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Final

TCE Plume Delineation & Source Investigation Report
SWMU 55
Naval Activity Puerto Rico
RCRA/HSWA Permit No. PR2170027203
Ceiba, Puerto Rico

Prepared For

Department of the Navy
Atlantic Division
Naval Facilities Engineering Command

Norfolk, Virginia

Under the
LANTDIV CLEAN Program

Contract No. N62470-95-D-6007
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August 11, 2004

Prepared by

CH2M HILL

Baker
Environmental, Inc.

CDM
Federal Programs Corp.

FINAL

TCE PLUME DELINEATION & SOURCE INVESTIGATION REPORT

SOLID WASTE MANAGEMENT UNIT 55

NAVAL ACTIVITY PUERTO RICO
RCRA/HSWA PERMIT NO. PR2170027203
CEIBA, PUERTO RICO

CONTRACT TASK ORDER 0268

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LIST OF ACRONYMS AND ABBREVIATIONS

bgs	below ground surface
CAO	Corrective Action Objectives
CMS	Corrective Measures Study
CMSI	Corrective Measures Study Investigation
COPC	Contaminant of Potential Concern
DFM	diesel fuel marine
DNAPL	Dense, Non-aqueous Phase Liquid
DO	Dissolved Oxygen
F	Fahrenheit
HESI	Heartland Environmental Services, Inc.
IDW	Investigation Derived Waste
J	Estimated Concentration
JP-5	jet fuel
LANTDIV	Atlantic Division Naval Facilities Engineering Command
LNAPL	light, non-aqueous phase liquid
µg/kg	micrograms per kilogram
µg/L	micrograms per liter
MCL	Maximum Contaminant Level
MS/MSD	Matrix Spike/Matrix Spike Duplicate
NSRR	Naval Station Roosevelt Roads
OD	Outside Diameter
ORP	Oxidation-Reduction Potential
oz	ounce
PID	Photoionization Detector
PM	Project Manager
PSH	Phase Separated Hydrocarbons
PVC	polyvinyl chloride
QA/QC	Quality Assurance/Quality Control
RBC	Risk-Based Concentration
RCRA	Resource Conservation and Recovery Act
RFI	RCRA Facility Investigation
SWMU	Solid Waste Management Unit

LIST OF ACRONYMS AND ABBREVIATIONS (continued)

TCE	Trichloroethene
TCL	Target Compound List
TWFF	Tow Way Fuel Farm
USEPA	United States Environmental Protection Agency
VOC	Volatile Organic Compound

1.0 INTRODUCTION

The Tow Way Fuel Farm (TWFF), located at Solid Waste Management Unit (SWMU) 7/8, Naval Activity Puerto Rico formerly Naval Station Roosevelt Roads (NSRR), located near Ceiba, Puerto Rico, has been the subject of numerous investigations, even before the implementation of Resource Conservation and Recovery Act (RCRA) corrective action requirements. A full RCRA Facility Investigation (RFI) (Baker, 1997) has been performed, along with a United States Environmental Protection Agency (USEPA) approved RFI report for the Tow Way Fuel Farm. Additional investigations since the RFI include the Additional Well Installation (Baker, 1998), Corrective Measures Study Investigations (CMSI) (Baker, 1999), Hydraulic Characteristics Evaluation (McLaren Hart, 1999), Trichloroethene (TCE) Investigation Report (Baker, 2000), and Pier 1 Report of Findings authored by McLaren-Hart (McLaren-Hart, 2000). During the CMSI, TCE was found at the TWFF in monitor well 7MW07. As a result of the various investigations and in support of ongoing efforts on the Corrective Measures Study (CMS), various additional data requirements were identified. On December 19, 2000, a meeting to present a conceptual approach on gathering the necessary data to support the CMS was held at EPA Region II New York office. In addition, on May 23, 2001 discussions continued on data collections to include data for the groundwater model being developed. It was agreed by all that a work plan to address the data needs should be developed. A work plan for additional data collection was developed and implemented as a result of those discussions (Baker, 2001). During this additional data collection effort, TCE concentrations in monitor well 7MW07 were found to have increased fourteen-fold, from 2,000J micrograms per liter (µg/L) in April 1998, to 28,000J µg/L in January 2002, a period of approximately four years (Baker, 2003a). Because of this increase in concentration, additional characterization of the source of this TCE was recommended in the Draft Final Task I CMS prior to finalization of the CMS (Baker, 2003b). A Draft TCE Plume Source Delineation Work Plan was submitted on May 8, 2003. This work plan received comments from the USEPA on June 13, 2003. A Final TCE Plume Delineation and Source Investigation Work Plan was submitted on July 25, 2003 (Baker, 2003c). This report details the results of the implemented work plan.

It should be noted that the CMS process for the TCE plume at the TWFF is being dealt with separately from the CMS at the TWFF addressing the phase separated hydrocarbons (PSH). The TCE plume at the TWFF is located in a different area outside the known PSH contamination. An independent CMS for the TCE plume at the TWFF will be developed for the site separately from the current Final CMS Task I Report (Baker, 2003b) for the TWFF, addressing those contaminants associated with the TCE contamination at the site. On February 24, 2004 the USEPA Region II requested that this potential source area and associated TCE plume at the TWFF be designated as SWMU 55 since the TCE releases do not appear to be associated with either SWMU 7 or 8. All future work associated with this TCE site at the TWFF will be designated as SWMU 55.

1.1 Objectives

The TCE Plume Delineation and Source Investigation was performed in order to identify the TCE source to the extent practical, to delineate the dissolved TCE plume at this point in time, and to assist in providing alternatives to addressing the TCE contamination in the CMS. It should be noted that this source would be a result of a historical release. No activities resulting in ongoing contamination at this site are occurring at the present time.

