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DRAFT WORK PLAN FOR SITE CLOSURE AT TANK FARM 2 NS NEWPORT RI (DRAFT ACTING AS FINAL)

5/1/2005

FOSTER WHEELER

LETTER OF TRANSMITTAL

FOSTER WHEELER ENVIRONMENTAL CORPORATION

133 Federal Street
Boston, MA 02110

TEL: (617) 457-8200
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TO: Paul Kulpa
RIDEM
235 Promenade Street
Providence, RI 02908-5767

DATE: 09/18/03	**JOB NO: 2033.1044**
ATTENTION: Paul Kulpa	
RE: Work Plan for Site Closure – Tank Farm 2	

WE ARE SENDING YOU: X Attached ___ Under separate cover via _____ the following items:

___ Shop Drawings ___ Prints ___ Plans ___ Samples ___ Specifications

___ Copy of Letter Change Order _____

COPIES	NO.	DESCRIPTION
1	1	Work Plan For Site Closure – Tank Farm 2

THESE ARE TRANSMITTED as checked below:

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REMARKS: **Please find attached Work Plan for Site Closure - Tank Farm 2, for review and comment. Please call with any questions.**

Thank you,
Melanie Weed

COPY TO: **1 copy - Hasan Dogrul (DESC)**
2 copies – Dave Deroche (NAVY)
1 copy – Larry Kahrs (TtFW)
1 copy – Melanie Weed/file (TtFW)

SIGNED: **Melanie Weed (617) 457-8255**

Melanie B. Weed

If enclosures are not as noted, kindly notify us at once.

DEFENSE ENERGY SUPPORT CENTER
CONTRACT NO. SPO600-98-C-5305

DRAFT
WORK PLAN FOR SITE CLOSURE
TANK FARM 2

DEFENSE FUEL SUPPORT POINT – MELVILLE
PORTSMOUTH, RHODE ISLAND

September 2003

Prepared by

Foster Wheeler Environmental Corporation
133 Federal Street, 6th Floor
Boston, Massachusetts 02110

Revision	Date	Prepared By	Approved By	Pages Affected
0	9/15/03	M. Weed	L. Kahrs	All

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ACRONYMS

ABM	asbestos containing material
AOPEC	Area of Potential Environmental Concern
bgs	below ground surface
COC	Chain of Custody
COPC	chemical of potential concern
CSM	Conceptual Site Model
DESC	Defense Energy Support Center
DFSP	Defense Fuel Support Point
FFA	Federal Facilities Agreement
FID	Flame Ionization Detector
GAC	granular activated carbon
GZA	GZA GeoEnvironmental, Inc.
JP	jet propulsion
LEL	lower explosivity level
LNAPL	light non-aqueous phase liquids
MLW	mean low water
MS/ MSD	matrix spike/ matrix spike duplicate
NAPL	non-aqueous phase liquid
NETC	Naval Education and Training Center
NFPA	National Fire Prevention Association
NUSC	Naval Underwater Systems Center
PAH	Polyaromatic Hydrocarbon
PCB	Polychlorinated Biphenyl
PID	Photoionization Detector
ppm	parts per million
QA/QC	quality assurance/quality control
QC	quality control
RIDEM	Rhode Island Department of Environmental Management
RIPDES	Rhode Island Pollutant Discharge Elimination System
SVOC	Semi-Volatile Organic Compound
TPH	Total Petroleum Hydrocarbons
UCL	Upper Concentration Limit
USEPA	United States Environmental Protection Agency
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 2 at the former Defense Fuel Support Point (DFSP) Melville. The objective of this Work Plan is to present information pertaining to Tank Farm 2 (hereinafter referred to as "the site") including data collection, data evaluation, and potential data gaps, in order to obtain closure of the site and conveyance of 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 closure of the underground storage tanks (USTs) located at the site and activities associated with the storage and transfer of petroleum products.

Previous site investigations, analytical results, and other documents pertaining to Tank Farm 2 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 identified. This current condition was determined by reviewing the most recent data collection that has occurred onsite, comparing any detected contaminants with the appropriate RIDEM criteria for each media, and by determining the presence of NAPL. This review has led to the identification of apparent data gaps, questions, and potential issues relative to the closure of the site. It is the intent of this Work Plan to present both the Navy and RIDEM with an overall strategy for closure of this site, obtain agreement between DESC, the Navy, and RIDEM concerning this strategy, and implement any additional data acquisition that may be needed. Once any data needs are assessed and filled, the site conditions will be reassessed, 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).

In consultation with the Navy, and in an effort to move the project along, the Work Plan for Site Closure is submitted for your information. The purpose of this Work Plan is to provide RIDEM with a description of the approach and strategy at Tank Farm 2. This is the third of the four sites proposed for closure by DESC and the Navy.

Foster Wheeler Environmental Corporation (Foster Wheeler) proposes to utilize a risk-based approach 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.

1.2 Organization

This Work Plan for Site Closure is divided into five sections, each covering a different aspect of the closure strategy.

- Section 1.0 – This section provides the introduction, purpose, and organization of this Work Plan for Site Closure.

- Section 2.0 – This section describes the background of Tank Farm 2. The site location, topography, geology, hydrogeology, current/future land use, regulatory setting, environmental setting, and appropriate screening criteria are discussed.

- Section 3.0 – This section provides the facility description and activity history at Tank Farm 2. The operational history of Tank Farm 2, previous investigations, and closure activities are discussed in this section.

- Section 4.0 – This section describes the Conceptual Site Model (CSM) derived for the site. This CSM describes the potential primary and secondary sources of contamination at the site, the migration and transport mechanisms associated with these sources, and the potential intake routes of human and ecological receptors affected by these sources.

- Section 5.0 – This section describes the environmental status of the potential source areas associated with Tank Farm 2. It discusses those potential source areas that have been adequately addressed and those that have outstanding questions and issues.

- Section 6.0 – This section describes the sample management used in the supplemental sampling and investigation. Discussed in this section are proper sample identification, sample packing and shipping procedures, chain of custody preparation, and quality assurance/quality control (QA/QC) procedures.

2.0 SITE BACKGROUND

2.1 Site Description and Surrounding Area Description

Tank Farm 2 is located in the Melville section of Portsmouth, Rhode Island, approximately 1,000 feet southeast of the Fuel Loading Area (See Figure 2-1). The 70-acre site is bordered by undeveloped woodlands to the west, Tank Farm 1 and the Naval Fire Department to the northwest, Melville Campground and Recreational Area to the north and east, Melville Naval Family Housing to the southeast, and the Newport Naval Cable TV property to the south. Beyond the woodlands to the west is the Ted Hood Marine complex and Narragansett Bay. Surrounding the Cable TV property to the south is farmland. Another nearby landmark is an underground water storage reservoir located 200 feet to the northwest. This underground water storage reservoir 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 2 has eleven 2.5 million-gallon concrete USTs (Tanks 19-29) (Figure 2-2). The tanks are cylindrical in shape and located approximately 5 feet below grade. Underground petroleum distribution lines connect the USTs to the Fuel Loading Area. These fuel distribution lines are located approximately 10 feet below grade in concrete lined utility trenches. Buried conduit laterals extend from the distribution lines to the sump pump chamber adjacent to each tank. These chambers are accessed from concrete vaults at the ground surface and extend approximately 13 feet below the tank floor. The sump pump chambers are used to house the pumps associated with the tanks' petroleum transfer system, as well as the under-drainage system described below.

The surface of the Tank Farm is covered with grass, paved access roads, and miscellaneous access chambers. There are also two non-Polychorinated Biphenyl (PCB) transformer vaults (No. 219 and 220), an abandoned administrative building (No. 66), and an Electrical Substation (No. 15) located in this area. A power line right of way extends from the top of the hill towards Tank Farm 1 and the Fuel Loading Area (Figure 2-2).

Located around each tank are ring drains, a groundwater under-drainage system that prevents excessive hydrostatic uplift pressure on the bottom of the tanks. The ring drains are reportedly located 2.5 feet below the bottom of the tanks. (According to GZA GeoEnvironmental, Inc. (GZA), groundwater elevation data indicates groundwater flow in the vicinity of most tanks is radially inward towards the ring drain systems. The only tanks where groundwater occasionally drops below the bottom of the ring drains are Tanks 19, 20, and 23.) The ring drains discharge into the sump located in the sump pump chamber adjacent to the tank. The groundwater is pumped from the sumps via a common drainage pipe (also housed in the utility trench) to Tanks 9 and 10 in Tank Farm 1. The groundwater discharges from Tanks 9 and 10, through oil/water separators located in the Fuel Loading Area, into Narragansett Bay. This outfall (#008) is located 2,000 feet northwest of the site and is regulated by a Rhode Island Pollutant Discharge Elimination System (RIPDES) permit. Naval Station Newport (NAVSTA) currently monitors this permitted outfall and provides the data to RIDEM on a monthly basis.

2.2 Topography

Tank Farm 2 is located on the crown of a hill. The topography of Tank Farm 2 is relatively flat and slopes gently from approximate elevation 160 feet MLW along the eastern side of the Tank Farm to 145 feet along the western side. The surrounding grades drop steeply downward to the west, moderately downward to the north, and gently downward to the east of the tank farm. The Melville North pond is located approximately 400 feet to the northeast. The pond, located at an approximate elevation of 135 feet, discharges to the northwest through Melville Pond into Narragansett Bay. Groundwater flows under the site to the west and northwest.

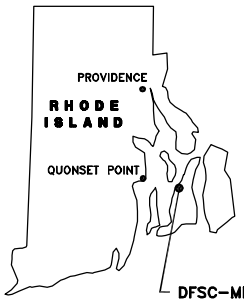

FIGURE 2-1

DEFENSE FUEL SUPPORT POINT MELVILLE
PORTSMOUTH, RHODE ISLAND

SITE LOCATION MAP

SCALE: AS SHOWN

CADDFILE: DESC007.DWG

2.3 Generalized Geology and Hydrogeology

The geology at Tank Farm 2 is generally typified by highly fractured shale bedrock, overlain by a thin veneer 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 zero to seven feet in thickness. Bedrock outcrops can be observed in many areas of 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 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 four to six 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 one to thirty feet beneath grade. Groundwater fluctuates between five and nine feet at the site during the year.

In conjunction with the Tank Farm construction, each tank has a ring drain system to prevent hydraulic uplift forces on the UST. These ring drains encircle the bottom of each tank at a depth of approximately 25 feet below grade. These ring drains operate via gravity, as the Tank Farm lies at a relatively higher elevation compared to the surrounding topography. As stated above, all collected groundwater is currently directed to an oil/water separator at the site, prior to discharge at the RIPDES-permitted outfall in Narragansett Bay.

In order to evaluate the extent of contamination onsite, a 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 2 showing a "cut and cover" tank and typical site geology is presented in Figure 2-3.

Figure 2-3 suggests that these ring drains constantly effect 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 onsite. The ring drain system has acted to minimize potential contamination from the site on a continuing basis.

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 1996 and 1997. Presently, DESC has ceased operation and vacated the site.

The re-use scenario projected for Tank Farm 2 is also industrial/commercial as a restricted recreational open space.

NOTES:

1. BASE PLAN WAS DERIVED AND DIGITIZED BY FOSTER WHEELER ENVIRONMENTAL CORPORATION IN MAY 1999 FROM DRAWING ENTITLED "DFSC-TANK FARM 2 - SITE PLAN", PROJECT NO. 31288.15, FIGURE NO. 2, CAD FILE: 31288-15.DWG, DATED MARCH 1998, BY GZA ENVIRONMENTAL, INC.
2. ORIGINAL BASE PLAN WAS DEVELOPED FROM A PLAN PROVIDED BY THE NAVY ENTITLED "MASTER SHORE STATION DEVELOPMENT PLAN PART IV SECTION 6 AREA DEVELOPMENT PLAN GAS & FUEL OIL", DATED 12/9/53, ORIGINAL SCALE 1"=100', DRAWING NO. 638010, AND FROM A 1988 AERIAL PHOTOGRAPH OF THE SITE, SCALE 1"=40'.
3. THE LOCATIONS OF THE MONITORING WELLS WERE APPROXIMATELY DETERMINED BY PACING FROM EXISTING TOPOGRAPHIC AND MAN-MADE FEATURES. THIS DATA SHOULD BE CONSIDERED ACCURATE ONLY TO THE DEGREE IMPLIED BY THE METHOD USED.

REVISIONS			
SYMBOL	DESCRIPTION	DATE	APPROVED

MELVILLE RECREATIONAL CAMPING AREA

MELVILLE RECREATIONAL CAMPING AREA

WOODED AREA

CROSS ROAD

BRADFORD AVENUE

GRASS

INSPECTED 5/15/01

TANK 28 123

GZ-213

GZ-210

INSPECTED 5/3/01

TANK 27 123

GZ-212

GZ-209

INSPECTED 5/25/01

TANK 29 123

GZ-214

GZ-211

GZ-228

C-11A

C-11

B-24

B-25

C-10A

C-10

B-22

B-23

RSC CULVERT

B-21

B-20

B-19

C-9

C-9A

GZ-219

B-18

B-17

JP-5 SATURATED SOIL PILES

GZ-215

GRASS

INSPECTED 4/11/01

C-8A

C-8

GZ-208

B-16

TANK 26 123

GZ-222

PROPERTY LINE

MELVILLE NAVY FAMILY HOUSING

NEWPORT NAVAL CABLE TV

INSPECTED 7/19/01

TANK 21 117

GZ-227

GZ-203

B-31

B-30

PLUG

C-3

B-29

B-27

B-26

C-4

B-28

INSPECTED 8/14/01

TANK 22 117

GZ-204

"SLUDGE" NOTED ON M54 McCUSKER DRAWING FD02

GZ-217

INSPECTED 6/8/01

TANK 23 117

B-4

GZ-205

INSPECTED 3/26/01

TANK 24 117

GZ-206

GZ-220

B-15

B-14

B-13

C-6

NAVAL FIRE DEPARTMENT

PROPERTY LINE

WATER TREATMENT SYSTEM

FENCE

PLUG

C-12

B-32

B-33

C-1

B-34

B-1

B-2

C-5

B-3

C-14

B-5

B-6

C-2

B-7

B-9

B-10

C-13

GZ-221

GZ-216

BURIED UTILITY LINES (TYPICAL)

INSPECTED 3/13/01

TANK 25 117

GZ-224

GZ-207

B-12

B-11

C-7

INSPECTED 3/8/01

GZ-223

TO TANK FARM 1

CULVERT

TEMPORARY DISCHARGE TO TANKS 9 & 10 (7/18/01- 7/31/01 125,000 GALLONS)

NORTH TRENCH

NAVY'S ELECTRICAL SUBSTATION

GZ-201

B-35

PUMP SUMP CHAMBER (TYPICAL)

TANK 19 108

GZ-226

GZ-225

INSPECTED 2/27/01

CONTAINS PRODUCT LINE BOTTOM SEDIMENT & WATER LINE STEAM LINE CONDENSATE LINE

GZ-202

B-8

INSPECTED 2/21/01

TANK 20 108

GZ-218

WOODED

WOODED

CONTAINS PRODUCT LINE BOTTOM SEDIMENT & WATER LINE STEAM LINE CONDENSATE LINE

CONCRETE LINED UTILITY TRENCH (TYPICAL)

SOUTH TRENCH

SOUTH ACCESS ROAD

SOUTH ACCESS ROAD

DEFENSE HIGHWAY

POWER LINE CORRIDOR

LEGEND:

GZ-201 — MONITORING WELLS INSTALLED BY GZA DRILLING, INC. BETWEEN 10/28/96 AND 12/10/96, OBSERVED BY GZA PERSONNEL

B-35 — SOIL BORING LOCATIONS PERFORMED BY GZA DRILLING, INC. BETWEEN 5/5/97 AND 5/9/97, OBSERVED BY GZA PERSONNEL

GZ-226 — MONITORING WELLS INSTALLED BY GZA DRILLING, INC. BETWEEN 9/22/97 AND 10/21/97, OBSERVED BY GZA PERSONNEL

TANK 23 117 — UNDERGROUND STORAGE TANK; INDICATES BOTTOM ELEVATION OF UNDERGROUND STORAGE TANK

0 100 200
SCALE IN FEET

P. E. SEALS

Date: SEPTEMBER 2001
Scale: AS SHOWN
Designed by: E. GRIFFIN
Drawn by: F. MENICHELLI
Checked by: L. KAHRS
Approved by: L. KAHRS

Engineering . Remediation . Planning . Consulting
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DEFENSE FUEL SUPPORT POINT MELVILLE
PORTSMOUTH, RHODE ISLAND

TANK FARM 2
SITE PLAN

PROJECT NO: 2033.1026.0000
CADD FILE NO: DESC002c.DWG
DRAWING No FIGURE 2-2
SHEET 1 OF 1

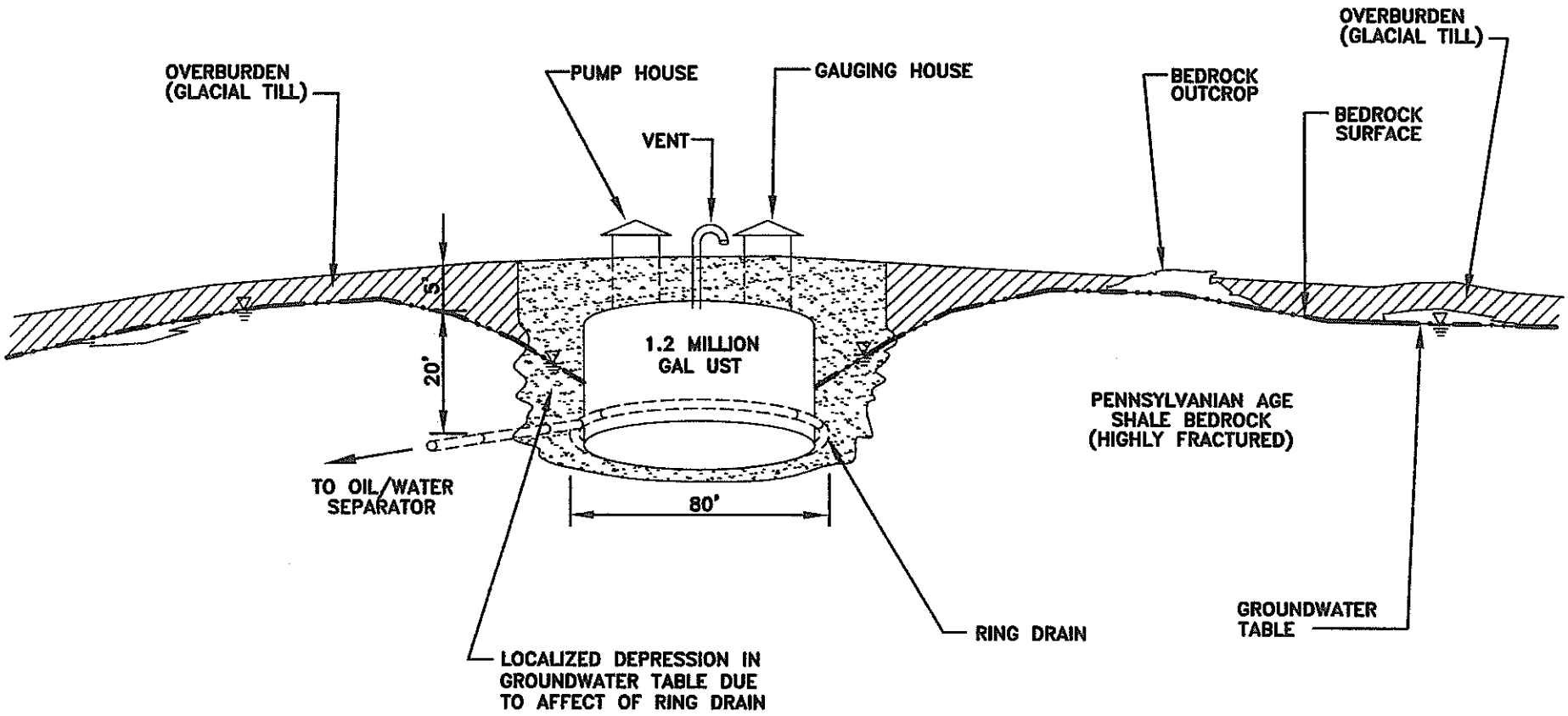


FIGURE 2-3

DEFENSE FUEL SUPPORT POINT MELVILLE
PORTSMOUTH, RHODE ISLAND

GENERALIZED CROSS-SECTION OF TANK FARM 2 SHOWING "CUT AND COVER" TANK AND TYPICAL SITE GEOLOGY

NOT TO SCALE

CADDFILE: 10060000_A0014.DWG

2.5 Regulatory Setting

2.5.1 Regulatory Jurisdiction

The Tank Farm 2 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. For this reason, DESC seeks to meet the RIDEM UST requirements regarding the closure of the tank system at the Tank Farm 2 site.

It is also recognized that the Navy, RIDEM, and the United States Environmental Protection Agency (USEPA) have established a Federal Facilities Agreement (FFA) concerning the regulatory framework and responsibilities at this site. All work proposed in this Work Plan shall be done in consultation with the Navy in order to ensure that this work is consistent with the provisions of the FFA.

