

**Data Gap Investigation Report**  
for  
**Goss Cove Landfill**

**Naval Submarine Base New London**  
Groton, Connecticut



**Northern Division**  
**Naval Facilities Engineering Command**  
**Contract Number N62472-90-D-1298**  
**Contract Task Order 0275**

August 1997



**Brown & Root Environmental**

A Division of Halliburton NUS Corporation

**DATA GAP INVESTIGATION REPORT  
FOR  
GOSS COVE LANDFILL  
NAVAL SUBMARINE BASE NEW LONDON  
GROTON, CONNECTICUT  
COMPREHENSIVE LONG-TERM  
ENVIRONMENTAL ACTION NAVY (CLEAN) CONTRACT**

**Submitted to:  
Northern Division  
Environmental Branch Code 18  
Naval Facilities Engineering Command  
10 Industrial Highway, Mail Stop #82  
Lester, Pennsylvania 19113-2090**

**Submitted by:  
Brown & Root Environmental  
600 Clark Avenue, Suite 3  
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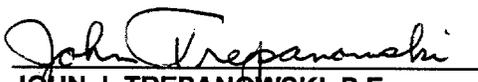
**CONTRACT NUMBER N62472-90-D-1298  
CONTRACT TASK ORDER 0275**

**AUGUST 1997**

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## 1.0 INTRODUCTION

The Department of Navy, Northern Division of the Naval Facilities Engineering Command, has issued Contract Task Order (CTO) 275, under Comprehensive Long-Term Environmental Action (CLEAN), Contract Number N62472-90-D-1298, to Brown & Root Environmental (B&R Environmental) to perform a Feasibility Study (FS) for the Goss Cove Landfill at the Naval Submarine Base - New London (NSB-NLON), Groton, Connecticut. This report describes the field sampling activities and presents the analytical results for the Data Gap Investigation (DGI) performed in support of the FS.

### 1.1 BACKGROUND INFORMATION

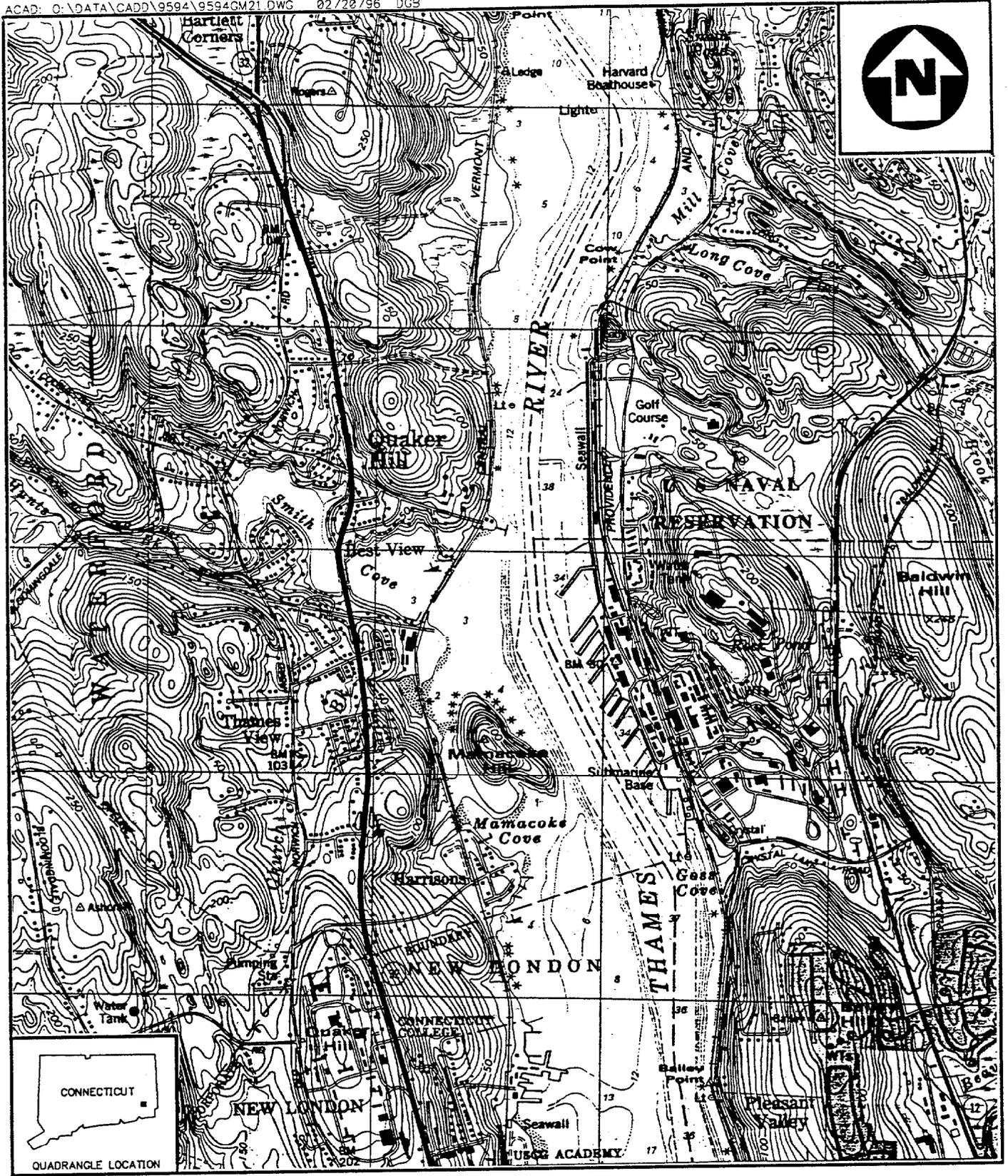
#### 1.1.1 Base Description

NSB-NLON is located in southeastern Connecticut in the Towns of Ledyard and Groton (Figure 1-1). It encompasses approximately 576 acres and lies on the east bank of the Thames River, approximately 6 miles north of Long Island Sound. NSB-NLON is bounded to the east by Connecticut Route 12, to the south by Crystal Lake Road, and to the west by the Thames River. The northern border is a low, east-southeast trending ridge extending from the Thames River to Baldwin Hill.

NSB-NLON currently provides base command for naval submarine activities in the Atlantic Ocean. It also provides housing for Navy personnel and their families and supports submarine training facilities, military offices, medical facilities, and facilities for the submarine maintenance, repair, and overhaul.

#### 1.1.2 Site Description

The Goss Cove Landfill is located in the southwestern portion of NSB-NLON, adjacent to the Thames River (Figures 1-2, 1-3, and 1-4). It is west of the intersection of Crystal Lake Road and Military Highway, east of the Thames River and north of Goss Cove. An exposed bedrock outcrop is located along the northeast portion of the former landfill. Goss Cove is a small cove that lies south of the Goss Cove Landfill, adjacent to the Thames River. The northern half of the cove was filled to form the landfill. The Nautilus Museum and a paved parking lot have been constructed directly over the site of the former landfill. The Nautilus Museum is a submarine museum operated by the Navy and open to the public. The remaining area of the former landfill site is grass-covered. Railroad tracks run along the western edge of the site adjacent to the Thames River.



SITE LOCATION MAP  
NSB - NLON  
GROTON, CONNECTICUT

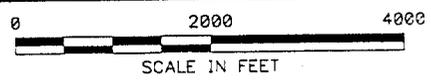
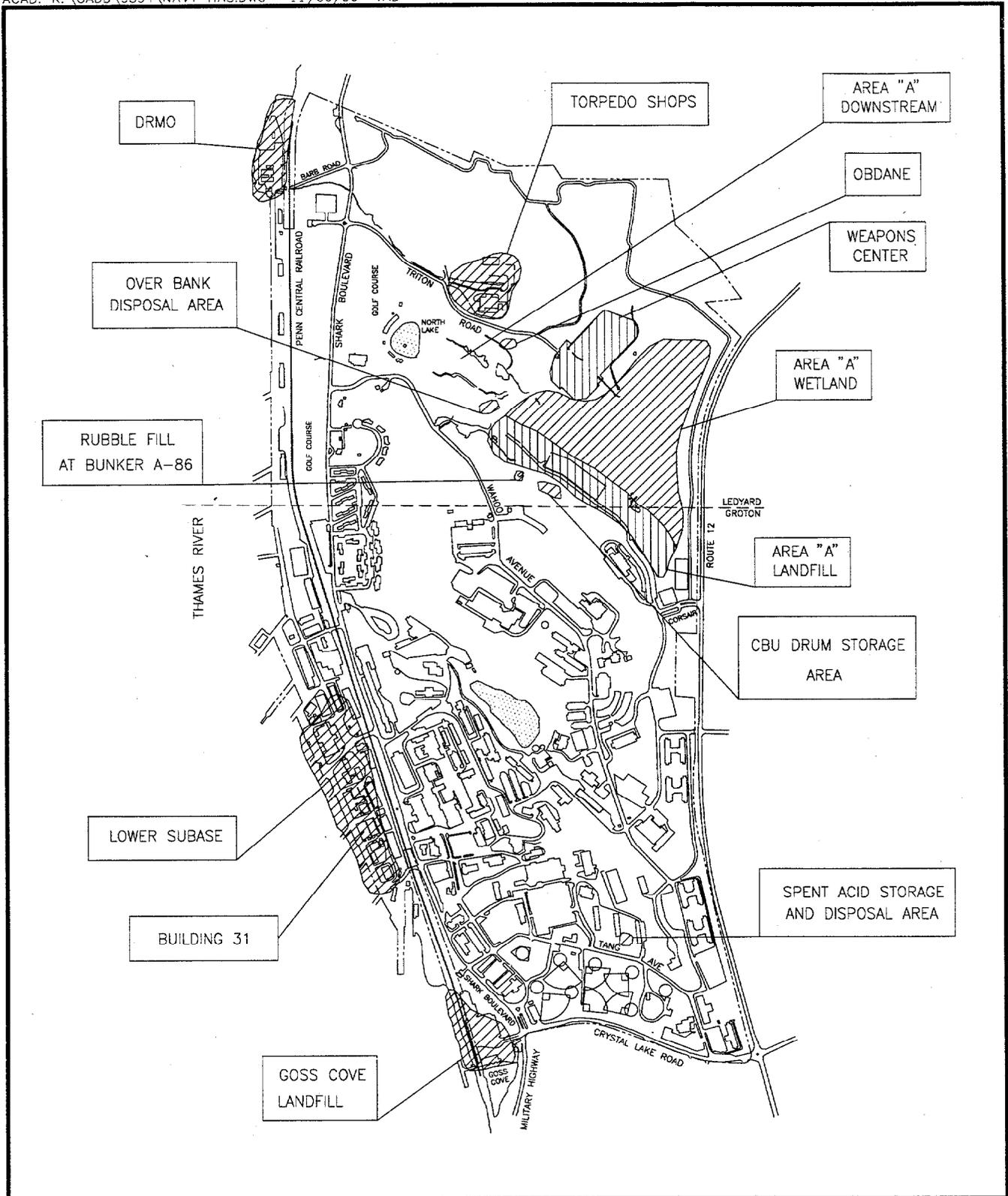


FIGURE 1-1

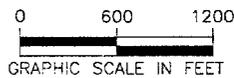


**Brown & Root Environmental**



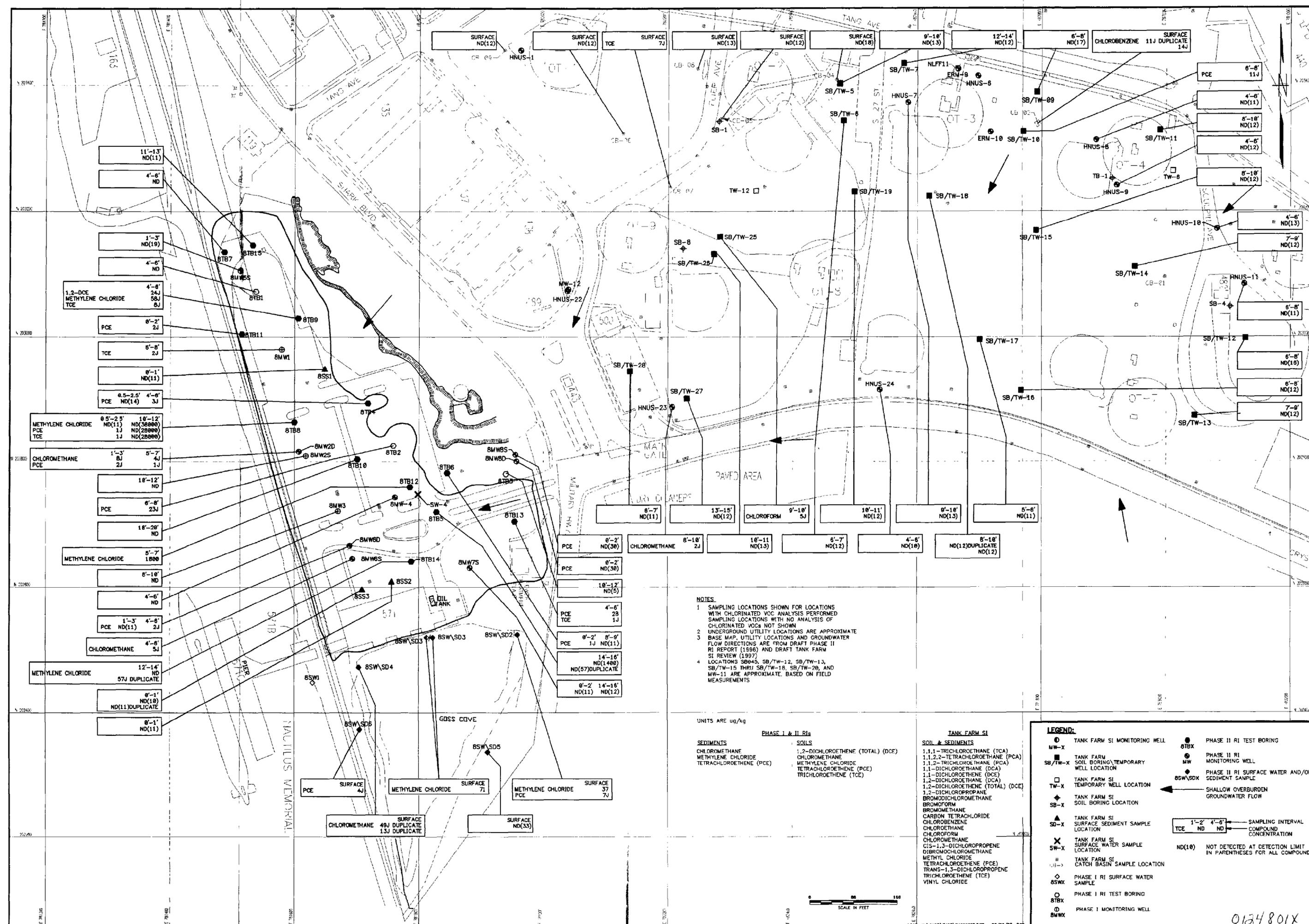
**SITE MAP**  
**NSB NLON**  
**GROTON, CONNECTICUT**

SOURCE: Naval Submarine Base  
 Existing Conditions  
 April 1985  
 Loureiro Engineering Associates



**FIGURE 1-2**  
**SITE LOCATION MAP**

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**NOTES:**

1. SAMPLING LOCATIONS SHOWN FOR LOCATIONS WITH CHLORINATED VOC ANALYSIS PERFORMED. SAMPLING LOCATIONS WITH NO ANALYSIS OF CHLORINATED VOCs NOT SHOWN.
2. UNDERGROUND UTILITY LOCATIONS ARE APPROXIMATE.
3. BASE MAP, UTILITY LOCATIONS AND GROUNDWATER FLOW DIRECTIONS ARE FROM DRAFT PHASE II RI REPORT (1998) AND DRAFT TANK FARM SI REVIEW (1997).
4. LOCATIONS SB/TW-5, SB/TW-12, SB/TW-13, SB/TW-15 THRU SB/TW-18, SB/TW-20, AND MW-11 ARE APPROXIMATE, BASED ON FIELD MEASUREMENTS.

UNITS ARE ug/kg

**PHASE I & II RIa**

**SEDIMENTS**  
 CHLOROMETHANE  
 METHYLENE CHLORIDE  
 TETRACHLOROETHENE (PCE)

**SOILS**  
 1,2-DICHLOROETHENE (TOTAL) (DCE)  
 CHLOROMETHANE  
 METHYLENE CHLORIDE  
 TETRACHLOROETHENE (PCE)  
 TRICHLOROETHENE (TCE)

**TANK FARM SI**

**SOIL & SEDIMENTS**  
 1,1,1-TRICHLOROETHANE (TCA)  
 1,1,2,2-TETRACHLOROETHANE (PCE)  
 1,1,2-TRICHLOROETHANE (PCA)  
 1,1-DICHLOROETHANE (DCA)  
 1,1-DICHLOROETHENE (DCE)  
 1,2-DICHLOROETHANE (DCA)  
 1,2-DICHLOROETHENE (TOTAL) (DCE)  
 1,2-DICHLOROPROPANE  
 BROMODICHLOROMETHANE  
 BROMOFORM  
 BROMOMETHANE  
 CARBON TETRACHLORIDE  
 CHLOROBENZENE  
 CHLOROETHANE  
 CHLOROFORM  
 CHLOROMETHANE  
 CIS-1,3-DICHLOROPROPENE  
 OIBROMOCHLOROMETHANE  
 METHYL CHLORIDE  
 TETRACHLOROETHENE (PCE)  
 TRANS-1,3-DICHLOROPROPENE  
 TRICHLOROETHENE (TCE)  
 VINYL CHLORIDE

**LEGEND:**

- TANK FARM SI MONITORING WELL
  - MW-X PHASE II RI TEST BORING
  - SB/TW-X TANK FARM SI MONITORING WELL LOCATION
  - MW PHASE II RI MONITORING WELL
  - TW-X TANK FARM SI TEMPORARY WELL LOCATION
  - BSW/SDX PHASE II RI SURFACE WATER AND/OR SEDIMENT SAMPLE
  - SB-X TANK FARM SI SOIL BORING LOCATION
  - SD-X TANK FARM SI SURFACE SEDIMENT SAMPLE LOCATION
  - SW-X TANK FARM SI SURFACE WATER SAMPLE LOCATION
  - BSWX PHASE I RI SURFACE WATER SAMPLE
  - BTX PHASE I RI TEST BORING
  - BWX PHASE I MONITORING WELL
- ← SHALLOW OVERBURDEN GROUNDWATER FLOW
- 1'-2' 4'-6' → SAMPLING INTERVAL  
 TCE ND ND → COMPOUND CONCENTRATION
- ND(10) NOT DETECTED AT DETECTION LIMIT IN PARENTHESES FOR ALL COMPOUNDS



**NORTHERN DIVISION**

**GOSS COVE LANDFILL DATA GAP INVESTIGATION**

CHLORINATED VOC DETECTIONS IN SOIL AND SEDIMENT

NSB-NLON, GROTON, CONNECTICUT

ACRHOBY FOR COMMANDER, NAVFAC

DATE

APPROVED

DEPARTMENT OF THE NAVY

NAVAL BASE  
 NAVAL SURFACING BRIG (NSB)  
 PHILADELPHIA, PA  
 GROTON, CT

SEAL AREA

SAT TO DATE

CODE ID NO 80091

SCALE

SPEC NO 84

CONSTRN CONTR NO N62472 -C-

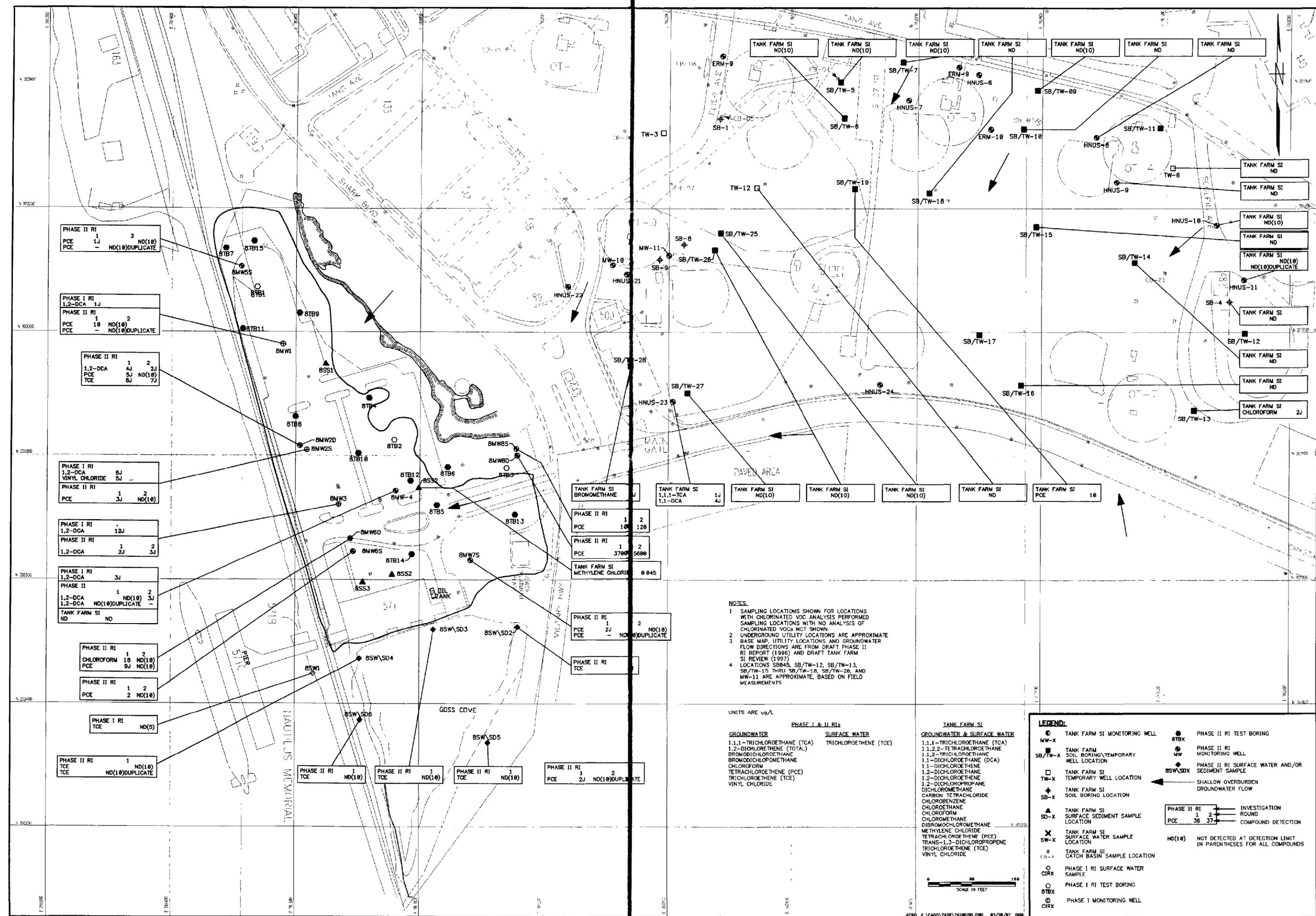
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**D** **FIGURE 1-3**

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PHASE II RI  
1 2  
PCE 1J ND(10)  
PCE - ND(10)DUPLICATE

PHASE I RI  
1,2-DCA 1J  
PHASE II RI  
1 2  
PCE 10 ND(10)  
PCE - ND(10)DUPLICATE

PHASE II RI  
1,2-DCA 1 2  
PCE 4J ND(10)  
TCE 8J ND(10)  
TCE 7J

PHASE I RI  
1,2-DCA 6J  
VINYL CHLORIDE 5J  
PHASE II RI  
1 2  
PCE 3J ND(10)

PHASE I RI  
1,2-DCA 12J  
PHASE II RI  
1,2-DCA 2J 3J

PHASE I RI  
1,2-DCA 3J  
PHASE II  
1,2-DCA 1 ND(10)  
1,2-DCA ND(10)DUPLICATE 2J  
TANK FARM SI ND ND

PHASE II RI  
1 2  
CHLOROFORM 18 ND(10)  
PCE 9J ND(10)

PHASE II RI  
1 2  
PCE 2 ND(10)

PHASE I RI  
TCE ND(5)

PHASE II RI  
1 ND(10)  
TCE ND(10)DUPLICATE

PHASE II RI  
1 ND(10)  
TCE

PHASE II RI  
1 ND(10)  
TCE

PHASE II RI  
1 ND(10)  
TCE

PHASE II RI  
1 2  
PCE 2J ND(10)DUPLICATE

TANK FARM SI  
BROMOMETHANE J

PHASE II RI  
1 2  
PCE 10 120

PHASE II RI  
1 2  
PCE 3700 5600

TANK FARM SI  
METHYLENE CHLORIDE 845

PHASE II RI  
1 2  
PCE 2J ND(10)  
PCE - ND(10)DUPLICATE

PHASE II RI  
TCE

PHASE II RI  
1 ND(10)  
TCE

- NOTES:
- SAMPLING LOCATIONS SHOWN FOR LOCATIONS WITH CHLORINATED VOC ANALYSIS PERFORMED. SAMPLING LOCATIONS WITH NO ANALYSIS OF CHLORINATED VOCs NOT SHOWN.
  - UNDERGROUND UTILITY LOCATIONS ARE APPROXIMATE.
  - BASE MAP, UTILITY LOCATIONS AND GROUNDWATER FLOW DIRECTIONS ARE FROM DRAFT PHASE II RI REPORT (1996) AND DRAFT TANK FARM SI REVIEW (1997).
  - LOCATIONS SB045, SB/TW-12, SB/TW-13, SB/TW-15 THRU SB/TW-18, SB/TW-28, AND MW-11 ARE APPROXIMATE, BASED ON FIELD MEASUREMENTS.