The objectives and specific elements of the field effort included:

A soil sampling program in the TCE investigation area to determine if a TCE source is present in a residual or mobile phase form of a dense, non-aqueous phase liquid (DNAPL) near monitor well 7MW07 and/or Building 2314.

A groundwater monitor well installation program to provide monitoring points downgradient of the dissolved TCE plume, including a sentinel groundwater monitor well at an appropriate depth in the aquifer.

Sampling of new and select existing groundwater monitoring wells to establish the extent of the dissolved TCE plume at this point in time.

1.2 Organization of the TCE Plume Delineation and Source Investigation Report

This report is organized into six sections. Section 1.0 of this document includes the objectives of this TCE report. Section 2.0 provides a description of the site history of the investigation area, including a summary of previous investigations. Section 3.0 provides a description of the physical characteristics of the site, including the currently understood geology and hydrogeology in the TCE area. Section 4.0 describes the field investigation. The results of the investigation activities that were conducted are described in Section 5.0. Section 6.0 provides conclusions and recommendations and Section 7.0 presents the report references.

2.0 SITE HISTORY

The following section is a discussion of the past and present conditions that exist in the TCE area at the TWFF.

2.1 Site Description

NSRR occupies part of the northern side of the east coast of Puerto Rico, along Vieques Passage with Vieques Island lying to the east about 10 miles from the harbor entrance. The northern entrance to NSRR is about 35 miles east along the coast road (Route 3) from San Juan. The closest large town is Fajardo (population approximately 37,000), which is about 10 miles north of NSRR on Route 3. Ceiba (population approximately 17,000) adjoins the west boundary of NSRR (see Figure 2-1).

NSRR occupies over 8,600 acres at the northeastern most portion of Puerto Rico. It was commissioned in 1943 as a Naval Operations Base, and finally redesignated a Naval Station in 1957. Currently the Base is in the process of decommissioning and is scheduled for operational closure on March 31, 2004.

The TWFF is located on a hillside along Forrestal Road north of Ensenada Honda (Figure 2-2). Constructed prior to 1957, the fuel farm originally consisted of nine USTs containing diesel fuel marine (DFM), Bunker C fuel, and jet fuel (JP-5). Piers and bulkheads for Atlantic Fleet support from the TWFF can be found in Ensenada Honda. To determine the impact of leaking pipelines and USTs in the vicinity of the piers, environmental investigations have also included this area south of Forrestal Road. The TCE area is found south of Forrestal Road near the pad of former Building 46, now designated as Building 2314, southeast of the main area of the TWFF.

2.2 TCE Area History

As stated in Section 1.0, the CMS Investigation findings revealed that TCE was present in the groundwater in monitor well 7MW07 at a concentration of 2,000J µg/L. TCE was also detected at an estimated concentration of 3 µg/L in monitor well 7MW08 (Baker, 1999). After these concentrations were detected in the groundwater, a history of the buildings in proximity to 7MW07 was compiled based on interviews with station personnel. A substantial structure (Building 46), located on the building pad immediately northeast of 7MW07 (between Forrestal Drive and the well), was destroyed during Hurricane Hugo in September 1989. This building was reportedly used for the storage and maintenance of small watercraft used in various harbor operations. While the repair activities had apparently been somewhat limited, the fact that maintenance was performed indicates the potential for cleaning and degreasing operations. This activity could potentially have led to a release of solvents. Also, it is unclear to what extent the buildings were used for storage and what was stored. The potential of a release of stored material in the past must be considered. In 1999, another structure comprised of a half-cylindrical structure constructed of cloth over a frame anchored to the existing concrete slab, was built. The building was used for cold storage and destroyed during Hurricane Georges in September 1998. Currently, Building 2314 exists as an uncovered concrete foundation with several unused walk-in freezers and buoys.

2.3 Summary of Previous Investigations

During the CMS Investigation (Baker, 1998), dissolved TCE was detected in and around 7MW07 at a concentration of 2,000J µg/L. (Note: all TCE concentrations and their locations from previous investigations are shown on Figure 2-3.) Monitor well 7MW07 is screened from 5 feet to 25 feet below the ground surface (bgs). In a subsequent TCE investigation, several temporary wells, both shallow and deep, were installed and sampled in the vicinity of 7MW07 (Baker, 2000). Groundwater samples from these wells were analyzed using an on-site mobile laboratory with a select number of split samples sent to a stateside analytical laboratory for confirmation. Groundwater was not purged prior to sampling and was sampled with a bottom filling bailer in order to allow for detection of the possible presence of DNAPL in the groundwater.

The TCE Investigation Report (Baker, 2000) documents the TCE concentration at 7MW07 again at 2,000 ug/L with an on-site laboratory. In addition, a temporary well placed next to 7MW07 (7-TCE-MW07), and screened from 30 feet to 35 feet bgs, was sampled with a TCE concentration of 1,000 µg/L by a stateside laboratory. Another temporary well located approximately 50 feet southeast of 7MW07 (TW-C), and screened from 17 feet – 22 feet bgs (shallow) and again from 21 feet to 26 feet bgs (deep), had TCE concentrations of 25 µg/L and 1,500 µg/L in the shallow and deep zones. The remaining TCE concentrations found in this investigation ranged from non-detect to 140 µg/L, with the higher concentrations found in the deeper wells.