2.6 Environmental Setting

2.6.1 Groundwater Classification

The groundwater beneath, and to the west and northwest of the site, has been classified by RIDEM as GB. 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. The groundwater to the northeast, east, and south 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 Melville North pond is located approximately 400 feet northeast of the tank farm. This pond is classified by RIDEM as Class A. Class A surface water bodies are suitable for drinking water supplies and all other water uses. Narragansett Bay is located approximately 1,000 feet west of the site and (in the vicinity of the site) is classified as a Class SB1 water body. Class SB1 waters are saltwater bodies that are designated for primary and secondary contact recreational activities, shellfish harvesting for controlled relay and depuration, and fish and wildlife habitat. They are suitable for aquacultural uses, navigation, and industrial cooling and must have good aesthetic value.

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-d):

- the site is currently limited to industrial/commercial activity;
- access to the property is limited to individuals working or temporarily visiting the site;

- 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); and
- an environmental land use restriction is in effect with respect to the property (This restriction is proposed as part of this Work Plan).

Method 1 Direct Contact and GB Leachability Criteria, based on GB classification, were applied to the soil data. No soil data exceeded these criteria.

Since Total Petroleum Hydrocarbons (TPH) can be a useful indicator of potential adverse impacts to human health, TPH Soil Objectives were also applied to the site (Direct Exposure and GB TPH Leachability Criteria). The Method 1 Industrial/Commercial TPH Direct Exposure Objective and the Method 1 GB TPH Leachability Criterion were compared to the analytical data from the soil samples collected onsite. One exceedance was noted from boring GZ-209, for both criteria.

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 the Method 1 GB Groundwater Objectives for each chemical detected on site. No groundwater exceedances were noted.

3.0 FACILITY DESCRIPTION AND HISTORY

3.1 Facility History

The United States Navy has owned this property since at least the 1940s. Tanks 19 to 29 were built between 1941 and 1943. The tank farm was operated by the Navy from the 1940s to 1974, and has been controlled by DESC ever since. Presently, DESC maintains contractual control of the facility, but has ceased operation at the property.

The tanks were used to store No. 5 fuel oil from the 1940s to 1975, distillate fuel (transition from No. 5 fuel oil to No. 2 fuel oil) from 1975 to 1985, and marine diesel fuel from 1985 to the mid-1990s. Tank 22 was taken out of service and cleaned in the mid-1970s and then used as a slop tank. The other tanks were taken out of service in the mid-1990s. Presently, the Tank Farm is inactive and the tanks have been closed in place.

As with the other tank farms, some of the USTs in Tank Farm 2 were periodically cleaned. Also, the tank bottoms were periodically pumped to remove accumulated sediments and water. Prior to the 1980s, the tank bottoms were pumped to an oil/water separator and sand filter unit near Tank 3 in the Fuel Loading Area. At some time in the past, the bottoms may also have been discharged to the ground surface in the vicinity of each tank. Since the 1970s, the bottoms have reportedly been properly disposed of at off-site facilities. Historical information suggests that tank bottom sludge, generated during tank cleaning, was disposed to the ground surface in the vicinity of each tank being cleaned from the mid 1940s until the mid 1970s. Between 500 and 900 cubic yards of sludge was reportedly disposed of at Tank Farm 2 (TRC, 1992).

Photos from the Tank Farm in 1981 show 9 dump loaded piles of contaminated soil labeled "Jet Propulsion (JP)-5 Saturated Soil". These soil piles were located 300 feet west of Tank 28. Since JP-5 fuel was not stored in Tank Farm 2, the soil apparently came from another area. There is no evidence of the soil piles remaining in Tank Farm 2 now.

3.2 Spills and Releases

As stated in the Study Area Screening Evaluation Work Plan (TRC, 1992), aerial photographs taken in 1951 shows "a series of three to four elongated ground scars approximately 400 feet southwest of Tank 25. These scars may be indicative of sludge disposal areas". Also, "the rectangular feature in the 1981 and 1988 aerial photographs may indicate a sludge disposal area". Additional discussion about the sludge disposal areas occurs later in this Work Plan.

3.3 Previous Investigations Performed at Tank Farm 2

Previous environmental investigations have been conducted at Tank Farm 2 by Envirodyne Engineers, Inc. in 1983, TRC Environmental Consultants, Inc. in 1992, GZA between 1996 and 1998, and Foster Wheeler in 1999 and 2001. The results of each of these investigations are summarized below.

- Initial Assessment Study [1983]

In March 1983, Envirodyne Engineers Inc. completed a Final Initial Assessment Study of 18 areas at the Naval Education and Training Center facility, including Tank Farm 2. This study was performed for the U.S. Navy to identify potential threats to human health or to the environment caused by past hazardous substance storage handling or disposal practices. The study did not include any soil or groundwater

testing but identified that tank bottom sludge may have been disposed of on the ground in the general vicinity of the tank being cleaned, and recommended that additional studies be performed.

- Study Area Screening Evaluation Work Plan [1992]

In July 1992, TRC Environmental Consultants, Inc. prepared a Work Plan for the environmental investigation of six sites on the U.S. Navy Naval Education and Training Center (NETC) and Naval Underwater Systems Center (NUSC) in Newport, Rhode Island. Tank Farm 2 was one of the study areas discussed.

The objective of the investigation of Tank Farm 2 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 a rectangular area of approximately 100 feet by 300 feet within the central portion of the tank farm between tanks 23 and 28. The edges of this area were defined by square concrete pillars laid end to end. Soil mounds, consisting of discolored soils, shale fragments, and various debris were observed at the northern end of this area. According to the Navy Contracting Officer, large, round Naval buoys were once stored at the northern end of this rectangular area, but he did not know the past use of the rectangular area.

Aerial photographs of the site taken from 1942 to 1988 were reviewed. The following timeline exits at Tank Farm 2:

- 1942 – Construction of the eleven tanks are seen.
- 1951 – A series of three to four elongated scars 400 feet southwest of Tank 25 were observed. These scars may be indicative of sludge disposal areas.
- 1963 – A heavily vegetated Tank Farm 2, with no indication of the ground scars, and the Melville North Pond, approximately 600 feet east of Tank 28.
- 1965 – A circular ground feature was observed near the southwestern portion of the tank farm
- 1981 – A large rectangular area was observed near the eastern central portion of the tank farm. A series of round features were visible at the northern portion of this area, representing Naval buoys. Also, several mounds of light colored fill material were present at the extreme northwest portion of the site next to Substation No. 15.
- 1988 – The rectangular feature was still present, but not the round features.

The proposed site investigation components contained in this document include reconnaissance surveys, geophysical surveys, a soil gas survey, soil and groundwater sampling, and a land survey.

- Work Plan for Site Investigation - Tank Farm 2 [1997]

In 1996, GZA conducted part of a Site Investigation to investigate the nature and extent of soil and groundwater contamination at Tank Farm 2. This investigation program included:

- the completion of 35 shallow soil borings along the route of the underground product distribution lines;
- the screening and analysis of soil samples collected during the drilling;
- the installation of 11 monitoring wells, one beside each of the tanks;
- the collection and analysis of groundwater samples from the newly installed wells; and
- the recording of separate phase product thickness.

Between October and December 1996, monitoring wells GZ-201 to GZ-211 were installed. Each well was placed in proximity to one of the 11 USTs. The locations of these wells are shown in Figure 2-2. During the installation, soil samples were collected at 5-foot intervals, and screened for Volatile Organic Compounds (VOCs) using a Photoionization Detector (PID) and a Flame Ionization Detector (FID). Ten of the boring samples were then submitted to the laboratory for TPH, VOCs, and Polyaromatic Hydrocarbon (PAH) analysis. The results of the analyses indicated:

- Borings GZ-205 (Tank 23), GZ-207 (Tank 25), and GZ-209 (Tank27) registered PID and or FID levels between 35 and 1,000 ppm.
- These same three samples revealed elevated TPH soil levels up to 5,600 ppm, and low but detectable levels of VOCs and PAHs.
- The remaining soil samples all showed TPH levels less than 200 ppm.

In May 1997, the thirty-five shallow soil borings (Borings B-1 through B-35) were taken along the route of the fuel distribution lines in Tank Farm 2. The locations of these borings are shown in Figure 2-2. The borings were advanced to a depth of 12 feet. One soil sample was obtained from each boring at a depth of 10 to 12 feet (typically just below the bottom of the concrete lined utility trench). The soil samples were screened for VOCs using a PID and FID and then submitted to the laboratory for analysis for TPH. The results of the analysis indicated:

- Borings B-10, B-12, and B-13, near Tank 25, exhibited elevated PID and FID readings.
- Borings B-10, B-11 and B-12, near Tank 25, exhibited elevated TPH concentrations (550 to 1,800 ppm).
- The remaining samples had TPH concentrations less than 63 ppm, with most less than 10 ppm.

In order to complete the Site Investigation at Tank Farm 2, GZA suggested:

- The installation of 17 additional groundwater wells;
- Field-screening of the soil cuttings for total VOCs with an FID;
- Collection of soil samples, obtained during the drilling of the monitoring wells;
- Collection of groundwater samples; and
- Analysis of these samples for VOCs, TPH, and PAHs.

- Site Investigation - Tank Farm 2 [1998]

In 1997, GZA conducted the rest of their Site Investigation at Tank Farm 2. This investigation included:

- the installation of 17 monitoring wells;
- the screening and analysis of soil samples collected during the drilling;
- the recording of separate phase product thickness; and
- the collection and analysis of groundwater samples from the newly installed wells.

In September and October 1997, an additional 17 monitoring wells (GZ-212 to GZ-228) were installed in a second phase of drilling. The locations of these wells are shown in Figure 2-2. Wells GZ-212, GZ-213, and GZ-214 were upgradient wells, located in the northeast part of the site between the Melville Recreational Camping Area and the Tank Farm. GZ-215 was located where the "JP-5 Saturated Soil" piles were reportedly stored. Wells GZ-221, GZ-223, and GZ-224 were located near Tank 25 in proximity of the shallow borings where soil samples had exhibited elevated TPH levels. The remaining monitoring wells were placed down-gradient of each tank (except Tank 28).

Soil samples were collected during the installation at 5-foot intervals and screened for VOCs using a PID and FID. Twelve selected soil samples, from borings GZ-212 to GZ-228, were submitted for analysis of TPH, VOCs, and PAHs. The results of these analyses indicated:

- Boring GZ-227, near Tank 21, exhibited elevated PID/FID readings.
- Borings GZ-217, and GZ-221 and GZ-224, near Tanks 21 and 25, exhibited lower detectable PID and FID readings.
- All samples showed TPH levels less than 200 ppm.

In June 1997, groundwater samples were taken from wells GZ-201 to GZ-211, except well GZ-207, which was dry at the time and could not be sampled. In December 1997, a groundwater sample was collected from well GZ-207 and from the newly installed wells GZ-212 to GZ-228. All of the samples were analyzed for TPH, VOCs, and PAHs.

- Wells GZ-201, GZ-202, GZ-208 and GZ-211 exhibited floating petroleum product, with the greatest average thickness observed in GZ-201 and GZ-202. These wells are located down-gradient or in the immediate vicinity of Tanks 19, 20, 26, and 29. (GZA reported an apparent correlation between the groundwater elevation and floating product thickness in GZ-201, but not in the other monitoring wells.)
- Twelve of the 28 samples exhibited detectable levels of TPH. The highest concentrations detected were in wells GZ-201, GZ-211, GZ-227, and GZ-218 at 1,600, 190, 28 and 5.4 ppm, respectively. These wells are located near Tanks 19, 29, 21, and 20, respectively. The remaining samples showed detections of less than 2.5 ppm.
- Fifteen of the 28 wells exhibited low levels of VOCs and PAHs, with no result exceeding RIDEM GB Groundwater Objectives. Naphthalene was detected in one sample (GZ-205 downgradient of Tank 23) above the RIDEM GA Groundwater Objective. GZA recommended additional investigations in this area.

- Tank Closure Assessment Report – Tank Farm 2 [1998]

Tank Farm 2 tank closure activities were conducted between September 1996 and May 1997. Before the tanks were cleaned, representative samples were collected from each of the eleven tanks for waste characterization. Nine of the tanks (Tanks 19 – 21 and 23 to 28) were found to contain variable quantities of residual marine diesel, other previously stored fuel oils, and water that had reentered the tanks. Tank 22 was found to contain a mixture of heavy sludge, soils, debris, and several types of oil. Although petroleum based, the type of petroleum product stored in Tank 22 could not be reasonably characterized.

Tanks found to contain large volumes of water were pumped down to levels sufficient to support tank entry. Recovered water in Tank Farm 2 tanks were consolidated in Tanks 21, 24, and 27 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 cleaned with a water soluble, biodegradable degreaser. The surfaces of each tank were washed with water after allowing the degreaser to penetrate. The washwater, sludge, oil, and other debris generated during cleaning was removed via pumps and other necessary equipment. Also, along with cleaning the tanks, all accessible appurtenances associated with each tank (i.e., pumps, interior pipelines, and vaults) were cleaned. In addition, oil/water separators

located in the vaults adjacent to the tanks and associated with the ring drains were emptied and cleaned. The separators were returned to service after the completion of the cleaning activities.

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 received this certification. Along with these gas free inspections, 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. The structural assessment reports revealed that all of the tanks had cracks in the floors. Weeping of oil/water into Tanks 19 – 24, and Tank 27 was also noted. Groundwater was observed to be weeping into Tanks 26 and 28.

In addition to cleaning and inspecting the tanks at Tank Farm 2, the fuel distribution pipelines associated with each tank and the transfer pipe loop were permanently decommissioned. 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% LEL. After completion of the pipeline cleaning, openings used to access and the clean the pipes were grouted and a blank flange was attached to prevent reuse.

Additionally, GZA conducted abatement activities of asbestos-containing insulation encountered on sections of the pipeline. Containment chambers were constructed within vaults where the piping was to be accessed for cleaning. The asbestos insulation was removed and then disposed of at an approved facility licensed to accept the material.

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.

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

- Tanks 19 through 29 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 some of the tanks and their associated vaults. Groundwater appears to be reentering the tanks through cracks or other structural deficiencies noted in the tank structural reports.
- The underground petroleum distribution lines were cleaned, closed in-place, and capped.
- Some of the pipelines used to convey fuel oil between the tanks in Tank Farm 2 and between Tank Farm 2 and the Lower Fuel Loading Area are insulated with asbestos containing material (ACM). The remaining ACM should be removed and disposed of at a licensed facility.
- The tanks in Tank Farm 2 should be permanently decommissioned using procedures approved by RIDEM. (It should be noted that GZA was not able to obtain the signed UST Closure Permits to complete this task)
- Upon completion of the decommissioning and ballasting of the tanks, the ring drain system at Tank Farm 2 should be permanently closed.
- Cracks in some of the USTs have resulted in petroleum releases to the subsurface environment. The extent of the subsurface contamination was not fully defined.

- Results of Groundwater Sampling for Fuel Loading Area and Tank Farms 1, 2, and 3 [1999]

In June 1999, Foster Wheeler sampled nine wells out of the twenty-seven monitoring wells at Tank Farm 2 (GZ-207, GZ-208, GZ-212, GZ-213, GZ-214, GZ-218, GZ-221, GZ-225, and GZ-227). All were analyzed for TPH, VOCs, and Semi-Volatile Organic Compounds (SVOCs). The results of the analysis were:

- NAPL was measured in wells GZ-202 and GZ-211, at 0.28 and 0.08 feet respectively, and therefore no samples were collected.
- TPH was detected in all wells, at concentrations ranging from 0.3 to 37 ppm. GZ-208 exhibited the highest concentration.
- Low level VOCs, ranging from 3 - 20 µg/l, were detected in wells GZ-207, GZ-208, GZ-218, and GZ-225.
- Seven out of the 9 wells sampled exhibited detectable levels of some SVOCs (1 – 10 ug/L).
- No exceedances of the RIDEM GB Groundwater Objectives were observed.

- Condensed Work Plan for Recovery Well Installation and Free Product Removal from Tank Farm #2 [2001]

This Work Plan described the activities associated with the removal of light non-aqueous phase liquids (LNAPL) or free product from groundwater surrounding underground storage tanks 20, 21, 26, and 29 in Tank Farm 2. These locations were chosen based on LNAPL levels detected during on-going tank closure activities at this Tank Farm. Product was also detected weeping through the bottom of tank 22 during closure indicating free product may be trapped below that tank.

The goal of this Work Plan was to remove free product from Tank Farm 2. Separate phase oil was detected in several monitoring wells surrounding underground storage tanks 20, 21, 22, 26 and 29 as indicated in the gauging data collected on July 10, 2001. Product was also detected seeping up from cracks in the bottom of tank 22. The work to remove the free product will proceed in the following phases:

Phase 1: Excavation of the edges of suspect tanks near proposed recovery well locations to verify tank locations. Once tank edges are confirmed, three 6-inch recovery wells will be installed around each of the following tanks: 20, 21, 22, 26 and 29, approximately 5 feet from the edge and equally spaced around the tank perimeter. This area is suspected to be the fill area between the tanks and the original shale ledge that was blasted out for tank construction. A majority of the LNAPL is suspected to be contained within this zone. In addition, one 6-inch recovery well will be installed on the downgradient side of tank 22 to intercept the ring drain located beneath the tank.

Phase 2: A vacuum truck and extension tube will be used to collect free product as it accumulates in each well. Thickness of product and the height of the groundwater/oil interface will be recorded twice weekly. This gauging data will be used to determine which wells will be pumped for product recovery. Total gallons removed from each well will be recorded.

Phase 3: After six weeks the data collected during the removal process will be reviewed. At this time Foster Wheeler will make a recommendation to continue product removal in the same manner or to enhance the method of collection with the use

of a more automated system, vacuum enhanced bio-slurping or other alternative technologies to improve recovery rates to speed up site closure.

- Remedial Action Report for the Underground Storage Tank and Piping Cleaning at Tank Farm 2 [2002]

Between January and August 2001, Foster Wheeler emptied and cleaned eleven (11) USTs (Tanks 19 – 29) at Tank Farm 2. The following occurred at each UST:

- The tank and pump chamber contents were pumped through an on-site water treatment system and back to clean tanks for re-ballasting. Liquids that could not be treated, such as sediment laden water and petroleum product were transported and disposed of off-site.
- The interior roof, walls, and floors were cleaned with a high-pressure water wash.
- The floors were wiped dry and the rinse water was collected and transferred through the water treatment system prior to being pumped into a previously cleaned tank for re-ballasting.
- Tanks were re-ballasted with approximately 1.25 million gallons of treated water to equalize the hydrostatic pressure inside and outside the tank.

Following cleaning, each UST was inspected for any signs of deterioration and/or water or petroleum infiltration through the tank walls or floor. Areas identified as points of infiltration or potential future points of groundwater infiltration were repaired. In concrete tanks such as those in Tank Farm 2, repair entailed widening cracks with a pneumatic chipping hammer to remove the affected area of concrete (<1/2 inch wide and <3 inches deep). The larger crack was then plugged with quick-curing marine hydraulic cement (Vandex Plug/Wasserstopper). The repaired area was inspected for continued infiltration of water or petroleum product the following day. If infiltration ceased, the repair was complete and conversely if infiltration continued, the crack was widened and plugged again until infiltration ceased.

Certification and inspection services were done on the eleven USTs and their adjacent pump chambers at Tank Farm 2. Each UST was suitable for closure in accordance with RIDEM UST closure criteria and the National Fire Prevention Association (NFPA) guidelines. The Marine Chemist entered each UST and monitored atmospheric conditions, including oxygen, combustible gases, carbon monoxide, hydrogen sulfide, and VOCs. The physical inspection criteria included the presence or absence of infiltrating or seeping liquids, and sediment or sludge residues. The Marine Chemist then issued a certificate indicating that the atmospheric and physical parameters had been met. The Marine Chemist's final certification indicated that the tank was gas-free, i.e., safe for workers and safe for hot work.

The fuel distribution piping associated with the Tank Farm 2 site was inspected in conjunction with this tank closure. Foster Wheeler re-verified that the piping was cleaned and decommissioned during previous efforts to clean and close Tank Farm 2. 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, or VOCs.

If a length of piping contained residual liquids, elevated combustible gases, or VOCs, that length of pipe was cleaned. Piping was cleaned by the standard "pigging" method, which consists of inserting a Styrofoam plug, or "pig", in the upgradient end of the pipe, applying a vacuum to the downgradient end of the pipe thus advancing the plug through the length of the pipe. Liquids generated as a result of this process were collected in the vacuum truck and then bulked with other liquids from the Tank Farm 2 closure activities. Once the piping was cleaned, a Marine Chemist inspected the endpoints of each section

of pipe to certify that the piping met both atmospheric and physical criteria as described above. Upon certification from the Marine Chemist indicating the piping to be acceptable for closure the piping was sealed using quick curing marine hydraulic cement.

In conjunction with tank cleaning activities, Foster Wheeler treated approximately 15,200,000 gallons of water through an on-site GAC treatment system. Treated water was subsequently discharged to clean tanks for ballast. The water treatment system was required to conform to the Navy's RIPDES permit requirements because of the contingency plan of discharging out the RIPDES outfall.

- Product Recovery – Tank Farm 2 [2003]

The approach for product removal at Tank Farm 2 consisted of three phases:

- Excavation to confirm the locations of the edges of the tanks and installation of the 6-inch diameter extraction wells;
- Installation of a conveyor belt product removal system and subsequent monitoring of product/water levels in the wells and gallons of product recovered from each well; and
- Enhancement of product recovery by installation of an automated vacuum system after 6 weeks of monitoring the conveyor belt system.

