location annotation). The pit seen in 1980 in the southern portion of the area has been filled. A large building in this area has been removed. |
| **08-22-84** | No significant findings. | A few containers (approximately 40) remain at the open storage area. | Stressed and dead vegetation is visible at the northwest portion of TF3. A large ground-scarred area devoid of vegetation is located at T35 and north of T35. Scarred areas devoid of vegetation area also visible near the center of TF3. (See 1986 for annotated location. A dark-toned area is visible along the bank of the drainage ditch that leads to Lawton Brook just south of T69. | Berm repair has been complete and the majority of the tank areas appear lined (not annotated). |
| **03-03-86*** | Liquid (probably oily) is inside the berm of AST #11. Two large stained areas are visible at T16. The northern stained area leads toward a culvert. Two areas of dark-toned material are at T17. | A fill area is located at the northwest portion of TF2. Approximately 60 containers remain in the open storage area. A pile of dark-toned material is located west of the containers. An area of staining or liquid is located adjacent to the containers. New ditches dug have been dug within TF2 (not annotated). | A large graded area is located where stressed and dead vegetation were located in the northwest portion of TF3 in 1984. The area around the transformers located south of T34 is being excavated. Scarred areas devoid of vegetation remain near the center of TF3 and at T35 and north of T35. Part of the fence is missing along the north side of TF3. Mounded material is located adjacent to drainage ditch in this area. Dark-toned mounded material is located west of T69. | The majority of the fuel loading area is not covered on the 1986 imagery. |

| Date[1] | Tank Farm 1 | Tank Farm 2 | Tank Farm 3 | Fuel Loading Area |
|---|---|---|---|---|
| **04-26-88*** | A pit is located at T15. A hose is located east of the pit leading to a probable stain at the edge of a wooded area. Equipment (probably a tractor) is attached to a probable flat bed loaded with material between the pit and hose. A pit is located west of AST #11. | Light-toned mounded material is visible in the former container storage area. Two large pits (one containing a cylindrical object) are in the north central portion of TF2. Three pits and a ground-scarred area are within and adjacent to wooded area on the western side of TF2. | Two ground-scarred areas are located in the wooded area on the western side of TF3. A drainage ditch leads toward the northern ground scar. A large ground-scarred area remains at T35 and north of T35. A new drainage ditch has been constructed west of T69. The fence has been repaired. A large pipe is visible adjacent to the south side of the large building west of T69 (this is the only date the pipe was visible). | Staining and an excavation are located south of the fuel loading docks. |
| **06-29-92** | Liquid or staining inside berm of AST #11. (See 1995 for location annotation.) | A large linear ground scar is on the west side of T26. (See 1995 for location annotation). | A ground-scarred area is visible near the center of TF3 where an area of disturbed ground and staining were noted in 1972. A smaller ground scarred area is visible at T35. The formerly scarred area north of T35 has revegeated. | Staining or liquid is located in two areas in the southern portion of the area (see1995 for location annotation). |
| **04-03-95*** | Liquid remains inside the berm of AST #11. | A fill area with probable debris is at the northwest corner of TF2. Minor debris is in the former open storage area. | A ground-scarred area remains at T35. | Staining or liquid is visible within the T3 berm. Excavations related to construction activity (none annotated) are located in the southeast portion of the area. A drum, a square container and an area of light-toned material are visible within the lot in the southern portion of the area. A drum storage area with thirty drums is located west of the aforementioned features. Staining is noted south of Building S52. |
| | | | | |

## REFERENCES – AERIAL PHOTOGRAPHS

| Date | Source | Scale | Type[2] | Mission | Roll / Frame # |
|---|---|---|---|---|---|
| 12-13-38 | NARA[3] | 1:24,000 | B&W | GS-F | 6 / 151-153 |
| 9-23-42 | NARA | 1:20,000 | B&W | NB | 5 / 173-177 |
| 6-27-44 | NOS[4] | 1:20,000 | B&W | 44C | 2117-2120 |
| 9-28-51 | NOS | 1:10,000 | B&W | 51J | 4493-4497 |
| 10-21-51 | NARA | 1:20,000 | B&W | DPI | 2H / 70-72 |
| 10-14-53 | NOS | 1:10,000 | B&W | 53J | 2109-2112 |
| 4-22-54 | NOS | 1:20,000 | B&W | 54W | 1149-1152 |
| 2-6-62 | AVPT[5] | 1:18,000 | B&W | 1188 | 21 / 80-83 |
| 9-7-63 | FSA[6] | 1:20,000 | B&W | DPI | 3DD / 188-190 |
| 10-31-64 | NOS | 1:20,000 | B&W | 64S | 9843-9846 |

[2] Film types: B&W – black & white; CC – conventional color; CIR – color infrared
[3] National Archives and Records Administration
[4] National Ocean Service
[5] Aerial Viewpoint
[6] Farm Service Agency