During the Additional Data Collection Investigation in January 2002 (Baker, 2003a), TCE was again measured in monitor well 7MW07 with the result being a concentration of 28,000J µg/L. The concentration of TCE in the field quality control/quality assurance (QA/QC) duplicate was found to be 23,000J µg/L. (Note that both concentrations were quantified as estimated by the laboratory based on sample dilutions.) These concentrations were approximately 2.5 percent of the solubility of TCE (TCE solubility is ~1,100,000 µg/L). The presence of DNAPL is suspected at concentrations in groundwater over 1 percent of the solubility of a compound (USEPA, 1992). Because the TCE concentration in 7MW07 was over 1 percent of its solubility, DNAPL may be present in the vicinity of this well. Four other monitor wells also had very small estimated concentrations of TCE during the Additional Data Collection Investigation. These include monitor wells 7MW08, UGW11, and 7MW20 in the area of the lower TWFF. All concentrations were estimated at less than 1 µg/L. A newly installed well, 7MW10, located downgradient of 7MW07, was sampled during this investigation with the result being non-detection of TCE. It should be noted, however, that the screen of this well was installed from 4 feet to 14 feet bgs, most likely too shallow to intercept the TCE plume should it have traveled to this point. A temporary well installed during the previous TCE Investigation near this location (TW-102), and screened from 17 feet to 22 feet bgs, yielded a small TCE detection of 5.4 µg/L during the TCE Investigation (Baker, 2000).

3.0 PHYSICAL CHARACTERISTICS OF THE STUDY AREA

3.1 Climatology

The climate of the Roosevelt Roads area is characterized as warm and humid, with frequent showers occurring throughout the year. A major factor affecting the weather is the pattern of trade winds associated with the Bermuda High, the center of which is in the vicinity of 30 North, 30 West. The prevailing wind direction reflects the easterly trade winds. The area receives a surface flow varying between the northeast to the southeast about 75 percent of the year, and as much as 95 percent of the time in July when the easterly winds are strongest. The differential heating of the land and sea during the day tends to give a more northerly component to the flow on the northern side of the island and a more southerly component on the southern side. During the night, a land breeze causes a prevailing southeasterly flow in the north and a prevailing northeasterly flow over the southern coast. The mean annual wind velocity is 5.5 knots, with a minimum in November and a maximum in August. Gales associated with westward moving disturbances in the trade winds or hurricanes passing either north or south of the area have the highest probability of occurrence from June through October.

Uniform temperatures prevail, with small diurnal ranges as a result of insular exposure and the relatively small land areas. The warmest months are August and September, while the coolest are January and February. Mean annual maximum temperatures range from 82.0 Fahrenheit (F) in January to 88.2F in August. The mean annual minimum temperatures vary from 64.0^0 F in January to 73.2^0 F in June. The highest maximum temperature recorded was 95^0 F, while the lowest minimum was 59F. Rain usually occurs at least nine days in every month, with an average of 60 inches per year although a dry winter season occurs from December through April. About 22 thunderstorm-days occur per year, with maximum frequencies of three days per month from May through October.

In late summer, the mean sky cover begins a steady decrease from a monthly maximum average of 6.5-tenths coverage in September to a minimum monthly average of 4.4-tenths coverage in February. From March through August, the monthly average clouds over increases steadily from 4.5- to 6.0-tenths coverage during the period. Over the open sea, a maximum of clouds (usually broken stratocumulus) occurs during early morning, with the skies clearing or becoming scattered with cumulus by afternoon. Completely clear or overcast skies are rare during daylight hours, while clear skies frequently occur at night.

The hurricane season is from mid-June through mid-September; maximum winds exceed 95 knots during severe hurricanes. An average of two tropical storms per year occur in the study area, one of which usually reaches hurricane intensity.

3.2 Topography

The regional area of Roosevelt Roads consists of an interrupted, narrow coastal plain with small valleys extending from the Sierra de Luquillo range, which has been severely eroded by streams into valleys several hundreds of feet deep. Slopes of up to 60 are common.

In the immediate area of the station, elevations range from sea level to approximately 295 feet. Immediately to the north of the NSRR boundary, the hills rise abruptly to heights of 800 to 1,050 feet above sea level, with the tallest peak located within two kilometers of the station boundary. There is a series of three hilly areas on the station, two of which separate the southern airfield area from the Port/Industrial, Housing and Personnel Support areas. The third set of hills is in the Bundy area. These ridgelines not only separate sections of the station, but also dictate the degree of allowable development. The ridgeline south of the airfield provides an excellent barrier which effectively decreases the aircraft-generated noise which reaches the Unaccompanied Enlisted Personnel Housing

areas to an acceptable level. Relief is low along the shoreline. Lagoons and mangrove swamps are common.

In the TCE Area, the land is fairly flat, sloping toward the Ensenada Honda. The elevation ranges from sea level to approximately 25 feet above mean sea level.

3.3 Geology

Several reports have documented the regional geology and the TWFF geology at this location, including most recently in the Additional Data Collection Investigation (Baker, 2002). This section will focus on the geology and hydrogeology as it is currently understood in the immediate location of the TCE plume.

During the previous TCE investigation, a conceptual model of the geology was developed through installation of wells and advancement of borings and illustrated in cross sections (Baker, 2000). This conceptual model identified unconsolidated and consolidated formations. The unconsolidated formations were categorized as fill and marine deposits. The consolidated formation was identified as Gabbro bedrock. This Gabbro was identified as either soft (decomposed) or hard (weathered or unweathered lithofied bedrock).

With the addition of information from the current investigation, the conceptual model has been updated. The physical conceptual model has generally not changed, but the terms describing the geology has. The terms "hard" and "soft" have been replaced with "decomposed" and "lithofied", respectively. The terms "hard" and "soft" were defined by split spoon blow counts. The new definitions of decomposed and lithofied are broader. The term decomposed considers not only blow counts, but also includes a visual description and qualitative drilling pressures. Decomposed bedrock is defined by the following:

- Gabbro rock fragments in a fine-grained matrix or as a sapprolite. (Sapprolite is decomposed bedrock that has maintained its original crystal structure.)
- Split spoon sampling generally occurring with blow counts of less than 50 blows per 6-inch interval, and penetrations greater than 0.5-foot.
- Augers can generally be used to advance the boring.

Lithofied bedrock is defined by the following:

- Gabbro rock fragments without a fine-grained matrix, or only a trace of fine-grained matrix.
- Split spoon sampling generally occurring with blow counts of more than 50 blows per 6-inch interval, with penetrations less than 0.5-foot.
- The down-hole hammer is generally required to advance the boring.