In October 2001, mobilization occurred to perform the tank location excavations. These excavations were necessary because the tops of the tanks were buried beneath 5 feet of backfill and the tank installation method (blasting out cavities in the bedrock for the placement of the tank) allowed for very little space between the tank wall and the surrounding bedrock. This annular space was targeted for the well installation because it was thought to contain recoverable free product. In most cases, the recovery well was located between the tank and a monitoring well found to contain free product.

Five recovery wells were installed on October 9, 2001. The rationale and the placement of these wells was as follows:

- RW1 – Installed at Tank 29, between the tank wall and GZ-211 (where gauging showed up to 0.11 feet of product).
- RW2 – Installed at Tank 21, between the tank wall and down-gradient of well GZ-227 (where gauging showed 0.02 feet of product).
- RW3 – Installed at Tank 26, between the tank wall and well GZ-208 (where gauging showed 0.01 feet of product).
- RW4 – Installed at Tank 20, between the tank wall and well GZ-202 (where gauging showed 0.05 feet of product).
- RW5 – Installed at Tank 22, where historical records showed TPH-contaminated soils.

In November 2001, the conveyor belt product recovery system was installed at RW1 and was run for 11 weeks. Water levels were monitored to ensure the belt continued to operate effectively. On February 7, 2002, a vacuum was attached to the belt skimmer to enhance product recovery. No product was recovered from this well. In April 2002, the system was moved to RW-5 and run until late July 2002. Again, no product was recovered.

Conclusions drawn from this operation were:

- The bedrock that was used to backfill the space between the tanks and the bedrock after the tanks were built is impermeable to water.
- This backfill appeared, and was confirmed during drilling, to have been well compacted allowing very little pore space to exist between grains.
- Material such as this backfill demonstrates a low transmissivity value for water, and an even lower one for No. 6 fuel.
- Pockets of fuel exist in the ground but this material does not allow them to be mobilized, therefore, it appears that the removal of this fuel will only be accomplished through excavation of contaminated soils.

3.4 Previous Response Actions/Closure Activities

The following activities have been conducted in order to facilitate closure of Tank Farm 2.

3.4.1 Free Liquid Recovery

As described in Section 3.3, *Product Recovery – Tank Farm 2* [2001], five recovery wells were installed in October 2001 (see Section 3.3 for locations). The conveyor belt product recovery system was installed at RW1 and was run for 11 weeks. On February 7, 2002, a vacuum was attached to the belt skimmer to enhance product recovery. No product was recovered from this well. In April 2002, the system was moved to RW-5 and run until late July 2002. Again, no product was recovered. It was concluded that the removal of fuel will only be accomplished through excavation of contaminated soils.

3.4.2 Tank Cleaning/Closure

As discussed in Section 3.3, *Tank Closure Assessment Report – Tank Farm 2* [1998], closure activities were conducted between September 1996 and May 1997. The following activities took place:

- Representative samples were collected from each of the eleven tanks for waste characterization. Residual marine diesel, other previously stored fuel oils, and water that had reentered the tanks was found in nine tanks. Tank 22 was found to contain a mixture of heavy sludge, soils, debris, and several types of oil that could not be reasonably characterized.
- Tanks found to contain large volumes of water were pumped down to levels sufficient to support tank entrée and recovered water was consolidated in Tanks 21, 24, and 27 for treatment with GAC prior to discharge from the site.
- 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.
- Oil/water separators located in the vaults adjacent to the tanks and associated with the ring drains were emptied and cleaned. The separators were returned to service after the 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 received this certification.
- Structural inspections were also performed and were limited to the interior surfaces of the tank shell and bottom, due to inaccessibility (buried) of the exterior structures. The structural assessment reports revealed that all of the tanks had cracks in the floors.

As discussed in Section 3.3, *The Remedial Action Report for the Underground Storage Tank and Piping Cleaning at Tank Farm 2* [2002], the USTs at Tank Farm 2 were cleaned between January and August 2001. The following occurred:

- The tank and pump chamber contents were pumped through an on-site water treatment system and back to cleaned tanks for re-ballasting. Liquids that could not be treated, such as sediment laden water and petroleum product were transported and disposed of off-site.
- The interior roof, walls and floors were cleaned with a high-pressure water wash.
- Tanks were re-ballasted with approximately 1.25 million gallons of treated water to equalize the hydrostatic pressure inside and outside the tank.
- Following cleaning, each UST was inspected for any signs of deterioration and/or water or petroleum infiltration through the tank walls or floor. Areas identified as points of infiltration or potential future points of groundwater infiltration were repaired.
- Certification and inspection services were done on the eleven USTs and their adjacent pump chambers at Tank Farm 2. Each UST was suitable for closure in accordance with RIDEM UST closure criteria and the NFPA guidelines.
- The Marine Chemist's final certification indicated that the tank was gas-free, i.e., safe for workers and safe for hot work.

3.4.3 Pipeline Cleaning/Closure

In Section 3.3, *Tank Closure Assessment Report – Tank Farm 2* [1998] and *The Remedial Action Report for the Underground Storage Tank and Piping Cleaning at Tank Farm 2* [2002], the cleaning and closure of the fuel distribution pipelines is discussed. The following is a summary of these reports:

- Between September 1996 and May 1997 the piping was accessed, purged, water washed, and flushed.
- The interior of the pipes were screened with a PID and an 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% LEL.
- After completion of the pipeline cleaning, openings used to access and the clean the pipes were grouted and a blank flange was attached to prevent reuse.
- Between January and August 2001, the fuel distribution piping was inspected and re-verified that the piping was cleaned and decommissioned during previous efforts to clean and close Tank Farm 2.
- 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, or VOCs. If a length of piping contained residual liquids, elevated combustible gases, or VOCs, that length of pipe was cleaned.
- Once the piping was cleaned, a Marine Chemist inspected the endpoints of each section and indicated that the piping was acceptable for closure. The piping was sealed using quick curing marine hydraulic cement.

4.0 CONCEPTUAL SITE MODEL

As mentioned previously, a CSM was constructed for Tank Farm 2 (Figure 4-1). A CSM is an integrated description of how people and potential ecological receptors could come into contact with contaminants at the site. The CSM has four main objectives, as follows:

- Identify the potential **sources** of the chemicals of potential concern (COPCs) and the likely distribution of the COPCs in the environmental media at the site;
- Identify the **mechanisms** by which the COPCs may move between environmental media and be transported through the environment;
- Identify the populations of **human and ecological receptors** that could come into contact with the affected media; and
- Identify the **routes of intake** (such as incidental ingestion of the soil or groundwater) by which the populations may be exposed.

The CSM was used as the basis for evaluating environmental site management options and identifying corresponding data needs.

4.1 Primary Sources

As shown in the first column of Figure 4-1, several known or suspected primary sources are located throughout Tank Farm 2. Primary sources include:

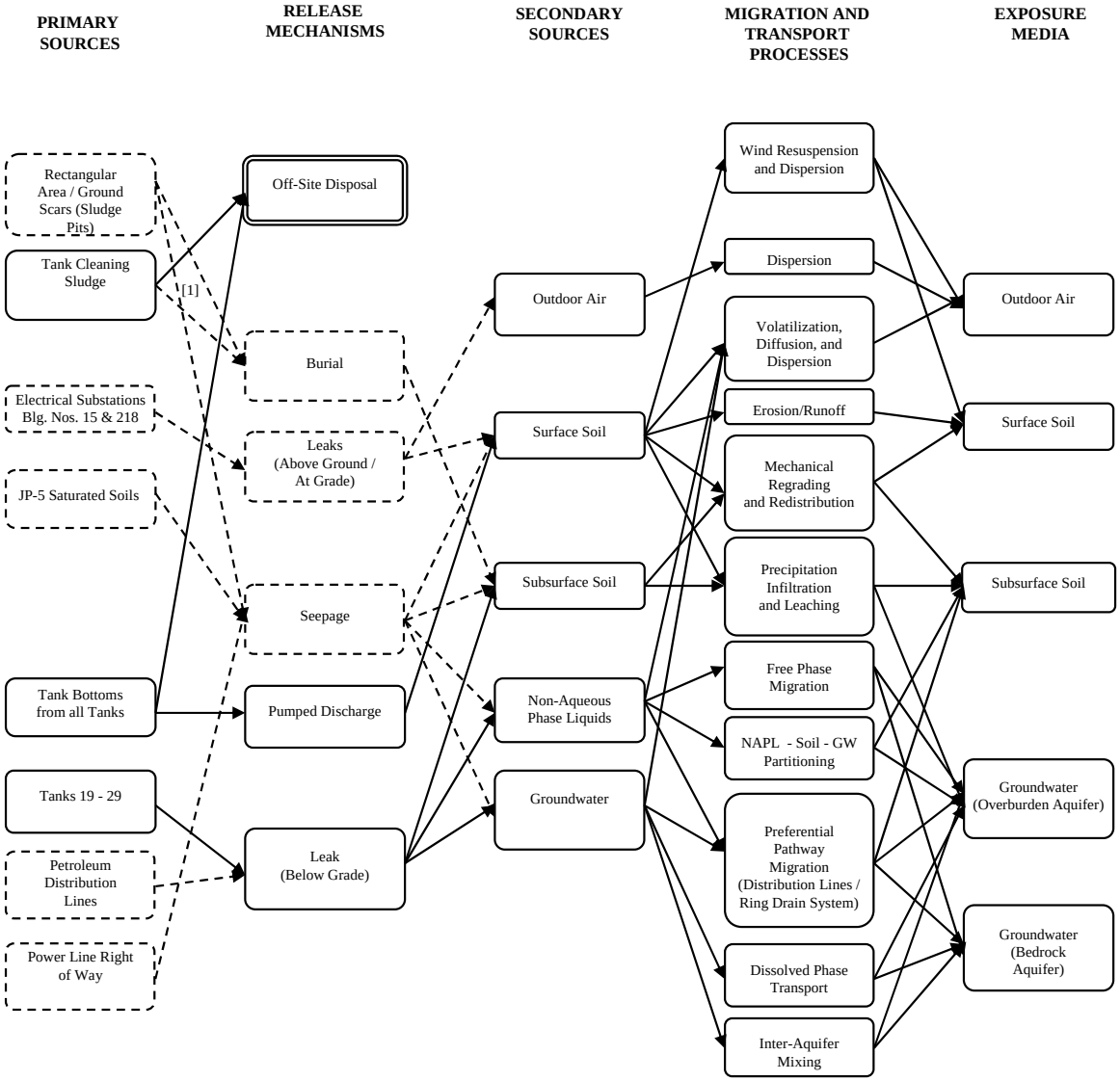
- The rectangular area and ground scars noted from aerial photographs of the site suspected to indicate sludge disposal;
- The tank cleaning sludge;
- The electrical substations;
- The JP-5 saturated soils piles;
- The tank bottoms from all of the tanks;
- Tanks 19 – 29;
- The concrete lined utility trenches that housed the petroleum distribution lines; and
- The power line right of way.

4.2 Secondary Sources

Releases from the primary sources may enter the surrounding soil or groundwater that may then serve as secondary sources of the constituents. Releases from the primary sources are possible due to leaks, seepage, and other activities that occurred as part of routine tank farm operations. Also, a few known releases have been documented. These releases include the disposal and seepage of tank bottoms and sludge from the USTs. Possible secondary sources at Tank Farm 2 are shown in Figure 4-1 and are discussed below.

Releases from the tanks and distribution lines, such as the product leaking from the tanks, may have resulted in contamination of the soils and possibly groundwater in the proximity of these facilities. Depending on the lateral extent of the spread of the free product, the concrete lined utility trenches containing the existing product transfer and drainage system pipelines may have become impacted.

FIGURE 4-1
CONCEPTUAL SITE MODEL FOR THE TANK FARM 2 PROPERTY



INTAKE ROUTES	POTENTIAL -> RECEPTORS -> [2]	C / - Site Worker	C / - Controlled-Access Visitor	- / F Groundskeeper	- / F Construction Worker	- / F Visitors	C / F Ecological (Terrestrial)	C / F Ecological (Aquatic)
Inhalation of Particulates		X	X	X	X	X	X	
Inhalation of Volatiles		X	X	X	X	X	X	
Incidental Ingestion		X		X	X	X	X	
Dermal Absorption		X	X	X	X	X	X	
Inhalation of Particulates		X	X	X	X	X	X	
Inhalation of Volatiles		X	X	X	X	X	X	
Incidental Ingestion				X	X		X	
Dermal Absorption				X	X		X	
Inhalation of Particulates				X	X		X	
Inhalation of Volatiles					X		X	
Ingestion		X						
Incidental Ingestion		X			X			
Dermal Absorption		X			X			
Inhalation of Volatiles		X			X			
Ingestion								
Incidental Ingestion								
Dermal Absorption								
Inhalation of Volatiles					X		X	

NOTES:
[1] Dashed lines indicate possible sources or processes that have not been conclusively proved or disproved.
[2] C = Current Land Use; F = Possible Future Land Use

GW = Groundwater
SW = Surface Water
NAPL = Non-Aqueous Phase Liquids

The ring drains and associated drainage system discharged into a sump pit located in the pump sump chamber adjacent to each tank. The groundwater was pumped from the sump pit to a common drainage pipe that discharges to Tanks 9 and 10 located in Tank Farm 1. (It should be noted, the ring drain system may have also formed a preferential pathway for material released in the vicinity of the tanks.) These discharges, as well as past disposal practices, such as discharging tank bottoms and placing sludges in the vicinity of each tank may have resulted in the contamination of shallow and deeper subsurface soils, and groundwater in this area.

Previous aerial photographs show a large rectangular area located in the eastern central portion of the site and three to four elongated ground scars approximately 400 feet southwest from Tank 25. These are considered areas of possible sludge burial and may have impacted the soils and groundwater of the site due to seepage. In 1981, a photograph depicted JP-5 saturated soil piles located west of Tank 28. These soils may have seeped contamination into the soils and groundwater of the site.

A power line right of way is located on the western portion of the site. Herbicides that may have been sprayed in this right of way may have leached into the soils and groundwater on site. Electrical substations located in the northern part of the site may have leaked and contaminated the surface soil or the outdoor air.

4.3 Migration and Transport Mechanisms

Once in the environment, various migration and transport mechanisms are likely to act to disperse and redistribute the contaminants remaining at Tank Farm 2. The CSM identifies potential migration and transport mechanisms for the constituents at Tank Farm 2. These mechanisms are shown in Figure 4-1 and are discussed below.

Contaminants that are present in the outdoor air from various release mechanisms may be transported throughout the outdoor air by dispersion. Contaminants present in the soil may migrate to the outdoor air by wind resuspension and dispersion or volatilization, diffusion, or dispersion. Contaminants in the soil may migrate throughout the soil by erosion or runoff, mechanical regrading and redistribution, or precipitation, infiltration, and leaching. Contaminants in the soil may move through the soil and into the groundwater via precipitation, infiltration, and leaching.

Contaminants in NAPL may migrate to the outdoor air by volatilization, diffusion, or dispersion. Contaminants in NAPL may move into the groundwater via free phase migration, NAPL-Soil-Groundwater partitioning, or by preferential pathway migration (distribution lines / ring drain system). Contaminants in NAPL could also be transported to the subsurface soil by NAPL-Soil-Groundwater partitioning. Contaminants in the groundwater may be transported throughout the groundwater by preferential pathway migration (distribution lines / ring drain system), dissolved phase transport, or inter-aquifer mixing. Contaminants in groundwater may migrate to the outdoor air by volatilization, diffusion, or dispersion.

4.4 Potential Human and Ecological Receptors

The CSM identifies potential human and ecological populations that may be at risk of exposure to the contaminants remaining at Tank Farm 2. These populations depend on how the property is used now and in the future. Below, current and potential future land uses are discussed, and the potentially exposed populations associated with these land uses are identified.

Current Human Receptors. Currently, the property is an inactive petroleum fuel tank farm. The majority of the site is fenced and locked, and access to the area is controlled by DESC. Individuals occasionally visit the site, generally in the context of the ongoing tank closure or site clean-up activities. Therefore, the populations at current risk of exposure are adult site workers or controlled-access visitors who could be exposed during their time on-site. However, the duration of visits and the intensity of a visitors' interaction with the potentially impacted site media are typically much less than that of a site worker, and the visitor would be expected to experience significantly less potential for exposure than the site worker.

Potential Future Human Receptors. In the future, the site is likely to be developed into a golf course. This scenario is considered limited access. This development would require excavation and regrading of the site. Therefore, the populations that may be at risk of exposure to contaminants that may remain at Tank Farm 2 include the construction workers and groundskeepers who would excavate and regrade the site and the future visitors using the golf course.

Potential Ecological Receptors. The majority of the Tank Farm 2 property is a fenced-in area that contains the USTs, their associated support structures and utilities, and the area's access roads. This area is largely grass covered and open. The portion of the site outside the fence includes farmland to the south and undeveloped woodlands to the west. While these areas were not surveyed to establish the types and number of terrestrial species present, this area appears to provide high quality habitat for a diversity of species. This is likely to include deer and birds. The plant life in this area is comprised primarily of typical grassland and wooded upland species.

4.5 Potential Intake Routes

The current site workers and controlled-access visitors, potential future construction workers and groundskeepers, potential future visitors, and terrestrial ecological receptors could come into contact with the contaminants in the soil, groundwater, and air at Tank Farm 2 in a number of ways. These intake routes are shown in Figure 4-1 and discussed below.

Current Exposure Routes. Site workers at Tank Farm 2 could contact the contaminants in soil through direct contact with the soil, incidental ingestion, and inhalation of airborne dust generated during the closure and cleanup activities. These types of exposures are likely to occur with surface soils or shallow soils (less than 10 feet below grade) that might be exposed during excavation and construction activities. Direct contact with deeper soils is considered unlikely given the depths of the structures and utilities that would be the focus of the construction activities. Site workers may also be exposed to chemicals in the groundwater via limited contact with the local groundwater during excavation work and be exposed by incidental ingestion of or dermal contact with groundwater. Similarly, this type of exposure is expected to be limited to within 10 feet of the ground surface. Site workers also may come into contact with the chemicals in the groundwater if the workers were to accidentally or purposefully ingest the water. However, at the present time there are no groundwater wells at the facility and any appreciable exposure to groundwater by incidental ingestion is not considered likely to occur.

Site workers may also be exposed to chemicals in the soils or groundwater if the chemicals were to volatilize and accumulate inside of a structure or a trench, where they could be inhaled. The structures on site that are associated with petroleum distribution, such as the tanks, are being removed or decommissioned. Due to the past use, workers will need to consider the potential for accumulation of vapors in these structures until the operations are complete. Exposure to accumulations of vapors in an open trench are expected to be minimal due to the effects of diffusion and dispersion in the atmosphere. However, due to the nature of the site and the remedial work that is being conducted, the workers should as a precaution consider the potential for this accumulation.

Visitors that are onsite currently have controlled access. By walking around the site, they may be exposed to the contaminants in the outdoor air or soil. Inhalation of particulates or volatiles may occur from any contaminants in the outdoor air or in the soil. Dermal contact with the soil may also expose these visitors to contaminants.

Future Exposure Routes. In the future, the populations at risk of exposure are construction workers, groundskeepers, and future visitors. These populations may contact the chemical in the soils and groundwater by the same pathways listed above. Specifically, the construction worker could contact chemicals in soil through direct contact with soil, incidental ingestion, or inhalation of volatile and particulate borne contaminants during construction activities. Also, the construction worker excavating or working in a confined trench or subsurface structure could be exposed to the chemicals in the soils and groundwater if the chemicals were to volatilize from the underlying soils and groundwater and be inhaled. Lastly, the construction worker could come into limited contact with the local groundwater during excavation work and be exposed by incidental ingestion of or dermal contact with groundwater.

In the future, groundskeepers and visitors may also be exposed via the pathways above. Specifically, they may contact chemicals in the soil through direct contact, incidental ingestion, or inhalation of windblown dust. Although these pathways are considered to occur, in the case of golf course development, the area would be landscaped and realistically the opportunity for extensive contact would be minimal for the visitors. For the groundskeeper, the opportunity for exposure would be greater due to the amount of contact with the soil during landscaping activities.

Ecological Exposure Routes. Terrestrial ecological receptors would be exposed to contaminants in the surface and subsurface soil via multiple routes of intake. Ecological exposures via the inhalation of volatile chemicals emitted from subsurface NAPL or contaminated groundwater may be anticipated.

5.0 ENVIRONMENTAL STATUS OF POTENTIAL SOURCE AREAS

Potential source area evaluations for Areas of Potential Environmental Concern (AOPECs) that have been previously addressed are provided in Appendix A. These areas include:

- JP-5 Saturated Piles (Rectangular Area)
- Tanks 19-29
- Electrical Substations
- Petroleum Distribution Lines

The soil borings and groundwater wells associated with Tank Farm 2 provide the data necessary to evaluate 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 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 of the site by media.

5.1 Potential Source Areas Adequately Addressed

5.1.1 Soil

The most recent data from each soil boring were compared to the RIDEM Method 1 Industrial/Commercial Direct Exposure and GB Leachability Criteria. Historical soil sampling summarized on Figure 5-1 does not indicate a widespread problem with contamination at Tank Farm 2. Only soil sample GZ-209 exceeded the TPH Industrial/Commercial Direct Contact and Leachability Criteria of 2,500 ppm with a concentration of 5,600 mg/kg. This sample was taken between 15 and 17 feet bgs. No other exceedances were noted. Figure 5-1 depicts the location of all soil samples taken at Tank Farm 2 and this exceedance. With the exception of the area immediately surrounding the GZ-209 soil boring location, no further action is recommended for the remainder of soils on site.