## REFERENCES – AERIAL PHOTOGRAPHS (continued)

| Date | Source | Scale | Type | Mission | Roll / Frame # |
|---|---|---|---|---|---|
| 3-9-70 | USGS[7] | 1:24,000 | B&W | GS-VCLG | 2 / 53-55 |
| 4-29-72 | KEY[8] | 1:12,000 | B&W | 073-72 | 27 / 1175-1178 |
| 4-14-75 | KEY | 1:12,000 | B&W | 058-75 | 27 / 1575, 1576; 28 / 1600, 1601 |
| 5-5-76 | FSA | 1:38,000 | B&W | 44005 | 176 / 141-143 |
| 3-28-79 | COL[9] | 1:12,000 | B&W | 8514 | 1 / 5-8 |
| 3-10-80 | KEY | 1:9,600 | B&W | 145-80 | 33 / 1533, 1534; 34 / 1480-1482 |
| 4-13-81 | API[10] | 1:24,000 | B&W | R.I. | 16 / 8, 9 |
| 8-22-84 | NOS | 1:20,000 | CC | 84ZC | 7052, 7053, 7096-7098 |

[7] United States Geologic Survey
[8] Keystone
[9] Col-East, Inc.
[10] Air Photographics, Inc.

## REFERENCES – AERIAL PHOTOGRAPHS (continued)

| Date | Source | Scale | Type | Mission | Roll / Frame # |
|---|---|---|---|---|---|
| 3-3-86 | COL | 1:5,760 | B&W | 10187 | 9 / 18, 19;<br>10 / 22-25 |
| 4-26-88 | AERO[11] | 1:24,000 | B&W | 88194 | 14 / 7-9 |
| 6-29-92 | USGS | 1:33,000 | CIR | 04412 | 5, 6 |
| 4-3-95 | COL | 1:6,000 | B&W | 15211 | 8 / 24, 25;<br>9 / 21-25 |

## REFERENCES – DIGITAL DATA

USGS Digital Orthophoto Quarter Quadrangles (DOQQs)

1) Prudence Island, RI Northeast (Photo Source Date: 3-29-95)
2) Prudence Island, RI Northwest (Photo Source Date: 3-29-95)
3) Prudence Island, RI Southeast (Photo Source Date: 3-29-95)
4) Prudence Island, RI Southwest (Photo Source Date: 3-29-95)
5) Tiverton, RI Northwest (Photo Source Date: 3-29-95)
6) Tiverton, RI Southwest (Photo Source Date: 3-29-95)

USGS Digital Raster Graphics (DRGs)

1) Prudence Island, RI (1996)

[11] Aerographics

## REFERENCES – DIGITAL DATA (continued)

USGS 7.5-minute, 30-meter Digital Elevation Models (DEMs)

1) Prudence Island, RI (Revision Date: 1-1-2001)
2) Tiverton, RI-MA (Revision Date: 1-1-2001)

## REFERENCES – MAPS

USGS 7.5-minute Topographic Maps

1) Prudence Island, RI (1996)

## LEGEND OF SYMBOLS

| | |
|---|---|
| B | - Building |
| BRM | - Building Removed |
| CS | - Containment Structure |
| CT | - Container |
| DB | - Debris |
| DE | - Depression |
| DG | - Disturbed Ground |
| DK | - Dark-Toned |
| DV | - Dead Vegetation |
| EQ | - Equipment |
| EX | - Excavation |
| FA | - Fill Area |
| GA | - Graded Area |
| GS | - Ground Scar |
| IM | - Impoundment |
| LQ | - Liquid |
| LT | - Light-toned |
| M | - Material |
| MH | - Manhole |
| MM | - Mounded Material |
| MT | - Medium-Toned |
| OB | - Object |
| OBN | - Open Burning |
| OS | - Open Storage |
| O/W | - Oil/Water |
| PROB | - Probable |
| SEP | - Separator |
| ST | - Stain |
| T | - Tank |
| TT | - Tank Truck |
| TF | - Tank Farm |
| TK | - Truck |
| VS | - Vegetation Stress |