The geology is illustrated by two new cross sections with orientations as shown on Figure 3-1. The geology is generally similar with previous investigations.

Cross Section A-A' is somewhat perpendicular to Forrestal Drive. Similar to previous investigations three different formations are shown in this cross section; fill material, marine deposits, and bedrock (Cross Section A-A' on Figure 3-2). Fill material is present across the entire section and consists

predominantly of rock fragments, with lesser amounts of sand, silt, and clay. In the area of 7MW23 and TW-3, the fill material consists mostly of cobbles (see the log for well 7MW23 in Appendix A). The fill material is thinnest near Ensenada Honda (approximately 1-foot thick) and thickens in the vicinity of the harbor police maintenance building (approximately 4-feet thick). Lithofied and decomposed bedrock are present along this section. Decomposed bedrock is present in the vicinity of well 7MW23 and boring 7TCESB08. This decomposed bedrock was generally observed as sand, silt, or clay, and rock fragments in varying amounts. The lithofied bedrock is gray and black in color and unweathered, to brown in color and weathered. Lithofied bedrock is present below the decomposed zones, indicating a pattern of progressively less weathering with depth. It is evident that the top of the bedrock dips to the southwest, toward the Ensenada Honda. This is likely an erosional feature, presumably caused by the Caribbean Sea, and replaced by marine deposits. These marine deposits consist of interbedded coarse-grained and fine-grained sediments. The upper coarse-grained marine bed consists of fine to coarse sand and shell/coral fragments. The fine-grained marine beds consist of silt or clay with a trace amount of shell fragments. The lower coarse-grained marine bed consists of fine to coarse sand with some clay and a lesser amount of shell and coral fragments.

Cross-section B-B' is somewhat parallel to Forrestal Drive. Again, this cross-section is similar to previous cross sections, showing the progression of fill, decomposed bedrock, and lithofied bedrock (Figure 3-2). The thickness of the filled material is variable, from 1-foot (e.g., temporary well 7TCETW208) to 6-feet (e.g., boring 7TCESB03). This fill generally consists of fine sand and rock fragments, with a lesser amount of silt and clay. The existence of decomposed bedrock in this section is sporadic. A relatively deep channel of decomposed bedrock is evident between temporary well 7TCETW207 and boring 7TCESB01. From the boring log 7TCESB05 (Appendix A), this decomposed bedrock is characterized as highly fractures, easily crumbled Gabbro and with silt-size particle zones. At well 7MW07, it is characterized as rock fragments in a silt matrix. A narrower and shallower decomposed bedrock zone is evident in the vicinity of boring 7TCESB03 and temporary well TW-C, and is similar in character as the other zone. Lithofied bedrock predominates along the southeastern end of this section, in the vicinity of well 7TCETW208. The lithofied bedrock is mainly gray or greenish-gray in color and unweathered, to brown in color and weathered.

On cross-section B-B', the contact between the decomposed and lithofied bedrock in the vicinity of boring 7TCESB05 and well 7MW07 was interpreted based on borings 7TCESB01 and 7TCESB02, rather than well 7MW07. This contact appears to be considerably shallower in borings 7TCESB01 and 7TCESB02 compared with well 7MW07. There were some subjective characterization differences (e.g., descriptions) and objective characterization differences (e.g., blow counts) between the borings and the well. The lithology descriptions from borings 7TCESB01 and 7TCESB02 were used to interpret the geology on cross-section B-B'. At this time it is not clear what has caused the difference; however, one possibility might be that the presence of decomposed bedrock at well 7MW07 to 28-feet bgs is due to a narrow fracture and attendant weathered zone at the well.

3.4 Hydrogeology

Figures 3-3 and 3-4 depict the top of the groundwater-bearing zone as it was encountered in the monitoring wells, both temporary and permanent, during the current TCE Investigation. Two independent rounds of depth to water measurements were taken in the permanent wells and the temporary wells. The first round of water levels were taken prior to the completion of 7TCETW208, 7TCETW209, and 7TCETW210 (Figure 3-3). The second round included these last three wells and is shown on Figure 3-4. The groundwater elevation information can be found in Table 3-1.

The groundwater table slopes toward Ensenada Honda as shown. In general, the groundwater was higher during the first measurement. At 7MW20, there was a difference of over 1 foot in the groundwater elevation in a period of 3 days. Other wells also had higher levels on September 22 than

on September 25. It is unclear what caused these differences during this short time frame. No significant precipitation occurred during the week prior to September 22. The average water table elevations of the older wells at this location are all lower than the elevations observed in September (Baker, 2003b). NSRR has experienced significant amounts of rainfall during this past year and this has likely raised the groundwater elevation at this site. This would explain a general increase, but not the sharp decrease over the three-day period.

4.0 TCE AREA INVESTIGATION

A TCE source area investigation was conducted by Baker between September 13 and 27, 2003 at the TWFF. The purpose of this investigation was to determine if a TCE source is present, whether or not this source exists as a DNAPL, and to determine if the dissolved-phase groundwater plume has changed since June 1999. The assumption of this investigation was that Building 2314 (formerly Building 46) is the source of the dissolved-phase groundwater contamination, and is based on three points:

1. A relatively high level of TCE was detected in well 7MW07, located near Building 2314;
2. TCE was not detected in wells upgradient of Building 2314 and well 7MW07, and;
3. TCE could be associated with the past use of Building 46 (a small craft boathouse).

The investigation included a soil boring and sampling program, a temporary monitoring well installation and sampling program, a permanent monitoring well installation and sampling program, and a historical information search. The sections that follow discuss these programs/elements. Field notes can be found in Appendix B.