Interviews held with Mr. Richard Lambert, the former terminal superintendent, were held on August 29, 2001 relative to former operations at DFSP Melville. These interviews revealed that no sludge or tank bottoms were generated at Tank Farm 2 since the BSW lines conveyed all tank bottom material (water and sludge) from the site to Tanks 9 and 10 for holding and ultimate disposal. Because of the presence of bedrock at or near ground surface, the observation of ground scarring for the purposes of sludge disposal does not seem valid. Additionally, no evidence of stressed vegetation, depressions of shallow soil contamination through previous sampling exists at the site. For these reasons, no further action is recommended regarding the potential disposal of JP-5 contaminated soils at the site.

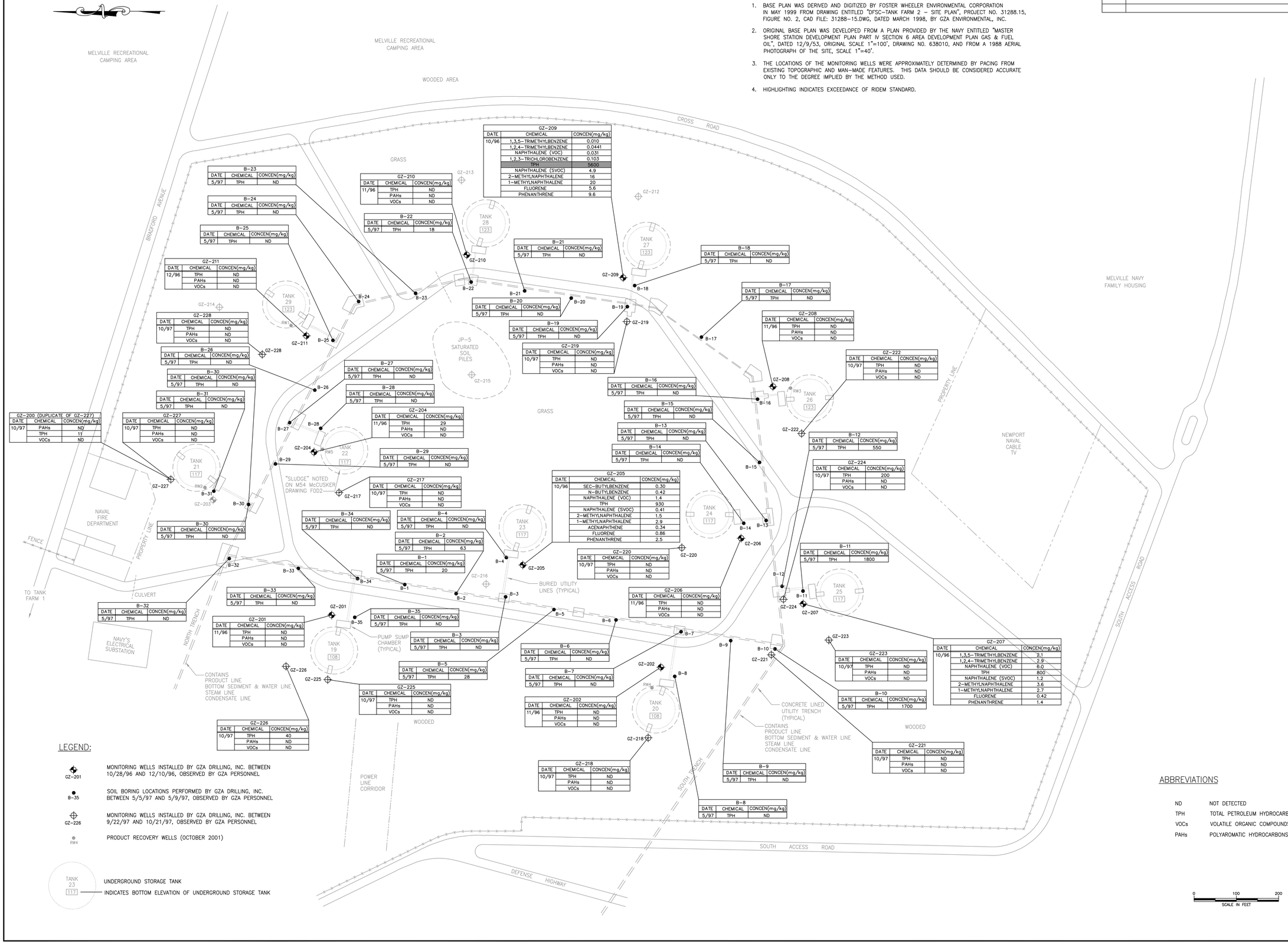
5.1.2 Groundwater

Since the groundwater onsite is classified as GB, the groundwater data that has been collected was compared to the RIDEM GB Groundwater Objectives. Groundwater has been collected most recently in some of the wells at Tank Farm 2 in 1999 by Foster Wheeler. Although VOCs and SVOCs were detected in some of the wells, no exceedances were noted. TPH was also detected in some wells but has no GB Groundwater Objective. Figure 5-2 depicts the locations of all of the groundwater monitoring wells and any detected concentrations. Figures 5-3 and 5-4 depict groundwater contours at the site in July 2001 and February 2002, respectively.

REVISIONS			
SYMBOL	DESCRIPTION	DATE	APPROVED

NOTES:

1. BASE PLAN WAS DERIVED AND DIGITIZED BY FOSTER WHEELER ENVIRONMENTAL CORPORATION IN MAY 1999 FROM DRAWING ENTITLED "DFSC–TANK FARM 2 – SITE PLAN", PROJECT NO. 31288.15, FIGURE NO. 2, CAD FILE: 31288–15.DWG, DATED MARCH 1998, BY GZA ENVIRONMENTAL, INC.
2. ORIGINAL BASE PLAN WAS DEVELOPED FROM A PLAN PROVIDED BY THE NAVY ENTITLED "MASTER SHORE STATION DEVELOPMENT PLAN PART IV SECTION 6 AREA DEVELOPMENT PLAN GAS & FUEL OIL", DATED 12/9/53, ORIGINAL SCALE 1"=100', DRAWING NO. 638010, AND FROM A 1988 AERIAL PHOTOGRAPH OF THE SITE, SCALE 1"=40'.
3. THE LOCATIONS OF THE MONITORING WELLS WERE APPROXIMATELY DETERMINED BY PACING FROM EXISTING TOPOGRAPHIC AND MAN–MADE FEATURES. THIS DATA SHOULD BE CONSIDERED ACCURATE ONLY TO THE DEGREE IMPLIED BY THE METHOD USED.
4. HIGHLIGHTING INDICATES EXCEEDANCE OF RIDEM STANDARD.



LEGEND:

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- B-35 — SOIL BORING LOCATIONS PERFORMED BY GZA DRILLING, INC. BETWEEN 5/5/97 AND 5/9/97, OBSERVED BY GZA PERSONNEL
- GZ-226 — MONITORING WELLS INSTALLED BY GZA DRILLING, INC. BETWEEN 9/22/97 AND 10/21/97, OBSERVED BY GZA PERSONNEL
- RW4 — PRODUCT RECOVERY WELLS (OCTOBER 2001)
- TANK 23 117 — UNDERGROUND STORAGE TANK; INDICATES BOTTOM ELEVATION OF UNDERGROUND STORAGE TANK

ABBREVIATIONS

ND	NOT DETECTED
TPH	TOTAL PETROLEUM HYDROCARBONS
VOCs	VOLATILE ORGANIC COMPOUNDS
PAHs	POLYAROMATIC HYDROCARBONS

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P. E. SEALS

Date: AUGUST 2003
Scale: AS SHOWN
Designed by: M. WEED
Drawn by: C. POTVIN
Checked by: L. KAHRS
Approved by: L. KAHRS

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DEFENCE FUEL SUPPORT POINT MELVILLE
PORTSMOUTH, RHODE ISLAND

TANK FARM 2
STATEWIDE SOIL SAMPLING RESULTS

PROJECT NO: 2033.1044
CADD FILE NO: 10440000_A001.DWG
DRAWING No FIGURE 5-1
SHEET 1 OF 1

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GZ-213		
DATE	CHEMICAL	CONCEN(mg/L)
12/97	VOCs	ND
	PAHs	ND
	TPH	1.1
6/99	TPH	0.34
	VOCs	ND
	BIS(2-ETHYLHEXYL)PHTHALATE	0.004JB

GZ-200 (DUPLICATE GZ-209)		
DATE	CHEMICAL	CONCEN(mg/L)
6/97	VOCs	ND
	NAPHTHALENE (SVOC)	0.036
	2-METHYLNAPHTHALENE	0.130
	1-METHYLNAPHTHALENE	0.200
	ACENAPTHYLENE	0.013
	ACENAPHTHENE	0.020
	FLUORENE	0.092
	PHENANTHRENE	0.110
	ANTHRACENE	0.013
	TPH	0.39

GZ-210		
DATE	CHEMICAL	CONCEN(mg/L)
6/97	BENZENE	0.0042
	ETHYLBENZENE	0.0049
	M&P-XYLENE	0.0017
	ISOPROPYLBENZENE	0.0034
	N-PROPYLBENZENE	0.0055
	1,3,5-TRIMETHYLBENZENE	0.0018
	1,2,4-TRIMETHYLBENZENE	0.022
	P-ISOPROPYLBENZENE	0.0064
	1-METHYLNAPHTHALENE	0.044
	TPH	ND

GZ-212		
DATE	CHEMICAL	CONCEN(mg/L)
12/97	CHLOROFORM	0.0011
	1,2,4-TRIMETHYLBENZENE	0.0016
	PAHs	ND
	TPH	ND
6/99	TPH	0.45
	BIS(2-ETHYLHEXYL)PHTHALATE	0.002JB
	VOCs	ND

GZ-214		
DATE	CHEMICAL	CONCEN(mg/L)
12/97	VOCs	ND
	PAHs	ND
	TPH	ND
6/99	TPH	1.4
	VOCs	ND
	PHENOL	0.003J
	DIETHYLPHTHALATE	0.001J
	DI-N-BUTYLPHTHALATE	0.001J
	BIS(2-ETHYLHEXYL)PHTHALATE	0.010B

GZ-211		
DATE	CHEMICAL	CONCEN(mg/L)
6/97	VOCs	ND
	2-METHYLNAPHTHALENE	0.012
	1-METHYLNAPHTHALENE	0.051
	FLUORENE	0.020
	PHENANTHRENE	0.032
	TPH	190

GZ-209		
DATE	CHEMICAL	CONCEN(mg/L)
6/97	VOCs	ND
	2-METHYLNAPHTHALENE	0.010
	1-METHYLNAPHTHALENE	0.033
	TPH	2.5

GZ-208		
DATE	CHEMICAL	CONCEN(mg/L)
6/97	VOCs	ND
	1-METHYLNAPHTHALENE	0.043
	TPH	2
6/99	TPH	37
	1,2,4-TRIMETHYLBENZENE	0.016
	NAPHTHALENE (VOC)	0.020
	NAPHTHALENE (SVOC)	0.008
	2-METHYLNAPHTHALENE	0.006
	FLUORENE	0.002J
	PHENANTHRENE	0.003J
	BIS(2-ETHYLHEXYL)PHTHALATE	0.004J

GZ-219		
DATE	CHEMICAL	CONCEN(mg/L)
12/97	VOCs	ND
	PAHs	ND
	TPH	ND

GZ-227		
DATE	CHEMICAL	CONCEN(mg/L)
6/99	TPH	1.6
	NAPHTHALENE (VOC)	0.001J
	2-METHYLNAPHTHALENE	0.003J
	PHENANTHRENE	0.001J
	BIS(2-ETHYLHEXYL)PHTHALATE	0.004J

GZ-204		
DATE	CHEMICAL	CONCEN(mg/L)
6/97	VOCs	ND
	PAHs	ND
	TPH	ND

GZ-215		
DATE	CHEMICAL	CONCEN(mg/L)
12/97	SEC-BUTYLBENZENE	0.0033
	P-ISOPROPYLTOLUENE	0.0021
	PAHs	ND
	TPH	1.3

GZ-203		
DATE	CHEMICAL	CONCEN(mg/L)
6/97	VOCs	ND
	PAHs	ND
	TPH	ND

GZ-222		
DATE	CHEMICAL	CONCEN(mg/L)
12/97	VOCs	ND
	PAHs	ND
	TPH	0.36

GZ-205		
DATE	CHEMICAL	CONCEN(mg/L)
6/97	O-XYLENE	0.0011
	ISOPROPYLBENZENE	0.0023
	N-PROPYLBENZENE	0.0035
	1,3,5-TRIMETHYLBENZENE	0.0012
	SEC-BUTYLBENZENE	0.0012
	NAPHTHALENE (VOC)	0.037
	NAPHTHALENE (SVOC)	0.042
	2-METHYLNAPHTHALENE	0.010
	1-METHYLNAPHTHALENE	0.084
	TPH	ND

GZ-217		
DATE	CHEMICAL	CONCEN(mg/L)
12/97	VOCs	ND
	PAHs	ND
	TPH	2

GZ-220		
DATE	CHEMICAL	CONCEN(mg/L)
12/97	VOCs	ND
	PAHs	ND
	TPH	ND

GZ-216		
DATE	CHEMICAL	CONCEN(mg/L)
12/97	VOCs	ND
	PAHs	ND
	TPH	ND

GZ-206		
DATE	CHEMICAL	CONCEN(mg/L)
6/97	SEC-BUTYLBENZENE	0.0027
	PAHs	ND
	TPH	ND

GZ-201		
DATE	CHEMICAL	CONCEN(mg/L)
6/97	VOCs	ND
	1-METHYLNAPHTHALENE	0.01
	TPH	1600

GZ-207		
DATE	CHEMICAL	CONCEN(mg/L)
6/99	TPH	3.5
	METHYLENE CHLORIDE	0.004J
	ACETONE	0.009J
	NAPHTHALENE (VOC)	0.003J
	DIETHYLPHTHALATE	0.001J
	DI-N-BUTYLPHTHALATE	0.001J
	BIS(2-ETHYLHEXYL)PHTHALATE	0.004J

GZ-223		
DATE	CHEMICAL	CONCEN(mg/L)
12/97	CHLOROFORM	0.0013
	PAHs	ND
	TPH	ND

GZ-202		
DATE	CHEMICAL	CONCEN(mg/L)
6/97	VOCs	ND
	1-METHYLNAPHTHALENE	0.013
	TPH	2.1

GZ-225		
DATE	CHEMICAL	CONCEN(mg/L)
6/99	TPH	0.73
	METHYLENE CHLORIDE	0.003J
	DIETHYLPHTHALATE	0.002J
	DI-N-BUTYLPHTHALATE	0.001J
	BIS(2-ETHYLHEXYL)PHTHALATE	0.006

GZ-218		
DATE	CHEMICAL	CONCEN(mg/L)
12/97	1,2,4-TRIMETHYLBENZENE	0.0053
	P-ISOPROPYLTOLUENE	0.0011
	NAPHTHALENE (VOC)	0.0097
	PAHs	ND
	TPH	5.4
6/99	TPH	3.7
	METHYLENE CHLORIDE	0.003J
	1,2,4-TRIMETHYLBENZENE	0.007
	NAPHTHALENE (VOC)	0.008
	DIETHYLPHTHALATE	0.002J
	BIS(2-ETHYLHEXYL)PHTHALATE	0.009

GZ-221		
DATE	CHEMICAL	CONCEN(mg/L)
12/97	VOCs	ND
	PAHs	ND
	TPH	ND
6/99	TPH	0.7
	VOCs	ND
	BIS(2-ETHYLHEXYL)PHTHALATE	0.002J

GZ-221 DUPLICATE		
DATE	CHEMICAL	CONCEN(mg/L)
6/99	TPH	0.3
	ACETONE	0.008J
	NAPHTHALENE (SVOC)	0.005J
	2-METHYLNAPHTHALENE	0.002J
	BIS(2-ETHYLHEXYL)PHTHALATE	0.002J

LEGEND:

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- B-35 — SOIL BORING LOCATIONS PERFORMED BY GZA DRILLING, INC. BETWEEN 5/5/97 AND 5/9/97, OBSERVED BY GZA PERSONNEL
- GZ-226 — MONITORING WELLS INSTALLED BY GZA DRILLING, INC. BETWEEN 9/22/97 AND 10/21/97, OBSERVED BY GZA PERSONNEL
- RW4 — PRODUCT RECOVERY WELLS (OCTOBER 2001)
- TANK 23 / 117 — UNDERGROUND STORAGE TANK; INDICATES BOTTOM ELEVATION OF UNDERGROUND STORAGE TANK

ABBREVIATIONS

NS	NOT SAMPLED
ND	NOT DETECTED
TPH	TOTAL PETROLEUM HYDROCARBONS
TVPH	TOTAL VOLATILE PETROLEUM HYDROCARBONS
VOCs	VOLATILE ORGANIC COMPOUNDS
SVOCs	SEMI-VOLATILE ORGANIC COMPOUNDS
PBCs	POLYCHLORINATED BIPHENYLS
PEST	PESTICIDES
PAHs	POLYAROMATIC HYDROCARBONS

0 100 200
SCALE IN FEET

DEFENCE FUEL SUPPORT POINT MELVILLE
PORTSMOUTH, RHODE ISLAND

TANK FARM 2
SITEWIDE GROUNDWATER SAMPLING RESULTS

PROJECT NO: 2033.1044
CADD FILE NO: 10440000_A002.DWG

DRAWING No
FIGURE 5-2
SHEET 1 OF 1

REVISIONS			
SYMBOL	DESCRIPTION	DATE	APPROVED

NOTES:

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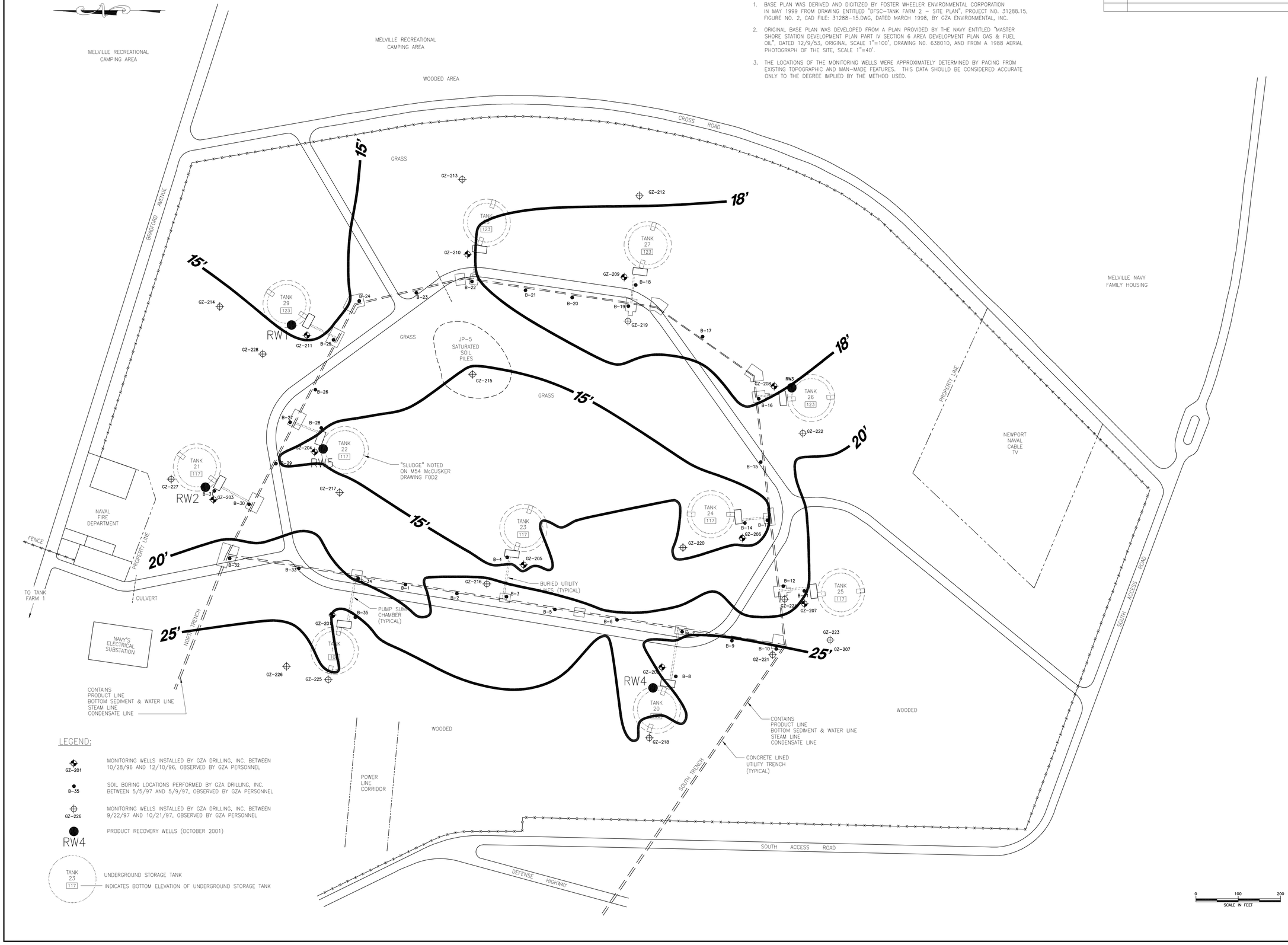