UNITS ARE ug/L

GROUNDWATER  
1,1,1-TRICHLOROETHANE (TCA)  
1,2-DICHLOROETHANE (TOTAL)  
BROMODICHLOROETHANE  
BROMODICHLOROMETHANE  
CHLOROFORM  
TETRACHLOROETHENE (PCE)  
TRICHLOROETHENE (TCE)  
VINYL CHLORIDE

SURFACE WATER  
TRICHLOROETHENE (TCE)

TANK FARM SI  
GROUNDWATER & SURFACE WATER  
1,1,1-TRICHLOROETHANE (TCA)  
1,1,2-TRICHLOROETHANE  
1,1,2-TRICHLOROETHANE (DCA)  
1,1-DICHLOROETHANE  
1,2-DICHLOROETHANE  
1,2-DICHLOROPROPANE  
DIBROMOETHANE  
DIBROMOCHLOROMETHANE  
METHYLENE CHLORIDE  
TETRACHLOROETHENE (PCE)  
TRANS-1,3-DICHLOROPROPENE  
TRICHLOROETHENE (TCE)  
VINYL CHLORIDE

**LEGEND:**

- NW-X TANK FARM SI MONITORING WELL
- SB/TW-X TANK FARM SI SOIL BORING/TEMPORARY WELL LOCATION
- TW-X TANK FARM SI TEMPORARY WELL LOCATION
- SB-X TANK FARM SI SOIL BORING LOCATION
- SD-X TANK FARM SI SURFACE SEDIMENT SAMPLE LOCATION
- SW-X TANK FARM SI SURFACE WATER SAMPLE LOCATION
- CB-X TANK FARM SI CATCH BASIN SAMPLE LOCATION
- CIRX PHASE I RI SURFACE WATER SAMPLE
- STBX PHASE I RI TEST BORING
- CIRX PHASE I MONITORING WELL
- 8TBX PHASE II RI TEST BORING
- NW PHASE II RI MONITORING WELL
- BSW/SDX PHASE II RI SURFACE WATER AND/OR SEDIMENT SAMPLE
- SHALLOW OVERBURDEN GROUNDWATER FLOW
- INVESTIGATION ROUND
- COMPOUND DETECTION
- ND(10) NOT DETECTED AT DETECTION LIMIT IN PARENTHESES FOR ALL COMPOUNDS



DEPARTMENT OF THE NAVY  
NAVAL FACILITIES ENGINEERING COMMAND  
NAVAL BASE  
NAVAL SUBMINE BASE NEW LONDON  
GROTON, CT

**NORTHERN DIVISION**

**GOSS COVE LANDFILL DATA GAP INVESTIGATION**  
CHLORINATED VOLATILE ORGANIC DETECTIONS IN GROUNDWATER & SURFACE WATER  
NSB-NLON, GROTON, CONNECTICUT

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**D** **FIGURE 1-4**

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It is reported that the landfill operated at the site from 1946 through 1957 (IAS, 1983). Incinerator ash and inert rubble were disposed in the northern portion of Goss Cove. It is unknown whether any other materials were disposed at the site. Based on review of aerial photographs of the Goss Cove area by Atlantic Environmental, Inc., no evidence of fill existed within the limits of Goss Cove in 1934, but the railroad tracks were located in their present position between Goss Cove and the Thames River. In 1951, fill extended into the cove as far south as the present access driveway to the museum. In 1965 the landfill extended to its present limit. Photographs from 1965, 1970, 1975, and 1980 showed cars parked on the landfill surface. In 1986, the Nautilus Museum existed in the southern area of the landfill, and a paved parking area covered the remaining area of the landfill to the north.

Fill material, consisting of ash, metal, brick, glass, and sand and gravel, extends to depths of up to 24 feet at the site. Several large compressed gas cylinders were uncovered in the parking area north of the Nautilus Museum building during the excavation of a utility trench. Natural organic silt of the cove extends approximately 10 to 15 feet beneath the fill. Stratified glacial drift deposits of fine sand and gravel exists below the silt or fill, where the silt does not exist below the fill. The fill material and silt deposits thicken toward the river.

Geological cross-sections for the Goss Cove Landfill Site are shown on Figures 1-5 through 1-8.

The shallow overburden groundwater flow is to the west toward the Thames River. Groundwater flow directions in the shallow overburden are shown on Figures 1-3 and 1-4.

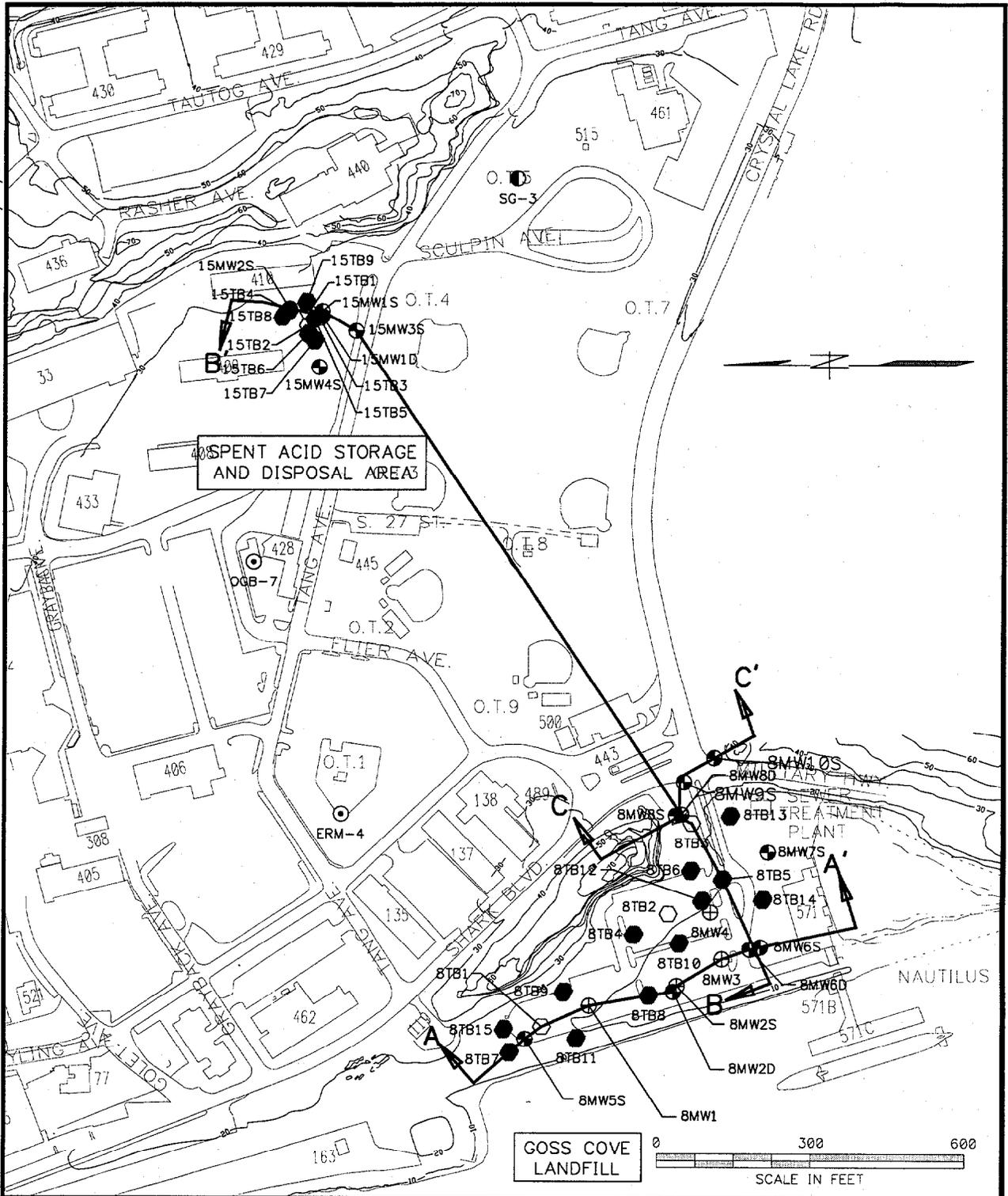
### **1.1.3 Previous Investigations**

#### **1.1.3.1 Phase I and II RI**

Two phases of Remedial Investigation (RI) have been conducted to determine the nature and extent of contamination at the Goss Cove Landfill.

Atlantic Environmental Services, Inc. (Atlantic) conducted the Phase I RI field investigation from 1990 to 1992. This investigation consisted of a soil gas survey; test borings; monitoring well installation; and soil, surface water, and groundwater sampling. The soil gas survey was conducted in an attempt to locate potential sources of volatile organic contamination. Seven subsurface (3 feet deep) soil samples plus one field duplicate were collected from three test borings and four monitoring well borings to confirm the soil gas survey results. Four overburden monitoring wells were installed within the former landfill and one groundwater sample was obtained from each well. One surface water sample was collected in the

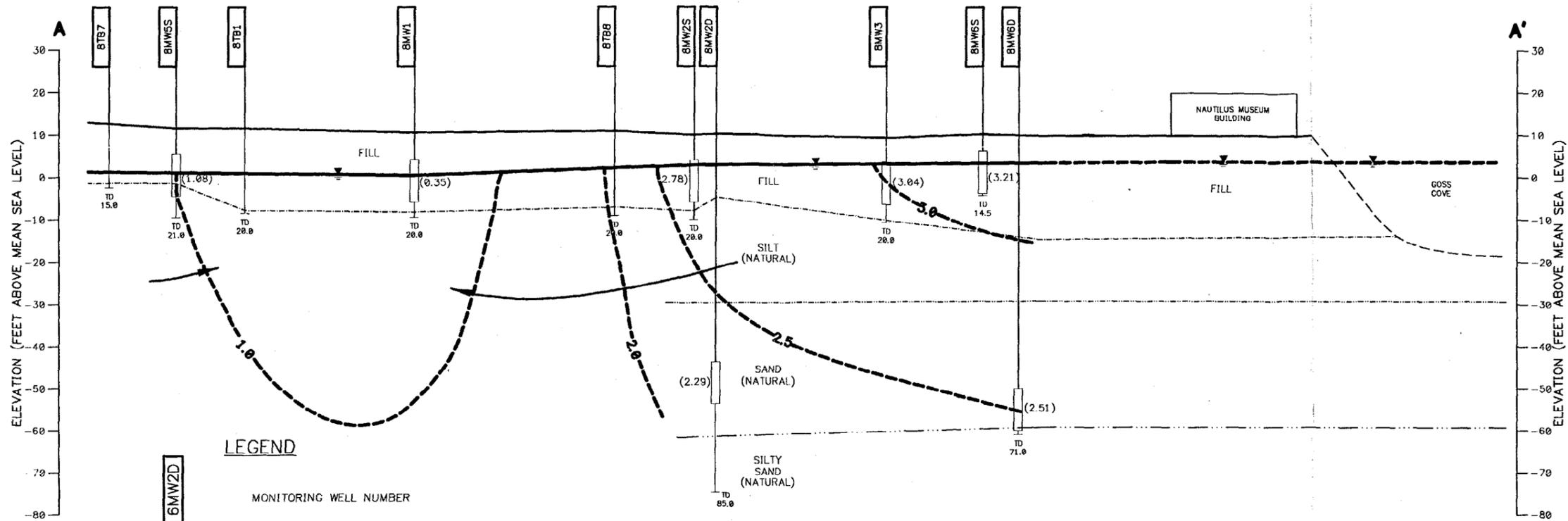
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CHECKED BY	DATE		APPROVED BY	DATE
COST/SCHED-AREA	<b>TOPOGRAPHIC SURFACE AND CROSS-SECTION LOCATION MAP GOSS COVE LANDFILL NSB-NLON GROTON, CONNECTICUT</b>		APPROVED BY	DATE
SCALE AS NOTED			DRAWING NO. FIGURE 1-5	REV. 0

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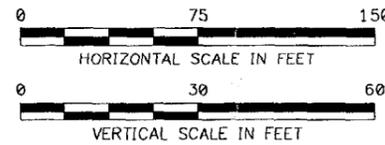
GOSS COVE LANDFILL



LEGEND

- MONITORING WELL NUMBER
- GROUND SURFACE
- GROUNDWATER SURFACE
- UNCONSOLIDATED MATERIAL CHANGE 1
- UNCONSOLIDATED MATERIAL CHANGE 2
- UNCONSOLIDATED MATERIAL CHANGE 3
- BEDROCK SURFACE
- TOP OF MONITORED INTERVAL
- GROUNDWATER POTENTIOMETRIC MEASUREMENT
- GROUNDWATER POTENTIAL LINE
- BOTTOM OF MONITORED INTERVAL
- TOTAL DEPTH OF WELL OR BORING (FT BGS)
- GROUNDWATER FLOW DIRECTION

CROSS-SECTION A-A'

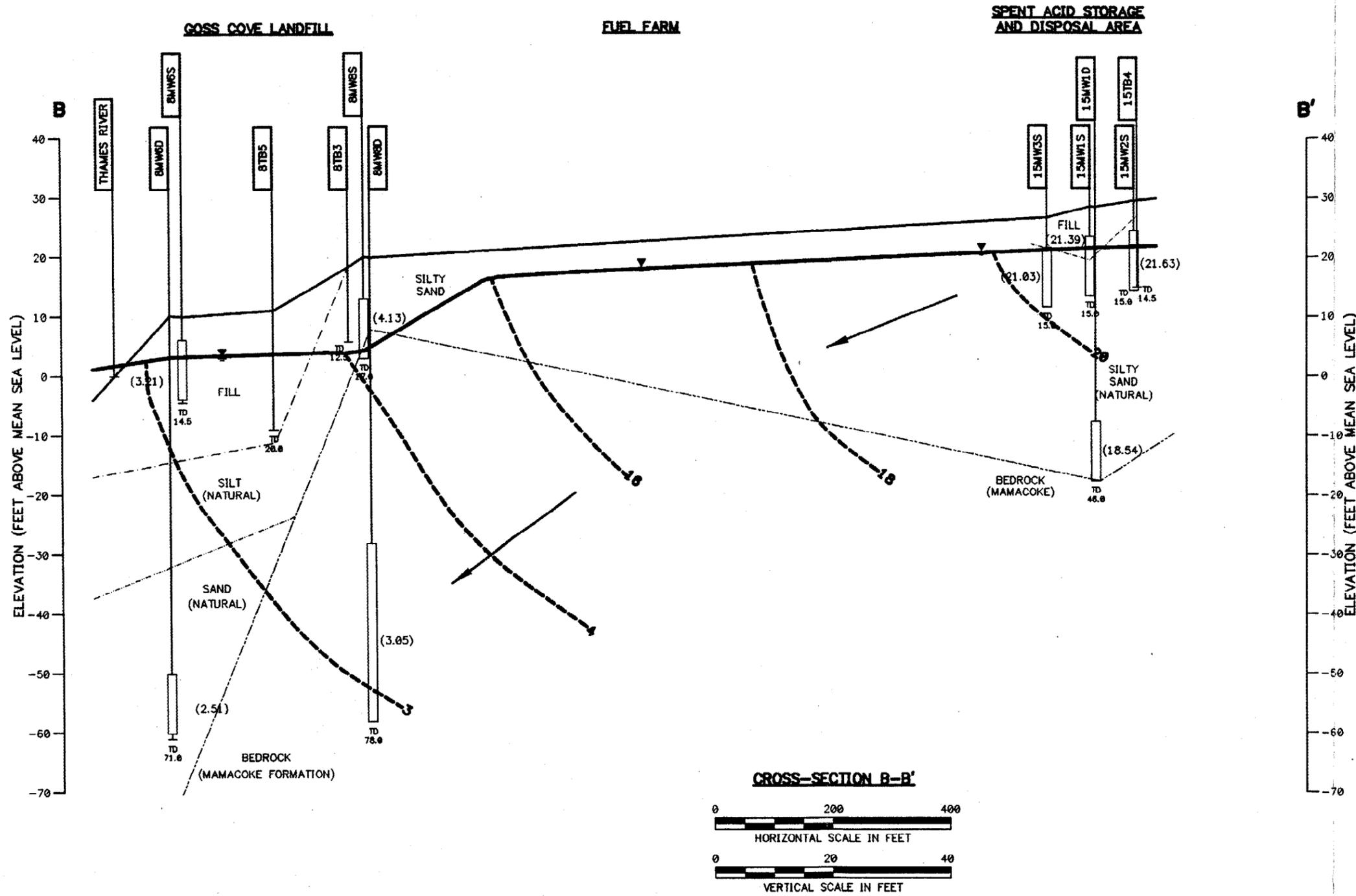


NOTES

1. (WD) MEANS WELL HAS BEEN DESTROYED OR DAMAGED
2. (NL) MEANS WELL COULD NOT BE LOCATED
3. (NT) MEANS WELL WAS NOT TESTED DUE TO ACCESS PROBLEMS
4. GROUNDWATER LEVEL MEASUREMENTS WERE TAKEN AUGUST 23, 1994. GROUNDWATER FLOW DIRECTIONS ARE REPRESENTATIVE OF THESE MEASUREMENTS. SEASONAL VARIABILITY AND TIDAL VARIABILITY NEAR THE THAMES RIVER MAY CAUSE CHANGES IN GROUNDWATER FLOW DIRECTIONS.

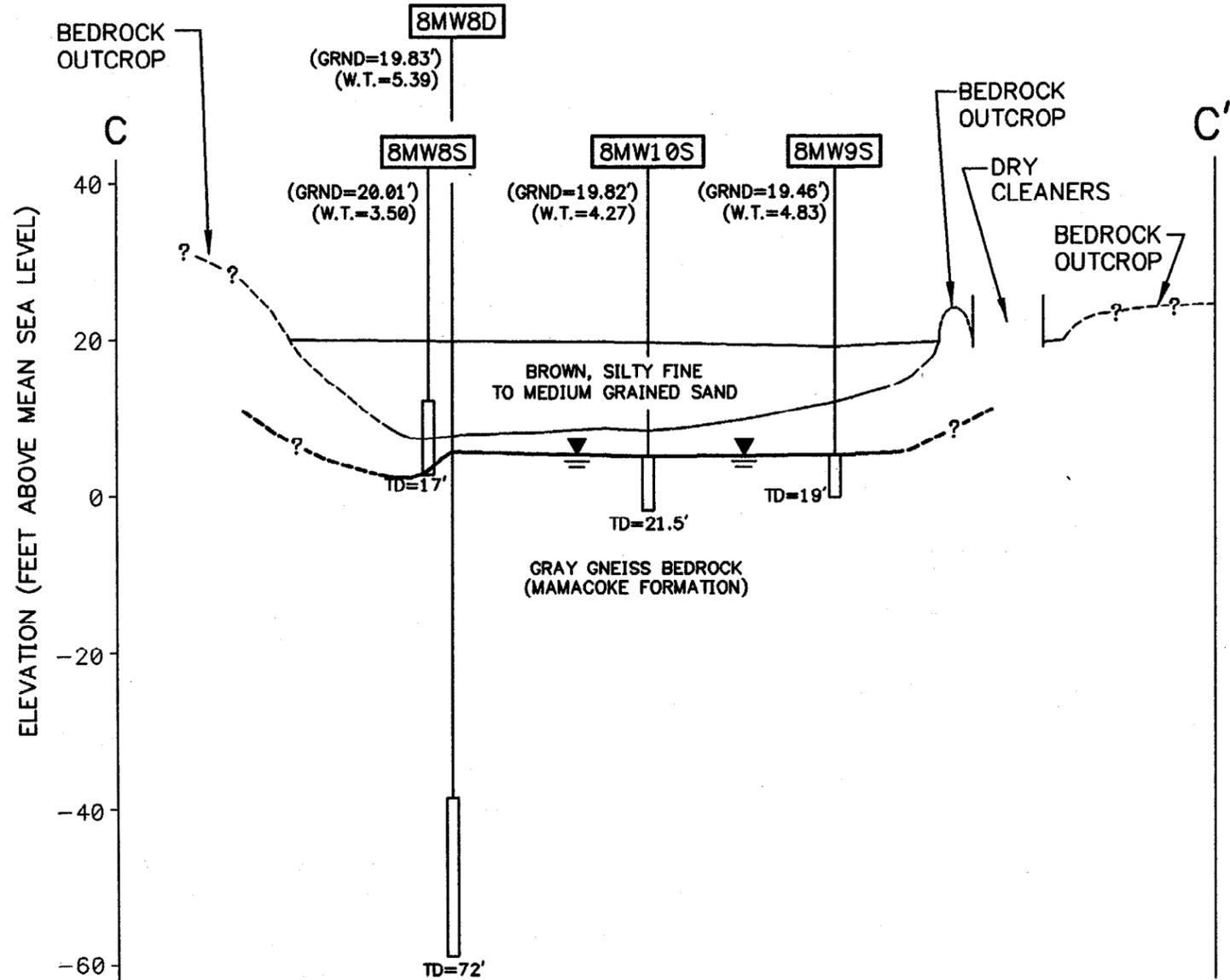
NO.	DATE	REVISIONS	BY	CHKD	APPD	REFERENCES	DRAWN BY MF	DATE 3/15/97	<p><b>Brown &amp; Root Environmental</b></p> <p>CROSS SECTION A-A' GOSS COVE LANDFILL NSB-NLON GROTON, CONNECTICUT</p>	CONTRACT NO. 7428	OWNER NO.
							CHECKED BY	DATE		APPROVED BY	DATE
							COST/SCHED-AREA			APPROVED BY	DATE
							SCALE AS NOTED			DRAWING NO.	REV.
										FIGURE 1-6	0

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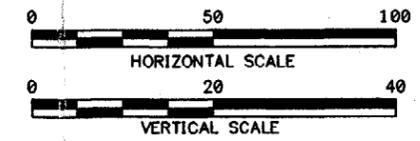
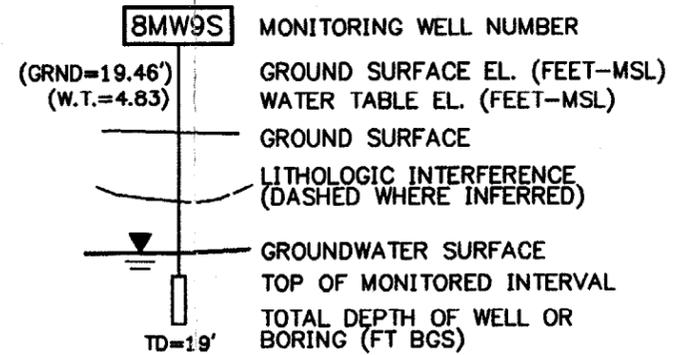


NO.	DATE	REVISIONS	BY	CHKD	APPD	REFERENCES	DRAWN BY MF	DATE 3/15/97	Brown & Root Environmental	CONTRACT NO. 7428	OWNER NO.
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							COST/SCHED-AREA			APPROVED BY	DATE
							SCALE AS NOTED			DRAWING NO. FIGURE 1-7	REV. 0

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**LEGEND**



NO.	DATE	REVISIONS	BY	CHKD	APPD	REFERENCES	DRAWN BY DLT	DATE 8/4/97	 Brown & Root Environmental  GOSS COVE LANDFILL DATA GAP INVESTIGATION CROSS-SECTION C-C' NSB, NEW LONDON, CT	CONTRACT NO. 7428	OWNER NO. 0275
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							COST/SCHED-AREA			APPROVED BY	DATE
							SCALE AS NOTED			DRAWING NO.	REV.
									FIGURE 1-8	0	

FORM CADD NO. 0275H B1008 - REV 0 - 02/11/97

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Thames River downstream of the landfill. Sampling, boring, and well locations of the Phase I are illustrated on Figure 1-3.

B&R Environmental conducted the Phase II RI field investigation from 1993 to 1995. This investigation included the collection of five surface (<3 feet deep) and four subsurface (>3 feet deep) soil samples from six well borings. Four surface and eleven subsurface soil samples plus two field duplicates were collected from twelve test borings. Three shallow and four deep monitoring wells were installed. Eleven groundwater samples and two field duplicates were collected from the four Phase I monitoring wells and the seven Phase II monitoring wells during each round of two rounds of sampling. Surface water and sediment sampling were also collected during the Phase II RI. Five surface water samples (plus one field duplicate) and five sediment samples (plus one field duplicate) were collected from the perimeter of Goss Cove. One additional sediment sample was collected from Goss Cove during the supplemental ecological sampling round. Three supplemental surface soil samples plus a field duplicate were collected during a third sampling event. Sampling, boring, and well locations of the Phase II RI are illustrated on Figure 1-3. Three rounds of air sampling were performed. The air samples were collected from within and around the Nautilus Museum.

Positive detections of volatile organic compounds (VOCs) from samples of the Phase I and Phase II RI are shown on Figures 1-3 and 1-4.

Elevated concentrations of ethylbenzene, toluene, and xylenes (which indicate the presence of fuel-related contamination) and acetone and methylene chloride were detected in a few of the subsurface soil samples at the Goss Cove Landfill. The sample collected from a depth of 10 to 12 feet in boring 8TB8 contained the maximum concentration of each of these compounds except toluene; toluene was detected in this sample at a concentration of 15,000  $\mu\text{g}/\text{kg}$ , ethylbenzene at a concentration of 69,000  $\mu\text{g}/\text{kg}$ , xylenes at a concentration of 480,000  $\mu\text{g}/\text{kg}$ , acetone at a concentration of 23,000  $\mu\text{g}/\text{kg}$ , and methylene chloride at a concentration of 38,000  $\mu\text{g}/\text{kg}$ . Other samples containing elevated concentrations of VOCs include the 5- to 7-foot sample from 8TB12 (ethylbenzene at 3,300  $\mu\text{g}/\text{kg}$ , xylenes at 25,000  $\mu\text{g}/\text{kg}$ , and methylene chloride at 1,800  $\mu\text{g}/\text{kg}$ ), the 8- to 10-foot sample from 8MW3 (toluene at 22,000  $\mu\text{g}/\text{kg}$  and xylenes at 25,000  $\mu\text{g}/\text{kg}$ ), the 10- to 12-foot sample from 8TB4 (toluene at 21,000  $\mu\text{g}/\text{kg}$ ), and the 10- to 12-foot sample from 8MW2 (xylenes at 2,200  $\mu\text{g}/\text{kg}$ ). The soil sample locations with the highest detections of non-chlorinated and chlorinated VOCs were located in the central portion of the site. Concentrations of other VOCs in subsurface soils, including four halogenated aliphatics, two ketones, two monocyclic aromatics, and carbon disulfide, were all below 200  $\mu\text{g}/\text{kg}$ .

Phase I and II surface soil samples contained fewer VOCs detections. With the exceptions of acetone (at 210 µg/kg in 8MW5S) and 2-butanone (detected in two samples at 36 µg/kg and 64 µg/kg), all concentrations of VOCs in surface soil samples were less than 20 µg/kg.

Phase I RI results indicated that fuel-type constituents (benzene, toluene, ethylbenzene, and xylenes) were present in groundwater at concentrations of up to 610 µg/L. Other VOCs were also detected in the Phase I RI samples at the following maximum concentrations including acetone (700 µg/L), 4-methyl-2-pentanone (200 µg/L), vinyl chloride (5 µg/L), and 1,2-dichloroethene (12 µg/L). Several noncarcinogenic polycyclic aromatic hydrocarbons (PAHs), three phenols, benzoic acid, and dibenzofuran were also detected in groundwater samples during the Phase I RI. With the exception of phenolic compounds (which ranged in concentration up to 500 µg/L), all semivolatile concentrations were less than 65 µg/L. Wells 8MW2S and 8MW3S contained the maximum concentrations of all organic compounds except benzoic acid during the Phase I RI.

Benzene, ethylbenzene, toluene, and xylenes were also detected in groundwater samples collected during Rounds 1 and 2 of the Phase II RI, with concentrations of up to 520 µg/L (xylenes) during Round 1 and up to 390 µg/L (xylenes) during Round 2. Maximum concentrations of these fuel-related compounds during both rounds were detected in samples from well 8MW3S. Several other VOCs were detected during both rounds, including halogenated aliphatics, ketones, and carbon disulfide. PCE was detected at concentrations of 100 µg/L and 120 µg/L in monitoring well 8MW8S during Rounds 1 and 2, respectively, and concentrations of 3,700 µg/L and 5,600 µg/L in monitoring well 8MW8D during Rounds 1 and 2, respectively. Concentrations of PCE in the other samples were significantly lower with a maximum of only 10 µg/L. Acetone was also detected at 220 µg/L in the Round 1 sample from 8MW8D. All other volatile organics were detected at concentrations less than 60 µg/L. The source of VOCs contamination could not be defined.