4.1 Historical Information

Determination of the presence of DNAPL at a site typically includes physical evidence from a site characterization and historical evidence from a background literature search and/or interviews USEPA, 1992). The sources of historical information at NSRR regarding Building 46 included a real estate section records search and personnel interviews. Personnel interviews included environmental personnel, two facility inspectors, and neighboring facility employees (fuel farm and harbor police) who might have general or specific knowledge regarding past uses of Building 46. The harbor police building is located near Building 46, and is used as a small boat storage and maintenance facility, which is similar in use to historical Building 46 use.

Naval Station Real Estate records indicate that Building 46 was built in 1962 as a small craft boat house, with additional usage information indicating operational storage or maintenance/product storage. Building 46 was destroyed during hurricane Hugo on or about September 17, 1989. Interviews with two facility inspectors revealed that Building 46 was used as a maintenance shop by the Surface Operations Department. Sections of the floor where boats motors and parts were cleaned and tested were bermed. Liquid wastes spilled on the floor were drain out of the building to a near by drainage. (Ortiz/Datko, 2004).

Building 46 was rebuilt in 1991 as Building 2314; a commercial storage building used by Surface Ops and Morale, Welfare, and Recreation Departments. Building 2314 was originally a Quonset-style building with a cloth roof. This building was partially destroyed during Hurricane Georges on or about September 21, 1998. Currently, several large unused walk-in freezers are located on the concrete foundation along with buoys.

Harbor police personnel indicated that they perform minor engine and boat repair. No solvents are currently used. The flammable storage locker (west of the building and near 7MW24) is used for paint and thinner storage. If operations at the former small craft boathouse (Building 46) were similar to the current harbor police operations, solvents like TCE were not used.

Baker personnel examined utility maps of the Building 46 vicinity, and the current structure to identify any floor drains connected to the sanitary sewer system. Professional experience indicates that floor drains are typically used for the disposal of used solvent and often DNAPL/source areas originate around these drain lines. Utility maps could not be located that showed sanitary

connections to Building 46. No floor drains were observed during the field reconnaissance.

4.2 Soil Boring Program

Initially, eight soil borings were located around and topographically/hydraulically downgradient of the Building 2314 foundation (borings 7TCESB01 through 7TCESB08 as shown on Figure 4-1). The purpose of these borings was to assess the presence of DNAPL and determine its nature and extent. Since no floor drains (potential preferential pathways) were found, the boring locations were not changed to accommodate such features. The borings were advanced using a combination of augering and down hole hammer.

Due to the potential presence of DNAPL, boring locations were drilled initially using an outside-in approach. Borings 7TCESB08 and 7TCESB03 were drilled first. No evidence of soil contamination above lithofied bedrock was observed in samples from these borings. So, it was decided to proceed with boring 7TCESB05, located near 7MW07 (the suspected source area). Again, evidence of soil contamination was not observed in samples from this boring.

Several borings were moved and one boring added to the soil investigation. Lithofied bedrock was encountered at a relatively shallow depth (5-feet bgs). The boring was advanced deeper at a later date to confirm the presence of lithofied bedrock. The new location had to be moved approximately 10-feet to the northwest due to the presence of cobbles and boulders around the original location. This location was identified as 7TCESB06A since it was more than 1- to 2-feet from the original location. Due to the observation of elevated photo-ionization detector (PID) readings from samples 1- to 6-feet bgs at this boring, boring 7TCESB09 was added to the soil investigation to provide delineation of potential contamination at 7TCESB06A. Borings 7TCESB01 and 7TCESB02 were originally located farther from Building 2314 than borings 7TCESB05 and 7TCESB03. Since soil contamination was not observed in borings near the south side of the building foundation, borings 7TCESB01 and 7TCESB02 were moved and used for different purposes. Borings 7TCESB01 and 7TCESB02 were located near 7MW07 to locate a potential localized source and to determine the nature of bedrock near the well. No contamination was observed in samples from relocated borings 7TCESB01 and 7TCESB02. Additionally, some lithology differences between well 7MW07 and these two borings were evident (see Section 3.3).

4.3 Monitoring Well Installation Program

The monitoring well program included the installation and sampling of eight temporary monitoring wells and four permanent monitoring wells. Table 4-1 provides a summary of temporary and permanent monitoring well construction details. The subsections that follow discuss the locations and rationale for installation of temporary and permanent monitoring wells.

4.3.1 Plume Area Temporary Monitoring Wells

Initially, five temporary monitoring wells were located to determine if the dissolved-phase groundwater plume had changed since 1999. It should be noted that the work plan had designed flexibility to allow for up to ten temporary monitoring wells. Subsequently, five additional temporary monitoring wells were located to assist in delineation of the extent of the dissolved-phase groundwater plume.

According to the Work Plan, the temporary well screens installed in bedrock were to be placed 1- to 2-feet into lithofied bedrock. It was observed during drilling however, that in all borings, except 7TCETW204, groundwater occurred 10- to 15- feet into the lithofied zone. The well screen depths were adjusted so that the first groundwater zone was captured and the depths were similar to the deep

temporary wells installed in 1999 (beginning at 20- to 23-feet bgs). It should be noted that the highest levels of TCE were observed in these deep temporary wells.

All temporary wells were installed using polyvinyl chloride (PVC) materials and 5-foot screen lengths. Well diameters were either 1-inch outside diameter (OD) or 2-inch OD. Wells 7TCETW201, 7TCETW202, and 7TCETW203 were 1-inch OD, but the interface probe would not fit inside the casing. Subsequent wells (7TCETW204, 7TCETW205, 7TCETW206, and 7TCETW207) were 2-inch OD to accommodate the interface probe. Wells 7TCETW208, 7TCETW209, and 7TCETW210 were 1-inch OD since these wells were farther away from the source area and DNAPL was not detected at any previous wells.