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P. E. SEALS

Date: AUGUST 2003
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Designed by: M. WEED
Drawn by: F. MENICHELLI
Checked by: L. KAHRS
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DEFENCE FUEL SUPPORT POINT MELVILLE
PORTSMOUTH, RHODE ISLAND

TANK FARM 2
GROUNDWATER CONTOUR MAP
JULY 2001

PROJECT NO: 2033.1044
CADD FILE NO: 10440000_A005.DWG
DRAWING No FIGURE 5-3
SHEET 1 OF 1

REVISIONS			
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MELVILLE RECREATIONAL CAMPING AREA

MELVILLE RECREATIONAL CAMPING AREA

WOODED AREA

CROSS ROAD

BRADFORD AVENUE

GRASS

20'

GZ-213

GZ-212

TANK 28 123

TANK 27 123

GZ-210

GZ-209

B-18

B-22

B-21

B-20

B-19

GZ-219

B-17

GZ-214

B-24

B-23

TANK 29 123

RW1

GZ-211

B-25

GZ-228

GRASS

JP-5 SATURATED SOIL PILES

GZ-215

GRASS

B-26

B-27

B-28

GZ-204

TANK 22 117

RW5

"SLUDGE" NOTED ON M54 McCUSKER DRAWING F0D2

15'

RW3

GZ-208

B-16

TANK 26 123

GZ-222

B-15

PROPERTY LINE

MELVILLE NAVY FAMILY HOUSING

NEWPORT NAVAL CABLE TV

TANK 21 117

GZ-227

RW2

B-31

GZ-203

B-30

B-29

GZ-217

NAVAL FIRE DEPARTMENT

FENCE

PROPERTY LINE

TANK 23 117

TANK 24 117

B-14

B-13

GZ-206

GZ-220

B-32

B-33

B-4

GZ-205

B-34

B-1

B-2

GZ-216

BURIED UTILITY LINES (TYPICAL)

B-5

B-6

B-12

B-11

GZ-224

GZ-207

TANK 25 117

TO TANK FARM 1

CULVERT

B-35

GZ-201

PUMP SUMP CHAMBER (TYPICAL)

B-7

B-9

B-10

GZ-223

GZ-207

NAVY'S ELECTRICAL SUBSTATION

NORTH TRENCH

TANK 19 108

GZ-226

GZ-225

25'

GZ-221

GZ-202

B-8

RW4

TANK 20 108

GZ-218

CONTAINS
PRODUCT LINE
BOTTOM SEDIMENT & WATER LINE
STEAM LINE
CONDENSATE LINE

WOODED

WOODED

CONTAINS
PRODUCT LINE
BOTTOM SEDIMENT & WATER LINE
STEAM LINE
CONDENSATE LINE

CONCRETE LINED UTILITY TRENCH (TYPICAL)

SOUTH TRENCH

SOUTH ACCESS ROAD

SOUTH ACCESS ROAD

POWER LINE CORRIDOR

DEFENSE HIGHWAY

LEGEND:

- GZ-201 — MONITORING WELLS INSTALLED BY GZA DRILLING, INC. BETWEEN 10/28/96 AND 12/10/96, OBSERVED BY GZA PERSONNEL
- B-35 — SOIL BORING LOCATIONS PERFORMED BY GZA DRILLING, INC. BETWEEN 5/5/97 AND 5/9/97, OBSERVED BY GZA PERSONNEL
- GZ-226 — MONITORING WELLS INSTALLED BY GZA DRILLING, INC. BETWEEN 9/22/97 AND 10/21/97, OBSERVED BY GZA PERSONNEL
- RW4 — PRODUCT RECOVERY WELLS (OCTOBER 2001)
- TANK 23 117 — UNDERGROUND STORAGE TANK; INDICATES BOTTOM ELEVATION OF UNDERGROUND STORAGE TANK

0 100 200
SCALE IN FEET

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P. E. SEALS

Date: AUGUST 2003
Scale: AS SHOWN
Designed by: M. WEED
Drawn by: F. MENICHELLI
Checked by: L. KAHRS
Approved by: L. KAHRS

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DEFENCE FUEL SUPPORT POINT MELVILLE
PORTSMOUTH, RHODE ISLAND

TANK FARM 2
GROUNDWATER CONTOUR MAP
FEBRUARY 2002

PROJECT NO: 2033.1044
CADD FILE NO: 10440000_A004.DWG
DRAWING No FIGURE 5-4
SHEET 1 OF 1

REVISIONS			
SYMBOL	DESCRIPTION	DATE	APPROVED

NOTES:

1. BASE PLAN WAS DERIVED AND DIGITIZED BY FOSTER WHEELER ENVIRONMENTAL CORPORATION IN MAY 1999 FROM DRAWING ENTITLED "DFSC-TANK FARM 2 – SITE PLAN", PROJECT NO. 31288.15, FIGURE NO. 2, CAD FILE: 31288-15.DWG, DATED MARCH 1998, BY GZA ENVIRONMENTAL, INC.
2. ORIGINAL BASE PLAN WAS DEVELOPED FROM A PLAN PROVIDED BY THE NAVY ENTITLED "MASTER SHORE STATION DEVELOPMENT PLAN PART IV SECTION 6 AREA DEVELOPMENT PLAN GAS & FUEL OIL", DATED 12/9/53, ORIGINAL SCALE 1"=100', DRAWING NO. 638010, AND FROM A 1988 AERIAL PHOTOGRAPH OF THE SITE, SCALE 1"=40'.
3. THE LOCATIONS OF THE MONITORING WELLS WERE APPROXIMATELY DETERMINED BY PACING FROM EXISTING TOPOGRAPHIC AND MAN-MADE FEATURES. THIS DATA SHOULD BE CONSIDERED ACCURATE ONLY TO THE DEGREE IMPLIED BY THE METHOD USED.

MELVILLE RECREATIONAL CAMPING AREA

MELVILLE RECREATIONAL CAMPING AREA

WOODED AREA

CROSS ROAD

BRADFORD AVENUE

GRASS

GZ-211

DATE	DEPTH (ft)
1/97-8/97	ND
9/97	0.01
10/97-11/97	0.02
12/97	0.03
1/98	0.02
2/98	0.01
3/98	ND
6/99	0.08
7/01	0.07
8/20/01	0.09
8/28/01	ND
10/01	0.17
11/01	0.46
2/02	0.01

RW-1

DATE	DEPTH (ft)
10/15/01	0.03
10/22/01	0.04
11/5/01	0.01
11/19/01	0.01
2/02	ND

GZ-213

DATE	DEPTH (ft)
6/99; 7/01-8/01 2/02	ND

GZ-212

DATE	DEPTH (ft)
6/99; 7/01-8/01 2/02	ND

GZ-210

DATE	DEPTH (ft)
1/97-6/97; 6/99; 7/01-8/01; 2/02	ND

GZ-209

DATE	DEPTH (ft)
1/97-8/97; 6/99; 7/01-8/01; 2/02	ND

GZ-208

DATE	DEPTH (ft)
1/97-7/97	ND
8/97	0.02
9/97	0.01
10/97	0.01
11/97	ND
12/97	0.01
1/98-3/98; 6/99	ND
7/01	0.10
8/20/01	0.08
8/28/01	0.02
10/01	0.03
11/01	0.41
2/02	0.06

RW-3

DATE	DEPTH (ft)
10/01-11/01; 2/02	ND

GZ-214

DATE	DEPTH (ft)
6/99; 7/01-8/01; 2/02	ND

GZ-219

DATE	DEPTH (ft)
6/99; 7/01-8/01 2/02	ND

GZ-228

DATE	DEPTH (ft)
6/99; 7/01; 8/01; 10/01-11/01; 2/02	ND 0.01 ND

GZ-227

DATE	DEPTH (ft)
6/99	ND
7/01	0.02
8/01	0.02
10/01	ND
11/01	0.01
2/02	ND

GZ-204

DATE	DEPTH (ft)
1/97-8/97; 6/99; 7/01-8/01; 11/01; 2/02	ND

RW-5

DATE	DEPTH (ft)
10/01-11/01 2/02	ND

RW-2

DATE	DEPTH (ft)
10/01-11/01; 2/02	ND

GZ-215

DATE	DEPTH (ft)
6/99; 7/01-8/01; 10/01-11/01; 2/02	ND

GZ-222

DATE	DEPTH (ft)
6/99; 7/01-8/01; 11/01; 2/02	ND

GZ-203

DATE	DEPTH (ft)
1/97-8/97; 6/99; 7/01-8/01; 11/01; 2/02	ND

GZ-217

DATE	DEPTH (ft)
6/99; 7/01-8/01; 11/01; 2/02	ND

GZ-205

DATE	DEPTH (ft)
1/97- 8/97; 6/99; 7/01-8/01; 12/02	ND

GZ-216

DATE	DEPTH (ft)
6/99; 7/01-8/01; 2/02	ND

GZ-220

DATE	DEPTH (ft)
6/99; 7/01-8/01; 2/02	ND

GZ-206

DATE	DEPTH (ft)
1/97- 8/97; 7/01-8/01; 2/02	ND

GZ-224

DATE	DEPTH (ft)
6/99; 7/01-8/01; 2/02	ND

GZ-223

DATE	DEPTH (ft)
6/99; 7/01-8/01; 2/02	ND

GZ-207

DATE	DEPTH (ft)
1/97-8/97; 6/99; 7/01-8/01; 2/02	ND

GZ-221

DATE	DEPTH (ft)
6/99	ND

GZ-226

DATE	DEPTH (ft)
3/98; 7/01-8/01; 2/02	ND

GZ-201

DATE	DEPTH (ft)
1/97	0.01
2/97	0.01
3/97	0.02
4/97	0.02
5/97	ND
6/97	0.12
7/97	0.12
8/97	ND
3/98; 6/99; 7/01-8/01; 2/02	

GZ-225

DATE	DEPTH (ft)
6/99; 7/01-8/01; 2/02	ND

GZ-202

DATE	DEPTH (ft)
1/97-8/97	ND
9/97	0.02
10/97	0.11
11/97	0.03
12/97	0.02
1/98-2/98	ND
3/98	0.23
6/99	0.28
7/01	0.03
8/20/01	0.05
10/01	0.02
11/01	0.01
2/02	0.05

GZ-218

DATE	DEPTH (ft)
12/97; 6/99; 7/01-8/01; 11/01; 2/02	ND

TANK 28 123 — TANK 27 123 — TANK 29 123 — TANK 26 123 — TANK 22 117 — TANK 21 117 — TANK 23 117 — TANK 24 117 — TANK 25 117 — TANK 19 108 — TANK 20 108

JP-5 SATURATED SOIL PILES

"SLUDGE" NOTED ON M54 McCUSKER DRAWING FOD2

MELVILLE NAVY FAMILY HOUSING

PROPERTY LINE

NEWPORT NAVAL CABLE TV

NAVAL FIRE DEPARTMENT

FENCE

PROPERTY LINE

TO TANK FARM 1

CULVERT

NAVY'S ELECTRICAL SUBSTATION

NORTH TRENCH

CONTAINS PRODUCT LINE BOTTOM SEDIMENT & WATER LINE STEAM LINE CONDENSATE LINE

BURIED UTILITY LINES (TYPICAL)

PUMP SUMP CHAMBER (TYPICAL)

WOODED

POWER LINE CORRIDOR

SOUTH TRENCH

CONCRETE LINED UTILITY TRENCH (TYPICAL)

WOODED

SOUTH ACCESS ROAD

SOUTH ACCESS ROAD

DEFENSE HIGHWAY

LEGEND:

GZ-201 — MONITORING WELLS INSTALLED BY GZA DRILLING, INC. BETWEEN 10/28/96 AND 12/10/96, OBSERVED BY GZA PERSONNEL

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GZ-226 — MONITORING WELLS INSTALLED BY GZA DRILLING, INC. BETWEEN 9/22/97 AND 10/21/97, OBSERVED BY GZA PERSONNEL

RW4 — PRODUCT RECOVERY WELLS (OCTOBER 2001)

TANK 23 117 — UNDERGROUND STORAGE TANK; INDICATES BOTTOM ELEVATION OF UNDERGROUND STORAGE TANK

ABBREVIATIONS

ND NOT DETECTED

0 100 200
SCALE IN FEET

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P. E. SEALS

Date: AUGUST 2003
Scale: AS SHOWN
Designed by: M. WEED
Drawn by: C. POTVIN
Checked by: L. KAHRS
Approved by: L. KAHRS

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DEFENCE FUEL SUPPORT POINT MELVILLE
PORTSMOUTH, RHODE ISLAND

TANK FARM 2
NON-AQUEOUS PHASE LIQUIDS MONITORIN DATA

PROJECT NO: 2033.1044
CADD FILE NO: 10440000_A003.DWG
DRAWING No FIGURE 5-5
SHEET 1 OF 1

5.1.3 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. In February 2002, 0.05 feet of NAPL was measured in well GZ-202. Since March 1998, NAPL has been measured in this well (from 0.01 to 0.28 feet). Also in February 2002, 0.06 feet of NAPL was measured in GZ-208. NAPL has been measured in this well since July 2001, ranging from 0.02 to 0.10 feet. 0.01 feet of NAPL was measured in GZ-211 in February 2002. NAPL has been measured in this well from September 1997 to February 1998 (0.01 to 0.03 feet), from June 1999 to August 2001 (0.07 to 0.09 feet), and from October 2001 to February 2002 (0.01 to 0.46 feet). Wells GZ-201, GZ-227, and GZ-228 did not have any measurable NAPL in February 2002, but have at some point. Figure 5-5 shows the locations that contain NAPL and relative thicknesses. Due to the presence of NAPL in wells GZ-202, GZ-208, and GZ-211 in their most recent gaugings, a condition exists which exceeds the UCL. Additional investigation into NAPL levels detected in several of the site wells is warranted, however, monitoring wells which have had no historical NAPL, as indicated on Figure 5-5, require no further action.

5.2 Potential Source Areas with Outstanding Questions/Issues

5.2.1 Soil

As discussed in Section 5.1.1, GZ-209 exceeded the TPH Industrial/Commercial Direct Contact and Leachability Criteria of 2,500 ppm with a concentration of 5,600 mg/kg at a depth of 15-17 feet bgs. This area of soil represents the only exceedance of the RIDEM Method 1 Industrial/Commercial Direct Exposure and GB Leachability Criteria found on the site. In order to better assess the source of this contamination, a test pit investigation is recommended. If the soil contamination is found to be localized an attempt will be made to remove the contaminated soils and provide closure samples from the four sides and bottom of the excavation area. A bottom hole grab sample will be taken at 17 feet and sidewall samples will be collected two feet off the bottom of the excavation from each wall and then composited. The two samples will be analyzed for TPH. Any soils exhibiting staining or petroleum odors will be sampled for waste characterization parameters and staged on 6-millimeter poly sheeting and covered. See Figure 5-1 for test pit location.

5.2.2 Non-Aqueous Phase Liquids

NAPL has been detected in several of the site monitoring wells during recent groundwater monitoring as discussed in Section 5.1.3 above. Due to the dense nature of the fill material surrounding these wells, it is possible that the groundwater encountered may not represent true subsurface conditions and therefore, the NAPL levels may not be indicative of what is found in the surrounding area. It is recommended that wells GZ-202, GZ-208, GZ-211 be purged a minimum of 5 well volumes of groundwater and gauged for product after they are allowed to recharge. The resulting data will provide a more accurate reading of NAPL at these locations so that a recommendation can be made.

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:	TF2	Tank Farm 2
Sample types:	GZ-209	Former GZA soil boring location
QC sample designations:	D	Duplicate Sample
	MS/MSD	Matrix Spike/Matrix Spike Duplicate
Sampling depth:	5	5-ft sampling depth

Trip Blank Collected on August 28, 2003: TB082803

Equipment Rinsate Collected on August 28, 2003: ER082803

MS/MSD: indicate on chain of custody 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 Chain of Custody (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, chain of custody 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 contamianted 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 facilty 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, PPE will be considered non-contaminated waste and will be disposed of with the site debris.

6.4 Sample 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 chain of custody. Foster Wheeler will perform a QA/QC screening on laboratory data to ensure against bias and error.

Sample holding times are identified in Table 6-1 below.

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 chain-of-custody 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 chain of custody 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

Final Initial Assessment Study of the Naval Education and Training Center, Newport, RI. Navy Assessment and Control of Installation Pollutants Department, Port Hueneme, California – March 1983 (Prepared by Envirodyne Engineers, Inc.)

Study Area Screening Evaluation Work Plan. Naval Education and Training Center, Newport, Rhode Island – July 1992 (Prepared by TRC Environmental Consultants, Inc.)

Work Plan for Site Investigation – Tank Farm 2. Defense Fuel Supply Center, Melville, Portsmouth, Rhode Island – August 1997 (Prepared by GZA GeoEnvironmental, Inc.)

Tank Closure Assessment Report – Tank Farm 2. Defense Energy Support Center, Melville, Portsmouth, Rhode Island – October 1998 (Prepared by GZA GeoEnvironmental, Inc.)

Results of Groundwater Sampling for Fuel Loading Area and Tank Farms 1, 2, and 3. Defense Fuel Support Point – Melville, Portsmouth, Rhode Island – September 1999 (Prepared by Foster Wheeler Environmental Corporation)

Appendix A

Summary Evaluations for Areas of Potential Environmental Concern Previously Addressed

SECTION 1 POSSIBLE SOURCE AREA IDENTIFICATION

SITE Tank Farm 2

POSSIBLE SOURCE AREA JP-5 Piles

FIGURE/MAP Figure 2-2

SIZE (approx.)

Length	200 ft	**Width**	150 ft
Area	30,000 ft^2		0.69 acres

DESCRIPTION OF AREA AND PAST OPERATIONS

- Photographs dated June 1981 showed nine dump loaded piles of petroleum contaminated soil 300 feet west of Tank 28. The title of the photos is "JP-5 saturated soil". The soil appears to have originated from another area other than Tank Farm 2 since JP-5 was not stored here. The soils have apparently been removed since there is not present evidence of the piles at the Tank Farm.

DISTANCE TO PROPERTY LINES (approx.)

☑	North	700 ft
☑	South	1,300 ft
☑	East	550 ft
☑	West	1,020 ft

REFERENCES

1. Work Plan for Site Investigation, GZA GeoEnvironmental, Inc. 8/97
2. Site Investigation Report, GZA GeoEnvironmental, Inc. 5/98

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

1.	_____	☐	JP-4
2.	_____	☑	JP-5
3.	_____	☐	Distillate Fuel (No. 5 – No. 2)
4.	_____	☐	No. 5 Fuel Oil
5.	_____	☐	Other: Marine Diesel Fuel

RELEASE STATUS ☐ Confirmed Release ☑ Potential for Release

RELEASE SUMMARY (if applicable)

- Potential for JP-5 to migrate from soil piles in the media present at Tank Farm 2.

SECTION 2 SUMMARY OF PAST INVESTIGATIONS AND SAMPLING

SECTION 2.1 SOIL

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

Predominant Soil Type in the Vadose Zone Shale and Sandstone

Groundcover Type grass

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 0
Downgradient 1

Depth to Groundwater
Minimum 10.43 ft bgs (2/98)
Average 16.20 ft bgs
Maximum 21.98 ft bgs (10/97)

Depth to Bedrock 8 ft bgs

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

Predominant Soil Type in the Saturated Zone Shale and Sandstone

Groundwater Sampling Summary **[See Figure 2-2 for sampling locations]**

		ANALYTES												
Source Area	Well 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})	Notes
JP-5 Piles	GZ-215	12/97			12/97	12/97								
NOTES: 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 ND

Free Liquid Gauging Summary **[See Figure 2-2 for gauging locations]**

Source Area	Well / Boring Associated with Source Area	Free Product Thickness (ft)	Date Measured
	GZ-215	ND	10/97 – 3/98; 6/99; 7/01 – 8/01; 10/01 – 11/01; 2/02
NOTES: ND = Not Dectected			

SECTION 2.4 SOIL GAS

Soil Gas Sampled in this Area ☐ Yes ☑ No

Number of Soil Gas Samples 0

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
- ☐ Other _____

Man-Made Structure Sampling Summary

Tank Number	Contents	Water Level (ft)	Sludge Layer (ft)	Product Layer (ft)	Date Sampled

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
JP-5 Piles	GZ-215	Soil	N/A	No soil sample taken
		Groundwater	ND	VOCs and TPH detected at low concentrations – No GB Standards
		Free Product	ND	2/02
NOTES:				
BGA = Below GB Groundwater Objective			L = Leaching Criteria	
BDC = Below Direct Contact			DC = Direct Contact	
BLC = Below Leaching Criteria			ND = Non Detect	
N/A = Not Applicable				

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 2

POSSIBLE SOURCE AREA Petroleum Distribution Lines

FIGURE/MAP Figure 2-2

SIZE (approx.)

Length 7,200 ft **Diameter** 6, 10, and 12 in

DESCRIPTION OF AREA AND PAST OPERATIONS

- Lines are located approximately 10 feet below grade.
- The laterals extending from the tanks to the main lines are buried; the remaining fuel lines are in concrete-lined utility trenches.
- Connect all 11 tanks in Tank Farm 2

DISTANCE TO PROPERTY LINES (approx.)