The soil gas survey performed as part of the Phase I RI did not indicate the presence of elevated levels of VOCs in this area.

#### **1.1.3.2 Tank Farm/Ballfields Area Investigation**

The Tank Farm/Ballfields area along Crystal Lake Road northeast of, and upgradient from, the Goss Cove Landfill. B&R Environmental conducted an investigation of the Tank Farm in 1995 and 1996. The primary objectives of this investigation were to define the nature and extent of the soil and groundwater contamination at IRP Site No. 23, evaluate the impact of that contamination on the storm water discharge, and recommend remedial alternatives, if needed. The investigation included subsurface geophysical

surveys, soil boring and monitoring well installations, soil sampling, investigation of underground pipelines, groundwater sampling, sediment sampling, and surface water sampling. One groundwater sample from monitoring well 8MW4 and a surface water sample were collected from the Goss Cove Landfill site (IRP Site No. 8) as part of the Tank Farm/Ballfields Area Investigation. Sampling, boring, and well locations of the Tank Farm/Ballfields Area Investigation are illustrated on Figures 1-3 and 1-4.

The majority of samples from the Tank Farm/Ballfields Area Investigation were analyzed for petroleum constituents (benzene, ethylbenzene, toluene, xylene, methyltert-butylether, and total petroleum hydrocarbons). PCE was not detected in the soil and groundwater samples analyzed for Target Compound List (TCL) VOCs in the vicinity of the Goss Cove Landfill. Positive detections for samples analyzed for VOCs are shown on Figures 1-3 and 1-4.

### **1.1.3.3 Contaminant Migration Modeling**

As part of the evaluation of remedial strategy for Goss Cove sediment and surface water, a desktop modeling effort was performed to evaluate the potential for migration of ecological COCs from the former Goss Cove Landfill into Goss Cove and an information package was prepared to present the results of this modeling (B&R Environmental, May 1997).

Modeling was performed for two migration pathways, surface water runoff and groundwater movement, and for each of these pathways two scenarios were evaluated, including existing site conditions and future site conditions after placement of an impervious cap over the former Goss Cove Landfill.

Results of this modeling showed that no significant migration of ecological COCs is either currently occurring or likely to occur in the future from the former Goss Cove Landfill to Goss Cove.

## **1.2 SCOPE AND OBJECTIVE**

Although previous investigations have not completely defined the lateral extent of the landfill, it was assumed that, for the purpose of conducting the FS, the estimated limit of the landfill shown in Figure 1-2 was relatively accurate, given the natural site boundaries of the Thames River to the west, the bedrock outcrop to the north, the Goss Cove to the south, and the lack of VOC contamination to the east. It was thus assumed that sufficient data existed regarding the nature and extent of the soil contamination to conduct the FS and that, if additional data is required to determine the limits of the VOC contamination, it would be collected during the remedial design (RD) or remedial action (RA).

Therefore, the primary objective of the DGI was to determine if the source of the tetrachloroethene (PCE) contamination detected during the Phase II RI in the groundwater from monitoring wells 8MW8S and 8MW8D lies within the Goss Cove Landfill Site.

As presented in the Field Sampling Plan for Goss Cove Landfill Data Gap Investigation (B&R Environmental, January 1997), the DGI was to be performed in two phases. Phase 1 was to include sampling of the overburden soil in the vicinity of monitoring wells 8MW8S and 8MW8D to determine if this soil is the source of the PCE contamination detected in the underlying groundwater. Phase 1 was also to include a fracture trace analysis of the area and the installation and sampling of shallow monitoring wells upgradient of monitoring wells 8MW8S and 8MW8D to either locate the source of PCE contamination or, at least, identify potential points of origin. Based upon the results of Phase 1, Phase 2 was to include the installation and sampling of deep monitoring wells and/or additional shallow monitoring wells to pinpoint the location of the source of PCE contamination.

During Phase 1 and Phase 2 groundwater sampling and analysis were also to be conducted to determine the potential for natural attenuation of PCE contamination through measurement of such indicator parameters as concentration of selected anions (chlorides, sulfates, nitrates), total organic carbon (TOC), and dissolved methane.

As further discussed in Section 3.0 of this report, the results from the Phase 1 sampling and analysis were sufficient to achieve the DGI's objectives and thus no Phase 2 sampling and analysis were conducted.

### **1.3 REPORT ORGANIZATION**

Section 1.0 of this report is an introduction and presents site background information, the project scope and objectives, and a discussion of previous investigation activities. Section 2.0 describes field sampling activities. Section 3.0 presents and discusses investigation results. Section 4.0 summarizes the findings and conclusions of the DGI.

## 2.0 FIELD INVESTIGATION ACTIVITIES

Field investigation activities included the drilling and sampling of soil borings and monitoring wells. These activities were conducted in accordance with the Field Sampling Plan for Goss Cove Landfill Data Gap Investigation (B&R Environmental, January 1997) although, as discussed in Sections 1.2 and 3.0 of this report, only one phase of sampling was conducted instead of the two which had been planned. The locations of the newly installed soil borings and monitoring wells are shown on Figure 2-1. The field activities log book is attached to this report as Appendix A.

### 2.1 SOIL BORINGS AND SOIL SAMPLING

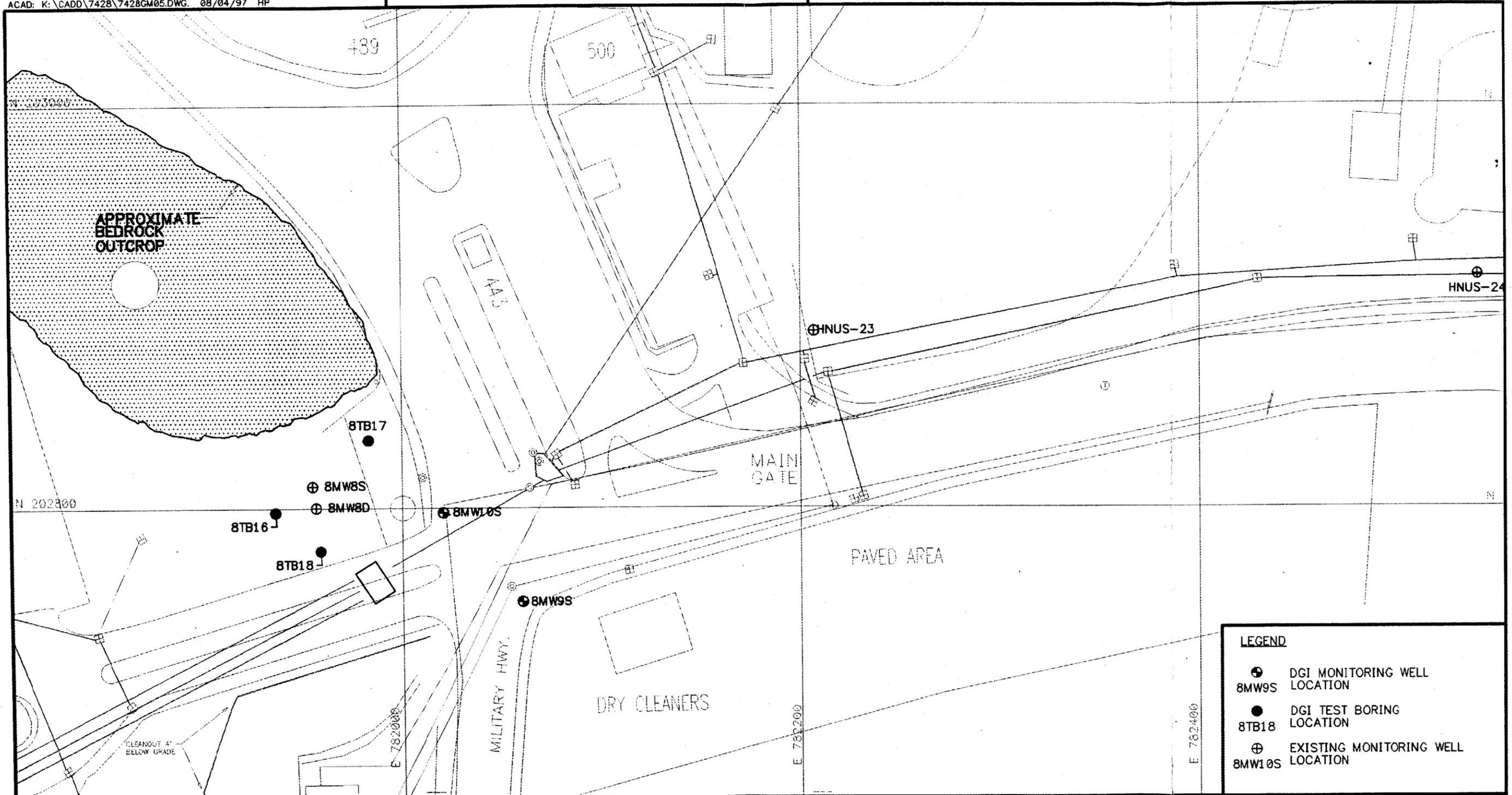
The purpose of drilling and sampling the soil borings was to determine if the source of PCE contamination detected in the groundwater at monitoring wells 8MW8S and 8MW8D during the Phase II RI is in the overburden materials.

A total of five borings (8TB16, 8TB17, 8TB18, 8MW9S and 8MW10S) were drilled during the first phase of the DGI. Two of these five borings (8MW9S and 8MW10S) were converted to monitoring wells.

A total of five subsurface samples (one from each boring) were collected and analyzed for TCL VOCs. Analytical results for the soil samples are discussed in Section 3.0. The borings were advanced to auger refusal in all five borings with 4¼-inch inside diameter (ID) hollow stem augers. Soil samples were collected with 2-inch outside diameter (OD) split-spoon samplers. Split-spoon samples were collected continuously in each test boring from the ground surface to the top of bedrock. Each split-spoon was examined by the field geologist for any indication of contamination and classified according to the Unified Soil Classification System (USCS). Each split-spoon sample was field screened with a Photo Ionization Detector (PID). A description of the soil, the number of blows per foot and PID readings were recorded on boring logs maintained by B&R Environmental personnel. Soil boring logs are attached to this report as Appendix B.

As can be seen from these logs no significant evidence of contamination was detected in the overburden material, which consisted of mostly fill and silty fine to medium sand. Since none of the samples had readings above background levels and no water was encountered in the overburden materials, all five samples submitted for analysis, were taken from the soil/bedrock interface.

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**LEGEND**

- ⊕ DGI MONITORING WELL LOCATION  
8MW9S
- DGI TEST BORING LOCATION  
8TB18
- ⊕ EXISTING MONITORING WELL LOCATION  
8MW10S

NO.	DATE	REVISIONS	BY	CHKD	APPD	REFERENCES	DRAWN BY HJP	DATE 8/3/97	 <b>Brown &amp; Root Environmental</b>	CONTRACT NO. 7428	OWNER NO.
							CHECKED BY	DATE		APPROVED BY	DATE
							COST/SCHED-AREA			APPROVED BY	DATE
							SCALE AS NOTED			DRAWING NO. FIGURE 2-1	REV. 0

**PHASE 1 DRILLING SAMPLING LOCATIONS  
GOSS COVE LANDFILL DATA GAP INVESTIGATION  
NSB-NLON, GROTON, CONNECTICUT**

FORM CADD ALL DRAWING SHEETS - REV 0 - 02/11/97

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The three soil borings not converted to wells were backfilled with cuttings and bentonite chips to the ground surface. All drill cuttings were collected and containerized in DOT-approved drums, labeled as to their contents and temporarily stored in the decontamination area at the Area A Landfill.

## **2.2 MONITORING WELL INSTALLATION**

The purpose of drilling and installing two new monitoring wells and sampling groundwater from these wells was to identify the source of PCE contamination in monitoring wells 8MW8S and 8MW8D and to evaluate the potential for natural attenuation of that contamination.

Both of the new wells (8MW9S and 8MW10S) were originally planned to be shallow overburden wells. However, since no water was encountered in the overburden, the wells were constructed as shallow bedrock monitoring wells.

The well borings were advanced to the top of bedrock using 4¼-inch ID hollow-stem augers. Soil samples were collected in the overburden as discussed in Section 3.1. Since bedrock was encountered before the water table, drilling continued using a 4-inch OD down-the-hole air hammer. Cuttings were logged and containerized as drilling proceeded to the bottom of the hole. The depth of the well was based on water bearing zones within the bedrock fractures. Water was encountered at 16.5 feet below ground surface (bgs) in well 8MW9S and from 16.5 feet to 19.5 feet bgs in well 8MW10S.

After the boring was advanced to the desired depth below the water bearing zone, the 2-inch ID, Schedule 40 PVC monitoring well and PVC riser pipe was installed. Well screens were 5 feet in length in well 8MW9S and 7 feet in well 8MW10S. Slot size was 0.010 inches. The top of the riser pipe was set approximately 2 inches below ground surface. Well screens and riser pipe conform to National Sanitation Foundation (NSF) Standard 14 and consisted of flush-jointed threads.

The annulus between the well and the borehole was backfilled with a quartz sand from 6 inches below the bottom of the well cap to approximately two feet above the top of the screen. A bentonite pellet seal was placed above the filter sand pack and a cement grout was placed above the bentonite pellet seal to approximately one foot below ground surface. A steel protective casing was installed flush with the ground surface at both locations to eliminate obstruction of vehicular traffic. Soil boring logs and monitoring well construction diagrams are attached to this report as Appendix B.

After installation, both monitoring wells were developed to remove fines from around the filter pack. Wells were developed by using a 2-inch diameter purge pump. Development proceeded until water quality

parameters, including pH, specific conductivity, and temperature stabilized to within 10 percent and turbidity was less than 5 NTU's or until seven well casing volumes were purged. Monitoring well development records are attached to this report as Appendix C.

During development, PID readings of the groundwater were recorded, as measured in the head space in a zip-lock bag. The readings were taken at random and ranged from 67 to 84 PPM for well 8MW9S and from 15 to 43 PPM for well 8MW10S. These readings were recorded in the above-mentioned well development records. No free product was observed during well development.

All well development water was containerized in DOT-approved drums, labeled as to their contents and temporarily stored at the Area A Landfill.

### **2.3 GROUNDWATER SAMPLING**

Fourteen groundwater samples were collected, along with the required Quality Control (QC) samples. Groundwater samples were collected for analysis from existing monitoring wells 8MW8S, 8MW8D, HNUS-22, HNUS-23, HNUS-24 and from the newly installed wells 8MW9S and 8MW10S.

Two samples were sequentially collected from each well. First, prior to purging, a sample was collected to assess the presence of Dense Non Aqueous Phase Liquid (DNAPL). Second, following purging, a sample was collected for the analysis of dissolved phase compounds.

The unpurged groundwater samples were collected from the bottom of each well using a peristaltic pump with Teflon tubing. The Teflon tubing was lowered to the bottom of the well and connected to the peristaltic pump. Samples were collected immediately from the outlet of the peristaltic pump. After sampling, the Teflon tubing was discarded.

The purged groundwater samples were collected using U.S. EPA Region I's low-flow purging and sampling techniques. The wells were purged using a peristaltic pump with Teflon tubing installed to the middle of the screen interval if the entire screen was below the water table or to the middle of the water column if the screen straddled the water table. Pharmaceutical-grade tubing was used in the rotaries of the peristaltic pump. The wells were purged at a flow rate ranging from approximately 0.25 liters per minute to 0.4 liters per minute. Low Flow Purge Data Sheets are attached to this report as Appendix D.

During purging, water quality parameters were obtained directly through a flow-through cell, except for turbidity measurements, which were obtained from a "T" valve connection immediately ahead of the flow-

through cell using a Lamotte Chemical turbidity meter. The other measured water quality parameters included pH, specific conductivity, temperature, dissolved oxygen (DO) and ORP/Eh. All water quality parameters were measured at approximately 5 minute intervals. Purging was deemed to be complete when the above-mentioned water quality parameters stabilized for three consecutive readings to within limits set forth in the Field Sampling Plan for Goss Cove Landfill Data Gap Investigation (B&R Environmental (January 1997).

All purged water was containerized in DOT-approved drums, labeled as to their contents and temporarily stored at the Area A Landfill.

In addition to the above-mentioned water quality parameters, the purged groundwater samples were also field tested for divalent iron and alkalinity. No detections of divalent iron were found in any of the seven purged groundwater samples. Total alkalinity ranged from 12.5 milligrams per liter (mg/L) to 210 mg/L. All information regarding the groundwater sampling is provided on the Low Flow Data Sheets and Groundwater Sample Log Sheets which are attached to this report as Appendices D and E, respectively.

#### **2.4 GROUNDWATER ELEVATION MEASUREMENTS**

One round of groundwater level measurements was conducted on the seven wells sampled for groundwater. Groundwater levels were measured from the surveyed reference point (top of riser pipe casing) for each monitoring well. All water levels were measured on the same day (February 5, 1997) using an oil/water interface probe. No free product/water interface was detected either at the surface or bottom of any of the seven wells. Groundwater level measurements and water table elevations are provided on Table 2-1.

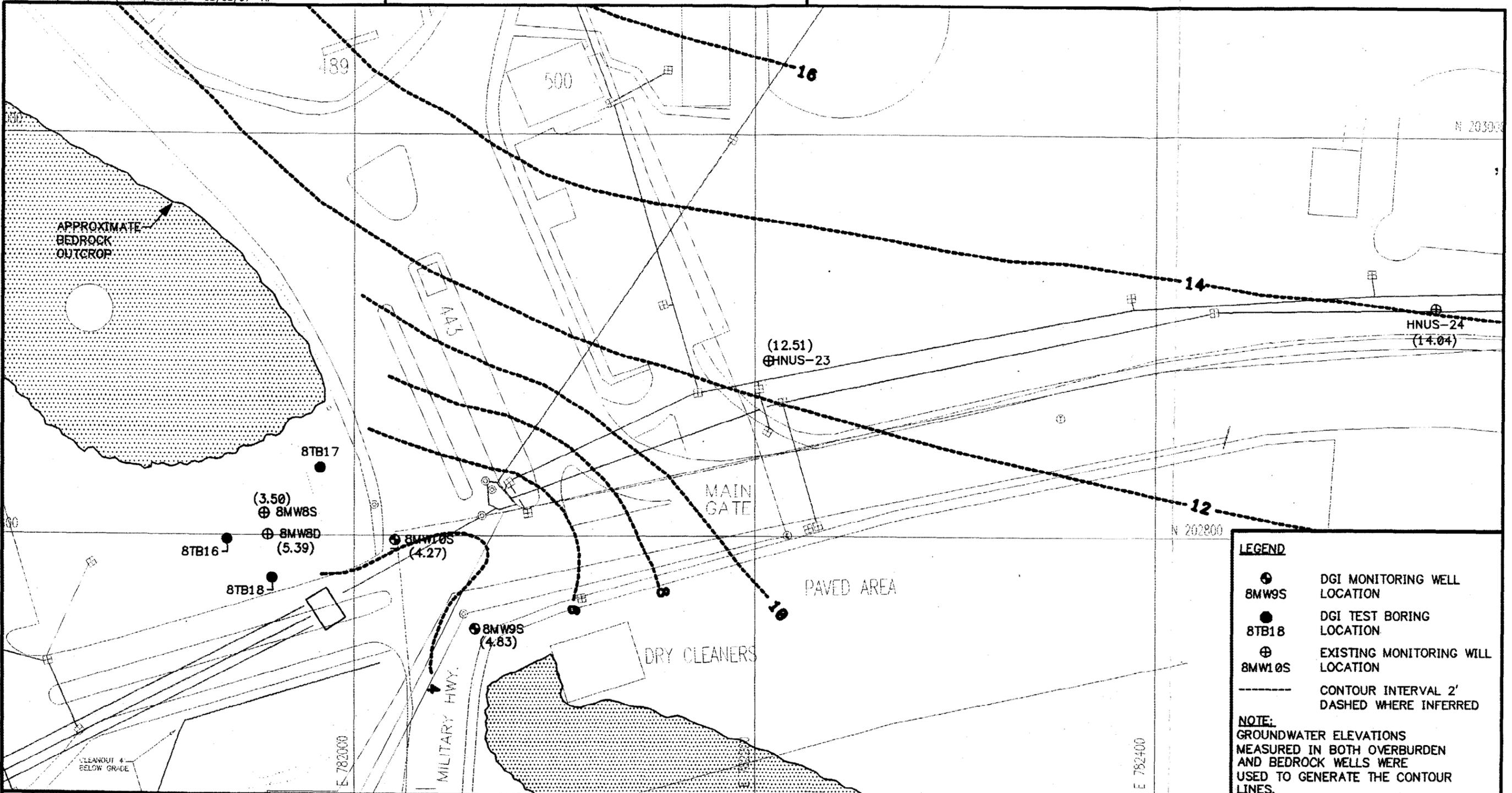
These water table elevations were used to construct a generalized groundwater contour map of the Goss Cove area. Both shallow overburden and shallow bedrock wells were used to construct the contour elevations and are shown on Figure 2-2. In general, groundwater flow direction is in a southwesterly direction towards the Thames River. Groundwater flow may also be influenced by underground utility conduits, which are numerous in the area of this investigation.

Groundwater flow within the bedrock is controlled by fractures and bedding planes. Based on areal photos and field measurements, the general strike of the bedrock in this area is northwest with numerous open joints and bedding planes. The bedrock outcrop just southeast of well 8MW9S appears to have an apparent dip towards the east.

**TABLE 2-1**

**GROUNDWATER LEVEL MEASUREMENTS AND WATER TABLE ELEVATIONS  
GOSS COVE LANDFILL DATA GAP INVESTIGATION  
NAVAL SUBMARINE BASE NEW LONDON  
GROTON, CONNECTICUT**

<b>Well Number</b>	<b>Reference Elevation (feet)</b>	<b>Depth to Water (feet)</b>	<b>Water Level Elevation (feet)</b>
8MW8S	19.53	14.14	5.39
8MW8D	19.68	16.18	3.50
8MW9S	19.01	14.18	4.83
8MW10S	19.22	14.95	4.27
HNUS-22	25.31	9.67	15.64
HNUS-23	18.03	5.52	12.51
HNUS-24	24.72	10.68	14.04



**LEGEND**

- DGI MONITORING WELL LOCATION
- 8MW9S
- 8TB18
- ⊕ EXISTING MONITORING WELL LOCATION
- ⊕ 8MW10S
- CONTOUR INTERVAL 2' DASHED WHERE INFERRED

**NOTE:**  
GROUNDWATER ELEVATIONS MEASURED IN BOTH OVERBURDEN AND BEDROCK WELLS WERE USED TO GENERATE THE CONTOUR LINES.

NO.	DATE	REVISIONS	BY	CHKD	APPD	REFERENCES	DRAWN BY	DATE	CONTRACT NO.	OWNER NO.
							HJP	8/3/97	7428	
							CHECKED BY	DATE	APPROVED BY	DATE
							COST/SCHED-AREA		APPROVED BY	DATE
							SCALE		DRAWING NO.	REV.
							AS NOTED		FIGURE 2-2	0

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## **2.5 SURVEYING**

Elevations and coordinates for all soil borings and monitoring wells installed during the DGI were surveyed by a licensed surveyor. Existing control point No. 920 near the site was used to perform the surveying. All control points were surveyed to second order of accuracy and were tied into the Connecticut State Plan coordinate for horizontal location and National Geodetic Vertical Datum (NGVD 1929) for elevation. Soil borings were surveyed horizontally to the nearest 1.0 foot and vertically to the nearest 0.1 foot from the existing ground surface. Monitoring wells were surveyed horizontally to the nearest 1.0 foot and vertically to the nearest 0.01 foot from the top of the well casing.

## **2.6 DECONTAMINATION**

All downhole drilling equipment and non-dedicated sampling equipment was decontaminated prior to, during, and after the drilling and sampling events. The equipment was steam cleaned prior to arrival on site, between borings and at the completion of the drilling program. Steam cleaning took place at the decontamination pad at the Area A Landfill.

The split spoon samplers and all other non-dedicated sampling equipment were decontaminated as per the requirements in the Field Sampling Plan for Goss Cove Landfill Data Gap Investigation (B&R Environmental, January 1997).

Field measurement equipment, including the water quality meter and water level measuring device, was rinsed with analyte-free water.

## 3.0 INVESTIGATION RESULTS

### 3.1 FRACTURE TRACE ANALYSIS

Aerial photographs of the Goss Cove Landfill Site area were examined to determine the location of any local fractures. Fracture traces are surficial expression of subsurface discontinuities. Traces are linear features less than one mile in length.

The following difficulties were encountered in the course of this analysis. No true stereographic pairs were available for the area of interest. Two aerial photographs (CTDEP Frames No. 13-72-3937, dated 04/17/80 and No. 32-72-5350, dated 03/23/86) with the appropriate overlap were used. These two photographs were taken at slightly different scales and 6 years apart. Significant land use changes occurred during this time interval. These two factors made discernment of linear features difficult. In addition, the scale of the available photographs was too large to facilitate a detailed analysis of the Goss Cove Landfill Site area and most observed linear features were more regional than site-specific in nature.

All identified linear features were cross referenced with topographic maps. The most prominent linear features in the area are northwest-southeast trending ridges and valleys. Several features that conjugate to this primary orientation were also observed. Most of the remaining features were drainages or man-made pathways. After ruling out the above items, three possible fractures in the immediate vicinity of the Goss Cove Landfill Site remained, as shown on Figure 3-1. Two of these possible fractures are parallel to each other, approximately 200 feet apart and extend in a northwest-to-southeast direction from the corner of Crystal Lake Road and Military Highway. The third possible fracture extends in a near-northern direction roughly along Military Highway and intercepts the southern of the two previously-mentioned fracture at about mid-length. The location of these features were relayed to the field team to provide guidance for drilling operations.

### 3.2 SUBSURFACE SOIL ANALYSES

The five subsurface soil samples collected from borings 8TB16, 8TB17, 8TB18 and monitoring wells 8MW9S and 8MW10S were analyzed for TCL VOCs.

Analytical results are summarized in Table 3-1 and PCE concentrations and depths of detection are shown on Figure 3-2. Laboratory data sheets are attached to this report as Appendix F.