The presence of DNAPL was checked at each temporary and permanent well. At the 1-inch OD wells, a groundwater sample was collected from the bottom of the well and placed into one 8-ounce (oz) clear glass container. A small amount (less than 3-grams) of Sudan IV dye was added. Sudan IV dye will stain organic liquids (e.g., TCE) red, indicating that DNAPL is present. At the 2-inch OD wells, an interface probe was slowly lowered down to the bottom of the well. The interface probe detects different liquids based on light wave refractive property differences between water and other liquids. No DNAPL was detected in any temporary or permanent well.

7TCETW201 was placed to be downgradient of the leading edge of the plume. This temporary well was among the first wells installed and sampled. The purpose of this well was to locate a permanent monitoring well to act as a sentinel well to monitor possible downgradient migration of the plume.

Temporary wells 7TCETW202 through 7TCETW205 were located within the plume as well as in side gradient locations. Based on the analytical results from well 7TCETW202 through 7TCETW205, temporary wells 7TCETW209 and 7TCETW210 (Figure 4-1) were placed farther away from the plume to delineate both the eastern and western sides of the plume.

Temporary wells 7TCETW206 and 7TCETW207 (Figure 4-1) were added to the program by the Project Manager (PM) and located close to Building 2314. The purpose of these wells was to obtain samples of groundwater in close proximity to the building and suspected source area. Based on the analytical results from wells 7TCETW206 and 7TCETW207, temporary well 7TCETW208 was placed farther away from the plume to delineate the eastern side of the plume.

4.3.2 Permanent Monitoring Wells

Four permanent monitoring wells were installed in this field program (Figure 4-1). Well 7MW21 was installed as the sentinel well and placed at temporary well 7TCETW201 location since the TCE and daughter products were not detected. Wells 7MW22 and 7MW23 were placed at temporary wells 7TCETW205 and 7TCETW204, respectively. Well 7MW24 was placed downgradient of well 7MW07. Wells 7MW22, 7MW23, and 7MW24 were placed within the plume to monitor changes in plume concentrations over time. The permanent well screens were placed at depths similar to the deep temporary installed during the 1999 investigation.

4.4 Sampling and Analysis Program

Soil and groundwater water samples were collected and analyzed during this field investigation to further determine the nature and extent of contamination at SWMU 7. Both laboratory and field analyses were conducted. Laboratory analysis included select target compound list (TCL) volatile organic compounds (VOCs) by EPA Method 8260B that were established during the development of the EPA approved work plan, and included trichloroethene, cis-1,2-dichloroethene, trans-1,2-dichloroethene, 1,1-dichloroethene, vinyl chloride, 1,1,2- trichloroethane, tetrachloroethene, 1,2-

dichloroethane, 1,1-dichloroethane, chloroform, methylene chloride, pentachloromethane, and chloromethane. Field analysis included dye shake test, pH, specific conductance, temperature, turbidity, oxidation/reduction potential (ORP), and dissolved oxygen (DO). A list of samples obtained during this investigation can be found in Table 4-2. The field parameters collected during groundwater sampling can be found in Table 4-3.

Laboratory sample analysis was conducted on either standard or expedited turnaround time. Soil sample analysis was conducted on a standard 28-day turnaround time. Groundwater sample analysis was conducted on a 24-hour turnaround time so that the dissolved-phase plume could be delineated in one mobilization. The data was provided to the Baker PM. The PM and other office personnel analyzed and interpreted the data with support from the field team. The PM then provided recommendations for additional/alternate sample locations.

4.5 Quality Assurance/Quality Control Samples

QA/QC samples were collected as part of this investigation in accordance with the Work Plan. The subsections that follow briefly describe the QA/QC samples collected.

4.5.1 Trip Blanks

One trip blank sample accompanied each cooler containing samples requiring the modified TCL VOC analysis. As show on Table 4-2, five trip blank samples were sent and analyzed.

4.5.2 Equipment Rinsate Blank Samples

Three equipment rinsate blank samples were collected. These samples will be associated with the subsurface soil and groundwater sampling. As shown on Table 4-2, the samples were from soil and groundwater sampling equipment.

4.5.3 Field Blank Samples

Three field blank samples were collected from different source water used in equipment decontamination procedures and collection of equipment rinsate blank samples (lab grade de-ionized water). Table 4-2 shows the sample identification and associated water source.

4.5.4 Field Duplicate Samples

Field duplicate samples of the subsurface soil and groundwater were collected. According to the Work Plan, one duplicate sample was to be collected for every 10 samples collected. This frequency was maintained for groundwater. However, due to a field crew error, the sample frequency was at 10% of environmental samples.

4.5.5 Matrix Spike/Matrix Spike Duplicate Samples

One matrix spike/matrix spike duplicate sample (MS/MSDs) was collected for every 20 samples collected of a similar matrix. One MS/MSD was collected for subsurface soils, and one for groundwater samples.

4.6 Other Investigation Considerations

Investigation support tasks included utility clearance, Investigation Derived Waste (IDW)

management, decontamination, surveying, health and safety, and sample handling. The subsections that follow briefly describe these tasks.

4.6.1 Utility Clearance

Utilities around all boring and well locations were cleared through the NSRR digging permit process. Field verification was generally not performed, with the exception of 7TCESB07. Boring 7TCESB07 was located near buried fuel lines. Baker personnel verified the location of the lines to the extent possible with NSRR personnel support.

4.6.2 Investigation Derived Waste

Soil, decontamination water, and groundwater IDW were generated during this investigation. IDW was managed in accordance with the Work Plan. Four drums of soil and seven drums of decontamination water and groundwater were generated during this investigation. These drums are being temporarily stored at the NSRR IDW storage area (located outside Building 38). Samples were collected and analyzed in accordance with the Work Plan. Upon issuance of this report, the analytical data has been received by Baker and forwarded to Environmental Management Specialists, Inc., who will be contracted to dispose of the IDW. The IDW analytical data can be found in Appendix C.