☑	North	_____ ft
☑	South	_____ ft
☑	East	_____ ft
☑	West	_____ ft

REFERENCES

1. Work Plan for Site Investigation, GZA GeoEnvironmental, Inc. 8/97
2. Site Investigation Report, GZA GeoEnvironmental, Inc. 5/98
3. Tank Closure Assessment Report – Tank Farm 2, GZA GeoEnvironmental, Inc. 10/98
4. Results of Groundwater Sampling for Fuel Loading Area and Tank Farms 1, 2, & 3, Foster Wheeler Environmental Corporation. 9/99

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

1.	_____	☐	JP-4
2.	_____	☐	JP-5
3.	_____	☑	Distillate Fuel (No. 5 – No. 2)
4.	_____	☑	No. 5 Fuel Oil
5.	_____	☑	Other: Marine Diesel Fuel

RELEASE STATUS ☐ Confirmed Release ☑ Potential for Release

RELEASE SUMMARY (if applicable)

- Possible release of fuel into the ground from lines

SECTION 2 SUMMARY OF PAST INVESTIGATIONS AND SAMPLING

SECTION 2.1 SOIL

Number of Soil Samples **Surface (0'-2' bgs)** 0
Subsurface (vadose zone) 30

Predominant Soil Type in the Vadose Zone fill (topsoil - ~12'); shale

Groundcover Type grass

Potential for Wind / Water Erosion ☐ Yes ☑ No

Surface Soil Sampling Summary (0'-2' bgs) N/A

Subsurface Soil Sampling Summary (vadose zone) **[See Figure 2-2 for sampling locations]**

				ANALYTES												
Source Area	Boring Designation	Sample ID	Sample Depth (ft)	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})
Petroleum Distribution Lines	GZ-219	S-2	4-6	10/97			10/97	10/97							
	GZ-224	S-3	8-10	10/97			10/97	10/97							
	GZ-221	S-3	10-12	10/97			10/97	10/97							
	B-1	S-1	10-12	5/97											
	B-2	S-1	10-12	5/97											
	B-3	S-1	10-12	5/97											
	B-5	S-1	10-12	5/97											
	B-6	S-1	10-12	5/97											
	B-7	S-1	10-12	5/97											
	B-9	S-1	10-12	5/97											
	B-10	S-1	10-12	5/97											
	B-12	S-1	10-12	5/97											
	B-13	S-1	10-12	5/97											
	B-15	S-1	10-12	5/97											
	B-16	S-1	10-12	5/97											
	B-17	S-1	10-12	5/97											
	B-19	S-1	10-12	5/97											
	B-20	S-1	10-12	5/97											
	B-21	S-1	10-12	5/97											
	B-22	S-1	10-12	5/97											
	B-23	S-1	10-12	5/97											
	B-24	S-1	10-12	5/97											
	B-25	S-1	10-12	5/97											
	B-26	S-1	10-12	5/97											
	B-27	S-1	10-12	5/97											
	B-29	S-1	10-12	5/97											
	B-30	S-1	10-12	5/97											
	B-32	S-1	10-12	5/97											
	B-33	S-1	10-12	5/97											
	B-34	S-1	10-12	5/97											

SECTION 2.2 GROUNDWATER

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

Number of Groundwater Sampling Locations **Upgradient** 0
Downgradient 3

Depth to Groundwater **Minimum** 13.22 ft bgs (GZ-224; 1/98)
Average 21.52 ft bgs
Maximum 29.82 ft bgs (GZ-221; 10/97)

Depth to Bedrock 22.5 ft bgs (average between GZ-219, 221, and 224)

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

Predominant Soil Type in the Saturated Zone Weathered Shale

Groundwater Sampling Summary **[See Figure 2-2 for sampling locations]**

		ANALYTES												
Source Area	Well 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})	Notes
Petroleum Distribution Lines	GZ-219	12/97			12/97	12/97								
	GZ-221	6/99			6/99	12/97	6/99							
	GZ-224	12/97			12/97	12/97								
NOTES: 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	ND

Free Liquid Gauging Summary **[See Figure 2-2 for gauging locations]**

Source Area	Well / Boring Associated with Source Area	Free Product Thickness (ft)	Date Measured
Petroleum Distribution Lines	GZ-219	ND	10/97 – 3/98; 6/99; 7/01 – 8/01; 2/02
	GZ-221	ND	10/97 – 3/98; 6/99
	GZ-224	ND	10/97 – 3/98; 6/99; 7/01 – 8/01; 2/02
NOTES: ND = Not Dectected			

SECTION 2.4 SOIL GAS

Soil Gas Sampled in this Area ☐ Yes ☑ No

Number of Soil Gas Samples 0

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
- ☑ Other – Pipelines

Man-Made Structure Sampling Summary **[See Figure 2-2 for sampling locations]**

Tank Number	Contents	Water Level (ft)	Sludge Layer (ft)	Product Layer (ft)	Date Sampled

If an Underground Storage Tank Date Cleaned _____
Date Closed _____

If Underground Distribution Lines Date Cleaned 9/96 – 5/97
Date Plugged 9/96 – 5/97

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
Petroleum Distribution Lines	GZ-219, GZ-221, GZ-224, B-1, B-2, B-3, B-5, B-6, B-7, B-9, B-10, B-12	Soil	BDC	B-10 – TPH (1700mg/kg); GZ-224 – TPH (200mg/kg)
	B-13, B-15, B-16, B-17, B-19, B-20, B-21, B-22, B-23, B-24, B-25, B-26	Groundwater	ND	GZ-221 – TPH and SVOC detected (6/99) – No GB Standard
	B-27, B-29, B-30, B-32, B-33, B-34	Free Product	ND	2/02
NOTES:				
BGB = Below GB Groundwater Objective			L = Leaching Criteria	
BDC = Below Direct Contact			DC = Direct Contact	
BLC = Below Leaching Criteria			ND = Non Detect	

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 2

POSSIBLE SOURCE AREA Tank 19

FIGURE/MAP Figure 2-2

SIZE (approx.)

Length 116 ft **Width** 116 ft
Area 13,456 ft^2 0.31 acres

DESCRIPTION OF AREA AND PAST OPERATIONS

- 2.5 million gallon cylindrical UST made of concrete
- 116 ft in diameter and 33.5 ft deep, constructed 5 ft below grade and installed in 1942
- Pump sump chamber is located adjacent to tank and houses pumps associated with the tanks' underdrainage and petroleum transfer systems
- Ring drains are located around the perimeter of the UST. They are 12" in diameter and 2.5 ft below the tank.
- The ring drains discharge into a sump pit located in the pump sump chamber.
- Underground petroleum distribution lines connect all of the tanks in Tank Farm 2.
- When sludge was cleaned out of tank, it was disposed of on the ground in the general vicinity of the tank.
- Taken out of service in the mid-1990s.
- Emptied, cleaned, and inspected in October 1996.

DISTANCE TO PROPERTY LINES (approx.)

☑	North	650 ft
☑	South	1,800 ft
☑	East	1,400 ft
☑	West	800 ft

REFERENCES

1. Final Initial Assessment Study of the Naval Education and Training Center, Envirodyne Engineers, Inc. 3/83
2. Study Area Screening Evaluation Work Plan, TRC Environmental Corporation. 7/92
3. Work Plan for Site Investigation, GZA GeoEnvironmental, Inc. 8/97
4. Site Investigation Report, GZA GeoEnvironmental, Inc. 5/98
5. Tank Closure Assessment Report – Tank Farm 2, GZA GeoEnvironmental, Inc. 10/98
6. Results of Groundwater Sampling for Fuel Loading Area and Tank Farms 1, 2, & 3, Foster Wheeler Environmental Corporation. 9/99

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

1. _____
2. _____
3. _____
4. _____
5. _____

☐	JP-4
☐	JP-5
☑	Distillate Fuel (No. 5 to No.2)
☑	No. 5 Fuel Oil
☑	Other: Marine Diesel Fuel

RELEASE STATUS ☐ Confirmed Release ☑ Potential for Release
RELEASE SUMMARY (if applicable)

- Tank bottom sludge disposed to the ground surface in the vicinity of the tank.
- Possible release from ring drains when they discharge into pump house or common drainage pipe.

SECTION 2 SUMMARY OF PAST INVESTIGATIONS AND SAMPLING

SECTION 2.1 SOIL

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

Predominant Soil Type in the Vadose Zone sandstone; shale

Groundcover Type grass

Potential for Wind / Water Erosion ☐ Yes ☑ No

Surface Soil Sampling Summary (0'-2' bgs) **[See Figure 2-2 for sampling locations]**

				ANALYTES											
Source Area	Boring Designation	Sample ID	Sample Depth (ft)	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})
Tank 19	GZ-201	S-1	0-2	Nov-96			Nov-96	Nov-96							
	GZ-225	S-1	0-2	Oct-97			Oct-97	Oct-97							

Subsurface Soil Sampling Summary (vadose zone) **[See Figure 2-2 for sampling locations]**

				ANALYTES											
Source Area	Boring Designation	Sample ID	Sample Depth (ft)	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})
Tank 19	GZ-226	S-2	4-6	Oct-97			Oct-97	Oct-97							
	B-35	S-1	10-12	May-97											

SECTION 2.2 GROUNDWATER

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

Number of Groundwater Sampling Locations **Upgradient** 1
Downgradient 2

Depth to Groundwater **Minimum** 22.97 ft bgs (3/98; GZ-226)
Average 34.78 ft bgs
Maximum 46.60 ft bgs (6/97; GZ-201)

Depth to Bedrock 6 ft bgs (GZ-201); 44 ft bgs (GZ-225); 13.5 ft bgs (GZ-226); 21.2 ft bgs (average of wells)

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

Predominant Soil Type in the Saturated Zone shale

Groundwater Sampling Summary **[See Figure 2-2 for sampling locations]**

		ANALYTES												
Source Area	Well 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})	Notes
Tank 19	GZ-201	Jun-97			Jun-97	Jun-97								
	GZ-225	Jun-99			Jun-99	Dec-97	Jun-99							
	GZ-226	Dec-97			Dec-97	Dec-97								
NOTES: 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 ft
Maximum 0.18 ft (GZ-201; 5/97)
Most Recent ND

Free Liquid Gauging Summary **[See Figure 2-2 for gauging locations]**

Source Area	Well / Boring Associated with Source Area	Free Product Thickness (ft)	Date Measured
Tank 19	GZ-201	0.01	1/97
		0.01	2/97
		0.02	3/97
		0.02	4/97
		0.18	5/97
		0.12	6/97
		0.12	7/97
		ND	8/97 – 3/98; 6/99; 7/01 – 8/01; 2/02
	GZ-225	ND	10/97 – 3/98; 6/99; 7/01 – 8/01; 2/02
	GZ-226	ND	10/97 – 3/98; 7/01 – 8/01; 2/02
NOTES: 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
- ☐ Other _____

Man-Made Structure Sampling Summary **[See Figure 2-2 for sample location]**

Tank Number	Contents	Water Level (ft)	Sludge Layer (ft)	Product Layer (ft)	Date Sampled
19	F-76	0.54	-	0.28	9/96

If an Underground Storage Tank Date Cleaned 9/96
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
Tank 19	GZ-201, GZ-225, GZ-226	Soil	BDC/BLC/ND	GZ-226 – TPH (40mg/kg); ND other wells
		Groundwater	NS	GZ-225 (6/99) – TPH, 1 VOC, and 3 SVOCs detected – no GB Standards
		Free Product	ND	2/02
NOTES:				
BGB = Below GB Groundwater Objective			L = Leaching Criteria	
BDC = Below Direct Contact			DC = Direct Contact	
BLC = Below Leaching Criteria			ND = Non Detect	
NS = No Standard				

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 2

POSSIBLE SOURCE AREA Tank 20

FIGURE/MAP Figure 2-2

SIZE (approx.)

Length 116 ft **Width** 116 ft
Area 13,456 ft^2 0.31 acres

DESCRIPTION OF AREA AND PAST OPERATIONS

- 2.5 million gallon cylindrical UST made of concrete
- 116 ft in diameter and 33.5 ft deep, constructed 5 ft below grade and installed in 1942
- Pump sump chamber is located adjacent to tank and houses pumps associated with the tanks' underdrainage and petroleum transfer systems
- Ring drains are located around the perimeter of the UST. They are 12" in diameter and 2.5 ft below the tank.
- The ring drains discharge into a sump pit located in the pump sump chamber.
- Underground petroleum distribution lines connect all of the tanks in Tank Farm 2.
- When sludge was cleaned out of tank, it was disposed of on the ground in the general vicinity of the tank.
- Taken out of service in the mid-1990s.
- Emptied, cleaned, and inspected in September 1996.

DISTANCE TO PROPERTY LINES (approx.)

☑	North	1,550 ft
☑	South	900 ft
☑	East	1,400 ft
☑	West	300 ft

REFERENCES

1. Final Initial Assessment Study of the Naval Education and Training Center, Envirodyne Engineers, Inc. 3/83
2. Study Area Screening Evaluation Work Plan, TRC Environmental Corporation. 7/92
3. Work Plan for Site Investigation, GZA GeoEnvironmental, Inc. 8/97
4. Site Investigation Report, GZA GeoEnvironmental, Inc. 5/98
5. Tank Closure Assessment Report – Tank Farm 2, GZA GeoEnvironmental, Inc. 10/98
6. Results of Groundwater Sampling for Fuel Loading Area and Tank Farms 1, 2, & 3, Foster Wheeler Environmental Corporation. 9/99

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

1.	_____	☐	JP-4
2.	_____	☐	JP-5
3.	_____	☑	Distillate Fuel (No. 5 to No.2)
4.	_____	☑	No. 5 Fuel Oil
5.	_____	☑	Other: Marine Diesel Fuel

RELEASE STATUS ☐ Confirmed Release ☑ Potential for Release

RELEASE SUMMARY (if applicable)

- Tank bottom sludge disposed to the ground surface in the vicinity of the tank.
- Possible release from ring drains when they discharge into pump house or common drainage pipe.

SECTION 2 SUMMARY OF PAST INVESTIGATIONS AND SAMPLING

SECTION 2.1 SOIL

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

Predominant Soil Type in the Vadose Zone sand, silt, gravel

Groundcover Type grass

Potential for Wind / Water Erosion ☐ Yes ☑ No

Surface Soil Sampling Summary (0'-2' bgs) **[See Figure 2-2 for sampling locations]**

				ANALYTES											
Source Area	Boring Designation	Sample ID	Sample Depth (ft)	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})
Tank 20	GZ-202	S-1	0-2	Nov-96			Nov-96	Nov-96							

Subsurface Soil Sampling Summary (vadose zone) **[See Figure Y-Y for sampling locations]**

				ANALYTES											
Source Area	Boring Designation	Sample ID	Sample Depth (ft)	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})
Tank 20	GZ-218	S-2	5-7	Oct-97			Oct-97	Oct-97							
	B-8	S-1	10-12	May-97											

SECTION 2.2 GROUNDWATER

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

Number of Groundwater Sampling Locations **Upgradient** 1 plus 1 recovery well
Downgradient 1

Depth to Groundwater **Minimum** 6.96 ft bgs (2/98; GZ-218)
Average 23.82 ft bgs
Maximum 40.68 ft bgs (2/97; GZ-202)

Depth to Bedrock 5 ft bgs (GZ-202);18 ft bgs (GZ-218); 11.5 ft bgs (av)

Preferential Pathways for Groundwater Migration ☐ Yes ☑ No

Describe: _____

Predominant Soil Type in the Saturated Zone Weathered shale

Groundwater Sampling Summary **[See Figure 2-2 for sampling locations]**

		ANALYTES												
Source Area	Well 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})	Notes
Tank 20	GZ-202	6/97			6/97	6/97								
	GZ-218	6/99			6/99	12/97	6/99							
	RW-3													Installed 10/01
NOTES: 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 ft
Maximum 0.28 ft (GZ-202; 6/99)
Most Recent 0.05 ft

Free Liquid Gauging Summary **[See Figure Y-Y for gauging locations]**

Source Area	Well / Boring Associated with Source Area	Free Product Thickness (ft)	Date Measured
Tank 20	GZ-202	ND	1/97 – 8/97
		0.02	9/97
		0.11	10/97
		0.03	11/97
		0.02	12/97
		ND	1/98 – 2/98
		0.23	3/98
		0.28	6/99
		0.03	7/01
		0.05	8/20/01
		0.02	10/01
		0.01	11/01
		0.05	2/02
	GZ-218	ND	10/97 – 3/98; 6/99; 7/01 – 8/01; 11/01; 2/02
	RW-3	ND	10/01 – 11/01; 2/02
NOTES: 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
- ☐ Other _____

Man-Made Structure Sampling Summary **[See Figure 2-2 for sampling locations]**

Tank Number	Contents	Water Level (ft)	Sludge Layer (ft)	Product Layer (ft)	Date Sampled
20	F-76	0.25	-	-	9/96

If an Underground Storage Tank **Date Cleaned** 9/96
Date Closed _____

If Underground Distribution Lines **Date Cleaned** 3/97
Date Plugged 3/97

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 20	GZ-202, GZ-218, B-8	Soil	ND	
		Groundwater	ND	GZ-202 – 1-Methylnaphthalene (0.13 ug/L) and TPH (2.1 ug/ml) detected – no GB GW Objective; GZ-218 – TPH (5400 ug/L) and 3 VOCs detected – no GB GW Objective (12/97); TPH (3700 ug/L) and a few VOCs and SVOCs detected – No GB GW Objectives (6/99)
		Free Product	0.05 ft	GZ-202 – 2/02
NOTES:				
BGA = Below GB Groundwater Objective			L = Leaching Criteria	
BDC = Below Direct Contact			DC = Direct Contact	
BLC = Below Leaching Criteria			ND = Non Detect	

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

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

Groundwater ☑ Yes ☐ No If so, which HS? Free product – GZ-202; 2/02

SECTION 1 POSSIBLE SOURCE AREA IDENTIFICATION

SITE Tank Farm 2

POSSIBLE SOURCE AREA Tank 21

FIGURE/MAP Figure 2-2

SIZE (approx.)

Length 116 ft **Width** 116 ft
Area 13,456 ft^2 0.31 acres

DESCRIPTION OF AREA AND PAST OPERATIONS

- 2.5 million gallon cylindrical UST made of concrete
- 116 ft in diameter and 33.5 ft deep, constructed 5 ft below grade and installed between 1941 and 1943
- Pump sump chamber is located adjacent to tank and houses pumps associated with the tanks' underdrainage and petroleum transfer systems
- Ring drains are located around the perimeter of the UST. They are 12" in diameter and 2.5 ft below the tank.
- The ring drains discharge into a sump pit located in the pump sump chamber.
- Underground petroleum distribution lines connect all of the tanks in Tank Farm 2.
- When sludge was cleaned out of tank, it was disposed of on the ground in the general vicinity of the tank.
- Taken out of service in the mid-1990s.
- When tank cleaning began in March 1996, this tank was used to store recovered water (petroleum contaminated water) for treatment prior to discharge from the site.
- Emptied, cleaned, and inspected in March 1996 and April 1997.

DISTANCE TO PROPERTY LINES (approx.)