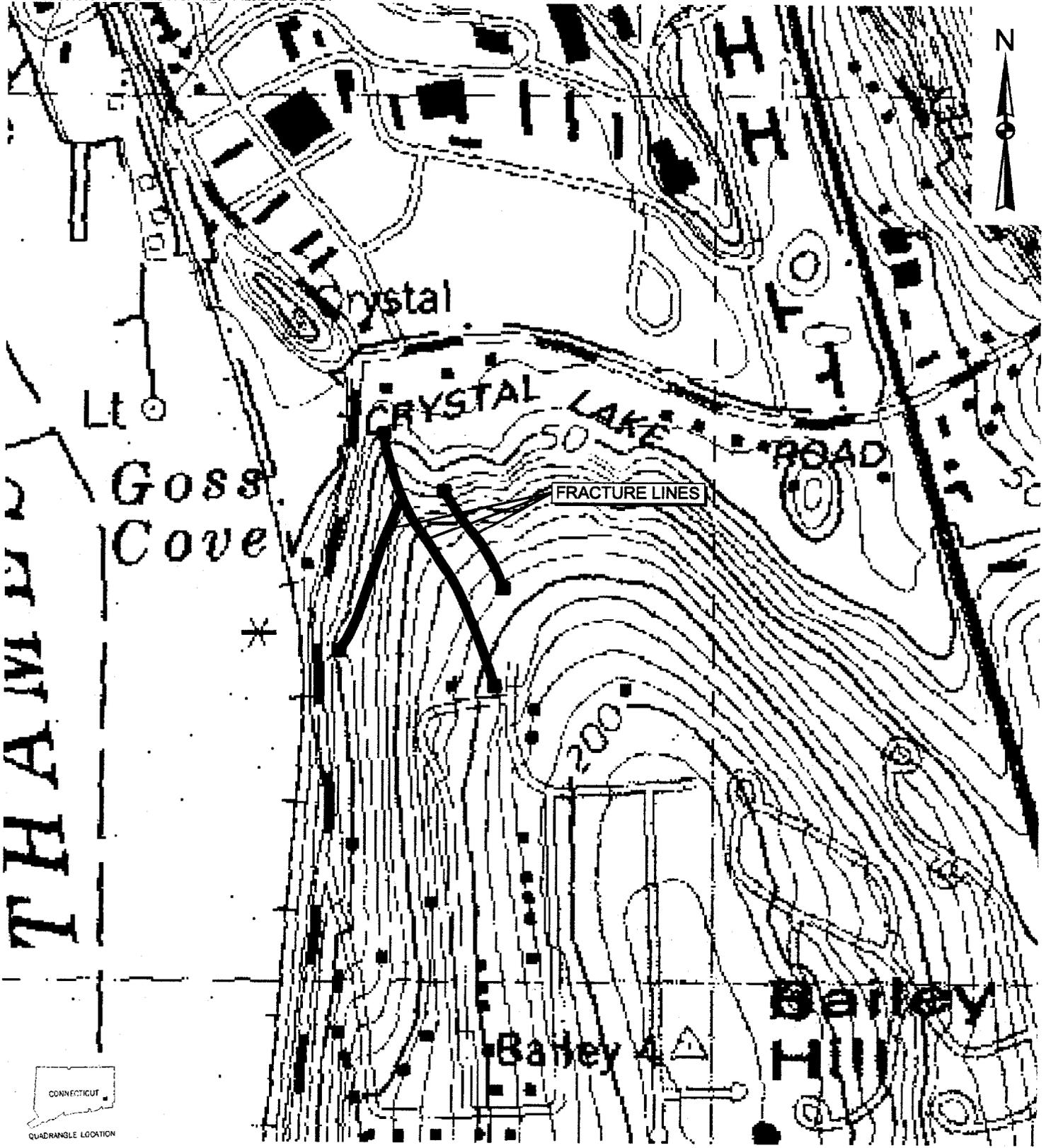
**TABLE 3-1**

**SUMMARY OF ANALYTICAL RESULTS  
SUBSURFACE SOIL  
GOSS COVE LANDFILL DATA GAP INVESTIGATION  
NAVAL SUBMARINE BASE NEW LONDON  
GROTON, CONNECTICUT**

<b>COMPOUND</b>	<b>8TB16 (@ 8 feet)</b>	<b>8TB17 (@ 6 feet)</b>	<b>8TB18 (@ 12 feet)</b>	<b>8MW9S (@ 6 feet)</b>	<b>8MW10S (@ 10 feet)</b>
<b>TCL VOCs (µg/kg)</b>					
Tetrachloroethene	5 J	9 J	8 J	29	86

**NOTES:**

J Denotes an estimated value less than the laboratory's Practical Quantitation Level (PQL)



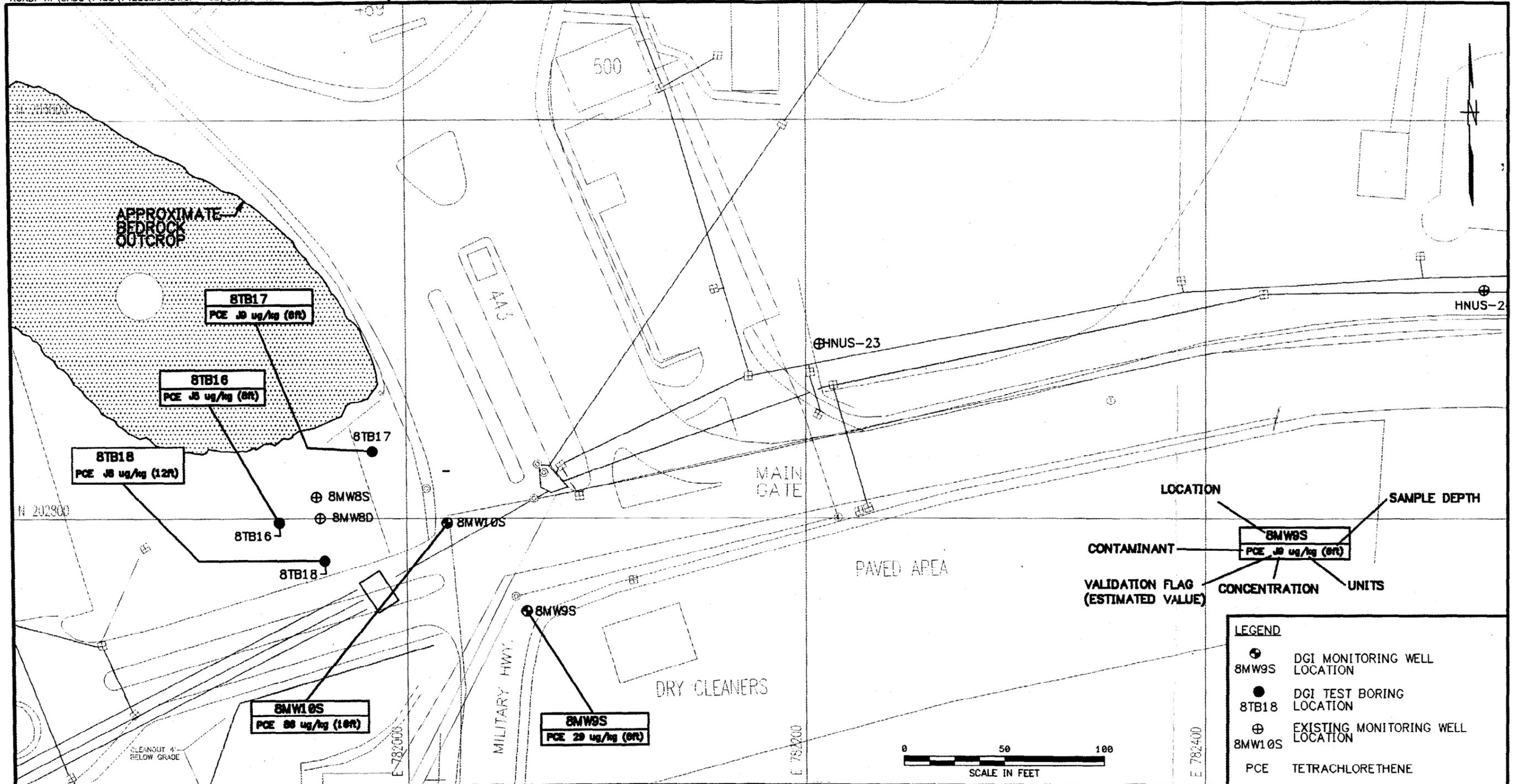
**FRACTURE TRACE MAP  
GOSS COVE LANDFILL  
MSB - NLON, GROTON, CONNECTICUT**

500 0 500 1000 Feet

FIGURE 3-1

  
**Brown & Root Environmental**

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**LOCATION**      **SAMPLE DEPTH**

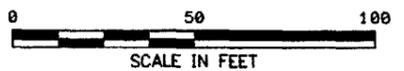
**CONTAMINANT**      **CONCENTRATION**      **UNITS**

**VALIDATION FLAG (ESTIMATED VALUE)**

8MW9S  
PCE 10 ug/kg (8R)

**LEGEND**

- ⊕ DGI MONITORING WELL LOCATION
- DGI TEST BORING LOCATION
- ⊕ EXISTING MONITORING WELL LOCATION
- PCE TETRACHLORETHENE



NO.	DATE	REVISIONS	BY	CHKD	APPD	REFERENCES	DRAWN BY	DATE	CONTRACT NO.	OWNER NO.
							HJP	8/3/97	7428	
							CHECKED BY	DATE	APPROVED BY	DATE
							COST/SCHED-AREA		APPROVED BY	DATE
							SCALE		DRAWING NO.	REV.
							AS NOTED		FIGURE 3-2	0

**Brown & Root Environmental**

**DETECTED CONCENTRATIONS OF PCE IN SOIL**  
GOSS COVE LANDFILL DATA GAP INVESTIGATION  
NSB-NLON, GROTON, CONNECTICUT

0124808Z

As can be seen from Table 3-1, the only chlorinated VOC detected in the subsurface soil samples was PCE. PCE concentrations in these samples were much lower than those previously detected in groundwater at well cluster 8MW8S/8MW8D and ranged from a minimum of 5 micrograms per kilogram ( $\mu\text{g}/\text{kg}$ ) in the sample collected from boring 8TB16 at a depth of 8 feet to a maximum of 86  $\mu\text{g}/\text{kg}$  in the sample collected from monitoring well 8MW10S at a depth of 10 feet.

### 3.3 GROUNDWATER ANALYSES

The seven unpurged groundwater samples collected from the bottom of monitoring wells 8MW8S, 8MW8D, 8MW9S, 8MW10S, HNUS-22, HNUS-23, and HNUS-24 prior to well purging were analyzed for TCL VOCs. The seven purged groundwater samples collected from the same monitoring wells were also analyzed for TCL VOCs. In addition, to assess the potential for natural attenuation of chlorinated VOCs such as PCE, these purged groundwater samples were tested for a series of field and laboratory parameters. Field parameters included: temperature, pH, conductivity, dissolved oxygen (DO), oxidation/reduction potential (ORP/Eh), divalent iron ( $\text{Fe}^{2+}$ ), and total alkalinity. Laboratory parameters included: dissolved anions (chlorides, sulfates, nitrates), total organic carbon (TOC), and dissolved methane gas.

Analytical results for the unpurged groundwater samples are summarized on Table 3-2. Analytical and field testing results for the purged groundwater samples are summarized on Table 3-3. Figure 3-3 shows PCE concentrations for both sets of samples. Laboratory data sheets are attached to this report as Appendix F.

As can be seen from Tables 3-2 and 3-3, PCE was by far the most prevalent VOC in groundwater, being detected in five of seven wells at concentrations ranging from 2  $\mu\text{g}/\text{L}$  (HNUS-23, purged) to 2,500  $\mu\text{g}/\text{L}$  (8MW9S, unpurged). By comparison, other VOC detections were relatively minor (i.e., maximum concentration of 25  $\mu\text{g}/\text{L}$ ) and included:

- Trichloroethene (TCE), which was detected in only one of seven wells (8MW8D) at a maximum concentration of 25  $\mu\text{g}/\text{L}$ ,
- Trichloroethane (TCA) which was detected in only one of seven wells (HNUS-23) at a maximum concentration of 4  $\mu\text{g}/\text{L}$ ,
- Dichloroethene (DCE) which was detected in one of seven wells (8MW8D) at a maximum concentration of 1  $\mu\text{g}/\text{L}$ .

TABLE 3-2

SUMMARY OF ANALYTICAL RESULTS  
 UNPURGED GROUNDWATER  
 GOSS COVE LANDFILL DATA GAP INVESTIGATION  
 NAVAL SUBMARINE BASE NEW LONDON  
 GROTON, CONNECTICUT

COMPOUND	8MW8S (@ 16.3 ft)	8MW8D (@ 80 ft)	8MW9S (@ 18.9 ft)	8MW10S (@ 21.4 ft)	HNUS-22 (@ 20.4 ft)	HNUS-23 (@ 16.8 ft)	HNUS-24 (@ 14.3 ft)
<b>TCL VOCs (µg/L)</b>							
1,1-Dichloroethane	U	U	U	U	U	5 J	U
Total 1,2-Dichloroethene	U	1 J	U	U	U	U	U
1,1,1-Trichloroethane	U	U	U	U	U	4 J	U
Trichloroethene	U	25	U	U	U	U	U
Tetrachloroethene	29	120	2500	1100	U	3 J	U
Ethylbenzene	U	U	U	U	U	2 J	U
Total Xylenes	U	U	U	U	U	11	3 J

J Denotes an estimated value less than the laboratory's Practical Quantitation Level  
 U Undetected at the method's detection limit (10 µg/L)

039712/P

3-8

CTO 0275

TABLE 3-3

**SUMMARY OF ANALYTICAL AND FIELD TESTING RESULTS  
PURGED GROUNDWATER  
GOSS COVE LANDFILL DATA GAP INVESTIGATION  
NAVAL SUBMARINE BASE NEW LONDON  
GROTON, CONNECTICUT**

COMPOUND	8MW8S (@ 15.3 ft)	8MW8D (@ 23.1 ft)	8MW9S (@ 14.9 ft)	8MW10S (@ 15.6 ft)	HNUS-22 (@ 10.6 ft)	HNUS-23 (@ 7.9 ft)	HNUS-24 (@10.8 ft)
<b>TCL VOCs (µg/L)</b>							
1,1-Dichloroethane	U	U	U	U	U	5 J	U
1,1,1-Trichloroethane	U	U	U	U	U	3J	U
Trichloroethene	U	3 J	U	U	U	U	U
Tetrachloroethene	24	1900	1800	770	U	2 J	U
<b>Natural Attenuation Field Parameters</b>							
Temperature (°C)	9.1	9.0	11.7	10.8	12.2	10.5	10.9
pH (S.U.)	7.12	7.21	5.60	5.70	5.87	5.7	5.78
Conductivity (mS/cm)	0.362	0.65	0.049	0.114	0.120	0.209	0.087
Dissolved Oxygen (DO, mg/L)	10.05	1.65	7.69	8.65	11.40	0.61	6.85
ORP/Eh (±mV)	+58.5	-15.7	+162.4	+164.6	+152.6	+109.3	+122.1
Divalent Iron (Fe <sup>2+</sup> , mg/L)	ND <sup>(1)</sup>	ND <sup>(1)</sup>	ND <sup>(1)</sup>	ND <sup>(1)</sup>	ND <sup>(1)</sup>	ND <sup>(1)</sup>	ND <sup>(1)</sup>
Alkalinity (total as mg/L CaCO <sub>3</sub> )	210	110	12.5	12.5	25.0	73.5	27.5
<b>Natural Attenuation Laboratory Parameters (mg/L)</b>							
Chlorides	5.6	120	7.8	36	10	30	13
Nitrates (as N)	3.0	0.3	< 0.1	0.23	4.7	2.5	0.81
Sulfates	29	35	9.6	11	18	20	9.9
Total Organic Carbon	5.0	2.1	1.0	1.0	2.1	2.3	1.4
Dissolved Methane	ND <sup>(2)</sup>	ND <sup>(2)</sup>	ND <sup>(2)</sup>	ND <sup>(2)</sup>	ND <sup>(2)</sup>	ND <sup>(2)</sup>	ND <sup>(2)</sup>

1 0.1 mg/L detection limit

2 3 µg/L detection limit

J Denotes an estimated value less than the laboratory's Practical Quantitation Level

U Undetected at the method's detection limit (10 µg/L)

ND Not Detected: Note 1: 0.1 mg/L detection limit, Note 2: 3µg/L detection limit

- Dichloroethane (DCA), which was detected in one of seven wells (HNUS-23) at a maximum concentration of 5 µg/L.
- Ethylbenzene and xylenes, which were detected in two of seven wells (HNUS-23, HNUS-24) at maximum concentrations of 2 µg/L and 11 µg/L, respectively.

A comparison of the PCE concentrations reported on Table 3-2 with those reported on Table 3-3 shows no conclusive evidence of the presence of DNAPL since the concentrations of the samples collected from the bottom of the wells prior to purging are not significantly higher than those of the samples collected from mid-depth of the same wells after purging. Also, as discussed in Section 2.0, no free product was observed during monitoring well development and purging and no free-product/water interface was detected at either the surface or bottom of any well.

The presence of DNAPL at the site was therefore not confirmed although it should still be considered likely, given the fact that maximum detected concentrations of PCE are within 1 percent of the solubility of that compound in water (about 200 mg/L), which is the generally accepted threshold for the potential presence of DNAPL.

As shown on Figure 3-3, the most significant PCE contamination extends along the southeast-to-northwest axis formed by the alignment of well cluster 8MW8S/8MW8D with wells 8MW9S and 8MW10S. This axis coincides with the general direction of the bedrock fractures discussed in Section 3.1 and of the bedrock outcropping observed at the site and, since DNAPL movement is often governed by bedrock topography, this observation tends to demonstrate that the source of the PCE contamination detected in well cluster 8MW8S/8MW8D is not located within the site but rather southeast of it and, most likely, outside NSB-NLON. The following arguments can also be made in support of this statement:

- At a given location, detected PCE concentrations were much higher in deep well 8MW8D (120/1,900 µg/L, unpurged/purged) than in shallow well 8MW8S (29/24 µg/L, unpurged/purged). This is typical of a situation where a source of dense contaminant, such as PCE, is located some distance away, which creates a downward trending plume.
- A likely source of PCE contamination is the dry cleaning establishment which is located approximately 150 feet southeast of well cluster 8MW8S/8MW8D, next to well 8MW9S.



- The only other PCE detection measured in the vicinity of the site occurred at very low concentrations (2 to 3  $\mu\text{g/L}$ ) in well HNUS-23, which is located at IRP Site No. 23: Tank Farm/Ballfield Area, approximately 200 feet west-northwest of well cluster 8MW8S/8MW8D.
- Although HNUS-23 is a relatively shallow overburden well which may not provide a full representation of the potential presence of such a dense contaminant as PCE, it is somewhat unlikely that any PCE source, if located in the vicinity of well HNUS-23, could migrate toward the Goss Cove Landfill Site since it would have to overcome the obstacle of sharply rising bedrock, which eventually outcrops in the immediate vicinity of well cluster 8MW8S/8MW8D.

A preliminary evaluation of the field and laboratory natural attenuation parameters shown on Table 3-3 shows that conditions for such natural attenuation of chlorinated VOCs are not very favorable. Typically, natural attenuation is fostered by anaerobic and reductive conditions (i.e., low DO, negative ORP/Eh) and evidence of its occurrence is provided by the detection of divalent iron, dissolved methane gas, and significant concentrations products of decomposition (i.e., lesser-chlorinated VOCs). The significant DO concentrations (except at 8MW8D and HNUS-23), positive ORP/Eh readings (except at 8MW8D), and absence of divalent iron shown by the data on Table 3-3 indicate that conditions in the groundwater at the site and its vicinity are not particularly anaerobic or reductive. The data on Table 3-3 also shows no methane gas detections and only low detection of TCE (3  $\mu\text{g/L}$  at 8MW8D) to correspond to the elevated concentrations of PCE.

It should be noted, however, that analytical results reported on Table 3-3 for well 8MW8D provide limited evidence that some natural attenuation of PCE may be occurring at that location because DO concentration and ORP/Eh reading are low (1.65 mg/L and - 15.7 mV) and a possible product of decomposition, TCE, was detected, albeit at a very low concentration (3  $\mu\text{g/L}$ ).

A review of the groundwater data of the Phase I and Phase II RI for evidence of natural attenuation of PCE downgradient of well cluster 8MW8S/8MW8D was inconclusive. This review did show only low concentrations of PCE and presence of possible products of decomposition. However, such an occurrence could also be explained by the possibility that PCE has not yet migrated significantly beyond well cluster 8MW8S/8MW8D, as evidenced in particular by the very low maximum concentrations at which PCE and the possible products of decomposition were detected (11  $\mu\text{g/L}$  PCE in well 8MW1, 8  $\mu\text{g/L}$  TCE in well 8MW2D, 18  $\mu\text{g/L}$  chloroform in well 8MW6D, 12  $\mu\text{g/L}$  DCE in well 8MW3S, 5  $\mu\text{g/L}$  vinyl chloride in well 8MW2S).

It should also be noted that increasing groundwater salinity in the vicinity of the Thames River will negatively impact the potential for biological action, especially since this salinity is likely to fluctuate over time in accordance to tidal conditions.

## 4.0 CONCLUSIONS AND RECOMMENDATIONS

### 4.1 CONCLUSIONS

Based upon the results of the Data Gap Investigation as discussed in Section 3.0, the following conclusions were developed:

- The source of the PCE contamination detected in the groundwater at well cluster 8MW8S/8MW8D is not located in the unsaturated subsurface soil in the immediate vicinity of this well cluster.
- The presence of DNAPL in the groundwater was not confirmed, although it should still be considered likely.
- The PCE contamination detected in the groundwater at well cluster 8MW8S/8MW8D is migrating onto the Goss Cove Landfill Site from a southeasterly direction and could originate at a dry cleaning establishment located approximately 150 feet southeast of this well cluster, opposite NSB-NLON's main gate. This assumption is supported by the observation that bedrock fractures and outcropping at the site follow a northwest to southeast direction and that DNAPL movement is often governed by bedrock topography.
- Conditions in the groundwater at the Goss Cove Landfill Site and its vicinity are not particularly favorable to natural attenuation of chlorinated VOCs and there is only very limited evidence that such a natural attenuation is currently taking place.

### 4.2 RECOMMENDATIONS

Based upon the above conclusions, it is recommended that no further groundwater investigation be conducted as part of this FS and that the groundwater be removed from consideration as an Operable Unit for this FS since the main contaminant of concern (COC), PCE, has been shown to originate from an offsite location.

It is further recommended that additional groundwater investigations be conducted south of Crystal Lake Road as part of a base-wide groundwater evaluation to pinpoint the location of off-base sources of PCE contamination upgradient of the Goss Cove Landfill Site.

**APPENDIX A**  
**FIELD ACTIVITIES LOG BOOK**

TITLE NSB GOSS COVE  
MON JAN 6 1997

PROJECT NO. 7428  
BOOK

Work continued from Page AT SITE : SCONTI

AM: CLOUDY COLD - WINDY  
PM: MOSTLY SUNNY COLD WINDY

0730 AT AIRPORT FOR FLT TO PROV.

1000 ARR PROV. RI AIRPORT.

1030 GET RENTAL CAR - DRIVE TO SITE

1145 CHECK INTO MOTEL - CALL ANDY  
STACPOLE, M. SCHULTZ.

1230 GO TO BASE GET PASS - HAD TO  
CALL ANDY TO GET OK FOR PASS.

1300 LOOK AROUND MAIN GATE AREA  
FOR POTENTIAL LOCATIONS OF WELLS.

1400 AT M. SCHULTZ'S OFFICE - WILL GET  
SOME UTILITY MAPS OF GOSS COVE  
AREA.

1530 LV M. SCHULTZ OFFICE - GO TO  
MAIN GATE AND WALK TO SEVERAL  
LOCATIONS BUT DID NOT LAYOUT  
HOLES AS YET, ALSO WILL WAIT  
UNTIL TUES TO GO IN

1630 LV BASE GO TO MOTEL MAKE  
SOME CALLS

1730 DONE FOR DAY.

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

Work continued to Page

SIGNATURE

24

WITNESS

SJ Conner

DATE

1/6/97

DATE

TITLE NSB GOSS COVE  
TUE JAN 7 1997

PROJECT NO. 7428  
BOOK

Work continued from Page AT SITE : SJIC

AM: SUNNY COLD WINDY  
PM: " " "

0700 ON SITE BEGIN TO LAYOUT

SOME HOLES, BUT THEN GO TO

M. SCHULTZ OFFICE FIRST. WILL

MEET W/ CMD HENN ~ 1130 - DECIDE  
TO GO TO TOWN HALL GET PROPERTY  
MAP OF AREA.

0900 GET SOME SUPPLIES FIRST ie.  
PAINT, LINES ETC.

1000 GET TAX MAP AND GIVE  
GREG HANOVER A CALL - WILL MEET  
W/ HIM TOMORROW.

1100 BACK ON BASE - M. SCHULTZ CALLS  
CMD HENN AND MEET W/ HIM - DISCUSS  
OUR PLANS FOR DRIVING NEXT TUES.  
(3 BORINGS) WILL LET HIM KNOW FOR  
SURE.

1200 LAYOUT PHASE I LOCATIONS AND  
2 PHASE II LOCATIONS.

1330 LUNCH

1400 BACK ON BASE TO CONFIRM LOCATIONS

W/ MAP.

1600 TAKE TO GEOLOGIC

1730 RETURN TO MOTEL

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

Work continued to Page

SIGNATURE

WITNESS

SJ Conner

DATE

1-7-97

DATE

25

TITLE NSB GOSS COVE  
WED JAN 8, 1997

PROJECT NO. 7428  
BOOK

Work continued from Page AT SITE S CONTI

0700 SPEND SOME TIME TO MAKE  
PHONE CALLS - CALLED RES FOR NEXT  
WEEK - TALKED TO ANDY STACKPOLE  
ABOUT HOLE LAYOUT - DISCUSSED  
POSSIBILITY OF DEEP HOLE VS SHALLOW  
HOLE FOR PHASE I

0800 TALK TO K. SIMPSON - MAY HAVE TO  
USE BLADDER PUMPS / FLOW CELL VS.  
PERISTALTIC - MAY ALTER SCHEDULE.

1000 CALL CRIS LOPES (DIG SAFE) WILL MEET  
TOMORROW MORNING TO LOCATE MORE UTIL

1200 TALK TO M. SCHWARTZ - WILL MEET W/M

1300 TOMORROW - LUNCH -

1500 AT TOWN OF GROTON - GOT  
DIGGING PERMIT FROM GREG HANDLER  
AT POLICE DEPT MET W/  
JOE JUWIGER - 31<sup>00</sup>/HR + TAX ETC PER  
MIN 4 HRS. AFTER 4 - GET 8. MAN  
445 - 9721 - SHIFT COMMANDER.  
CONES (BY US) GIVE HIM NOTICE  
BEFORE WE PROCEED.

1600 TALK TO JOHN DAVIS OF GEO LOGIC  
DISCUSS SCHEDULE A LITTLE, BUT  
NO DEFINITE SCHEDULE.

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

Work continued to Page

SIGNATURE

Sj Conti

DATE

1-8-97

DATE

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WITNESS

TITLE NSB GOSS COVE  
WED (CONT)

PROJECT NO. 7428  
BOOK

Work continued from Page

HE ALSO NEEDS A PLACE TO STORE  
DRUMS - I TOLD HIM AREA "A" LANDFILL.

ALSO TALK TO K. SIMPSON - ORDERED MORE  
TRAFFIC CONES AND HE WILL CHECK INTO  
INS. CERTIF

1630 TALK TO JEAN LUC - HE WILL CALL OFFICE  
TO ALSO CHECK ON INS CERTIF FOR TOWN  
OF GROTON INS CERTIFICATE

1705 CALLED GEO LOGIC - GAVE SEC. DIRECTIONS  
TO BASE FOR JOHN DAVIS.

1730 FINISH UP NOTES ETC.

VOID  
SJC.