4.6.3 Decontamination

All re-usable sampling equipment (e.g., augers and down-hole hammers) was decontaminated between borings/wells. Additionally, split-spoon samplers were decontaminated between samples. Decontamination methods were performed in accordance with the base RFI Work Plan (Baker 1995).

4.6.4 Surveying

All soil borings, temporary monitoring wells, and permanent monitoring wells were surveyed as discussed in the Work Plan. PVC casing stickup heights were measured (to the nearest 0.01-foot) at temporary wells that were converted to permanent wells, or were removed prior to the survey. During the survey, the top of PVC casing and the ground surface elevation were surveyed at each of these temporary wells. The reference elevations were then calculated based on the measured stickup heights and surveyed elevations.

4.6.5 Health and Safety Procedures

The health and safety procedures found in the base RFI work plan (Baker, 1995), were employed during this investigation. A health and safety briefing was conducted on September 13, 2003.

4.6.6 Chain-of-Custody

Chain-of-Custody procedures presented in the base RFI work plan (Baker, 1995) were followed. A chain-of-custody form was completed for each container in which the samples are shipped. Copies of the chains-of-custody can be found in Appendix D.

5.0 TCE INVESTIGATION RESULTS

This section presents the results of the September 2003 TCE Plume Delineation and Source Investigation. Only the compounds associated with a chlorinated solvent plume were requested to be reported as outlined in the EPA approved work plan. These included the compounds of TCE, cis-1,2-dichloroethene, trans-1,2-dichloroethene, 1,1-dichloroethene, vinyl chloride, 1,1,2 trichloroethane, 1,1,1 trichloroethane, tetrachloroethene, 1,2 dichloroethane, 1,1 dichloroethane, chloroform, methylene chloride, pentachloroethane, and chloromethane. Appendices E and F contain the complete analytical data set for this sampling event.

Because there was contamination in the blanks associated with this field event, the QA/QC sample results and the effect of this contamination on the field sample analytical results will be discussed first. Qualifications to the field data will be noted and then the discussion of the qualified analytical results of the field data will occur.

5.1 Quality Assurance / Quality Control Results

Table 5-1 presents the positive detections in the QA/QC samples, including field blanks, trip blanks, and equipment rinsates. As shown, there were four VOCs detected in the QA/QC field blank (potable water supply) and trip blank samples, including chloroform, chloromethane, methylene chloride, and TCE. Of these four, only methylene chloride was not detected in the field samples. No detections of VOCs were found in the equipment rinsates.

According to the USEPA Risk Assessment Guidance for Superfund (USEPA, 1989) (Volume 1, Human Health Evaluation Manual (Part A), EPA/540/1-89/002, December 1989), and the Standard Operating Procedure for the Validation of Organic Data Acquired Using SW-846 Method 8260B (USEPA Region II, 1999), all analytical results from blank analyses must be considered when determining the validity of field analytical data.

Qualifications to the analytical data were made based on the results of the QA/QC samples. Because chloroform was detected in the potable water supply field blank at a level of 160 µg/L, all chloroform detections in the site data were considered unusable. All detections in the site data were less than 160 µg /L (7TCETW206--0.14J µg/L; 7TCETW207--0.14J µg/L; 7MW20--0.13J µg/L, 7MW20D--0.12J µg/L, 7MW24--0.55J µg/L, and UGW11--20 µg/L). Chloromethane was detected in trip blank 7TCETB01. No environmental samples associated with this trip blank contained chloromethane, so its detection did not affect any analytical results. TCE was detected in a trip blank (7TCETB05) at a concentration of 0.34 µg /L. The analytical results associated with this trip blank included the samples from wells 7MW21, 7MW22, 7MW23, 7MW24, 7TCETW208, 7TCETW209, and 7TCETW210 (See Appendix D). Five of these samples had positive TCE detections. Based on the guidance, those analytical results less than five times the concentration detected in the QA/QC sample can be considered to be non-detect. Those samples from 7TCETW208 (0.68J µg/L), 7MW21 (1.4 µg/L), and 7MW22 (0.44J µg/L) were all less than 5 times 0.34 µg/L (1.7 µg/L), and are therefore considered non-detect in the following discussion. Only these three samples were affected as a result of this trip blank contamination.

Heartland Environmental Services, Inc. (HESI) performed a data validation. The only qualification to the data from this report includes changing the positive detection of methyl chloride in 7TCETW202 to non-detect due to preparation blank contamination. Appendix G contains the validation reports from HESI.

Duplicate environmental samples were taken from soil sample location 7TCESB06-03, and

groundwater sample locations 7TCETW203 and 7MW20. These results are presented alongside their respective original sample results in the following sections. In the case of 7TCETW203 there were three compounds detected at estimated concentrations in the duplicate sample that were not detected in the original sample. Therefore, the duplicate sample results will be used in the discussion. All other duplicate results mimicked the original sample results.

5.2 Soil Sample Results

Table 5-2 presents the positive detections of the requested compounds in the soil samples that were sent to the analytical laboratory. One detection of TCE at a concentration of 110 micrograms per kilogram (µg/kg) was found in the fourteen soil samples that were sent to the laboratory. This was seen in 7TCESB05-05, located near monitor well 7MW07, and at a depth of 11 feet below the ground surface. Figure 5-1 depicts the hit boxes associated with this investigation. There was no DNAPL detected in the soil samples during this investigation.

5.3 Groundwater Sample Results

Table 5-3 presents the positive detections of the requested compounds in the groundwater samples that were sent to the stateside analytical laboratory. Of the fourteen requested compounds (see list above), nine of these were positively detected in the groundwater during this investigation. Only 1,1-dichloroethane, methylene chloride, pentachloroethane, and vinyl chloride were not detected. As discussed previously, chloroform was removed from the positively detected compound list based on detection in a field blank. The positively detected results are shown on Figure 5-1 in the form of hit boxes. The sample that contained the most detected compounds was 7TCETW206 with five compounds. This sample was collected from the groundwater 16 – 21 feet bgs and is located at the corner of former Building 46.