☑	North	300 ft
☑	South	2,200 ft
☑	East	750 ft
☑	West	1,000 ft

REFERENCES

1. Work Plan for Site Investigation, GZA GeoEnvironmental, Inc. 8/97
2. Site Investigation Report, GZA GeoEnvironmental, Incl. 5/98
3. Tank Closure Assessment Report – Tank Farm 2, GZA GeoEnvironmental, Inc. 10/98
4. Results of Groundwater Sampling for Fuel Loading Area and Tank Farms 1, 2, & 3, Foster Wheeler Environmental Corporation. 9/99

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

1.	_____	☐	JP-4
2.	_____	☐	JP-5
3.	_____	☑	Distillate Fuel (No. 5 to No.2)
4.	_____	☑	No. 5 Fuel Oil
5.	_____	☑	Other: Marine Diesel Fuel

RELEASE STATUS ☐ Confirmed Release ☑ Potential for Release

RELEASE SUMMARY (if applicable)

- Tank bottom sludge disposed to the ground surface in the vicinity of the tank.
- Possible release from ring drains when they discharge into pump house or common drainage pipe

SECTION 2 SUMMARY OF PAST INVESTIGATIONS AND SAMPLING

SECTION 2.1 SOIL

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

Predominant Soil Type in the Vadose Zone Shale

Groundcover Type grass

Potential for Wind / Water Erosion ☐ Yes ☑ No

Surface Soil Sampling Summary (0'-2' bgs) **[See Figure 2-2 for sampling locations]**

				ANALYTES											
Source Area	Boring Designation	Sample ID	Sample Depth (ft)	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})
Tank 21	GZ-227	S-1	0-2	10/97			10/97	10/97							

Subsurface Soil Sampling Summary (vadose zone) **[See Figure 2-2 for sampling locations]**

				ANALYTES											
Source Area	Boring Designation	Sample ID	Sample Depth (ft)	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})
Tank 21	B-31	S-1	10-12	5/97											

SECTION 2.2 GROUNDWATER

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

Number of Groundwater Sampling Locations **Upgradient** 0
Downgradient 2 plus 1 recovery well

Depth to Groundwater **Minimum** 10.94 ft bgs (GZ-227; 2/98)
Average 21.12 ft bgs
Maximum 31.30 ft bgs (GZ-203; 6/97)

Depth to Bedrock 2 ft bgs (GZ-203);39 ft bgs (GZ-227); 20.5 ft bgs (av)

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

Predominant Soil Type in the Saturated Zone Weathered Shale

Groundwater Sampling Summary **[See Figure 2-2 for sampling locations]**

Source Area	Well Associated with Source Area	ANALYTES: TPH	TVPH	BETX	VOCs	PAHs	SVOCs	PCBs/ Pest	Metals	Base Neutrals /Acids	Oil and Grease	Aliphatic (C_5-C_{12})	Aromatic (C_8-C_{10})	Notes
Tank 21	GZ-203	6/97			6/97	6/97								
	GZ-227	6/99			6/99	12/97	6/99							
	RW-2													Installed 10/01

NOTES:
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 ft
Maximum	0.02 ft (GZ-227; 8/01)
Most Recent	ND

Free Liquid Gauging Summary **[See Figure 2-2 for gauging locations]**

Source Area	Well / Boring Associated with Source Area	Free Product Thickness (ft)	Date Measured
Tank 21	GZ-203	ND	1/97 – 3/98; 6/99; 7/01 – 8/01; 11/01; 2/02
	GZ-227	ND	10/97 – 3/98; 6/99
		0.02	7/01
		0.02	8/01
		ND	10/01
		0.01	11/01
		ND	2/02
	RW-2	ND	10/01 – 11/01; 2/02

NOTES:
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
- ☐ Other _____

Man-Made Structure Sampling Summary **[See Figure 2-2 for sampling locations]**

Tank Number	Contents	Water Level (ft)	Sludge Layer (ft)	Product Layer (ft)	Date Sampled
Tank 21	F-76	8.23	-	0.02	3/96

If an Underground Storage Tank
Date Cleaned 3/96
Date Closed _____

If Underground Distribution Lines
Date Cleaned 3/97
Date Plugged 3/97

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 21	GZ-203, GZ-227, B-31	Soil	ND	
		Groundwater	NS	GZ-227 (12/97 and 6/99) – TPH, SVOCs, and VOCs detected - No GB GW Objectives
		Free Product	ND	2/02
NOTES:				
BGA = Below GB Groundwater Objective			L = Leaching Criteria	
BDC = Below Direct Contact			DC = Direct Contact	
BLC = Below Leaching Criteria			ND = Non Detect	
NS = No Standard				

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 2

POSSIBLE SOURCE AREA Tank 22

FIGURE/MAP Figure 2-2

SIZE (approx.)

Length 116 ft **Width** 116 ft
Area 13,456 ft^2 0.31 acres

DESCRIPTION OF AREA AND PAST OPERATIONS

- 2.5 million gallon cylindrical UST made of concrete
- 116 ft in diameter and 33.5 ft deep, constructed 5 ft below grade and installed between 1941 and 1943
- Pump sump chamber is located adjacent to tank and houses pumps associated with the tanks' underdrainage and petroleum transfer systems
- Ring drains are located around the perimeter of the UST. They are 12" in diameter and 2.5 ft below the tank.
- The ring drains discharge into a sump pit located in the pump sump chamber.
- Underground petroleum distribution lines connect all of the tanks in Tank Farm 2.
- When sludge was cleaned out of tank, it was disposed of on the ground in the general vicinity of the tank.
- Taken out of service and cleaned in the mid-1970s.
- Used as a "slop" tank since the mid-1970s.
- Emptied, cleaned, and inspected in March 1996 and April 1997.

DISTANCE TO PROPERTY LINES (approx.)

☑	North	600 ft
☑	South	1,900 ft
☑	East	750 ft
☑	West	950 ft

REFERENCES

1. Work Plan for Site Investigation, GZA GeoEnvironmental, Inc. 8/97
2. Site Investigation Report, GZA GeoEnvironmental, Inc. 5/98
3. Tank Closure Assessment Report – Tank Farm 2, GZA GeoEnvironmental, Inc. 10/98
4. Results of Groundwater Sampling for Fuel Loading Area and Tank Farms 1, 2, & 3, Foster Wheeler Environmental Corporation. 9/99

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

1.	_____	☐	JP-4
2.	_____	☐	JP-5
3.	_____	☑	Distillate Fuel (No. 5 – No. 2)
4.	_____	☑	No. 5 Fuel Oil
5.	_____	☑	Other: Marine Diesel Fuel

RELEASE STATUS ☐ Confirmed Release ☑ Potential for Release

RELEASE SUMMARY (if applicable)

- Tank bottom sludge disposed to the ground surface in the vicinity of the tank.
- Possible release from ring drains when they discharge into pump house or common drainage pipe

SECTION 2 SUMMARY OF PAST INVESTIGATIONS AND SAMPLING

SECTION 2.1 SOIL

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

Predominant Soil Type in the Vadose Zone Silty, gravely, sand and slightly weathered shale

Groundcover Type grass

Potential for Wind / Water Erosion ☐ Yes ☑ No

Surface Soil Sampling Summary (0'-2' bgs) **[See Figure 2-2 for sampling locations]**

				ANALYTES											
Source Area	Boring Designation	Sample ID	Sample Depth (ft)	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})
Tank 22	GZ-217	S-1	0-2	10/97			10/97	10/97							

Subsurface Soil Sampling Summary (vadose zone) **[See Figure 2-2 for sampling locations]**

				ANALYTES											
Source Area	Boring Designation	Sample ID	Sample Depth (ft)	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})
Tank 22	GZ-204	S-2	5-6	11/96			11/96	11/96							
	B-28	S-1	10-12	5/97											

SECTION 2.2 GROUNDWATER

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

Number of Groundwater Sampling Locations — **Upgradient** 0; **Downgradient** 2 plus 1 recovery well

Depth to Groundwater — **Minimum** 5.45 ft bgs (GZ-217; 2/98); **Average** 15.88 ft bgs; **Maximum** 26.32 ft bgs (GZ-217; 10/97)

Depth to Bedrock 10 ft bgs (GZ-204);0.3 ft bgs (GZ-217);5.1 ft bgs (av)

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

Predominant Soil Type in the Saturated Zone Shale; sandstone

Groundwater Sampling Summary **[See Figure Y-Y for sampling locations]**

		ANALYTES												
Source Area	Well Associated with Source Area	TPH	TVPH	BETX	VOCs	PAHs	SVOCs	PCBs/ Pest	Metals	Base Neutrals /Acids	Oil and Grease	Aliphatic (C_5-C_{12})	Aromatic (C_8-C_{10})	Notes
Tank 22	GZ-204	6/97			6/97	6/97								
	GZ-217	12/97			12/97	12/97								
	RW-5													Installed 10/01
NOTES: 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 ND

Free Liquid Gauging Summary **[See Figure 2-2 for gauging locations]**

Source Area	Well / Boring Associated with Source Area	Free Product Thickness (ft)	Date Measured
Tank 22	GZ-204	ND	1/97 – 3/98; 6/99; 7/01 – 8/01; 11/01; 2/02
	GZ-217	ND	10/97 – 3/98; 6/99; 7/01 – 8/01; 11/01; 2/02
	RW-5	ND	10/01 – 11/01; 2/02
NOTES: 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
- ☐ Other _____

Man-Made Structure Sampling Summary **[See Figure 2-2 for sampling locations]**

Tank Number	Contents	Water Level (ft)	Sludge Layer (ft)	Product Layer (ft)	Date Sampled
Tank 22	Slop*	2.00	0.50	2.15	3/96

Note:
* = Mixture of heavy sludge, solids, debris, and several types of oil

If an Underground Storage Tank — **Date Cleaned** 3/96; **Date Closed** _____

If Underground Distribution Lines — **Date Cleaned** 4/97; **Date Plugged** 4/97

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 22	GZ-204, GZ-217, B-28	Soil	BDC	GZ-204 (TPH-29mg/kg; DC = 2,500 mg/kg)
		Groundwater	ND	GZ-217 (12/97) – TPH 2mg/kg – no GB GW Obj.
		Free Product	ND	2/02
NOTES:				
BGA = Below GB Groundwater Objective			L = Leaching Criteria	
BDC = Below Direct Contact			DC = Direct Contact	
BLC = Below Leaching Criteria			ND = Non Detect	

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 2

POSSIBLE SOURCE AREA Tank 24

FIGURE/MAP Figure 2-2

SIZE (approx.)

Length	116 ft	**Width**	116 ft
Area	13,456 ft^2		0.31 acres

DESCRIPTION OF AREA AND PAST OPERATIONS

- 2.5 million gallon cylindrical UST made of concrete
- 116 ft in diameter and 33.5 ft deep, constructed 5 ft below grade and installed between 1941 and 1943
- Pump sump chamber is located adjacent to tank and houses pumps associated with the tanks' underdrainage and petroleum transfer systems
- Ring drains are located around the perimeter of the UST. They are 12" in diameter and 2.5 ft below the tank.
- The ring drains discharge into a sump pit located in the pump sump chamber.
- Underground petroleum distribution lines connect all of the tanks in Tank Farm 2.
- When sludge was cleaned out of tank, it was disposed of on the ground in the general vicinity of the tank.
- A circular feature was noted on a 1965 aerial photo 100' northwest of Tank 24. Also observed in 1970. [Sludge?]
- Taken out of service and cleaned in the mid-1990s.
- Emptied, cleaned (1/97 – 2/97), and inspected (2/97).

DISTANCE TO PROPERTY LINES (approx.)

☑	North	1,450 ft
☑	South	1,000 ft
☑	East	900 ft
☑	West	750 ft

REFERENCES

1. Study Area Screening Evaluation Work Plan, Naval Eduation and Training Center, Newport, RI, TRC Environmental Consultants, Inc. 7/92
2. Work Plan for Site Investigation, GZA GeoEnvironmental, Inc. 8/97
3. Site Investigation Report, GZA GeoEnvironmental, Inc. 5/98
4. Tank Closure Assessment Report – Tank Farm 2, GZA GeoEnvironmental, Inc. 10/98
5. Results of Groundwater Sampling for Fuel Loading Area and Tank Farms 1, 2, & 3, Foster Wheeler Environmental Corporation. 9/99

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

1. _____
2. _____
3. _____
4. _____

☐	JP-4
☐	JP-5
☑	Distillate Fuel (No. 5 – No. 2)
☑	No. 5 Fuel Oil

5. _____ ☑ Other: Marine Diesel Fuel

RELEASE STATUS ☐ Confirmed Release ☑ Potential for Release

RELEASE SUMMARY (if applicable)

- Tank bottom sludge disposed to the ground surface in the vicinity of the tank.
- Possible release from ring drains when they discharge into pump house or common drainage pipe

SECTION 2 SUMMARY OF PAST INVESTIGATIONS AND SAMPLING

SECTION 2.1 SOIL

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

Predominant Soil Type in the Vadose Zone Silty sand; shale

Groundcover Type grass

Potential for Wind / Water Erosion ☐ Yes ☑ No

Surface Soil Sampling Summary (0'-2' bgs) N/A

Subsurface Soil Sampling Summary (vadose zone) **[See Figure 2-2 for sampling locations]**

				ANALYTES											
Source Area	Boring Designation	Sample ID	Sample Depth (ft)	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})
Tank 24	GZ-220	S-3	8-8.7	10/97			10/97	10/97							
	GZ-206	S-3	10-12	11/96			11/96	11/96							
	B-14	S-1	10-12	5/97											

SECTION 2.2 GROUNDWATER

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

Number of Groundwater Sampling Locations **Upgradient** 0
Downgradient 2

Depth to Groundwater **Minimum** 8.44 ft bgs (GZ-220; 1/98)
Average 19.27 ft bgs
Maximum 30.11 ft bgs (GZ-206; 2/97)

Depth to Bedrock 8 ft bgs (GZ-206 and GZ-220)

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

Predominant Soil Type in the Saturated Zone Weathered Shale/slate

Groundwater Sampling Summary **[See Figure 2-2 for sampling locations]**

		ANALYTES													
Source Area	Well 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})	Notes
Tank 24	GZ-206	6/97			6/97	6/97								
	GZ-220	12/97			12/97	12/97								
NOTES: 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	ND

Free Liquid Gauging Summary **[See Figure 2-2 for gauging locations]**

Source Area	Well / Boring Associated with Source Area	Free Product Thickness (ft)	Date Measured
Tank 24	GZ-206	ND	1/97 – 3/98; 6/99; 7/01 – 8/01; 2/02
	GZ-220	ND	10/97 – 3/98; 6/99; 7/01 – 8/01; 2/02
NOTES: 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
- ☐ Other _____

Man-Made Structure Sampling Summary **[See Figure 2-2 for sampling locations]**

Tank Number	Contents	Water Level (ft)	Sludge Layer (ft)	Product Layer (ft)	Date Sampled
Tank 24	F-76	8.12	-	-	3/96

If an Underground Storage Tank **Date Cleaned** 1/97
Date Closed _____

If Underground Distribution Lines **Date Cleaned** 3/97
Date Plugged 3/97

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 24	GZ-206, GZ-220, B-14	Soil	ND	
		Groundwater	ND	
		Free Product	ND	2/02
NOTES:				
BGA = Below GB Groundwater Objective			L = Leaching Criteria	
BDC = Below Direct Contact			DC = Direct Contact	
BLC = Below Leaching Criteria			ND = Non Detect	

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 2

POSSIBLE SOURCE AREA Tank 25

FIGURE/MAP Figure 2-2

SIZE (approx.)

Length 116 ft **Width** 116 ft
Area 13,456 ft^2 0.31 acres

DESCRIPTION OF AREA AND PAST OPERATIONS

- 2.5 million gallon cylindrical UST made of concrete
- 116 ft in diameter and 33.5 ft deep, constructed 5 ft below grade and installed between 1941 and 1943
- Pump sump chamber is located adjacent to tank and houses pumps associated with the tanks' underdrainage and petroleum transfer systems
- Ring drains are located around the perimeter of the UST. They are 12" in diameter and 2.5 ft below the tank.
- The ring drains discharge into a sump pit located in the pump sump chamber.
- Underground petroleum distribution lines connect all of the tanks in Tank Farm 2.
- When sludge was cleaned out of tank, it was disposed of on the ground in the general vicinity of the tank.
- A 1951 aerial photo shows a series of 3 to 4 elongated ground scars about 400 feet west-southwest of Tank 25.
- Taken out of service and cleaned in the mid-1990s.
- Emptied, cleaned (8/96- 9/96), and inspected (10/96 and 12/96).

DISTANCE TO PROPERTY LINES (approx.)

☑	North	1,900 ft
☑	South	700 ft
☑	East	900 ft
☑	West	600 ft

REFERENCES

1. Study Area Screening Evaluation Work Plan, Naval Eduation and Training Center, Newport, RI, TRC Environmental Consultants, Inc. 7/92
2. Work Plan for Site Investigation, GZA GeoEnvironmental, Inc. 8/97
3. Site Investigation Report, GZA GeoEnvironmental Inc. 5/98
4. Tank Closure Assessment Report – Tank Farm 2, GZA GeoEnvironmental, Inc. 10/98
5. Results of Groundwater Sampling for Fuel Loading Area and Tank Farms 1, 2, & 3, Foster Wheeler Environmental Corporation. 9/99

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

1.	_____	☐	JP-4
2.	_____	☐	JP-5
3.	_____	☑	Distillate Fuel (No. 5 – No. 2)
4.	_____	☑	No. 5 Fuel Oil

5. _____ ☑ Other: Marine Diesel Fuel

RELEASE STATUS ☐ Confirmed Release ☑ Potential for Release

RELEASE SUMMARY (if applicable)

- Tank bottom sludge disposed to the ground surface in the vicinity of the tank.
- Possible release from ring drains when they discharge into pump house or common drainage pipe

SECTION 2 SUMMARY OF PAST INVESTIGATIONS AND SAMPLING

SECTION 2.1 SOIL

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

Predominant Soil Type in the Vadose Zone Fill; sand

Groundcover Type grass

Potential for Wind / Water Erosion ☐ Yes ☑ No

Surface Soil Sampling Summary (0'-2' bgs) **[See Figure 2-2 for sampling locations]**

				ANALYTES											
Source Area	Boring Designation	Sample ID	Sample Depth (ft)	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})
Tank 25	GZ-223	S-1	0-2	10/97			10/97	10/97							

Subsurface Soil Sampling Summary (vadose zone) **[See Figure 2-2 for sampling locations]**

				ANALYTES											
Source Area	Boring Designation	Sample ID	Sample Depth (ft)	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})
Tank 25	GZ-207	S-3	10-12	10/96			10/96	10/96							
	B-11	S-1	10-12	5/97											

SECTION 2.2 GROUNDWATER

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

Number of Groundwater Sampling Locations **Upgradient** 0
Downgradient 1

Depth to Groundwater **Minimum** 15.81 ft bgs (GZ-207; 4/97)
Average 23.78 ft bgs
Maximum 31.74 ft bgs (GZ-223;10/97)

Depth to Bedrock 24 ft bgs (GZ-207);15 ft bgs (GZ-223);19.5ft bgs (av)

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

Predominant Soil Type in the Saturated Zone Weathered Shale

Groundwater Sampling Summary **[See Figure 2-2 for sampling locations]**

		ANALYTES												
Source Area	Well 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})	Notes
Tank 25	GZ-207	6/99			6/99		6/99							Dry—6/97
	GZ-223	12/97			12/97	12/97								
NOTES: 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	ND

Free Liquid Gauging Summary **[See Figure 2-2 for gauging locations]**

Source Area	Well / Boring Associated with Source Area	Free Product Thickness (ft)	Date Measured
Tank 25	GZ-207	ND	1/97 – 3/98; 6/99; 7/01 – 8/01; 2/02
	GZ-223	ND	10/97 – 3/98; 6/99; 7/01 – 8/01; 2/02
NOTES: ND = Not Dectected			

SECTION 2.4 SOIL GAS

Soil Gas Sampled in this Area ☐ Yes ☑ No

Number of Soil Gas Samples 0

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

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 [See Figure 2-2 for sampling locations]

Tank Number	Contents	Water Level (ft)	Sludge Layer (ft)	Product Layer (ft)	Date Sampled
Tank 25	F-76	0.08	-	-	3/96

Man Underground Storage Tank — Date Cleaned 8/96 – 9/96; Date Closed _____

Underground Distribution Lines — Date Cleaned 3/97; Date Plugged 3/97

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 25	GZ-207, GZ-224, B-11	Soil	BDC	GZ-207 (Detected SVOCs and TPH); B-11(detected TPH); GZ-224 (TPH detected)
		Groundwater	ND	GZ-207 (TPH, VOCs, and SVOCs detected – No GB GW Objective)
		Free Product	ND	2/02
NOTES:				
BGA = Below GB Groundwater Objective			L = Leaching Criteria	
BDC = Below Direct Contact			DC = Direct Contact	
BLC = Below Leaching Criteria			ND = Non Detect	

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 2

POSSIBLE SOURCE AREA Tank 26

FIGURE/MAP Figure 2-2

SIZE (approx.)

Length 116 ft **Width** 116 ft
Area 13,456 ft^2 0.31 acres

DESCRIPTION OF AREA AND PAST OPERATIONS

- 2.5 million gallon cylindrical UST made of concrete
- 116 ft in diameter and 33.5 ft deep, constructed 5 ft below grade and installed between 1941 and 1943
- Pump sump chamber is located adjacent to tank and houses pumps associated with the tanks' underdrainage and petroleum transfer systems
- Ring drains are located around the perimeter of the UST. They are 12" in diameter and 2.5 ft below the tank.
- The ring drains discharge into a sump pit located in the pump sump chamber.
- Underground petroleum distribution lines connect all of the tanks in Tank Farm 2.
- When sludge was cleaned out of tank, it was disposed of on the ground in the general vicinity of the tank.
- Taken out of service and cleaned in the mid-1990s.
- Emptied, cleaned (10/96 – 11/96), and inspected (2/97).

DISTANCE TO PROPERTY LINES (approx.)