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

Work continued to Page

SIGNATURE

Sj Conti

DATE

1-8-97

DATE

WITNESS

27

TITLE NSB GOSS COVE  
THUR JAN 9 1997

PROJECT NO. 7428  
BOOK

Work continued from Page AT SITE SJC

AM: CLOUDY COLD

PM: " "

0700 ON SITE TO LAYOUT REMAINING  
PHASE II HOLES - HAD TO GO BACK  
TO MOTEL TO GET PROPERTY MAP  
0730 BACK ON SITE - LAYED OUT  
HOLES.

0830 MET CHRIS LOPES (TOWN OF GROTON)

TO LAYOUT SANITARY SEWER -  
1000 SHE WILL COME BACK TO  
LAY OUT FORCE MAIN THIS AFT.  
WENT OVER TO SEE MARK S.

BUT WASNT IN - I LEFT NOTE

1100 WENT UP TO BLDG 166 - TALKED  
TO DICK C & ANDY S. WENT TO  
AREA A LAND FILL TO LOOK AT  
DRUMS - I DONT THINK ANY ARE  
OURS - ONE IS FULL BUT IS SCAPS  
DRUM, BUT WE MAY HAVE TO HANDLE  
IT. ALSO SOME EMPTY DRUMS ARE  
NOT OURS EITHER

1145 CHECK IN AT M. SCHUTZ OFFICE,

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

Work continued to Page

SIGNATURE

28

WITNESS

SJC

DATE

1-9-97

DATE

TITLE NSB NLON  
THURS (CONT)

PROJECT NO. 7428  
BOOK -

Work continued from Page

STILL NOT IN LEFT NOTE. TALKED TO  
DOMINICK G. SAID MARK WAS OUT  
ON BASE AND MAY HAVE MEETING THIS  
AFT. - MY CALL YESTERDAY TO MARK -  
HE INDICATED THAT HE WAS GOING TO  
BE AVAILABLE TODAY.

1300 LUNCH

1330 CALLED JL. GOREIUX - LEFT MSG.

CALLED GEO LOGIC - SET UP MONDAY'S  
MEET AT NOON @ AT BASE.

ALSO READ WORK PLAN FOR GREG  
HANOVER AT TOWN OF GROTON.

1445 WENT AFTER SOME OFFICE SUPPLIES  
FOR NEXT WEEKS WORK.

STILL NO WORD FROM MS.

1530 MADE ANOTHER CALL TO MARK. NO  
ANSWER.

1630 RETURN TO MOTEL - LOOK OVER  
WORK PLAN AND FINISH NOTES

1730 DONE FOR DAY.

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

Work continued to Page

SIGNATURE

WITNESS

SJC

DATE

1-9-97

DATE

29

TITLE NSB NLON Goss Cove PROJECT NO. 7428

FRI JAN 10 1997

BOOK

Work continued from Page AT SITE: SJC

AM: SUNNY, COLD

PM: " "

0700 AT SITE. PROCEED TO  
GET UTIL CLEARANCE AND  
DIGGING PERMIT FROM MARCS.

0800 AT GOSS COVE AND AT INTERSTRA  
MARK ISSUES PERMIT FOR THE  
INITIAL 5 WELLS.

1030 AT BLD 166 - CLEAN UP OUR  
STORAGE AREA ETC.

1230 LV. FOR PROV. AIRPORT

1500 RE TO PGH

1700 ARR PGH. GET LUGGAGE.

1730 AT OFFICE.

1830 LV OFFICE

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

Work continued to Page

SIGNATURE

30

WITNESS

SJ Conti

DATE

1-10-97

DATE

TITLE NSB NLON - Goss Cove PROJECT NO. 7428

MON JAN 13 1997

BOOK

Work continued from Page AT SITE: SJC/KS

AM: SUNNY V COLD

PM: " COLD.

0700 AT PGH AIRPORT

0830 FLT TO PROV.

1000 ARR PROV.

1030 LV. PROVIDENCE

1130 ARR. MOTEL - CHECK IN.

1215 GET PASSES.

1230 DRIVERS ARR. GET THEIR PASSES.

SHOW THEM HOLE LOCATIONS AND  
CONDUCTIVES. SESSION IN FIELD.

1330 GO TO DECON PAD - GEO LOGS - RE-BUILD.

1400 SJC/KS GO TO BLDG 166 - BEGIN TO SORT  
EQ. - GET DICK C. TO SIGN APP FOR  
PERM PASS.

1445 GO TO SEE GREG HANOVER - GIVE HIM  
INS CERTIF FOR DIGGING PERMIT FOR  
WELL TO BE DONE ON ROAD.

1530 RETURN TO BLDG 166 - UN PACK/LOAD  
EQ.

1730 GO GET VERMICULITE - AND MORE

1830 G BAGS. DONE FOR DAY.

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

Work continued to Page

SIGNATURE

WITNESS

SJ Conti

DATE

1-13-97

DATE

31

TITLE NSB Goss Cove  
TUE JAN 14 1997

PROJECT NO. 7428  
BOOK

Work continued from Page

AT SITE SJU/ KS  
GEOLOGIC (2 MEN)

AM: CLEAR COLD.

PM:

" " [449-3558] MUSEUM NOS.  
[24 HRS \*] [449-3291] PO. SLATE

0700 AT SITE - GO INTO MUSEUM TO GET  
CMD HENRY KNOW WE WOULD BE STARTING  
TODAY. - BUT HE WASNT IN YET.

0745 ALSO WAIT FOR DRILLERS TO ARRIVE.

0815 GEOLOGIC<sup>S</sup> RIG - FUEL LINE FROZEN -  
WILL HAVE TO THAW OUT.

SJU/ KS WENT TO BLDG 166 - DROP OFF  
VERMICULITE - KS CALLED LAB.

0930 AT GOSS COVE. RIG SETS UP.

1010 AT 8TB18 - TOOK S-1 0-2'

1200 DONE AT 8TB18 - Sampled. CHLORINATED  
12'-12.7' → [08TB1812] VOCS

1230 LUNCH

1300 ON SITE - MOVE TO 8TB16 - SET UP

1412 TAKE CHEM SAMPLE [08TB1608] (8-10')  
ALSO TAKE DUP DU01

1500 MOVE TO 8TB17

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

Work continued to Page

SIGNATURE

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WITNESS

SJ Contri

DATE

1-14-97

DATE

TITLE NSB GOSS COVE  
TUE (CONT)

PROJECT NO. 7428  
BOOK

Work continued from Page

1505 TAKE S-1 0-2' FROM 8TB17

1520 TAKE S-3 4-6' " "

1525 TAKE [08TB1706] FROM 6-7' FOR  
CHLOR. VOCS. ALSO MS/MSD.

GOT SPOON REF @ 7' - DECIDE TO TRY  
AUGERS - BUT ALSO GOT REF @ 7'

1545 TOP @ 7' HERE - DONE W/ HOLE.  
PULL AUGERS.

1630 AT BLDG 166 PACKING SAMPLES.

	QUANTITIES	
	MSA	2nd
1730 LU FOR FED EX. 8TB18	12	7
	16	6
1830 ARR AT MOTEL	17	4
TOTAL	(29)	(17)

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

Work continued to Page

SIGNATURE

WITNESS

SJ Contri

DATE

1-14-97

DATE

33

TITLE NSB Goss Cove  
WED JAN 15 1997

PROJECT NO. 7428  
BOOK

Work continued from Page AT SITE: SJC/KS

AM: CLEAR COLD - BREEZY  
PM: " " " "

0700 AT SITE GET PAPERWORK READY  
0730 TAKE TRIP BLANK  
0800 DRIVERS, POLICE AND TOWN INSP  
ARRIVE TO CONTROL TRAFFIC.  
SET UP RIG  
0830 TAKE S-1 FROM 8MW9S.  
0845 AT 7' HIT REF (TOP OF ROCK)  
TAKE [08SB9S06] → CHLOR. VOCS  
CONVERT TO AIR HAMMER - 4" φ  
0915 BEGIN TO AIR HAMMER FROM 7' TO  
1030 19' - HIT FRACTURE AT 16.5 TO 16.8.  
WAIT FEW MINUTES - UNTIL  
WATER ACCUM. - CLEAN OUT HOLE  
1045 GO AFTER WELL MATERIALS. (GEOLOGIC)  
1115 BEGIN TO SET WELL AT 8MW9S.  
SET SCREEN 19 → 14  
SAND 19 → 12  
PELLETS 12 → 9  
GROUT TO SURF

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

Work continued to Page

SIGNATURE

SJ Conte

DATE

1-15-97

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WITNESS

TITLE NSB Goss Cove  
WED (CONT)

PROJECT NO. 7428  
BOOK

Work continued from Page

1200 DONE W/ POLICE (4 HRS)  
CLEAN UP.  
1230 LUNCH  
1300 BEGIN @ 8MW10S  
1345 TAKE [08SB10S10] CHLORINATED VOCS  
MAY HAVE HIT BOULDER 11.5 → 14.5  
TOOK S-7 (SEE BORING LOG) BUT WAS  
WEATH ROCK.  
1430 HAMMER BIT TO 21.5.

	DRILL HSA	4" φ AIR HAMMER	SS SPOONS	2" PVC
8MW9S	(7')	7 TO 19	4	19'
8MW10S	(15')	11.5 → 14.5 16 → 21.5	3 6 7	21.5

1530 BEGIN TO SET WELL IN 8MW10S.  
ALSO NEED TO CONFIRM EQUIP FOR  
TAKING DISS. METHANE USING KIT  
SEE FOOTNOTE IN WP. KENNY JACKS.  
LOOKING INTO THIS  
1645 WELL SET - DRIVERS CLEAN UP - TAKE  
1700 PACK SAMPLES AT BLDG 166.  
1730 GO TO FED EX.  
1830 AT MOTEL.

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

Work continued to Page

SIGNATURE

SJ Conte

DATE

1-15-97

WITNESS

DATE

35

TITLE NSB GOSS COVE  
THUR JAN 16 1997

PROJECT NO. 7428  
BOOK

Work continued from Page

AT SITE: SIC/KS

AM: CLOUDY, COLD W/ RAIN.  
PM: " " "

0700 AT SITE. - SET UP INST FOR  
DEVELOPING WELLS.

0800 POLICE ARR TO DIRECT TRAFFIC  
PROCEED TO DEV. 8MWIOS W/ PURGE  
PUMP AT  $\approx$  16PM @  $\approx$  -2' DD.

0820 START TO TAKE RDS.

0910 DONE PUMPING - PUMPED  $\approx$  50 GAL.  
INTO DRUM, (SEE DEV SHEET)  
CLEAN UP MOVE DRUM TO DECON PAD

0930 POLICE DONE, BUT ARE GUAR. 4 HRS

0940 START DEV @ 8MWIOS. USING PURGE  
PUMP AND NEW LINE. - STILL  
RAINING FAIRLY HARD - DO NOT  
NEED TRAFFIC CONTROL HERE.

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

Work continued to Page

SIGNATURE

*SJ Contri*

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WITNESS

DATE

1-16-97

DATE

TITLE NSB GOSS COVE  
THURS CONT.

PROJECT NO. 7428  
BOOK

Work continued from Page

1100 FINISH DEV. OF 8MWIOS. STILL  
RAINING - CLEAN UP - DRIVERS  
TAKE DRUMS TO DECON PAD

1200 LUNCH

1230 BACK AT 166 - SPENT REST OF  
MFT CALLS INSTRUMENTS.

YSI SOME

TURB METER, etc

BECAME FAMILIAR W/ ALKALINITY METER  
AND FERROUS IRON METER.

TRIED TO GET FINALIZED THE PROCD  
FOR FIELD INJECTION OF DSS METHANE.  
CAUSED KATAHIDIN - LIL SAID SHE WOULD  
CALL AIR TOXICS LTD.

QUANTITIES

1730 RETURN TO 1. DEV. 4 HRS  
MOTEL NO FOR 2 WELLS  
NEWS ON DSS METH. METHOD.

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

Work continued to Page

SIGNATURE

*SJ Contri*

WITNESS

DATE

1-16-97

DATE

37

TITLE NSB GOSS COVE  
FRI JAN 17 1997

PROJECT NO. 7428  
BOOK -

Work continued from Page

AT SITE: SJL/KS

AM: SUNNY VERY COLD, WINDY 10°F  
PM: " " "

0700 AT SITE AT BLDG 166 - LOAD UP  
VAN W/ ALL SAMPLING EQUIP.

0830 GO TO HNUIS 24 AND PROCEED TO  
TAKE DNAPL SAMPLE FROM BOTTOM  
OF WELL USING PERISTALTIC PUMP.  
PULSED ALL TUBING - WILL USE NEW  
TUBING WHEN WE RETURN TO SAMPLE  
FROM ABOVE - ALSO TOOK DUP HERE.  
FOR DNAPL.

1000 GO BACK TO BLDG 166 - THE PACKAGE  
FROM AIR TOXICS ARR W/ BULB AND  
SYRINGE - BUT WE ONLY GOT 1 SET,  
WILL HAVE TO BECON EVERYTHING.  
ALSO I CALLED LIL PEPIN BACK AND  
SHE SAID THAT DEBBIE PERLE LEFT  
A MESSG RE: THE DISS. METHANE.

MESSG STATED TO FILL 40ML - W/O  
ANY AIR SPACE - AND TO SEND 2-40ml  
VIALS. HOWEVER OUR FOOTNOTE IN

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

Work continued to Page

SIGNATURE

SJ Conti.

DATE

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WITNESS

TITLE NSB GOSS COVE  
FRI (CONT)

PROJECT NO. 7428  
BOOK

Work continued from Page

THE WP SAYS TO ONLY INJECT 5ml  
INTO A 30 ml VOA, LEAVING 25ml  
OF HEADSPACE SO ' SO WE HAVE 2  
QUESTIONS

1. HOW MUCH DO WE INJECT IF WE USE  
A 40ml VIAL INSTEAD OF 30ml - DO  
WE INJECT 5ml - TO LEAVE 25 ml OF  
HEADSPACE.
2. AND IF WE HAVE TO FILL UP 2-40ml  
VIALS WHY DO WE EVEN HAVE TO USE  
THE BULB AND SYRINGE METHOD

1120 AT HNUIS 24 AGAIN - PROCEED TO  
PURGE WELL.

1145 SAMPLE TIME AT HNUIS 24.

FIELD BLANK  
GO TO AIR TOXICS (40ml) - LABEL AS  
FIELD (AMBIENT AIR BLANK) FOR EACH  
DAY - JUST ONE AMBIENT.

1230 LUNCH

1300 BACK ON SITE AT HNUIS 23

1340 TOOK DNAPL SAMPLE.

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

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TITLE NSB GOSS COVE  
FRI CONT.

PROJECT NO. 7428  
BOOK

Work continued from Page

1350 ROLL AND DISCARD TUBING - PROCEED  
TO PURGE WELL USING PERISTALTIC  
PUMP FROM A MIDPOINT OF SCREEN TO  
SAMPLE THE GW AT THIS INTERVAL.  
\* CALLED POLICE DEPT TO ARRANGE FOR  
TRAFFIC CONTROL ON SAT FROM 1 TO 5  
PM.

LT WIERSMA - 135 ROICC

449 - 4557

F. WHEELER CONTACT - CALLED LT.  
BUT JUST LEFT MESSAGE

1430 TOOK SAMPLE HNS 23 OIL ALSO  
TOOK DUP HERE DUPO3

1550 ARR BLDG 166 - BEGIN TO PACK  
SAMPLES, CLEAN, DECON EQUIP.

1730 W FOR FED EX  
1800 ARR " "  
1830 " MOTEL.

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

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WITNESS

SJ Conti

DATE

1-17-97

DATE

TITLE NSB GOSS COVE  
SAT JAN 18

PROJECT NO. 7428  
BOOK

Work continued from Page AT SITE STC/KS

AM: CLEAR VERY COLD BREEZY.  
PM: " " " "

0700 ON SITE AT BLDG 166 - PROCEED  
TO CALIBRATE INSTRUMENTS, LABEL  
BOTTLES AND LOAD VAN WITH EQUIP.

0815 SET UP AT BMWIOS.

0845 TOOK DNAPL SAMPLE - ALSO TOOK  
MS/MSD FROM THIS LOCATION @  
BMWIOS.

0915 SET UP FOR PURGING (MIDPOINT  
OF WATER OIL)

0935 SAMPLE TIME FOR REG GW  
SAMPLE @ 3' OFF BOTTOM AT  
BMWIOS.

1015 BEGIN TO FIELD TEST FOR FERROUS  
IRON & ALKALINITY.

1045 CLEAN UP AT BMWIOS - GO TO  
AREA - DISPOSE OF PURGE WATER  
INTO LABELED 55 GAL DRUM.

1115 AT 166 - WRITE UP MORE LABELS  
AND GET BOTTLE SETS READY FOR  
SAMPLING AT BMWIOS.

1215 LUNCH

1245 AT BMWIOS - WAITING FOR TRAFFIC

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

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WITNESS

SJ Conti

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1-18-97

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TITLE NSB GOSS COVE PROJECT NO. 7428  
SAT (CONT) 1-18-97 BOOK

Work continued from Page

1300 SET UP AT 8 MW 9S - PROCEED  
TO SAMPLE DNAPL FIRST. FROM  
BOTTOM OF MW = SET TUBING  $\approx 1\frac{1}{2}$ '

1315 FROM BOTM AND OBTAINED SAMPLE.  
PULLED AND DISCARDED TUBING.

SET NEW TUBING AT  $\approx$  MIDPOINT  
OF WATER COLUMN  $\approx 2'$  FROM  
BOTM (SINCE ONLY 4' WATER IN WELL.)

1355 SAMPLE TIME FOR 086W9S01.  
ALSO PULLED THE DISS METHANE  
SAMPLE (5ml) USING SYRINGE.

1415 PROCEED TO TAKE FERROUS IRON &  
ALKALINITY - CLEAN UP, ETC.

1500 GO TO BLDG 166 - FINISH WRITING  
LABELS - PUT BOTTLES IN ZIP LOCKS  
AND PUT SAMPLES ON ICE.

1600 UNLOAD VAN - PUT INST ON CHARGE  
RECON BULB & SYRINGE - START PAPER

1700 WORK FOR SUN.

1745 TAKE PURGE WATER TO AREA "A" PUT  
INTO DRUM.

1820 ARRC HOTEL

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WITNESS

SJ Cortez

Work continued to Page

DATE

1-18-97

DATE

TITLE NSB GOSS COVE PROJECT NO. 7428  
SUN JAN 19, 1997 BOOK

Work continued from Page

AT SITE: SJC/KS.

AM: SUNNY VERY COLD - BREEZY.  
PM: " " " "

0700 AT BLDG 166 - PROCEED TO CALIB  
INSTR. AND LOAD VAN - FINISH  
LABELS AND BOTTLE SETS.

RANDY

0745 VAN SPERANTAC [3291] STATES  
WE CANT SAMPLE AT MUSEUM  
WELLS TODAY (WHILE IT IS OPEN) BOTH  
ANDY S & JEAN LUC - SAID IT WAS  
ARRANGED THAT WE COULD - DECIDE

0815 TO GO TO HNUS 22

0835 SAMPLED DNAPL FROM HNUS 22

0850 START PURGING WELL HNUS 22

0930 SAMPLE TIME HNUS 2202 - AT  
MIDPOINT OF SCREEN -

ALSO CALLED ANDY TO SEE IF WE CAN  
GET INTO WELLS INSIDE OF THE MUSEUM  
GATE.

1030 AT 166 - PUT BOTTLES ON ICE.

SCIENTIFIC BINDERY PRODUCTIONS (CHICAGO 60605)

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WITNESS

SJ Cortez

DATE

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TITLE NSB GOSS COVE  
SUN (CONT)

PROJECT NO. 7428  
BOOK

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1130 GAVE ANDY'S A CALL AGAIN  
SAID HE WAS WAITING FOR A  
CALL IN REGARDS TO WELLS  
8MW8S, D.

1230 LUNCH

1300 WAITING FOR A.S. TO CALL

1318 GOT CALL FROM A.S. SAY  
"ALL SET" AT MUSEUM - CAN  
GO DIRECTLY TO WELLS

1330 TAKE WL AT BOTH WELLS  
8MW8S & D - SEE SIS.

1355 TAKE DNAPL OF 8MW8D (FROM BOTH)

1505 TAKE SAMPLE FROM 8MW8D AT  
SCREEN MIDPOINT.

1530 TAKE DNAPL OF 8MW8S (FROM BOTH)

DISCARD TUBING - RE INSERT MORE  
TUBING TO MIDWAY OF WATER COL.  
(ONLY  $\approx$  1' OF WATER) WELL  
PURGED BY AIRER  $\approx$  1 VOLUME.  
WILL WAIT  $\approx$  10 MIN - CHECK REC

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

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WITNESS

SJ Conza

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DATE

TITLE NSB GOSS COVE  
SUN (CONT)

PROJECT NO. 7428  
BOOK

Work continued from Page

1605 SAMPLE TIME FOR REG SAMPLE  
AT 8MW8S. HOWEVER - THIS  
WELL IS MAKING VERY LITTLE  
WATER - SO WE ARE WAITING  
FOR IT TO REC TO FINISH FILLING  
OUR BOTTLE SETS.

1730 DONE SAMPLING - TAKE INSTR  
AND SAMPLES TO BLDG 166 - PUT  
INST ON CHARGE - DECON DISS  
METHANE BUBB ETC. PUT  
SAMPLES ON ICE.

1830 DONE.

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

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WITNESS

SJ Conza

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1-19-97

DATE

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TITLE NSB GOSS COVE  
MON JAN 20 1997

PROJECT NO. 7428  
BOOK

Work continued from Page

AT SITE: SJC/KS

AM: PARTLY CLOUDY V. COLD, WINDY  
PM: " " " "

0700 AT SITE AT BLDG 166 - KES  
PREPARES TO PACK SAMPLES  
FROM WEEKEND AND COMPLETES  
COC - SJC NEEDS TO CALL OFFICE  
ABOUT:

- SCHEDULE FOR PHASE II
- CHECK ON STATUS OF FRACTURE TRACE  
ANAL. NW/SE
- MEET W/ FOSTER WHEELER TODAY

LYNN STEWART - ATLANTA.

0820 CALL OFFICE - TALK TO JPO/AND  
PAUL WADE - RE - LINEATION OF BR  
AT SITE

0845 UPDATE JOHN LUI OF OUR PROGRESS.  
KES CALLS LAB.

0930 MEET W/ FOSTER/WHEELER - DAN  
1000 SULLIVAN / PETER TO LOCATE WELLS  
IN LANFILL.

1200 LUNCH.

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

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WITNESS

*SJ Foster*

DATE

1-20-97

DATE

TITLE NSB GOSS COVE  
MON (CONT)

PROJECT NO. 7428  
BOOK

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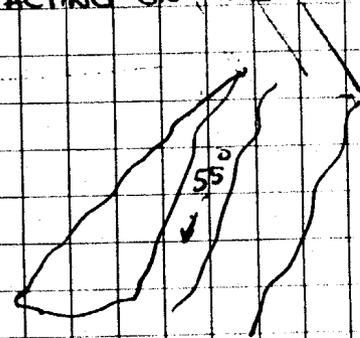
1300 ① N 45° W AT TOP OF OUT CROP NEAR  
FLAGPOLE. LINEATION W/ 55° & BEDDING  
PLANES

N 41° 21' 18.9"  
W 72° 05' 11.9"

①A

W/ PLAGIOCLASE FILING THE JOINTS. 2 TO  
3" SPACING ON THE JOINT

NW/SE



② N 50° W AT STOP 2

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

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SIGNATURE

WITNESS

*SJ Foster*

DATE

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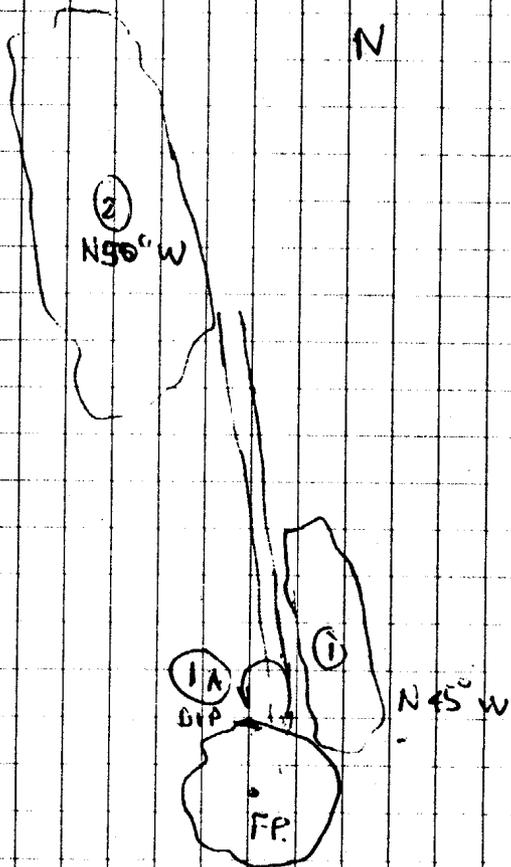
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TITLE NSB GOSS COVE  
MON (CONT)

PROJECT NO. 7428  
BOOK

Work continued from Page



GENERAL STRIKE DIRECTIONS ON TOP OF  
OUTCROP - NEAR MAIN GATE AND FLAGPOLE

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

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WITNESS

*S. J. Jants*

DATE

1/20/97

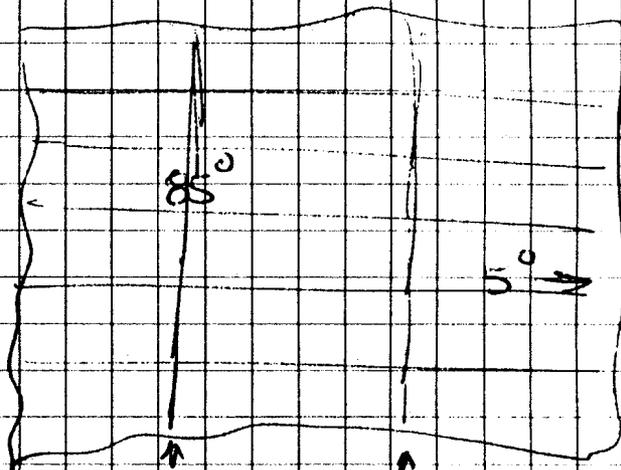
DATE

TITLE NSB GOSS COVE  
MON (CONT)

PROJECT NO. 7428  
BOOK

Work continued from Page

ALONG SHARK BLV - WEST OF PASS  
ID BLDG LOOKING WEST AT  
OUTCROP



NEAR VERT FRACTURES - TIGHTLY SPACED  
NEARLY HORIZ.