**Defense Fuel Support –Portsmouth, RI**
**Tank Farm 1, Tank Farm 2,**
**and Fuel Loading Area (DRAFT)**

**April 22, 1954**

**Approx. Scale 1:4,300**

**1 inch equals 358 feet**

**Defense Fuel Support –Portsmouth, RI**
**Tank Farm 1, Tank Farm 2,**
**and Fuel Loading Area (DRAFT)**

**October 21, 1951**

**Approx. Scale 1:4,300**

**1 inch equals 358 feet**

**Defense Fuel Support –Portsmouth, RI**
**Tank Farm 1, Tank Farm 2,**
**and Fuel Loading Area (DRAFT)**

**September 23, 1942**

**Approx. Scale 1:4,300**

**1 inch equals 358 feet**

**Defense Fuel Support –Portsmouth, RI**
**Tank Farm 1, Tank Farm 2,**
**and Fuel Loading Area (DRAFT)**

**April 03, 1995**

**Approx. Scale 1:4,300**

**1 inch equals 358 feet**

**Defense Fuel Support –Portsmouth, RI**
**Tank Farm 1, Tank Farm 2,**
**and Fuel Loading Area (DRAFT)**

**April 26, 1988**

**Approx. Scale 1:4,300**

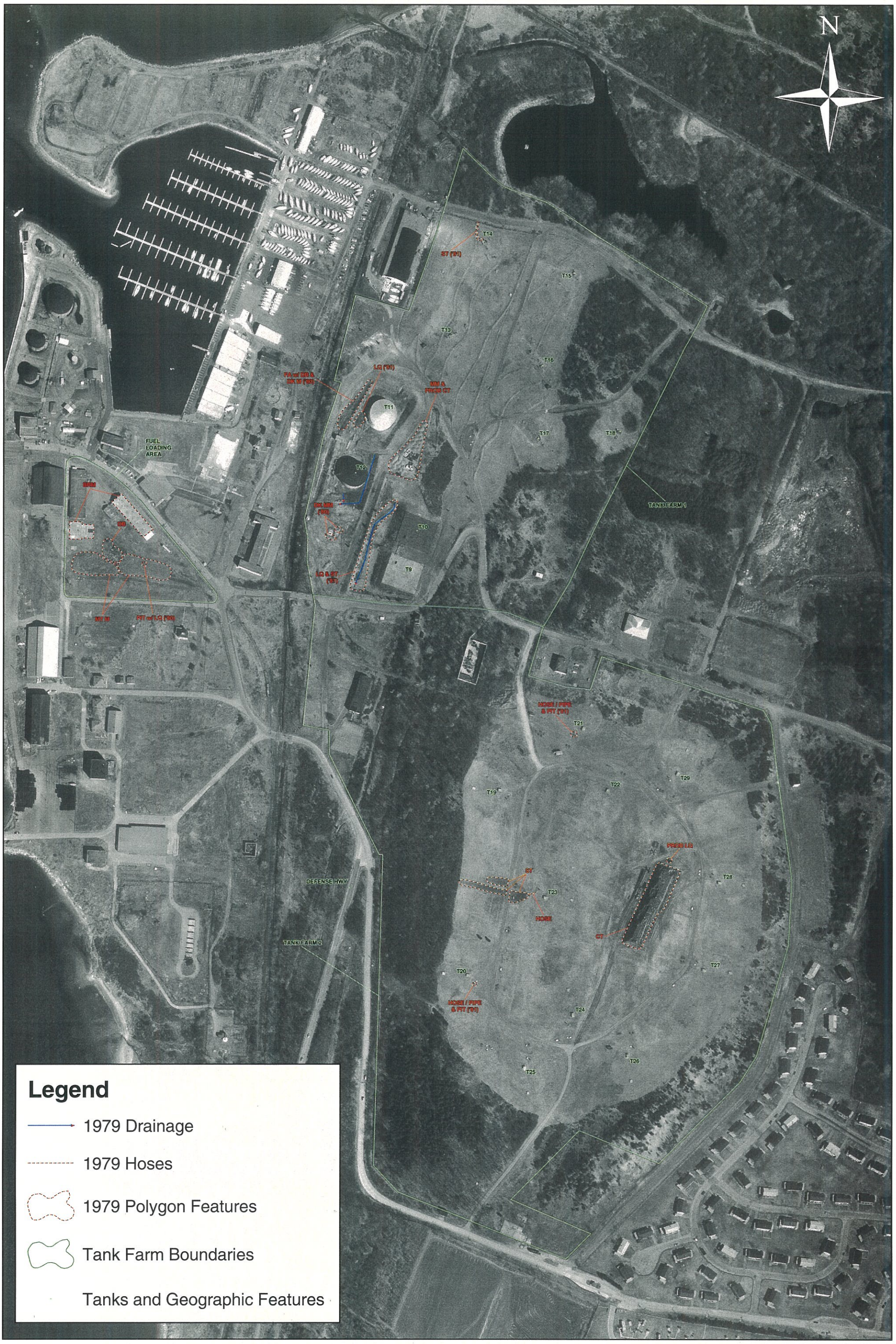
**1 inch equals 358 feet**

**Defense Fuel Support –Portsmouth, RI**
**Tank Farm 1, Tank Farm 2,**
**and Fuel Loading Area (DRAFT)**

**March 03, 1986**

**Approx. Scale 1:4,300**

**1 inch equals 358 feet**




**Defense Fuel Support –Portsmouth, RI**
**Tank Farm 1, Tank Farm 2,**
**and Fuel Loading Area (DRAFT)**

**March 28, 1979**

**Approx. Scale 1:4,300**

**1 inch equals 358 feet**

**Defense Fuel Support –Portsmouth, RI**
**Tank Farm 1, Tank Farm 2,**
**and Fuel Loading Area (DRAFT)**

**April 14, 1975**

**Approx. Scale 1:4,300**

**1 inch equals 358 feet**

**Defense Fuel Support –Portsmouth, RI**
**Tank Farm 1, Tank Farm 2,**
**and Fuel Loading Area (DRAFT)**

**April 29, 1972**

**Approx. Scale 1:4,300**

**1 inch equals 358 feet**

**Defense Fuel Support –Portsmouth, RI**
**Tank Farm 1, Tank Farm 2,**
**and Fuel Loading Area (DRAFT)**

**February 06, 1962**

**Approx. Scale 1:4,300**

**1 inch equals 358 feet**