☑	North	1,650 ft
☑	South	700 ft
☑	East	550 ft
☑	West	1,050 ft

REFERENCES

1. Work Plan for Site Investigation, GZA GeoEnvironmental, Inc. 8/97
2. Site Investigation Report, GZA GeoEnvironmental, Inc. 5/98
3. Tank Closure Assessment Report – Tank Farm 2, GZA GeoEnvironmental, Inc. 10/98
4. Results of Groundwater Sampling for Fuel Loading Area and Tank Farms 1, 2, & 3, Foster Wheeler Environmental Corporation. 9/99

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

1.	_____	☐	JP-4
2.	_____	☐	JP-5
3.	_____	☑	Distillate Fuel (No. 5 – No. 2)
4.	_____	☑	No. 5 Fuel Oil
5.	_____	☑	Other: Marine Diesel Fuel

RELEASE STATUS ☐ Confirmed Release ☑ Potential for Release

RELEASE SUMMARY (if applicable)

- Tank bottom sludge disposed to the ground surface in the vicinity of the tank.
- Possible release from ring drains when they discharge into pump house or common drainage pipe

SECTION 2 SUMMARY OF PAST INVESTIGATIONS AND SAMPLING

SECTION 2.1 SOIL

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

Predominant Soil Type in the Vadose Zone Till

Groundcover Type grass

Potential for Wind / Water Erosion ☐ Yes ☑ No

Surface Soil Sampling Summary (0'-2' bgs) N/A

Subsurface Soil Sampling Summary (vadose zone) **[See Figure 2-2 for sampling locations]**

				ANALYTES											
Source Area	Boring Designation	Sample ID	Sample Depth (ft)	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})
Tank 26	GZ-208	S-2	5-7	11/96			11/96	11/96							
	GZ-222	S-2	5-7	10/97			10/97	10/97							

SECTION 2.2 GROUNDWATER

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

Number of Groundwater Sampling Locations
Upgradient 1 plus 1 recovery well
Downgradient 1

Depth to Groundwater
Minimum 12.14 ft bgs (GZ-222; 2/98)
Average 23.28 ft bgs
Maximum 34.42 ft bgs (GZ-208; 6/97)

Depth to Bedrock 11ft bgs (GZ-208);7.5 ft bgs (GZ-222);9.25ft bgs (av)

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

Predominant Soil Type in the Saturated Zone Shale/sandstone

Groundwater Sampling Summary **[See Figure 2-2 for sampling locations]**

		ANALYTES												
Source Area	Well 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})	Notes
Tank 26	GZ-208	6/99			6/99	6/97	6/99							

		ANALYTES												
Source Area	Well 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})	Notes
	GZ-222	12/97			12/97	12/97								
	RW-2													installed 10/01
NOTES: 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 ft
Maximum 0.41 ft (GZ-208; 8/20/01)
Most Recent 0.06 ft

Free Liquid Gauging Summary **[See Figure 2-2 for gauging locations]**

Source Area	Well / Boring Associated with Source Area	Free Product Thickness (ft)	Date Measured
Tank 26	GZ-208	ND	1/97 – 7/97
		0.02	8/97
		0.01	9/97
		0.01	10/97
		ND	11/97
		0.01	12/97
		ND	1/98 – 3/98; 6/99
		0.10	7/01
		0.08	8/20/01
		0.02	8/28/01
		0.03	10/01
		0.41	11/01
		0.06	2/02
	GZ-222	ND	10/97 – 3/98; 6/99; 7/01 – 8/01; 11/01; 2/02
	RW-2	ND	10/01 – 11/01; 2/02
NOTES: ND = Not Dectected			

SECTION 2.4 SOIL GAS

Soil Gas Sampled in this Area ☐ Yes ☑ No

Number of Soil Gas Samples 0

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
- ☐ Other _____

Man-Made Structure Sampling Summary **[See Figure 2-2 for sampling locations]**

Tank Number	Contents	Water Level (ft)	Sludge Layer (ft)	Product Layer (ft)	Date Sampled
Tank 26	F-76	5.94	-	-	3/96

If an Underground Storage Tank **Date Cleaned** 10/96 – 11/96
Date Closed _____

If Underground Distribution Lines **Date Cleaned** 3/97
Date Plugged 3/97

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 26	GZ-208, GZ-222	Soil	ND	
		Groundwater	ND	GZ-208 (TPH, VOCs, and SVOCs detected – No GB GW Objective); GZ-222 (12/97) – TPH (0.36mg/kg)
		Free Product	0.06 ft	GZ-208; 2/02
NOTES:				
BGB = Below GB Groundwater Objective			L = Leaching Criteria	
BDC = Below Direct Contact			DC = Direct Contact	
BLC = Below Leaching Criteria			ND = Non Detect	

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

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

Groundwater ☑ Yes ☐ No If so, which HS? Free product (GZ-208; 2/02)

SECTION 1 POSSIBLE SOURCE AREA IDENTIFICATION

SITE Tank Farm 2

POSSIBLE SOURCE AREA Tank 27

FIGURE/MAP Figure 2-2

SIZE (approx.)

Length 116 ft **Width** 116 ft
Area 13,456 ft^2 0.31 acres

DESCRIPTION OF AREA AND PAST OPERATIONS

- 2.5 million gallon cylindrical UST made of concrete
- 116 ft in diameter and 33.5 ft deep, constructed 5 ft below grade and installed between 1941 and 1943
- Pump sump chamber is located adjacent to tank and houses pumps associated with the tanks' underdrainage and petroleum transfer systems
- Ring drains are located around the perimeter of the UST. They are 12" in diameter and 2.5 ft below the tank.
- The ring drains discharge into a sump pit located in the pump sump chamber.
- Underground petroleum distribution lines connect all of the tanks in Tank Farm 2.
- When sludge was cleaned out of tank, it was disposed of on the ground in the general vicinity of the tank.
- Taken out of service and cleaned in the mid-1990s.
- Emptied, cleaned (1/97 – 2/97), and inspected (2/97)

DISTANCE TO PROPERTY LINES (approx.)

☑	North	1,200 ft
☑	South	700 ft
☑	East	350 ft
☑	West	1,350 ft

REFERENCES

1. Work Plan for Site Investigation, GZA GeoEnvironmental, Inc. 8/97
2. Site Investigation Report, GZA GeoEnvironmental, Inc. 5/98
3. Tank Closure Assessment Report – Tank Farm 2, GZA GeoEnvironmental, Inc. 10/98
4. Results of Groundwater Sampling for Fuel Loading Area and Tank Farms 1, 2, & 3, Foster Wheeler Environmental Corporation. 9/99

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

1.	_____	☐	JP-4
2.	_____	☐	JP-5
3.	_____	☑	Distillate Fuel (No. 5 – No. 2)
4.	_____	☑	No. 5 Fuel Oil
5.	_____	☑	Other: Marine Diesel Fuel

RELEASE STATUS ☐ Confirmed Release ☑ Potential for Release

RELEASE SUMMARY (if applicable)

- Tank bottom sludge disposed to the ground surface in the vicinity of the tank.
- Possible release from ring drains when they discharge into pump house or common drainage pipe

SECTION 2 SUMMARY OF PAST INVESTIGATIONS AND SAMPLING

SECTION 2.1 SOIL

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

Predominant Soil Type in the Vadose Zone Sitly, gravelly sand

Groundcover Type grass

Potential for Wind / Water Erosion ☐ Yes ☑ No

Surface Soil Sampling Summary (0'-2' bgs) N/A

Subsurface Soil Sampling Summary (vadose zone) **[See Figure 2-2 for sampling locations]**

				ANALYTES											
Source Area	Boring Designation	Sample ID	Sample Depth (ft)	TPH	TVPH	BETX	VOCs	PAHs	SVOCs	PCBs/ Pest	Metals	Base Neutrals/ Acids	Oil and Grease	Aliphatic (C_8-C_{12})	Aromatic (C_8-C_{10})
Tank 27	B-18	S-1	10-12	5/97											
	GZ-209	S-4	15-17	10/96			10/96	10/96							

SECTION 2.2 GROUNDWATER

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

Number of Groundwater Sampling Locations **Upgradient** 1
Downgradient 1

Depth to Groundwater **Minimum** 13.58 ft bgs (GZ-212; 3/98)
Average 25.86 ft bgs
Maximum 38.15 ft bgs (GZ-209; 5/97)

Depth to Bedrock 11 ft bgs (GZ-209);18 ft bgs (GZ-212);14.5ft bgs (av)

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

Predominant Soil Type in the Saturated Zone Weathered Shale

Groundwater Sampling Summary **[See Figure 2-2 for sampling locations]**

	ANALYTES

Source Area	Well Associated with Source Area	TPH	TVPH	BETX	VOCs	PAHs	SVOCs	PCBs/ Pest	Metals	Base Neutrals /Acids	Oil and Grease	Aliphatic (C_8-C_{12})	Aromatic (C_8-C_{10})	Notes
Tank 27	GZ-209	6/97			6/97	6/97								
	GZ-200	6/97			6/97	6/97								Blind Dup of GZ-209
	GZ-212	6/99			6/99	12/97	6/99							

NOTES:
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	ND

Free Liquid Gauging Summary **[See Figure 2-2 for gauging locations]**

Source Area	Well / Boring Associated with Source Area	Free Product Thickness (ft)	Date Measured
Tank 27	GZ-209	ND	1/97 – 3/98; 6/99; 7/01 – 8/01; 2/02
	GZ-212	ND	10/97 – 3/98; 6/99; 7/01 – 8/01; 2/02

NOTES:
ND = Not Dectected

SECTION 2.4 SOIL GAS

Soil Gas Sampled in this Area ☐ Yes ☑ No

Number of Soil Gas Samples 0

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
- ☐ Other _____

Man-Made Structure Sampling Summary **[See Figure 2-2 for sampling locations]**

Tank Number	Contents	Water Level (ft)	Sludge Layer (ft)	Product Layer (ft)	Date Sampled
Tank 27	F-76	9.93	-	-	3/96

If an Underground Storage Tank — Date Cleaned 1/97 – 2/97; Date Closed _____

If Underground Distribution Lines — Date Cleaned 2/97; Date Plugged 2/97

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 27	GZ-209, GZ-212, B-18	Soil	TPH – 5600 mg/kg	GZ-209 – TPH exceeds DC criterion
		Groundwater	ND	TPH detected in GZ-209 and GZ-212; SVOCs also detected – no GB GW criteria. GZ-212 – 2 VOCs detected in 12/97- no GB GW criteria
		Free Product	ND	2/02
NOTES:				
BGB = Below GB Groundwater Objective				L = Leaching Criteria
BDC = Below Direct Contact				DC = Direct Contact
BLC = Below Leaching Criteria				ND = Non Detect

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 2

POSSIBLE SOURCE AREA Tank 28

FIGURE/MAP Figure 2-2

SIZE (approx.)

Length 116 ft **Width** 116 ft
Area 13,456 ft^2 0.31 acres

DESCRIPTION OF AREA AND PAST OPERATIONS

- 2.5 million gallon cylindrical UST made of concrete
- 116 ft in diameter and 33.5 ft deep, constructed 5 ft below grade and installed between 1941 and 1943
- Pump sump chamber is located adjacent to tank and houses pumps associated with the tanks' underdrainage and petroleum transfer systems
- Ring drains are located around the perimeter of the UST. They are 12" in diameter and 2.5 ft below the tank.
- The ring drains discharge into a sump pit located in the pump sump chamber.
- Underground petroleum distribution lines connect all of the tanks in Tank Farm 2.
- When sludge was cleaned out of tank, it was disposed of on the ground in the general vicinity of the tank.
- Aerial photo taken in 1963 shows the Melville North Pond 600 feet east of Tank 28.
- 200-300 feet west of Tank 28 is a rectangular area approximately 400' by 100' that was seen in 1981 aerial photos. A series of round features were visible at the northern portion of the rectangle. In 1988, the rectangle was present, but not the round features. [Possible sludge disposal?]
- Taken out of service and cleaned in the mid-1990s.
- Emptied, cleaned (9/96 – 10/96), and inspected (12/96 and 3/97)
- Photographs dated June 1981 showed nine dump loaded piles of petroleum contaminated soil 300 feet west of Tank 28. The title of the photos is "JP-5 saturated soil". The soil appears to have originated from another area other than Tank Farm 2 since JP-5 was not stored here. The soils have apparently been removed since there is not present evidence of the piles at the Tank Farm.

DISTANCE TO PROPERTY LINES (approx.)

☑	North	800 ft
☑	South	1,050 ft
☑	East	300 ft
☑	West	1,450 ft

REFERENCES

1. Study Area Screening Evaluation Work Plan, Naval Eduation and Training Center, Newport, RI, TRC Environmental Consultants, Inc. 7/92
2. Work Plan for Site Investigation, GZA GeoEnvironmental, Inc. 8/97
3. Site Investigation Report, GZA GeoEnvironmental, Inc. 5/98
4. Tank Closure Assessment Report – Tank Farm 2, GZA GeoEnvironmental, Inc. 10/98
5. Results of Groundwater Sampling for Fuel Loading Area and Tank Farms 1, 2, & 3, Foster Wheeler Environmental Corporation. 9/99

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

1.	_____	☐	JP-4
2.	_____	☐	JP-5
3.	_____	☑	Distillate Fuel (No. 5 – No. 2)
4.	_____	☑	No. 5 Fuel Oil
5.	_____	☑	Other: Marine Diesel Fuel

RELEASE STATUS ☐ Confirmed Release ☑ Potential for Release

RELEASE SUMMARY (if applicable)

- Tank bottom sludge disposed to the ground surface in the vicinity of the tank.
- Possible release from ring drains when they discharge into pump house or common drainage pipe

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 Silty, gravelly sand

Groundcover Type grass

Potential for Wind / Water Erosion ☐ Yes ☑ No

Surface Soil Sampling Summary (0'-2' bgs) N/A

Subsurface Soil Sampling Summary (vadose zone) **[See Figure 2-2 for sampling locations]**

				ANALYTES											
Source Area	Boring Designation	Sample ID	Sample Depth (ft)	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})
Tank 28	GZ-210	S-2	5-7	11/96			11/96	11/96							

SECTION 2.2 GROUNDWATER

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

Number of Groundwater Sampling Locations **Upgradient** 1
Downgradient 1

Depth to Groundwater **Minimum** 14.70 ft bgs (GZ-213; 3/98)
Average 19.54 ft bgs
Maximum 24.39 ft bgs (GZ-210; 6/97)

Depth to Bedrock 9 ft bgs (both wells)

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

Predominant Soil Type in the Saturated Zone Shale and sandstone

Groundwater Sampling Summary **[See Figure 2-2 for sampling locations]**

		ANALYTES												
Source Area	Well 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})	Notes
Tank 28	GZ-210	6/97			6/97	6/97								
	GZ-213	6/99			6/99	12/97	6/99							
NOTES: 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	ND

Free Liquid Gauging Summary **[See Figure 2-2 for gauging locations]**

Source Area	Well / Boring Associated with Source Area	Free Product Thickness (ft)	Date Measured
Tank 28	GZ-210	ND	1/97 – 3/98; 6/99; 7/01 – 8/01; 2/02
	GZ-213	ND	10/97 – 3/98; 6/99; 7/01 – 8/01; 2/02
NOTES: ND = Not Dectected			

SECTION 2.4 SOIL GAS

Soil Gas Sampled in this Area ☐ Yes ☑ No

Number of Soil Gas Samples 0

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
- ☐ Other _____

Man-Made Structure Sampling Summary **[See Figure 2-2 for sampling locations]**

Tank Number	Contents	Water Level (ft)	Sludge Layer (ft)	Product Layer (ft)	Date Sampled
Tank 28	F-76	1.80	-	-	3/96

If an Underground Storage Tank
Date Cleaned 9/96 – 10/96
Date Closed _____

If Underground Distribution Lines
Date Cleaned 3/97
Date Plugged 3/97

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 28	G-210, GZ-213, GZ-215	Soil	ND	
		Groundwater	BGB	GZ-210 – VOCs detected but no GB GW Objective
		Free Product	ND	2/02
NOTES:				
BGB = Below GB Groundwater Objective				L = Leaching Criteria
BDC = Below Direct Contact				DC = Direct Contact
BLC = Below Leaching Criteria				ND = Non Detect

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 2

POSSIBLE SOURCE AREA Tank 29

FIGURE/MAP Figure 2-2

SIZE (approx.)

Length 116 ft **Width** 116 ft
Area 13,456 ft^2 0.31 acres

DESCRIPTION OF AREA AND PAST OPERATIONS

- 2.5 million gallon cylindrical UST made of concrete
- 116 ft in diameter and 33.5 ft deep, constructed 5 ft below grade and installed between 1941 and 1943
- Pump sump chamber is located adjacent to tank and houses pumps associated with the tanks' underdrainage and petroleum transfer systems
- Ring drains are located around the perimeter of the UST. They are 12" in diameter and 2.5 ft below the tank.
- The ring drains discharge into a sump pit located in the pump sump chamber.
- Underground petroleum distribution lines connect all of the tanks in Tank Farm 2.
- When sludge was cleaned out of tank, it was disposed of on the ground in the general vicinity of the tank.
- 400 feet south of Tank 29 is a rectangular area approximately 400' by 100' that was seen in 1981 aerial photos. A series of round features were visible at the northern portion of the rectangle. In 1988, the rectangle was present, but not the round features. [Possible sludge disposal?]
- Taken out of service and cleaned in the mid-1990s.
- Emptied, cleaned (10/96 – 11/96), and inspected (11/96 and 12/96)

DISTANCE TO PROPERTY LINES (approx.)

☑	North	400 ft
☑	South	1,600ft
☑	East	450 ft
☑	West	1,400 ft

REFERENCES

1. Study Area Screening Evaluation Work Plan, Naval Eduation and Training Center, Newport, RI, TRC Environmental Consultants, Inc. 7/92
2. Work Plan for Site Investigation, GZA GeoEnvironmental, Inc. 8/97
3. Site Investigation Report, GZA GeoEnvironmental, Inc. 5/98
4. Tank Closure Assessment Report – Tank Farm 2, GZA GeoEnvironmental, Inc. 10/98
5. Results of Groundwater Sampling for Fuel Loading Area and Tank Farms 1, 2, & 3, Foster Wheeler Environmental Corporation. 9/99

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

1.	_____	☐	JP-4
2.	_____	☐	JP-5
3.	_____	☑	Distillate Fuel (No. 5 – No. 2)

4. _____ ☑ No. 5 Fuel Oil
5. _____ ☑ Other: Marine Diesel Fuel

RLEASE STATUS ☐ Confirmed Release ☑ Potential for Release

RELEASE SUMMARY (if applicable)

- Tank bottom sludge disposed to the ground surface in the vicinity of the tank.
- Possible release from ring drains when they discharge into pump house or common drainage pipe

SECTION 2 SUMMARY OF PAST INVESTIGATIONS AND SAMPLING

SECTION 2.1 SOIL

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

Predominant Soil Type in the Vadose Zone Silty, gravelly sand/ shale

Groundcover Type grass

Potential for Wind / Water Erosion ☐ Yes ☑ No

Surface Soil Sampling Summary (0'-2' bgs) **[See Figure 2-2 for sampling locations]**

				ANALYTES												
Source Area	Boring Designation	Sample ID	Sample Depth (ft)	TPH	TVPH	BETX	VOCs	PAHs	SVOCs	PCBs/ Pest	Metals	Base Neutrals/ Acids	Oil and Grease	Aliphatic (C_8-C_{10})	Aromatic (C_8-C_{10})
Tank 29	GZ-211	S-1	0-2	12/96			12/96	12/96							
	GZ-228	S-1	0-2	12/97			12/97	12/97							

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** 0
Downgradient 3 plus 1 recovery well

Depth to Groundwater **Minimum** 11.70 ft bgs (GZ-214; 2/98)
Average 21.65 ft bgs
Maximum 29.83 ft bgs (GZ-211; 6/97)

Depth to Bedrock 2.8ft bgs (GZ-211); 4ft bgs (GZ-214); 2ft bgs (GZ-228)

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

Predominant Soil Type in the Saturated Zone Shale/siltstone and sandstone

Groundwater Sampling Summary **[See Figure 2-2 for sampling locations]**

Source Area	Well Associated with Source Area	ANALYTES: TPH	TVPH	BETX	VOCs	PAHs	SVOCs	PCBs/ Pest	Metals	Base Neutrals /Acids	Oil and Grease	Aliphatic (C_5-C_{12})	Aromatic (C_8-C_{10})	Notes
Tank 29	GZ-211	6/97			6/97	6/97								
	GZ-214	6/99			6/99	12/97	6/99							
	GZ-228	12/97			12/97	12/97								
	RW-1													Installed 10/01

NOTES:
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 ft
Maximum	0.46 ft (GZ-211; 11/01)
Most Recent	0.01 ft

Free Liquid Gauging Summary **[See Figure 2-2 for gauging locations]**

Source Area	Well / Boring Associated with Source Area	Free Product Thickness (ft)	Date Measured
Tank 29	GZ-211	ND	1/97 – 8/97
		0.01	9/97
		0.02	10/97
		0.02	11/97
		0.03	12/97
		0.02	1/98
		0.01	2/98
		ND	3/98
		0.08	6/99
		0.07	7/01
		0.09	8/20/01
		ND	8/28/01
		0.17	10/01
		0.46	11/01
		0.01	2/02
	GZ-214	ND	10/97 – 3/98; 6/99; 7/01 – 8/01; 11/01; 2/02
	GZ-228	ND	10/97 – 3/98; 6/99
		0.01	7/01
		ND	8/01; 10/01 – 11/01; 2/02
	RW-1	0.03	10/15/01
		0.04	10/22/01
		0.01	11/5/01
		0.01	11/19/01
		ND	2/02

NOTES:
ND = Not Dectected

SECTION 2.4 SOIL GAS

Soil Gas Sampled in this Area ☐ Yes ☑ No

Number of Soil Gas Samples 0

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
- ☐ Other _____

Man-Made Structure Sampling Summary **[See Figure 2-2 for sampling locations]**

Tank Number	Contents	Water Level (ft)	Sludge Layer (ft)	Product Layer (ft)	Date Sampled
Tank 29	F-76	5.58	-	-	3/96

If an Underground Storage Tank **Date Cleaned** 10/96 – 11/96
Date Closed _____

If Underground Distribution Lines **Date Cleaned** 3/97
Date Plugged 3/97

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 29	GZ-211, GZ-214, GZ-228	Soil	ND	
		Groundwater	ND	GZ-211 – TPH detected but no GB GW Objective; GZ-228 (12/97) – Naphthalene detected – No GB GW Objective
		Free Product	0.01 ft	GZ-211 in 2/02
NOTES:				
BGB = Below GB Groundwater Objective			L = Leaching Criteria	
BDC = Below Direct Contact			DC = Direct Contact	
BLC = Below Leaching Criteria			ND = Non Detect	

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

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

Groundwater ☑ Yes ☐ No If so, which HS? Free Product in GZ-211