BEDDING PLANES 4" TO A 1' THICK 12 BR

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

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WITNESS

*S. J. Jants*

DATE

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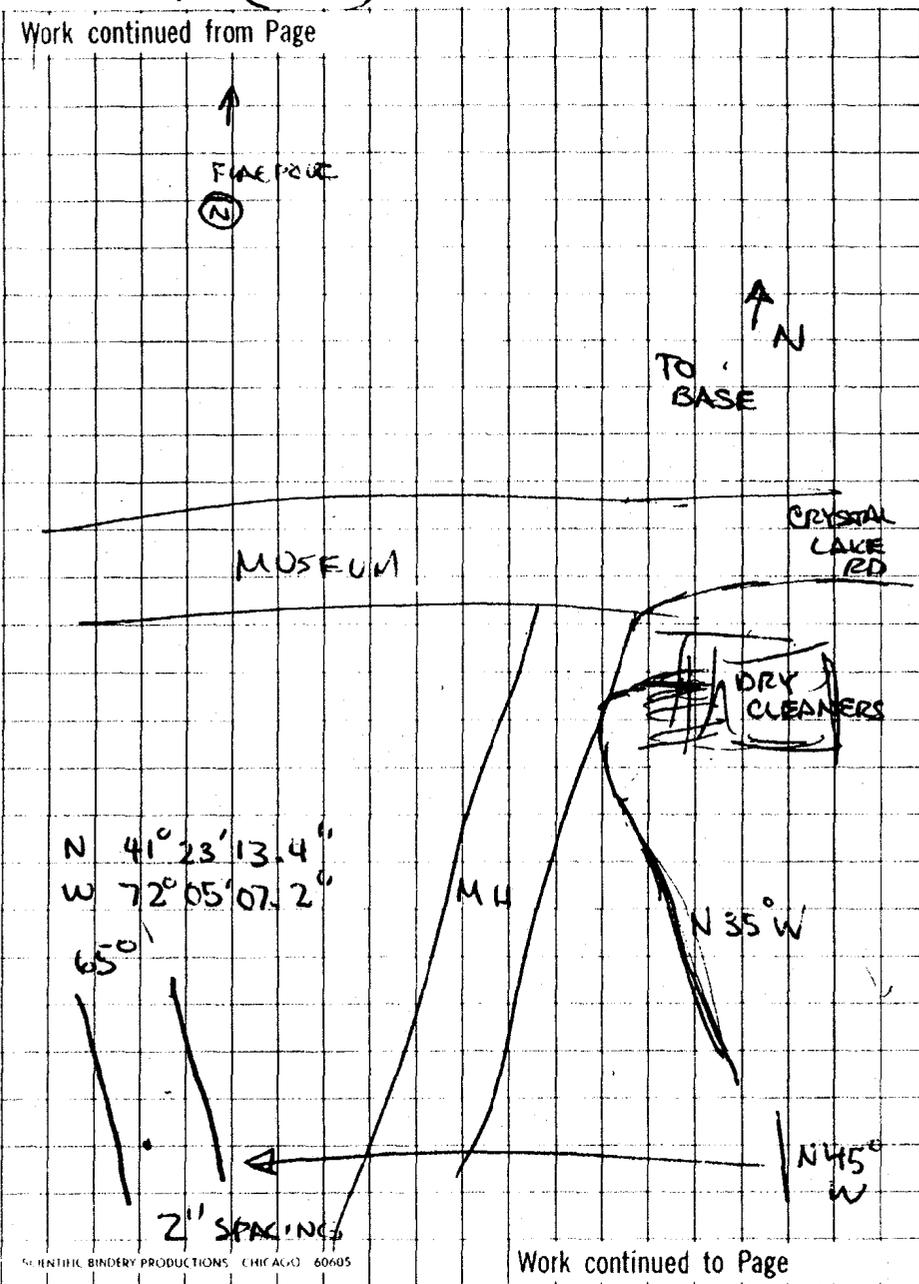
DATE

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TITLE NSB GOSS COVE  
MON (CONT)

PROJECT NO. 7428  
BOOK

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N 41° 23' 13.4"  
W 72° 05' 07.2"

2" SPRINGS

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WITNESS

*S. J. Conner*

DATE

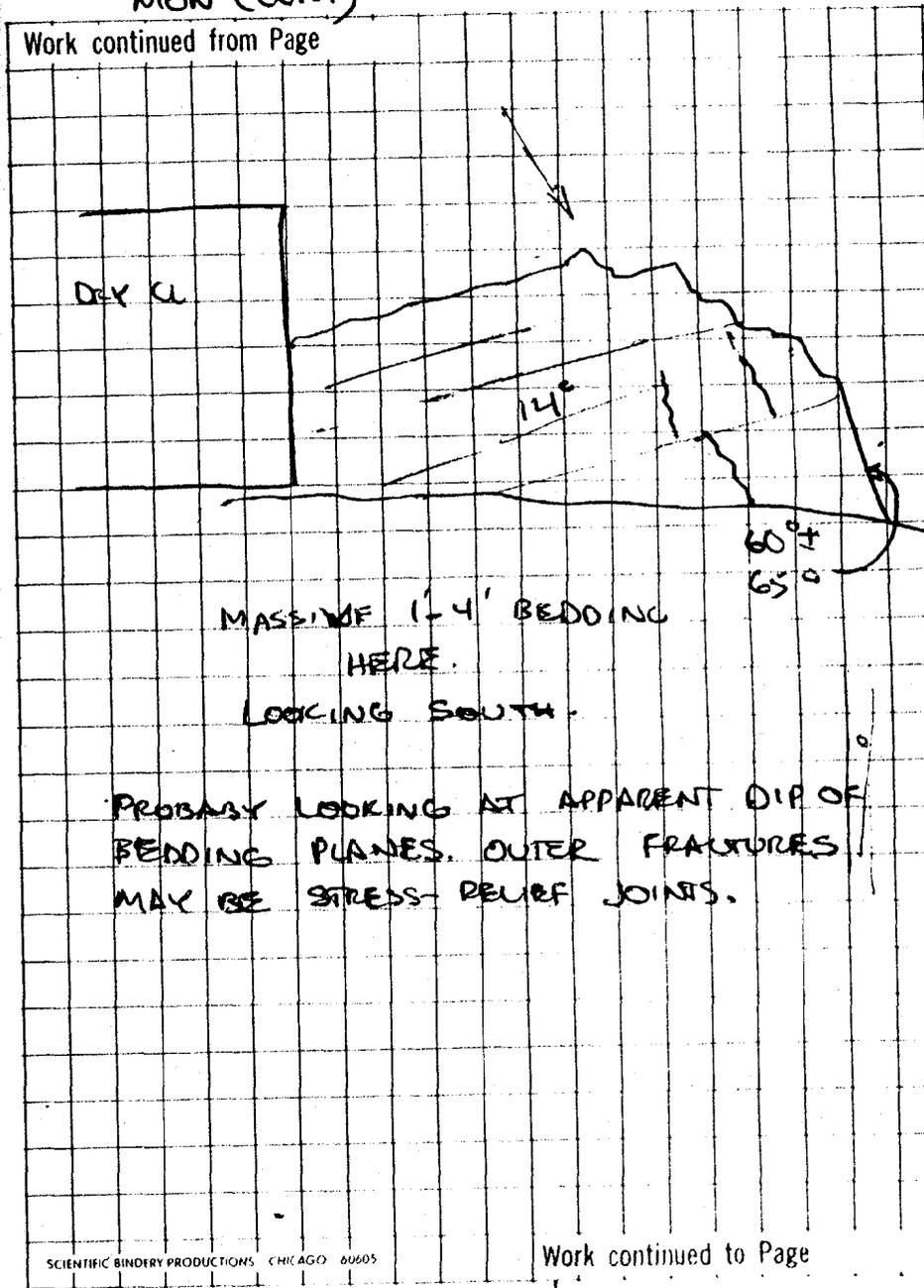
1/20/97

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TITLE NSB GOSS COVE  
MON (CONT)

PROJECT NO. 7428  
BOOK

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MASSIVE 1-4' BEDDING  
HERE.  
LOOKING SOUTH.

PROBABLY LOOKING AT APPARENT DIP OF  
BEDDING PLANES. OUTER FRACTURES  
MAY BE STRESS-RELIEF JOINTS.

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

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WITNESS

*S. J. Conner*

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TITLE NSB GOSS COVE

PROJECT NO. 7428

TUE JAN 21 1997

BOOK

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AT SITE KS/SC

AM: SUNNY COLD

PM: " "

0700 AT SITE: TALK TO ANDY S.  
ABOUT STORING OUR EQ BETWEEN  
SHIFTS - SAY OK TO STORE IN. FIT  
THE CONF ROOM IN BLDG 166.

0830 REARRANGE SOME EQ - UNLOAD  
VAN & CLEAN.

0930 RETURN TO MOTEL

1000 LU FOR AIRPORT

1200 FLT TO PGH

1445 LU PGH AIRPORT.

1500 ARR OFFICE

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

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WITNESS

*S. Conti*

DATE

1/22/97

DATE

TITLE NSB GOSS COVE

PROJECT NO. 7428

TUE FEB 4 1997

BOOK

Work continued from Page

AT SITE: SJC

AM: CLOUDY COLD

PM: " "

0700 AT PGH AIRPORT

0830 FLT TO PROV.

1000 ARR PROVS.

1030 GET CAR

1130 ARR MOTEL - CHECK IN.

1200 GET PASS

1230 ON SITE - CHECK AREA FOR  
DRUMS ETC - STILL HAVE 3-WATER  
1" SOLIDS FROM GOSS COVE. THESE  
TO BE PICKED UP AT LATER DATE.

1400 AT BLDG 166 - START TO GET  
EQUIP PACKED.

1600 GO AFTER - BOXES, POSTAGE ETC  
FOR SHIPPING

1730 RETURN TO MOTEL

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

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WITNESS

*S. Conti*

DATE

2-4-97

DATE

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TITLE NSB GOSS COVE  
WED FEB 5 1997

PROJECT NO. 7428  
BOOK

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AT SITE: SJC

AM: CLOUDY W/ RAIN. COLD

PM: CLOUDY - COLD

0700 AT SITE WAIT FOR SURVEYORS

0800 SURVEYORS ARR - SHOW THEM  
THE 5 LOCATIONS.

0900 RETURN TO BLDG 166 BEGIN  
TO PACK EQ. - ETC.

1300 LUNCH

1330 AT SITE

		DTW	BOTM	PROD
1400	BMW 9S	14.18	18.38	NO
1405	BMW 10S	14.95	21.15	NO
1412	BMW 8S	14.14	-	NO
1415	BMW 8D	16.18	-	-
1425	HNU5 22	9.67	-	NO
1435	HNU5 23	5.52	-	NO
1440	HNU5 24	10.68	-	NO

MEAS W/ KECK INT. PROBE KIR 89

GOT VAN STUCK NEAR HNU5 23  
HAD TO CALL TOW TRUCK TO PULL  
OUT. MADE SOME RUTS IN RIGHT  
FIELD, BUT LATER I TRIED TO

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

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SJ Conte.

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WITNESS

TITLE NSB GOSS COVE  
WED (CONT)

PROJECT NO. 7428  
BOOK

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FLATTEN THEM OUT W/ A RAKE.  
I HAD TO FILL OUT A REPORT GIVEN  
TO ME BY SECURITY. ANDY AND  
DICK TRIED TO HELP PUSH, BUT  
COULDN'T GET OUT.

1630 GOT OUT BY HAVING TOW TRUCK  
HOOK CABLE TO REAR OF VAN, THEN  
I WAS ABLE TO DRIVE OUT.

1730 AT BLDG 166, BUT WAS LOCKED.  
RETURN TO MOTEL. WILL FINISH  
PACKING, ETC TOMORROW.

THE BALLFIELD LOOKS IN PRETTY  
GOOD SHAPE AFTER I PACKED  
DOWN SOME OF RUTS - WILL TAKE  
SOME PHOTO'S TOMORROW WHEN IT  
IS LIGHTER OUT.

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

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SIGNATURE

SJ Conte

DATE

2/5/97

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WITNESS

55

TITLE NSB GOSS COLE  
THUR FEB 6 1997

PROJECT NO. 7428  
BOOK

Work continued from Page

AT SITE SSC

AM: CLOUDY, COLD

PM: CLOUDY, NOT AS COLD.

0710 AT BLDG 166 - FINISH UP  
PACKING - CALL FOR FED EX  
PICKUP

1000 DONE PACKING - BEGIN TO TAKE  
SOME EQUIP TO THE STORAGE  
AREA IN BLDG 166. INVENTORY  
AS FOLLOWS:

6- DI WATER POLYPACS	GEOPROBE EQUIP
1- BAG VERMICULITE	1- SMALL COOLER
1- DECONTUB/2 BRUSHES	2- DISP. BAILERS
1- FOLDING TABLE	1- BAILER BRUSH
1- PLASTIC MEAS. CUP	1- HARD HAT
1- CASE BLUE TYRES	4- GAL PH/COND BUFFERS
1- JAR LIQUINOX	1- PR BOOTS

1100 TOOK SOME PHOTOS OF BATTLEFIELDS.

1200 RETURN TO MOTEL.

1300 LV FOR AIRPORT.

1500 FLT TO PGH

1645 ARR PGH AIRPORT

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

1715 LEAVE AIRPORT

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*S. J. Costa*

DATE

2/6/97

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WITNESS

TITLE

PROJECT NO.  
BOOK

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SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

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DATE

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**APPENDIX B**

**SOIL BORINGS AND MONITORING WELLS LOGS**

**BROWN & ROOT  
ENVIRONMENTAL**

**LOG OF BORING 8MW9S**

PROJECT NO: 7428	PROJECT NAME: NSB Goss Cove DGI
PROJECT LOCATION: NSB-New London, CT.	DATE DRILLED: 1-15-97
DRILLING COMPANY: Geologic, Inc.	SURFACE ELEVATION: 19.46 Feet
DRILLING METHOD: Hollow Stem Auger/Air Hammer	BORING DIAMETER: 8.25/4 Inches
DRILLING RIG: Truck Mounted, Mobile	GEOLOGIST: S. J. Conti

DEPTH feet	SAMPLE NUMBER	BLOWS/FT.	PID (ppm)				GRAPHIC LOG	USCS/ROD	GEOLOGIC DESCRIPTION Density/Consistency, Hardness, Color	WELL DIAGRAM		
			Sample	B. Zone	Borehole	Drill B. Z.						
5	S-1	NA	.7					BR	Asphalt and road gravel			
		41	.6	0	0	0			Dense Brown Silty Fine/Medium SAND Trace Rock Fragments-Moist (Fill ?)			
	S-2	15	.6									
		13	0	0	0	0						
	S-3	15	0									
		11	0	0	0	0						
	S-4*	41	0									
		100/0	0	0	0	0						
	10											
	15											
20												
25												

PROJECT NO: 7428	PROJECT NAME: NSB Goss Cove DGI
PROJECT LOCATION: NSB-New London, CT.	DATE DRILLED: 1-15-97
DRILLING COMPANY: Geologic, Inc.	SURFACE ELEVATION: 19.82 Feet
DRILLING METHOD: Hollow Stem Auger/Air Hammer	BORING DIAMETER: 8.25/4 Inches
DRILLING RIG: Truck Mounted, Mobile	GEOLOGIST: S. J. Conti

DEPTH feet	SAMPLE NUMBER	BLOWS/FT.	PID (ppm)				GRAPHIC LOG	USCS/ROD	GEOLOGIC DESCRIPTION Density/Consistency, Hardness, Color	WELL DIAGRAM
			Sample	B. Zone	Borehole	Drill B. Z.				
5	S-1	NA	0				SPM	Asphalt and road gravel and SAND	<p>2" Sch.40 PVC</p> <p>0.01 slotted PVC screen</p> <p>grout</p> <p>bentonite seal</p> <p>Quartz Sand (20-30 sieve)</p>	
		19	.2	0	0	0		Medium Dense Brown Silty Fine/Medium SAND and Rock Fragments-Moist (Fill ?)		
	S-2	19	0							
		15	0	0	0	0				
	S-3	17	0					Medium Dense Brown Silty Fine/Coarse SAND-Trace Rock Fragments-Moist (Fill ?)		
27		0	0	0	0					
10	S-4	35	0							
		66	0	0	0	0				
	S-5	25	0				Medium Dense Brown Silty Fine/Medium SAND-Some Rock Fragments-Moist (Fill ?)			
21		0	0	0	0					
15	S-6*	14	0				Medium Dense Yellow Brown Silty Fine/Medium SAND-Some Rock Fragments-Moist			
		8/6"	0	0	0	0	Hit Refusal at 11.5, Converted to Air Hammer Bit (4-inch). Hit soft zone at 14.5. Took split-spoon sample from 14.5 to 16.0, but was Decomposed Gneiss.			
	120/0	0	0	0	0	Could be possible boulder from 11.5 to 14.5 (?)				
	S-7	65	0			VBR	Hard Decomposed Gneiss (poor recovery)			
20/6"		0	0	0	0	BR	∇ At 1530 hrs. 1-15-97			
20							Resumed with Air Hammer again from 16' to 21.5'. Water encountered between 16.5' and 19.5'. Drilled to 22.5 prior to well installation.			
							Hard Gray Gneiss as logged from cuttings.			
25							Bottom of boring at 22.5 feet. Monitoring well was installed to 21.5, as approximately 1' had caved.			
							* Took sample 08SB10S10 from 10 to 11 feet. Sent sample to Katahdin Analytical for 24 hr. turnaround.			



PROJECT NO: 7428	PROJECT NAME: NSB Goss Cove DGI
PROJECT LOCATION: NSB-New London, CT.	DATE DRILLED: 1-14-97
DRILLING COMPANY: Geologic, Inc.	SURFACE ELEVATION: 19.91 Feet
DRILLING METHOD: Hollow Stem Auger	BORING DIAMETER: 8.25 Inches
DRILLING RIG: Truck Mounted, Mobile	GEOLOGIST: S. J. Conti

DEPTH feet	SAMPLE NUMBER	BLOWS/FT.	PID (ppm)				GRAPHIC LOG	USCS/RGD	GEOLOGIC DESCRIPTION Density/Consistency, Hardness, Color	WELL DIAGRAM
			Sample	B. Zone	Borehole	Drill B. Z.				
5	S-1	19	0				SPH	Topsoil-Roots and Silty SAND		
		34	0	0	0	0		Medium Dense Brn Silty SAND-Trace Rock Fragments and Roots-Moist (Fill ?)		
	S-2	20	0					Medium Dense Yellow Brown Silty Fine/Medium SAND		
		18	0	0	0	0		Trace Gravel-Trace Rock Fragments-Moist (Fill ?)		
	S-3	4	0					Medium Dense Orange Brown Fine/Medium SAND		
		18	0	0	0	0		Trace Rock Fragments-Moist		
	S-4*	18	0					Dense Brown Silty SAND (Fill ?)-Trace Rock Frag.		
		120/6	0	0	0	0				
	10									Bottom of Boring at 7.0'. No water observed in the overburden materials. Auger refusal also a 7'
	15									Refusal at 7.0 feet. (Top of Rock)  *Took Sample (08TB1706) from 6 to 7 feet. Sent sample to Katahdin Analytical for 24 hr. turnaround.
20										

**BROWN & ROOT  
ENVIRONMENTAL**

**LOG OF BORING 8TB16**

PROJECT NO: 7428	PROJECT NAME: NSB Goss Cove DGI
PROJECT LOCATION: NSB-New London, CT.	DATE DRILLED: 1-14-97
DRILLING COMPANY: Geologic, Inc.	SURFACE ELEVATION: 15.76 Feet
DRILLING METHOD: Hollow Stem Auger	BORING DIAMETER: 8.25 Inches
DRILLING RIG: Truck Mounted, Mobile	GEOLOGIST: S. J. Conti

DEPTH feet	SAMPLE NUMBER	BLOWS/FT.	PID (ppm)				GRAPHIC LOG	USCS/ROD	GEOLOGIC DESCRIPTION Density/Consistency, Hardness, Color	WELL DIAGRAM	
			Sample	B. Zone	Borehole	Drill B. Z.					
5	S-1	NA	0				SP	Topsoil-Roots and Silty SAND			
		42	0	0	0	0		Medium Dense Brn Silty SAND and Rock Fragments (Gneiss)-Moist (Fill ?)			
	S-2	30	0					BR		Dense Brown Silty Fine/Coarse SAND-Tr. Rock Fragments-Moist (Fill ?)	
		35	0	0	0	0					
	S-3	20	0							BR	Dense Brown Silty Fine/Medium SAND-Some Rock fragments
		22	0	0	0	0					
S-4	17	0				BR	Decomposed Gneiss and Sand to 10.5'				
	59	0	0	0	0						
S-5*	51	0					BR	Hard Gray Gneiss and Sand			
	54	0	0	0	0						
10	S-6	24/6	0					BR	Bottom of Boring at 10.5'. No water observed in the overburden materials.		
		124/0	0	0	0					0	
15						BR			Refusal at 10.5 feet. (Top of Rock)		
20							BR		*Took Sample (08TB1608) from 8 to 10 feet. Also took Duplicate here (DU01). Sent samples to Katahdin Analytical for 24hr. turnaround.		

PROJECT NO: 7428

PROJECT NAME: Goss Cove DGI

PROJECT LOCATION: Goss Cove

DATE DRILLED: 1-15-97

DRILLING COMPANY: GEOLOGIC

SURFACE ELEVATION: Feet

DRILLING METHOD: HSA

BORING DIAMETER: Inches

DRILLING RIG: MOBILE

GEOLOGIST: CONT 1

DEPTH feet	SAMPLE NUMBER	BLOWS/FT. G <sup>1</sup>	PID (ppm)				GRAPHIC LOG	USCS/RQD	GEOLOGIC DESCRIPTION Density/Consistency, Hardness, Color	WELL DIAGRAM
			Sample	B. Zone	Borehole	Drill B. Z.				
0.0	S-1 e	NA 23	.7	0				4" ASPHALT SM DENSE BRN SILTY F/M SAND - TR		
2.0	0830	26 15	.6	0	0	0	SP	ROCK FRAGS. MOIST		
	S-2	8 7	.6					SAME AS ABOVE - MOIST (FIL?)		
4.0	0835	6 7	0	0	0	0				
5	S-3 e	8 7						SP SAME AS ABOVE - MOIST (FIL?)		
6.0	0840	5 6	0	0	0	0				
7.0	S-4 e	16 25	0	0	0	0		TOR @ 7' <sup>TOOK</sup> [08SB9506]		
	0845	100 %						BR CONVERT TO AIR HAMMER @ 7' SET HSA @ 7' (4" Ø BIT)		
10								BR GRAY GNEISS - (QUARTZ, FELDSPAR BIOTITE PARTICLES) DRILLED DRY UNTIL 16.5'		
								BR SAME AS ABOVE		
15								WL 15.5 @ 1030 HRS		
								16.5 16.8 16.5 HIT SAND FILLED FRACTURE AND WATER (= 3" FRACTURE)		
19.0								BR		
20								BOTM @ 19' • TO KATAWIN 1-20E CLOR. VOLCS		

JOB NUMBER:



BROWN & ROOT  
ENVIRONMENTAL

LOG OF BORING 8TB16

PROJECT NO: 7428	PROJECT NAME: NSB GOSS COVE DGT
PROJECT LOCATION: GOSS COVE	DATE DRILLED: 1-14-97
DRILLING COMPANY: GEOLOGIC	SURFACE ELEVATION: Feet
DRILLING METHOD: HSA	BORING DIAMETER: Inches
DRILLING RIG: MOBILE	GEOLOGIST: CONTI

DEPTH feet	SAMPLE NUMBER	BLOWS/FT. "	PID (ppm)				GRAPHIC LOG	USCS/RQD	GEOLOGIC DESCRIPTION Density/Consistency, Hardness, Color	WELL DIAGRAM N/A
			Sample	B. Zone	Borehole	Drill B. Z.				
0.0	S-1	NA	0					TOP 4" TOPSOIL - ROOTS - SILTY SAND		
	e							TOP 1' DUG W/ SHOVEL TO LOOK FOR		
2.0	1330	25/17	0	0	0	0		SPRINKLER SYS LINE		
	S-2	13/17	0					SM M DENSE BRN SILTY SAND AND		
	e							ROCK FRAGS ( GNEISS) - MOIST		
								(FILL)		
4.0	1335	14/21	0	0	0	0				
	S-3	9/11	0					SW DENSE BROWN SILTY F/C SAND		
5	e							TR ROCK FRAGS - MOIST		
6.0	1350	14/8	0	0	0	0		(FILL?)		
	S-4	6/11	0					DENSE BROWN SILTY F/C SAND		
	e	26/33	0	0	0	0		TR ROCK FRAGS - MOIST		
8.0	1400	31/20	0					SAME AS ABV		
	S-5	9/45	0					SP DENSE BROWN SILTY F/M SAND		
	e							SOME ROCK FRAGS		
10	1412	24/120	0	0	0	0	105 BR	HARD GRAY GNEISS & SAND		
	S-6									
12.0	1420									
								REF @ 10.5 (TOP)		
								BOTM @ 10.5		
15										
								TOOK [08TB1608] 8-10'		
								[DUOI] - DUP HERE		
20										
								• TO KATAHDIN FOR CHLOR. VOC'S		
								1-20Z		
								1-20Z DUP		

PROJECT NO: 7428	PROJECT NAME: NSB GOSS COVE OGI
PROJECT LOCATION: GOSS COVE	DATE DRILLED: 1-14-97
DRILLING COMPANY: GEOLOGIC	SURFACE ELEVATION: Feet
DRILLING METHOD: HSA	BORING DIAMETER: Inches
DRILLING RIG: MOBILE	GEOLOGIST: CONTI

DEPTH feet	SAMPLE NUMBER	BLOWS/FT.	PID (ppm)				GRAPHIC LOG	USCS/RQD	GEOLOGIC DESCRIPTION Density/Consistency, Hardness, Color	WELL DIAGRAM N/A
			Sample	B. Zone	Borehole	Drill B. Z.				
0.0	S-1	5 14	0				0.5	TOP 4" TOPSOIL		
2.0	1505	19 15	0	0	0	0		M DENSE BRN SILTY SAND - TR ROCK FRAG & ROOTS - MOIST (FILL?)		
4.0	S-2 1510	9 10	0	0	0	0		M DENSE YELLOW BRN SILTY F/M SAND - TR GRAVEL - TR ROCK FRAGS - MOIST (FILL?)		
5.0	S-3	1 3	0					M DENSE ORANG BRN SILTY SAND		
6.0	1520	8 10	0	0	0	0		(F TO M) TR ROCK FRAG (MOIST)		
7.0	S-4 1525	18 20	0	0	0	0	7.0	SM DENSE BRN SILTY SAND (FILL?) TR ROCK FRAGS	WILL TRY TO HSA FROM 7' TO SEE IF ON BOULDER OR ON BEDROCK.	
10								AUGERED FOR ≈ 10 MIN - COULD NOT GET DEEPER - TOR @ 7' ± BOT @ 7' AUGER REFUSAL		
15								TOOK [08TB1706] 6'-7'		
20								• TO KATANDIN - CHLOR VOC'S 1-2 OZ JAR 1-2 OZ " → MS/MSD		

BROWN & ROOT  
ENVIRONMENTAL

LOG OF BORING 8TB18

Page 1 of 1

PROJECT NO: 7428	PROJECT NAME: GOSS COVE DGI
PROJECT LOCATION: GOSS COVE	DATE DRILLED: 1-14-97
DRILLING COMPANY: GEO LOGIC	SURFACE ELEVATION: Feet
DRILLING METHOD: HSA	BORING DIAMETER: Inches
DRILLING RIG: MOBILE	GEOLOGIST: CONTI

DEPTH feet	SAMPLE NUMBER	BLOWS/FT. #	PID (ppm)				GRAPHIC LOG	USCS/ROD	GEOLOGIC DESCRIPTION Density/Consistency, Hardness, Color	WELL DIAGRAM N/A
			Sample	B. Zone	Borehole	Drill B. Z.				
0.0	S-1	6 13	0					TOP 6" TOPSOIL - TR ROOTS		
2.0	e 1010	32 26	0	0	0	0		SM M DENSE BRN SILTY SAND - MOIST W/ LG 2" PC ROCK @ 1'. (GNEISS)		
4.0	S-2 1020	19 13	0					SM M DENSE BRN SILTY SAND AND RK FRAG - MOIST (FILL) ?		
5.0	S-3 e	8 9	0					SP M. DENSE BRN SILTY SAND AND RK (GNEISS) FRAGS (FILL ?) MOIST		
6.0	1120	11 9	0	0	0	0		SP SAME AS ABV. MOIST		
8.0	S-4 e 1125	18 7 11 16	0					SM M DENSE BRN SILTY SAND - SOME ROCK FRAGS - MOIST		
10.0	S-5 e 1145	13 8 10 9	0					SM SAME AS ABOVE. MOIST		
12.0	S-6 e 1154	17 30 9 13	0					SP DENSE SILTY FTO C SAND - TR ROCK FRAGS - LAST .2 GRAY (GNEISS) TOOK (08TB1812)		
12.7	S-7 e 1200	53 129 12	0				12.7 REF	TOR @ 12.7'		
15.0								BOTM @ 12.7'		
								NO READINGS ON SAMPLE.		
20.0								• TO KATAHDIN FOR CHLORINATED VOCs 1-20Z JAR		

**APPENDIX C**

**MONITORING WELLS DEVELOPMENT RECORDS**





**APPENDIX D**

**LOW-FLOW PURGE DATA SHEETS**



GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NSB NION GOSS COVE LANDFILL Sample ID No.: HNUS24DL  
 Project No.: CTO 275 7428 Sample Location: TANK FARM  
 Sampled By: RS/SC  
 C.O.C. No.: GC COC 03  
 Type of Sample:  
 Low Concentration  
 High Concentration

Domestic Well Data  
 Monitoring Well Data  
 Other Well Type: \_\_\_\_\_  
 QA Sample Type: \_\_\_\_\_

**SAMPLING DATA:**

Date: <u>1/17/97</u>	Color	pH	S.O.	Temp.	Turbidity	DO	Salinity	Other
Time: <u>0820</u>	Visual	Standard	mg/l	Degrees C	<u>NA</u>	<u>NA</u>	%	NA
Method: <u>PERISTALTIC PUMP</u>	<u>GRAY</u>							

**PURGE DATA:**

Date:	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	Other
Method:	Initial							
Monitor Reading (ppm):	1							
Well Casing Diameter & Material	2							
Type:	3							
Total Well Depth (PD): <u>14.40</u>								
Static Water Level (WL): <u>10.80</u>								
One Casing Volume (gal/L):								
Start Purge (hrs):								
End Purge (hrs):								
Total Purge Time (min):								
Total Vol. Purged (gal/L):								

**SAMPLE COLLECTION INFORMATION:**

Analysis	Preservative	Container Requirements	Collected
<u>TCL CHLORINATED VOC</u>	<u>HCL, 4°C</u>	<u>40 ML VIALS (3X)</u>	<input checked="" type="checkbox"/>

**OBSERVATIONS / NOTES:**

DNAPL SAMPLING  
SAMPLED AT 1.5" OFF BOTTOM

Circle if Applicable:

<u>MS/MSD</u>	Duplicate ID No.: <u>0402</u>	Signature(s): <u>RS/SC</u>
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# GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NSB NION GOSS COVE LANDFILL  
Project No.: CTO 275 7428

Sample ID No.: HNUS23 DL  
Sample Location: TANK FARM  
Sampled By: RS/SC  
C.O.C. No.: GC COC 03

- Domestic Well Data
- Monitoring Well Data
- Other Well Type: \_\_\_\_\_
- QA Sample Type: \_\_\_\_\_

- Type of Sample:
- Low Concentration
  - High Concentration

### SAMPLING DATA:

Date: <u>1.17.97</u>	Color	pH	S.G.	Temp.	Turbidity	DO	Salinity	Other
Time: <u>1340</u>	Visual	Standard	mS/cm	Degrees C	<u>NA</u>	<u>NA</u>	%	NA
Method: <u>PERISTALTIC PUMP</u>	<u>CLEAR</u>							

### PURGE DATA:

Date:	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	Other
Method:	Initial							
Monitor Reading (ppm):	1							
Well Casing Diameter & Material	2							
Type:	3							
Total Well Depth (PD): <u>16.88</u>								
Static Water Level (WL): <u>6.53</u>								
One Casing Volume (gal.):								
Start Purge (hrs):								
End Purge (hrs):								
Total Purge Time (min):								
Total Vol. Purged (gal.):								

### SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
<u>TCL CHLORINATED VOC</u>	<u>HCL,</u> <u>4°C</u>	<u>40 ML VIALS (3X)</u>	

### OBSERVATIONS / NOTES:

DNAPL SAMPLING

Circle if Applicable:

MS/MSD	Duplicate ID No.:	Signature(s): <u>Kel Sh</u>
--------	-------------------	--------------------------------





# GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NSB NION GOSS COVE LANDFILL  
Project No.: CTO 275 7428

Sample ID No.: HNUS 22 DL  
Sample Location: GOSS COVE  
Sampled By: RS SC  
C.O.C. No.: GC COC 04

- Domestic Well Data
- Monitoring Well Data
- Other Well Type: \_\_\_\_\_
- QA Sample Type: \_\_\_\_\_

- Type of Sample:
- Low Concentration
- High Concentration

### SAMPLING DATA:

Date: <u>1.19.97</u>	Color Visual	pH Standard	S.O. mS/cm	Temp. Degrees C	Turbidity NTU	DO mg/L	Salinity %	Other NA
Time: <u>0835</u>	<u>CLEAR</u>							
Method: <u>PERISTALTIC PUMP</u>								

### PURGE DATA:

Date:	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	Other
Method:	Initial							
Monitor Reading (ppm):	1							
Well Casing Diameter & Material Type:	2							
	3							
Total Well Depth (TD): <u>20.5'</u>								
Static Water Level (WL): <u>10.00'</u>								
One Casing Volume (gal):								
Start Purge (hrs):								
End Purge (hrs):								
Total Purge Time (min):								
Total Vol. Purged (gal):								

### SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
<u>TCL CHLORINATED VOC</u>	<u>HCL, 4°C</u>	<u>40 ML VIALS (3X)</u>	

### OBSERVATIONS / NOTES:

DNAPL SAMPLING

Circle if Applicable:	Signature(s):
<input type="checkbox"/> MS/MSD <input type="checkbox"/> Duplicate ID No.: _____	<u>[Signature]</u>





# GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NSB NION GOSS COVE LANDFILL  
Project No.: CTO 275 7428

Sample ID No.: 08G-WWS DL  
Sample Location: GOSS COVE  
Sampled By: RS - SC  
C.O.C. No.: GC COC 04  
Type of Sample:  
 Low Concentration  
 High Concentration

- Domestic Well Data
- Monitoring Well Data
- Other Well Type: \_\_\_\_\_
- QA Sample Type: \_\_\_\_\_

### SAMPLING DATA:

Date: <u>1-18-97</u>	Color	pH	S.C.	Temp.	Turbidity	DO	Salinity	Other
Time: <u>0845</u>	Visual	Standard	mS/cm	Degrees C	<u>NA</u>	<u>NA</u>	%	NA
Method: <u>PERISTALTIC PUMP</u>	<u>CLEAR</u>							

### PURGE DATA:

Date:	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	Other
Method:	Initial							
Monitor Reading (ppm):	1							
Well Casing Diameter & Material	2							
Type:	3							
Total Well Depth (TD): <u>21.5</u>								
Static Water Level (WL): <u>15.53</u>								
One Casing Volume (gal):								
Start Purge (hrs):								
End Purge (hrs):								
Total Purge Time (min):								
Total Vol. Purged (gal/L):								

### SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
<u>TCL CHLORINATED VOC</u>	<u>HCL, 4°C</u>	<u>40 ML VIALS (3X)</u>	<input checked="" type="checkbox"/>

### OBSERVATIONS / NOTES:

DNAPL SAMPLING  
MS/MSD TAKEN

Circle if Applicable:

MS/MSD

Duplicate ID No.: \_\_\_\_\_

Signature(s):

RS-SC





# GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NSB NION GOSS COVE LANDFILL  
Project No.: CTO 275 7428

Sample ID No.: 08GW95 DL  
Sample Location: GOSS COVE  
Sampled By: KS SC  
C.O.C. No.: G-C COC 04

- Domestic Well Data
- Monitoring Well Data
- Other Well Type: \_\_\_\_\_
- QA Sample Type: \_\_\_\_\_

- Type of Sample:
- Low Concentration
  - High Concentration

### SAMPLING DATA:

Date: <u>1.18.97</u>	Color Visual	pH Standard	S.G. mS/cm	Temp. Degrees C	Turbidity <u>NA</u>	DO mg/L	Salinity %	Other NA
Time: <u>1315</u>	Method: <u>PERISTALTIC PUMP LT BRN</u>							

### PURGE DATA:

Date:	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	Other
Method:	Initial							
Monitor Reading (ppm):	1							
Well Casing Diameter & Material Type:	2							
	3							
Total Well Depth (FD): <u>19.00</u>	<b>NA</b>							
Static Water Level (WL): <u>14.95</u>								
One Casing Volume (gal.):								
Start Purge (hrs):								
End Purge (hrs):								
Total Purge Time (min):								
Total Vol. Purged (gal.):								

### SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
<u>TCL CHLORINATED VOC</u>	<u>HCL, 4°C</u>	<u>40 ML VIALS (3X)</u>	

### OBSERVATIONS / NOTES:

DNAPL SAMPLING

### Circle if Applicable:

MS/MSD <u>  </u>	Duplicate ID No.: <u>  </u>
---------------------	--------------------------------

Signature(s):  
K-S





# GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NSB NION GOSS COVE LANDFILL Sample ID No.: 08GW80 DL  
 Project No.: ETO 275 7428 Sample Location: GOSS COVE  
 Sampled By: RS SC  
 C.O.C. No.: GC COC 04  
 Type of Sample:  
 Domestic Well Data  
 Monitoring Well Data  
 Other Well Type: \_\_\_\_\_  
 QA Sample Type: \_\_\_\_\_  
 Low Concentration  
 High Concentration

### SAMPLING DATA:

Date:	Color	pH	S.C.	Temp.	Turbidity	DO	Salinity	Other
Time:	Visual	Standard	mS/cm	Degrees C	NTU	mg/L	%	NA
<u>1.19.97</u>					<u>NA</u>			
<u>1355</u>								
Method: <u>PERISTALTIC PUMP</u> <u>GRAY</u>								

### PURGE DATA:

Date:	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	Other
Method:	Initial							
	1							
Monitor Reading (ppm):	2							
Well Casing Diameter & Material	3							
Type:								
Total Well Depth (TD): <u>80'</u>								
Static Water Level (WL): <u>16.80</u>								
One Casing Volume (gal):								
Start Purge (hrs):								
End Purge (hrs):								
Total Purge Time (min):								
Total Vol. Purged (gal):								

### SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
<u>TCL CHLORINATED VOC</u>	<u>HCL,</u> <u>4°C</u>	<u>40 ML VIALS (3X)</u>	

OBSERVATIONS / NOTES:  
DNAPL SAMPLING

Circle if Applicable: MS/MSD  Duplicate ID No.: \_\_\_\_\_ Signature(s): [Signature]



# LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME:  
PROJECT NUMBER:

NSB NLON, Goss Cove Landfill DGI  
CTO 275 - 7428

WELL ID.: 086-W80 03  
DATE: 1.19.97

Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min.)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	ORP/Eh (mV)	Sal. (%)	Comments
1405	16.80	250	6.67	2.360	85	3.54	9.8	-15.6	1.77	LT CLOUDY / SLIGHT ORGANIC
1410	20.70	250	6.81	2.051	51	2.21	10.7	-16.5	1.46	" "
1415	-	200	7.17	1.703	64	2.20	10.2	-29.0	1.22	" "
1420	22.63	"	7.09	1.485	45	1.65	10.0	-24.0	1.06	V.SL. CLOUDY
1425	-	125	7.17	1.356	39	1.78	9.50	-29.6	.98	"
1430	22.89	"	7.14	1.291	38	1.22	9.15	-28.2	.94	"
1435	-	"	7.18	1.217	46	1.39	9.08	-31.5	.89	"
1440	23.14	"	7.25	1.086	53	1.44	8.90	-37.4	.78	"
1445	-	"	7.31	.900	65	1.85	9.01	-38.7	.64	ALMOST CLEAR
1450	-	"	7.27	.688	61	1.54	9.09	-29.8	.48	"
1500	23.16	"	7.21	.650	65	1.65	8.99	-15.7	.39	"
[ SAMPLED AT 1505 HRS ]										

SIGNATURE(S): [Signature]

Fe<sup>2+</sup> = NO

TOTAL ALKALINITY = 110 mg/L

\* 7.5 ppm in Hsp of Zip PAGE 1 OF 1  
Lock Bag of water taken  
from Bottom of Well  
(After taking DNAPL, PRIOR TO  
Purging)



# GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NSB NION GOSS COVE LANDFILL Sample ID No.: 08GWBS 01  
 Project No.: CTO 275 7928 Sample Location: GOSS COVE  
 Sampled By: RS SC  
 C.O.C. No.: GC COC 04  
 Type of Sample:  
 Domestic Well Data  
 Monitoring Well Data  
 Other Well Type: \_\_\_\_\_  
 QA Sample Type: \_\_\_\_\_  
 Low Concentration  
 High Concentration

**SAMPLING DATA:**

Date: <u>1.14.97</u>	Color	pH	S.C.	Temp.	Turbidity	DO	Salinity	Other
Time: <u>1530</u>	Visual	Standard	mS/cm	Degrees C	<u>NA</u>	<u>NA</u>	%	NA
Method: <u>PERISTALTIC PUMP</u>	<u>CLEAR</u>							

**PURGE DATA:**

Date:	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	Other
Method:	Initial							
Monitor Reading (ppm):	1							
Well Casing Diameter & Material	2							
Type:	3							
Total Well Depth (TD): <u>16.40</u>								
Static Water Level (W/L): <u>15.32</u>								
One Casing Volume (gal):								
Start Purge (hrs):								
End Purge (hrs):								
Total Purge Time (min):								
Total Vol. Purged (gal/L):								

**SAMPLE COLLECTION INFORMATION:**

Analysis	Preservative	Container Requirements	Collected
<u>TCL CHLORINATED VOC</u>	<u>HCL, 4°C</u>	<u>40 ML VIALS (3X)</u>	

**OBSERVATIONS / NOTES:**  
DNAPL SAMPLING

Circle if Applicable:

MS/MSD	Duplicate ID No.:	Signature(s):
<u>    </u>	<u>    </u>	<u>RS/SC</u>



**APPENDIX E**

**GROUNDWATER SAMPLE LOG SHEETS**



# Brown & Root Environmental

## MULTIPLE SAMPLE LOG SHEET

- 
- SURFACE SOIL
- 
- 
- SUBSURFACE SOIL
- 
- 
- SEDIMENT

- 
- LAGOON/POND
- 
- 
- OTHER

SAMPLER(S) SIGNATURE SJ ConterPROJECT NAME: NSB GOSS COVEAREA DESIGNATION GOSS COVEPROJECT NUMBER: 7428

Sample No.	SAMPLE METHOD	DEPTH (FT)	DATE	TIME	SAMPLED BY	CONCENTRATION (L) LOW (H) HIGH	(C) GRAB (C) COMPOSITE	ANALYSES				No. OF CONT. TOTAL	SOIL DESCRIPTION
								40 ml VOA	CHLOR. VOC'S	202 GRABS	CHLOR. VOC'S		
08TB01	DF	-	1-14-97	0800	KS	L	G	2				2	TRIP BLANK
08TB1812	SS	12-12.7	"	1200	KS/SC	"	"	-	1			1	SILTY F/C SAND - SOME RK
08TB1608	"	8-10	"	1412	"	"	"	-	1			1	SILTY F/M SAND - " "
DU01	"	8-10	"	0000	"	"	"	-	1			1	DUP FOR [08TB1608]
08TB1706	"	6-7'	"	1525	"	"	"	-	2			2	SILTY SAND (DO MS/MSD)
08RB01	"	-	"	0845	"	"	"	2				2	RINSE BLANK OVER TROWEL
08TB02	DF	-	1-15-97	0730	KS	"	"	2	-			2	
08SB9506	SS	6-7'	"	0845	KS/SC	"	"	-	1			1	BEN SILTY SAND - MOIST
08SB10S10	"	10-11.5	"	1345	"	"	"	-	1			1	" " " "
08RB02	DF	-	"	1645	"	"	"	2	-			2	RB OVER SPUT SPOON

REMARKS: DF - Direct Fill  
SS - sput spoonLAB: KATAHDINCOC NO: CG-COC-01 1/14/97  
CG-COC-02 1/15/97



# Brown & Root Environmental

## MULTIPLE SAMPLE LOG SHEET

- SURFACE SOIL  
 SUBSURFACE SOIL  
 SEDIMENT
- LAGOON/POND  
 OTHER

SAMPLER(S) SIGNATURE SJ Conter

PROJECT NAME: NSB GOSS COVE  
 PROJECT NUMBER: 7428

AREA DESIGNATION GOSS COVE

Sample No.	SAMPLE METHOD	DEPTH (FT)	DATE	TIME	SAMPLED BY	CONCENTRATION (L) / LOW (H) / HIGH	(G) GRAB (C) COMPOSITE	ANALYSES				No. OF CONT. TOTAL	SOIL DESCRIPTION
								90 ml VOA	CHLOR. VOC'S	202 GAS'S	CHLOR VOC'S		
08TB01	DF	-	1-14-97	0800	KS	L	G	2				2	TRIP BLANK
08TB1812	SS	12-12.7	"	1200	KS/SC	"	"	-	1			1	SILTY F/C SAND - SOME RK
08TB1608	"	8-10	"	1412	"	"	"	-	1			1	SILTY F/M SAND - " "
DU01	"	8-10	"	0000	"	"	"	-	1			1	DUP FOR [08TB1608]
08TB1706	"	6-7'	"	1525	"	"	"	-	2			2	SILTY SAND (DO MS/MSD)
08RB01	"	-	"	0845	"	"	"	2				2	RINSE BLANK OVER TROWEL
08TB02	DF	-	1-15-97	0730	KS	"	"	2	-			2	
08SB9506	SS	6-7'	"	0845	KS/SC	"	"	-	1			1	BEN SILTY SAND - MOIST
08SB10S10	"	10-11.5	"	1345	"	"	"	-	1			1	" " " "
08RB02	DF	-	"	1645	"	"	"	2	-			2	RB OVER SPUT SPOON

REMARKS: DF - Direct Fill  
 S.S - sput spoon

LAB: KATAHDIN

COC NO: CG-COC-01 1/14/97  
 CG-COC-02 1/15/97



# Brown & Root Environmental

## MULTIPLE SAMPLE LOG SHEET

- SURFACE SOIL
- SUBSURFACE SOIL
- SEDIMENT
- LAGOON/POND
- OTHER

SAMPLER(S) SIGNATURE Sj Conto

PROJECT NAME: NSB Goss Cove  
 PROJECT NUMBER: 7428

AREA DESIGNATION Goss Cove

Sample No.	SAMPLE METHOD	DEPTH (FT)	DATE	TIME	SAMPLED BY	CONCENTRATION (L)LOW (H)HIGH	(G)GRAB (C)COMPOSITE	ANALYSES						No. OF CONT. TOTAL	SOIL DESCRIPTION	
								40 ml VOA	CHLOR. VOCs	2 OZ GLASS	CHLOR. VOCs					
08TB01	DF	-	1-14-97	0800	KS	L	G	2							2	TRIP BLANK
08TB1812	SS	12-12.7	"	1200	Ks/sc	"	"	-	1						1	SILTY F/C SAND - SOME BK
08TB1608	"	8-10	"	1412	"	"	"	-	1						1	SILTY F/M SAND - " "
DU01	"	8-10	"	0000	"	"	"	-	1						1	DUP FOR [08TB1608]
08TB1706	"	6-7'	"	1525	"	"	"	-	2						2	SILTY SAND (DO MS/MSD)
08RB01	"	-	"	0845	"	"	"	2							2	RINSE BLANK OVER TROWEL
08TB02	DF	-	1-15-97	0730	KS	"	"	2	-						2	
08SB9506	SS	6-7'	"	0845	Ks/sc	"	"	-	1						1	BEN SILTY SAND - MOIST
08SB10S10	"	10-11.5	"	1345	"	"	"	-	1						1	" " " "
08RB02	DF	-	"	1645	"	"	"	2	-						2	RB OVER SPLIT SPOON

REMARKS: DF - Direct Fill  
 S.S - split spoon

LAB: KATAHDIN

COC NO: CG-COC-01 1/14/97  
 CG-COC-02 1/15/97



# Brown & Root Environmental

## MULTIPLE SAMPLE LOG SHEET

- SURFACE SOIL  
 SUBSURFACE SOIL  
 SEDIMENT

- LAGOON/POND  
 OTHER

SAMPLER(S) SIGNATURE SJ ConterPROJECT NAME: NSB Goss CoveAREA DESIGNATION Goss CovePROJECT NUMBER: 7428

Sample No.	SAMPLE METHOD	DEPTH (FT)	DATE	TIME	SAMPLED BY	CONCENTRATION (L) / LOW (H) / HIGH	(G) GRAB (C) COMPOSITE	ANALYSES				No. OF CONT. TOTAL	SOIL DESCRIPTION
								40 ml VOA	CHLOR. VOCs	202 GLASS	CHLOR VOCs		
08TB01	DF	-	1-14-97	0800	KS	L	G	2				2	TRIP BLANK
08TB1812	SS	12-12.7	"	1200	KS/SC	"	"	-	1			1	SILTY F/C SAND - SOME RK
08TB1608	"	8-10	"	1412	"	"	"	-	1			1	SILTY F/M SAND - " "
DU01	"	8-10	"	0000	"	"	"	-	1			1	DUP FOR [08TB1608]
08TB1706	"	6-7'	"	1525	"	"	"	-	2			2	SILTY SAND (DO MS/MSD)
08RB01	"	-	"	0845	"	"	"	2				2	RINSE BLANK OVER TROWEL
08TB02	DF	-	1-15-97	0730	KS	"	"	2	-			2	
08SB9506	SS	6-7'	"	0845	KS/SC	"	"	-	1			1	BEN SILTY SAND - MOIST
08SB10S10	"	10-11.5	"	1345	"	"	"	-	1			1	" " " "
08RB02	DF	-	"	1645	"	"	"	2	-			2	RB OVER SPUT SPOON

REMARKS: DF - Direct Fill  
SS - split spoon

LAB: KATAHDIN

COC NO: CG-COC-01 1/14/97  
CG-COC-02 1/15/97

## **APPENDIX F**

### **LABORATORY DATA SHEETS**

- F.1 Soil Samples VOCs**
- F.2 Unpurged Groundwater Samples VOCs**
- F.3 Purged Groundwater Samples VOCs**
- F.4 Purged Groundwater Samples Attenuation Parameters**

**APPENDIX F.1**

**Soil Samples VOCs Data Shets**

CTO 275 - NSB NEW LONDON  
 SOIL DATA  
 KATAHDIN  
 SDG: GTN001

SAMPLE NUMBER:	08SB10S10	08SB9S06	08TB1608	08TB1706	08TB1812
SAMPLE DATE:	01/15/97	01/15/97	01/14/97	01/14/97	01/14/97
LABORATORY ID:	WN0113-4	WN0113-3	WN0104-4	WN0104-6	WN0104-3
QC_TYPE:	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
% SOLIDS:	88.3 %	94.4 %	95.0 %	91.2 %	93.5 %

	RESULT	QUAL	UNITS												
<b>VOLATILES</b>															
1,1,1-TRICHLOROETHANE	11	U	UG/KG												
1,1,2,2-TETRACHLOROETHANE	11	U	UG/KG												
1,1,2-TRICHLOROETHANE	11	U	UG/KG												
1,1-DICHLOROETHANE	11	U	UG/KG												
1,1-DICHLOROETHENE	11	U	UG/KG												
1,2-DICHLOROETHANE	11	U	UG/KG												
1,2-DICHLOROPROPANE	11	U	UG/KG												
2-BUTANONE	11	U	UG/KG												
2-HEXANONE	11	U	UG/KG												
4-METHYL-2-PENTANONE	11	U	UG/KG												
ACETONE	11	U	UG/KG												
BENZENE	11	U	UG/KG												
BROMODICHLOROMETHANE	11	U	UG/KG												
BROMOFORM	11	U	UG/KG												
BROMOMETHANE	11	U	UG/KG												
CARBON DISULFIDE	11	U	UG/KG												
CARBON TETRACHLORIDE	11	U	UG/KG												
CHLOROBENZENE	11	U	UG/KG												
CHLOROETHANE	11	U	UG/KG												
CHLOROFORM	11	U	UG/KG												
CHLOROMETHANE	11	U	UG/KG												
CIS-1,3-DICHLOROPROPENE	11	U	UG/KG												
DIBROMOCHLOROMETHANE	11	U	UG/KG												
ETHYLBENZENE	11	U	UG/KG												
METHYLENE CHLORIDE	11	U	UG/KG	11	U	UG/KG	12	U	UG/KG	11	U	UG/KG	12	U	UG/KG
STYRENE	11	U	UG/KG												
TETRACHLOROETHENE	86	U	UG/KG	29	U	UG/KG	5	J	UG/KG	9	J	UG/KG	8	J	UG/KG
TOLUENE	11	U	UG/KG												
TOTAL 1,2-DICHLOROETHENE	11	U	UG/KG												
TRANS-1,3-DICHLOROPROPENE	11	U	UG/KG												
TRICHLOROETHENE	11	U	UG/KG												

CTO 275 - NSB NEW LONDON  
 SOIL DATA  
 KATAHDIN  
 SDG: GTN001

	08SB10S10	08SB9S06	08TB1608	08TB1706	08TB1812
SAMPLE NUMBER:	08SB10S10	08SB9S06	08TB1608	08TB1706	08TB1812
SAMPLE DATE:	01/15/97	01/15/97	01/14/97	01/14/97	01/14/97
LABORATORY ID:	WN0113-4	WN0113-3	WN0104-4	WN0104-6	WN0104-3
QC_TYPE:	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
% SOLIDS:	88.3 %	94.4 %	95.0 %	91.2 %	93.5 %
	RESULT QUAL UNITS				
<b>VOLATILES</b>					
VINYL CHLORIDE	11 U UG/KG				
XYLENES, TOTAL	11 U UG/KG				





**APPENDIX F.2**

**Unpurged Groundwater Samples VOCs Data Sheets**

CTO 275 - NSB NEW LONDON  
 WATER DATA  
 KATAHDIN  
 SDG: GTN001

SAMPLE NUMBER:	08GW10S DL	08GW8D DL	08GW8S DL	08GW9S DL	HNUS22 DL
SAMPLE DATE:	01/18/97	01/19/97	01/19/97	01/18/97	01/19/97
LABORATORY ID:	WN0138-2	WN0138-5	WN0138-6	WN0138-3	WN0138-4
QC_TYPE:	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
% SOLIDS:	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %

	RESULT QUAL UNITS			RESULT QUAL UNITS			RESULT QUAL UNITS			RESULT QUAL UNITS			RESULT QUAL UNITS		
<b>VOLATILES</b>															
1,1,1-TRICHLOROETHANE	10	U	UG/L												
1,1,2,2-TETRACHLOROETHANE	10	U	UG/L												
1,1,2-TRICHLOROETHANE	10	U	UG/L												
1,1-DICHLOROETHANE	10	U	UG/L												
1,1-DICHLOROETHENE	10	U	UG/L												
1,2-DICHLOROETHANE	10	U	UG/L												
1,2-DICHLOROPROPANE	10	U	UG/L												
2-BUTANONE	10	U	UG/L												
2-HEXANONE	10	U	UG/L												
4-METHYL-2-PENTANONE	10	U	UG/L												
ACETONE	10	U	UG/L												
BENZENE	10	U	UG/L												
BROMODICHLOROMETHANE	10	U	UG/L												
BROMOFORM	10	U	UG/L												
BROMOMETHANE	10	U	UG/L												
CARBON DISULFIDE	10	U	UG/L												
CARBON TETRACHLORIDE	10	U	UG/L												
CHLOROENZENE	10	U	UG/L												
CHLOROETHANE	10	U	UG/L												
CHLOROFORM	10	U	UG/L												
CHLOROMETHANE	10	U	UG/L												
CIS-1,3-DICHLOROPROPENE	10	U	UG/L												
DIBROMOCHLOROMETHANE	10	U	UG/L												
ETHYLBENZENE	10	U	UG/L												
METHYLENE CHLORIDE	10	U	UG/L												
STYRENE	10	U	UG/L												
TETRACHLOROETHENE	1100		UG/L	120		UG/L	29		UG/L	2500		UG/L	10	U	UG/L
TOLUENE	10	U	UG/L	10	U	UG/L	10	U	UG/L	20	U	UG/L	10	U	UG/L
TOTAL 1,2-DICHLOROETHENE	10	U	UG/L	1	J	UG/L	10	U	UG/L	10	U	UG/L	10	U	UG/L
TRANS-1,3-DICHLOROPROPENE	10	U	UG/L												
TRICHLOROETHENE	10	U	UG/L	25		UG/L	10	U	UG/L	10	U	UG/L	10	U	UG/L

CTO 275 - NSB NEW LONDON  
 WATER DATA  
 KATAHDIN  
 SDG: GTN001

	08GW10S DL	08GW8D DL	08GW8S DL	08GW9S DL	HNUS22 DL
SAMPLE NUMBER:	08GW10S DL	08GW8D DL	08GW8S DL	08GW9S DL	HNUS22 DL
SAMPLE DATE:	01/18/97	01/19/97	01/19/97	01/18/97	01/19/97
LABORATORY ID:	WN0138-2	WN0138-5	WN0138-6	WN0138-3	WN0138-4
QC_TYPE:	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
% SOLIDS:	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %
	RESULT QUAL UNITS				
<b>VOLATILES</b>					
VINYL CHLORIDE	10 U UG/L				
XYLENES, TOTAL	10 U UG/L				



CTO 275 - NSB NEW LONDON  
 WATER DATA  
 KATAHDIN  
 SDG: GTN001

SAMPLE NUMBER:  
 SAMPLE DATE:  
 LABORATORY ID:  
 QC\_TYPE:  
 % SOLIDS:

HNUS23 DL  
 01/17/97  
 WN0126-4  
 NORMAL  
 0.0 %

HNUS24 DL  
 01/17/97  
 WN0126-3  
 NORMAL  
 0.0 %

100.0 %

100.0 %

100.0 %

	RESULT QUAL UNITS			RESULT QUAL UNITS			RESULT QUAL UNITS			RESULT QUAL UNITS			RESULT QUAL UNITS		
<b>VOLATILES</b>															
VINYL CHLORIDE	10	U	UG/L	10	U	UG/L									
XYLENES, TOTAL	11		UG/L	3	J	UG/L									

**APPENDIX F.3**

**Purged Groundwater Samples VOCs Data Sheets**

CTO 275 - NSB NEW LONDON  
 WATER DATA  
 KATAHDIN  
 SDG: GTN001

SAMPLE NUMBER:	08GW10S 01	08GW8D 03	08GW8S 03	08GW9S 01	08RB01
SAMPLE DATE:	01/18/97	01/18/97	01/19/97	01/18/97	01/14/97
LABORATORY ID:	WN0138-9	WN0138-12	WN0138-13	WN0138-10	WN0104-2
QC_TYPE:	NORMAL	NORMAL	NORMAL	NORMAL	RINSE BLANK
% SOLIDS:	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %

	RESULT QUAL UNITS			RESULT QUAL UNITS			RESULT QUAL UNITS			RESULT QUAL UNITS			RESULT QUAL UNITS		
<b>VOLATILES</b>															
1,1,1-TRICHLOROETHANE	10	U	UG/L												
1,1,2,2-TETRACHLOROETHANE	10	U	UG/L												
1,1,2-TRICHLOROETHANE	10	U	UG/L												
1,1-DICHLOROETHANE	10	U	UG/L												
1,1-DICHLOROETHENE	10	U	UG/L												
1,2-DICHLOROETHANE	10	U	UG/L												
1,2-DICHLOROPROPANE	10	U	UG/L												
2-BUTANONE	10	U	UG/L												
2-HEXANONE	10	U	UG/L												
4-METHYL-2-PENTANONE	10	U	UG/L												
ACETONE	10	U	UG/L												
BENZENE	10	U	UG/L												
BROMODICHLOROMETHANE	10	U	UG/L												
BROMOFORM	10	U	UG/L												
BROMOMETHANE	10	U	UG/L												
CARBON DISULFIDE	10	U	UG/L												
CARBON TETRACHLORIDE	10	U	UG/L												
CHLOROETHANE	10	U	UG/L												
CHLOROETHENE	10	U	UG/L												
CHLOROFORM	10	U	UG/L												
CHLOROMETHANE	10	U	UG/L												
CIS-1,3-DICHLOROPROPENE	10	U	UG/L												
DIBROMOCHLOROMETHANE	10	U	UG/L												
ETHYLBENZENE	10	U	UG/L												
METHYLENE CHLORIDE	10	U	UG/L												
STYRENE	10	U	UG/L												
TETRACHLOROETHENE	770		UG/L	1900		UG/L	24		UG/L	1800		UG/L	10	U	UG/L
TOLUENE	10	U	UG/L	3	J	UG/L									
TOTAL 1,2-DICHLOROETHENE	10	U	UG/L												
TRANS-1,3-DICHLOROPROPENE	10	U	UG/L												
TRICHLOROETHENE	10	U	UG/L	3	J	UG/L	10	U	UG/L	10	U	UG/L	10	U	UG/L

CTO 275 - NSB NEW LONDON  
 WATER DATA  
 KATAHDIN  
 SDG: GTN001

	08GW10S 01	08GW8D 03	08GW8S 03	08GW9S 01	08RB01
SAMPLE NUMBER:	08GW10S 01	08GW8D 03	08GW8S 03	08GW9S 01	08RB01
SAMPLE DATE:	01/18/97	01/18/97	01/19/97	01/18/97	01/14/97
LABORATORY ID:	WN0138-9	WN0138-12	WN0138-13	WN0138-10	WN0104-2
QC_TYPE:	NORMAL	NORMAL	NORMAL	NORMAL	RINSE BLANK
% SOLIDS:	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %
	RESULT QUAL UNITS				
<b>VOLATILES</b>					
VINYL CHLORIDE	10 U UG/L				
XYLENES, TOTAL	10 U UG/L				

CTO 275 - NSB NEW LONDON  
 WATER DATA  
 KATAHDIN  
 SDG: GTN001

SAMPLE NUMBER:	08RB02	08TB01	08TB02	08TB03	08TB04
SAMPLE DATE:	01/15/97	01/14/97	01/15/97	01/17/97	01/18/97
LABORATORY ID:	WN0113-2	WN0104-1	WN0113-1	WN0126-1	WN0138-1
QC_TYPE:	RINSE BLANK	TRIP BLANK	TRIP BLANK	TRIP BLANK	TRIP BLANK
% SOLIDS:	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %

	RESULT QUAL UNITS			RESULT QUAL UNITS			RESULT QUAL UNITS			RESULT QUAL UNITS			RESULT QUAL UNITS		
<b>VOLATILES</b>															
1,1,1-TRICHLOROETHANE	10	U	UG/L												
1,1,2,2-TETRACHLOROETHANE	10	U	UG/L												
1,1,2-TRICHLOROETHANE	10	U	UG/L												
1,1-DICHLOROETHANE	10	U	UG/L												
1,1-DICHLOROETHENE	10	U	UG/L												
1,2-DICHLOROETHANE	10	U	UG/L												
1,2-DICHLOROPROPANE	10	U	UG/L												
2-BUTANONE	10	U	UG/L												
2-HEXANONE	10	U	UG/L												
4-METHYL-2-PENTANONE	10	U	UG/L	10	U	UG/L	10	U	UG/L	6	J	UG/L	10	U	UG/L
ACETONE	11		UG/L	10	U	UG/L	13	U	UG/L	21		UG/L	11		UG/L
BENZENE	10	U	UG/L												
BROMODICHLOROMETHANE	10	U	UG/L												
BROMOFORM	10	U	UG/L												
BROMOMETHANE	10	U	UG/L												
CARBON DISULFIDE	10	U	UG/L												
CARBON TETRACHLORIDE	10	U	UG/L												
CHLOROBENZENE	10	U	UG/L												
CHLOROETHANE	10	U	UG/L												
CHLOROFORM	10	U	UG/L												
CHLOROMETHANE	10	U	UG/L												
CIS-1,3-DICHLOROPROPENE	10	U	UG/L												
DIBROMOCHLOROMETHANE	10	U	UG/L												
ETHYLBENZENE	10	U	UG/L												
METHYLENE CHLORIDE	10	U	UG/L												
STYRENE	10	U	UG/L												
TETRACHLOROETHENE	10	U	UG/L												
TOLUENE	8	J	UG/L	3	J	UG/L	9	J	UG/L	3	J	UG/L	3	J	UG/L
TOTAL 1,2-DICHLOROETHENE	10	U	UG/L												
TRANS-1,3-DICHLOROPROPENE	10	U	UG/L												
TRICHLOROETHENE	10	U	UG/L												

CTO 275 - NSB NEW LONDON  
 WATER DATA  
 KATAHDIN  
 SDG: GTN001

	08RB02	08TB01	08TB02	08TB03	08TB04
SAMPLE NUMBER:	08RB02	08TB01	08TB02	08TB03	08TB04
SAMPLE DATE:	01/15/97	01/14/97	01/15/97	01/17/97	01/18/97
LABORATORY ID:	WN0113-2	WN0104-1	WN0113-1	WN0126-1	WN0138-1
QC_TYPE:	RINSE BLANK	TRIP BLANK	TRIP BLANK	TRIP BLANK	TRIP BLANK
% SOLIDS:	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %
	<b>RESULT QUAL UNITS</b>				
<b>VOLATILES</b>					
VINYL CHLORIDE	10 U UG/L				
XYLENES, TOTAL	10 U UG/L				

CTO 275 - NSB NEW LONDON  
 WATER DATA  
 KATAHDIN  
 SDG: GTN001

SAMPLE NUMBER:	DU02	DU03	HNUS22 02	HNUS23 02	HNUS24 02
SAMPLE DATE:	01/17/97	01/17/97	01/19/97	01/17/97	01/17/97
LABORATORY ID:	WN0126-2	WN0126-5	WN0138-11	WN0126-7	WN0126-6
QC_TYPE:	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
% SOLIDS:	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %

	RESULT QUAL UNITS			RESULT QUAL UNITS			RESULT QUAL UNITS			RESULT QUAL UNITS			RESULT QUAL UNITS		
<b>VOLATILES</b>															
1,1,1-TRICHLOROETHANE	10	U	UG/L	3	J	UG/L	10	U	UG/L	3	J	UG/L	10	U	UG/L
1,1,2,2-TETRACHLOROETHANE	10	U	UG/L												
1,1,2-TRICHLOROETHANE	10	U	UG/L												
1,1-DICHLOROETHANE	10	U	UG/L	5	J	UG/L	10	U	UG/L	5	J	UG/L	10	U	UG/L
1,1-DICHLOROETHENE	10	U	UG/L												
1,2-DICHLOROETHANE	10	U	UG/L												
1,2-DICHLOROPROPANE	10	U	UG/L												
2-BUTANONE	10	U	UG/L												
2-HEXANONE	10	U	UG/L												
4-METHYL-2-PENTANONE	10	U	UG/L												
ACETONE	10	U	UG/L	16	U	UG/L									
BENZENE	10	U	UG/L												
BROMODICHLOROMETHANE	10	U	UG/L												
BROMOFORM	10	U	UG/L												
BROMOMETHANE	10	U	UG/L												
CARBON DISULFIDE	10	U	UG/L												
CARBON TETRACHLORIDE	10	U	UG/L												
CHLOROENZENE	10	U	UG/L												
CHLOROETHANE	10	U	UG/L												
CHLOROFORM	10	U	UG/L												
CHLOROMETHANE	10	U	UG/L												
CIS-1,3-DICHLOROPROPENE	10	U	UG/L												
DIBROMOCHLOROMETHANE	10	U	UG/L												
ETHYLBENZENE	10	U	UG/L												
METHYLENE CHLORIDE	10	U	UG/L												
STYRENE	10	U	UG/L												
TETRACHLOROETHENE	10	U	UG/L	2	J	UG/L	10	U	UG/L	2	J	UG/L	10	U	UG/L
TOLUENE	10	U	UG/L												
TOTAL 1,2-DICHLOROETHENE	10	U	UG/L												
TRANS-1,3-DICHLOROPROPENE	10	U	UG/L												
TRICHLOROETHENE	10	U	UG/L												

CTO 275 - NSB NEW LONDON  
 WATER DATA  
 KATAHDIN  
 SDG: GTN001

SAMPLE NUMBER:	DU02	DU03	HNUS22 02	HNUS23 02	HNUS24 02
SAMPLE DATE:	01/17/97	01/17/97	01/19/97	01/17/97	01/17/97
LABORATORY ID:	WN0126-2	WN0126-5	WN0138-11	WN0126-7	WN0126-6
QC_TYPE:	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
% SOLIDS:	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %

	RESULT QUAL UNITS			RESULT QUAL UNITS			RESULT QUAL UNITS			RESULT QUAL UNITS			RESULT QUAL UNITS		
<b>VOLATILES</b>															
VINYL CHLORIDE	10	U	UG/L												
XYLENES, TOTAL	10	U	UG/L												

**APPENDIX F.4**

**Purged Groundwater Samples Attenuation  
Parameters Data Sheets**



CLIENT: JEAN-LUC GLORIEUX  
HALLIBURTON NUS, C/O BROWN & ROOT ENVIRONMENTAL  
661 ANDERSEN DRIVE, FOSTER PLAZA 7  
PITTSBURGH, PA 15220

Lab Number : WN-0138-13  
Report Date: 02/13/97  
PO No. : CTO 275  
Project : GROTON, CT

WIC#: MA-1051-95-3021-1298

REPORT OF ANALYTICAL RESULTS

Page 2 of 5

SAMPLE DESCRIPTION	MATRIX	SAMPLED BY		SAMPLED DATE RECEIVED				
08GW8S 03	Aqueous	K.S. & J. CONTI		01/19/97	01/21/97			
PARAMETER	RESULT	UNITS	DF	*PQL	METHOD	ANALYZED	BY	NOTES
Chloride	5.6	mg/L	1.0	2.0	300.0	01/21/97	CM	
Nitrate as N	3.0	mg/L	1.0	0.10	300.0	01/21/97	CM	
Sulfate	29.	mg/L	1.0	1.0	300.0	01/21/97	CM	
Total Organic Carbon (TOC)	5.0	mg/L	1.0	1.0	E415.1	01/28/97	BC	

\* PQL (Practical Quantitation Level) represents laboratory reporting limits and may not reflect sample-specific reporting limits. Sample-specific limits are indicated by results annotated with '<' values

02/13/97

LJO/ejnlp(dw)/pph  
NA21CLW2



CLIENT: JEAN-LOU GLORIEUX  
 HALLIBURTON NUS, C/O BROWN & ROOT ENVIRONMENTAL  
 661 ANDERSEN DRIVE, FOSTER PLAZA 7  
 PITTSBURGH, PA 15220

Lab Number : WN-0138-12  
 Report Date: 02/13/97  
 PO No. : CIO 275  
 Project : GROTON, CT

WIC#: MA-1051-95-3021-1298

REPORT OF ANALYTICAL RESULTS

Page 5 of 5

SAMPLE DESCRIPTION	MATRIX	SAMPLED BY		SAMPLED DATE RECEIVED			
08GW8D 03	Aqueous	K.S. & J. CONTI		01/18/97	01/21/97		
PARAMETER	RESULT	UNITS	DF	*PQL	METHOD	ANALYZED BY	NOTES
Chloride	120.	mg/L	5.0	2.0	300.0	01/29/97 CM	
Nitrate as N	0.30	mg/L	1.0	0.10	300.0	01/21/97 CM	
Sulfate	35.	mg/L	1.0	1.0	300.0	01/21/97 CM	
Total Organic Carbon (TOC)	2.1	mg/L	1.0	1.0	E415.1	01/28/97 BC	

\* PQL (Practical Quantitation Level) represents laboratory reporting limits and may not reflect sample specific reporting limits. Sample-specific limits are indicated by results annotated with '<' value.

02/13/97

LJO/ejnlp(dw)/pph  
 NA29CLW1

CLIENT: JEAN-LUC GLORIEUX  
HALLIBURTON NUS, C/O BROWN & ROOT ENVIRONMENTAL  
661 ANDERSEN DRIVE, FOSTER PLAZA 7  
PITTSBURGH, PA 15220

Lab Number : WN-0138-10  
Report Date: 02/13/97  
PO No. : CTO 275  
Project : GROTON, CT

WIC#: MA-1051-95-3021-1298

REPORT OF ANALYTICAL RESULTS

Page 4 of 5

SAMPLE DESCRIPTION	MATRIX	SAMPLED BY			SAMPLED DATE RECEIVED			
08GW95 01	Aqueous	K.S. & J. CONTI			01/18/97	01/21/97		
PARAMETER	RESULT	UNITS	DF	*PQL	METHOD	ANALYZED	BY	NOTES
Chloride	7.8	mg/L	1.0	2.0	300.0	01/21/97	CM	
Nitrate as N	<0.10	mg/L	1.0	0.10	300.0	01/21/97	CM	
Sulfate	9.6	mg/L	1.0	1.0	300.0	01/21/97	CM	
Total Organic Carbon (TOC)	1.0	mg/L	1.0	1.0	E415.1	01/28/97	BC	

\* PQL (Practical Quantitation Level) represents laboratory reporting limits and may not reflect sample-specific reporting limits. Sample-specific limits are indicated by results annotated with '<' values

02/13/97

LJO/ejnlp(dw)/pph  
NA21CLW2

CLIENT: JEAN-LUC GLORIEUX  
HALLIBURTON NUS, C/O BROWN & ROOT ENVIRONMENTAL  
661 ANDERSEN DRIVE, FOSTER PLAZA 7  
PITTSBURGH, PA 15220

Lab Number : WN-0138-9  
Report Date: 02/13/97  
PO No. : CIO 275  
Project : GROTON, CT

WIC#: MA-1051-95-3021-1298

REPORT OF ANALYTICAL RESULTS

Page 3 of 5

SAMPLE DESCRIPTION	MATRIX	SAMPLED BY		SAMPLED DATE RECEIVED				
08GW105 01	Aqueous	K.S. & J. CONTI		01/18/97	01/21/97			
PARAMETER	RESULT	UNITS	DF	*PQL	METHOD	ANALYZED	BY	NOTES
Chloride	36.	mg/L	1.0	2.0	300.0	01/29/97	CM	
Nitrate as N	0.23	mg/L	1.0	0.10	300.0	01/21/97	CM	
Sulfate	11.	mg/L	1.0	1.0	300.0	01/21/97	CM	
Total Organic Carbon (TOC)	1.0	mg/L	1.0	1.0	E415.1	01/28/97	BC	

\* PQL (Practical Quantitation Level) represents laboratory reporting limits and may not reflect sample-specific reporting limits. Sample-specific limits are indicated by results annotated with '<' values.

02/13/97

LJO/ejnlp(dw)/pph  
NA29CLW1



CLIENT: JEAN-LUC GLORIEUX  
 HALLIBURTON NUS, C/O BROWN & ROOT ENVIRONMENTAL  
 661 ANDERSEN DRIVE, FOSTER PLAZA 7  
 PITTSBURGH, PA 15220

Lab Number : WN-0138-11  
 Report Date: 02/13/97  
 PO No. : CTO 275  
 Project : GROTON, CT

WIC#: MA-1051-95-3021-1298

REPORT OF ANALYTICAL RESULTS

Page 1 of 5

SAMPLE DESCRIPTION	MATRIX	SAMPLED BY		SAMPLED DATE RECEIVED			
HNUS22 02	Aqueous	K.S. & J. CONTI		01/19/97	01/21/97		
PARAMETER	RESULT	UNITS	DF	*PQL	METHOD	ANALYZED BY	NOTES
Chloride	10.	mg/L	1.0	2.0	300.0	01/21/97 CM	
Nitrate as N	4.7	mg/L	1.0	0.10	300.0	01/21/97 CM	
Sulfate	18.	mg/L	1.0	1.0	300.0	01/21/97 CM	
Total Organic Carbon (TOC)	2.1	mg/L	1.0	1.0	E415.1	01/28/97 BC	

\* PQL (Practical Quantitation Level) represents laboratory reporting limits and may not reflect sample-specific reporting limits. Sample-specific limits are indicated by results annotated with '<' values

02/13/97

LJO/ejnlp (dw) /pph  
 NA21CLW2



CLIENT: JEAN-LUC GLORIEUX  
 HALLIBURTON NUS, C/O BROWN & ROOT ENVIRONMENTAL  
 661 ANDERSEN DRIVE, FOSTER PLAZA 7  
 PITTSBURGH, PA 15220

Lab Number : WN-0126-7  
 Report Date: 02/13/97  
 PO No. : CTO 275  
 Project : GROTON, CT

WIC#: MA-1051-95-3121-1298

REPORT OF ANALYTICAL RESULTS

Page 3 of 3

SAMPLE DESCRIPTION	MATRIX	SAMPLED BY		SAMPLED DATE RECEIVED			
HNUS2302	Aqueous	K. SIMPSON		01/17/97	01/20/97		
PARAMETER	RESULT	UNITS	DF	*PQL	METHOD	ANALYZED BY	NOTES
Chloride	30.	mg/L	2.0	2.0	300.0	01/29/97 CM	
Nitrate as N	2.5	mg/L	1.0	0.10	300.0	01/21/97 CM	
Sulfate	20.	mg/L	1.0	1.0	300.0	01/21/97 CM	
Total Organic Carbon (TOC)	2.3	mg/L	1.0	1.0	E415.1	01/28/97 BC	

\* PQL (Practical Quantitation Level) represents laboratory reporting limits and may not reflect sample specific reporting limits. Sample-specific limits are indicated by results annotated with '<' value

02/13/97

LJO/ejnlp(dw)/pph  
 NA29CLW1



CLIENT: JEAN-LUC GLORIEUX  
 HALLIBURTON NUS, C/O BROWN & ROOT ENVIRONMENTAL  
 661 ANDERSEN DRIVE, FOSTER PLAZA 7  
 PITTSBURGH, PA 15220

Lab Number : WN-0126-6  
 Report Date: 02/13/97  
 PO No. : CTO 275  
 Project : GROTON, CT

WIC#: MA-1051-95-3121-1298

REPORT OF ANALYTICAL RESULTS

Page 2 of 3

SAMPLE DESCRIPTION	MATRIX	SAMPLED BY		SAMPLED DATE RECEIVED				
HNUS2402	Aqueous	K. SIMPSON		01/17/97	01/20/97			
PARAMETER	RESULT	UNITS	DF	*PQL	METHOD	ANALYZED	BY	NOTES
Chloride	13.	mg/L	1.0	2.0	300.0	01/21/97	CM	
Nitrate as N	0.81	mg/L	1.0	0.10	300.0	01/21/97	CM	
Sulfate	9.9	mg/L	1.0	1.0	300.0	01/21/97	CM	
Total Organic Carbon (TOC)	1.4	mg/L	1.0	1.0	E415.1	01/28/97	BC	

\* PQL (Practical Quantitation Level) represents laboratory reporting limits and may not reflect sample-specific reporting limits. Sample-specific limits are indicated by results annotated with '<' values

02/13/97

LJO/ejnlp(dw)/pph  
 NA21CLW1

0002

# AIR TOXICS LTD.

Methane by Modified EPA 3810  
GC/FID

Field Sample I.D.	Lab Sample I.D.	File Name	Sample Date	Analyzed For	Dilution Factor	Det. Limit		Amount	
						(ppmv)	(mG/L)	(ppmv)	(mG/L)
WN0138-7	9701153-01A	2012203	1/18/97	Methane	1.00	4.3	0.003	Not Detected	Not Detected
WN0138-8	9701153-02A	2012204	1/19/97	Methane	1.00	4.3	0.003	Not Detected	Not Detected
WN0138-9	9701153-03A	2012205	1/18/97	Methane	1.00	4.3	0.003	Not Detected	Not Detected
WN0138-9 MS	9701153-03AMS	2012206	1/18/97	Methane	1.00	4.3	0.003	Not Analyzed	Not Analyzed
WN0138-9 MSD	9701153-03AMSD	2012207	1/18/97	Methane	1.00	4.3	0.003	Not Analyzed	Not Analyzed
WN0138-10	9701153-04A	2012208	1/18/97	Methane	1.00	4.3	0.003	Not Detected	Not Detected
WN0138-11	9701153-05A	2012209	1/19/97	Methane	1.00	4.3	0.003	Not Detected	Not Detected
WN0138-12	9701153-06A	2012210	1/19/97	Methane	1.00	4.3	0.003	Not Detected	Not Detected
WN0138-13	9701153-07A	2012211	1/19/97	Methane	1.00	4.3	0.003	Not Detected	Not Detected
Lab Blank	9701153-09A	2012202	NA	Methane	1.00	4.3	0.003	Not Detected	Not Detected
<b>Spiked Sample</b>								<b>% Recovery</b>	
Method Spike	9701153-08A	2012212	NA	Methane	1.00	4.3	0.003	96	

Analysis Date: 1/22/97  
Container Type: VOA Vial

COMMENTS: NA = Not Applicable