The highest concentration of TCE was again found in well 7MW07 at a level of 1,800 µg/L. This is an order of magnitude less than the concentration that was found in 2002 at this well, but is similar to the concentrations found in 1998 and 1999. Higher TCE levels were also found in new well 7MW24 (1,600 µg/L), new well 7MW23 (87 µg/L), and temporary well 7TCETW206 (66 µg/L). Tetrachloroethene was found in three locations, with the highest concentration being 4.5 µg/L. Daughter products of reductive dechlorination of TCE and tetrachloroethene (cis 1,2-dichloroethene, trans 1,2-dichloroethene, and 1,1-dichloroethene) were found in several locations. The trichloroethane compounds were also detected in small quantities, as was daughter product 1,2 – dichloroethane.

5.4 Comparison to Criteria and Corrective Action Objectives

Table 5-3 also contains the criteria against which the results of this investigation were compared. Included are the Federal Maximum Contaminant Levels (MCLs), the USEPA Region III Tap Water Risk Based Concentrations (RBCs) and the Corrective Action Objective (CAO) for TCE. Comparing the results from this investigation shows that 1,1,2 – trichloroethane, 1,2 – dichloroethane, cis 1,2-dichloroethene, tetrachloroethene, and TCE all exceed the USEPA Region III Tap Water RBCs in various samples. In addition, cis 1,2-dichloroethene and TCE exceed the Federal MCLs. The CAO for TCE at this site established during the Task I CMS Report (Baker, 2003b) was set at a value of 22 µg/L. There were four exceedances of this CAO, located in the heart of the plume at 7TCETW206, 7MW07, 7MW23, and 7MW24.

Of the nine VOCs detected during this investigation, only TCE has an established CAO (Baker, 2003b). Initial screening level risk assessments retained 1,1,2-trichloroethane, 1,1,-dichloroethene, and chloromethane as contaminants of potential concern (COPC) because of USEPA Region III Tap

Water RBC exceedances. They were then eliminated for two reasons: 1) all exceedances were below the industrial RBCs, and 2) exposure through groundwater is unlikely due to the fact that all potable water supply currently comes from El Yunque. Also during the CMS Task I Report, cis 1,2-dichloroethene was not retained as a COPC because previous detections of this compound did not exceed the USEPA Region III Tap Water RBC. 1,2-dichloroethane, 1,1,1-trichloroethane, trans 1,2-dichloroethane, and tetrachloroethene were not considered in the CMS Task I Report because they were not detected in previous investigations.

Figure 5-2 shows the extent of the TCE concentrations in the aquifer above the CAO level of 22 μg/L during this investigation. Also shown on this figure is the exceedance of TCE above this level as characterized during the 1999 TCE Investigation (Baker, 2000). Figure 5-3 depicts the vertical cross-sections of the TCE concentrations above the CAO along the two transects characterized in Section 3.

5.5 Discussion of Results

5.5.1 Plume Delineation

A major objective of this investigation was to provide a current understanding of the extent of the TCE plume in the groundwater. This objective was accomplished. As shown in Figure 5-2, the TCE concentrations above the current CAO from the 1999 TCE investigation and the concentrations of TCE above the CAO from the current (2003) investigation are given. A comparison of these two plumes indicates that no enlargement of the TCE plume in the lateral direction has occurred during the last four years.

From the results found, it appears that the extent of the TCE groundwater plume has been delineated horizontally. Specifically, in the lateral southeast direction from 7MW07, two temporary wells, 7TCETW208 and 7TCETW210 both were installed and sampled with the result being no detection of the listed VOCs. In the lateral west and northwest direction, temporary wells 7TCETW207 and 7TCETW209 were installed and sampled with the result being very small, estimated concentrations of tetrachloroethene, TCE and 1,1,-dichloroethene, although the results in well 7TCETW207 did exceed the USEPA Region III Tap Water RBC.

In the vertical direction, the TCE contamination has been characterized to the extent practical. As stated in the work plan, the bottoms of the temporary wells were to be set approximately 1-2 feet below the top of the lithofied bedrock, or at vertical locations approximately the same as those found in the previous TCE investigation. However, as discussed in Section 4.3, groundwater was not encountered in some cases until several feet below the top of the lithofied bedrock. In these cases, the groundwater samples were taken from temporary wells placed with their screens located at a depth of approximately 20-25 feet bgs. Also considered was the preservation of the integrity of the lithofied bedrock. If the well screens were placed within the lithofied bedrock, and were already at depths comparable to those drilled in 1999, they were not drilled deeper due to concerns about breaching the integrity of the bedrock.

Another objective of this investigation was to place a sentinel well downgradient of 7MW07. Temporary well 7TCETW201 was installed, sampled, and analyzed with a quick turnaround. With the results indicating no contamination, sentinel well 7MW21 was installed and sampled, again yielding qualified results indicating no detections of the target compounds (see Section 5.1).

5.5.2 Source Investigation

The final objective of this investigation was to determine if a continuing source of contamination is present in the unsaturated and/or unsaturated soil near the monitor well 7MW07. From the results of the soil analyses, it appears that there is not a continuing source of TCE or other chlorinated compound in the soil. Ten soil borings were advanced near and around Building 2314. The only soil boring result that had detectable concentrations of the target compounds was 7TCESB01, located immediately next to monitor well 7MW07. The relatively low concentration of TCE found in this sample was 110 µg/kg. No evidence of free or residual DNAPL was found in any of the soil or groundwater samples.

6.0 CONCLUSIONS AND RECOMMENDATIONS

This TCE Plume Delineation and Source Investigation provided valuable information for use in the upcoming CMS for this area. It was determined that no continuing source of TCE is apparent in the soil or groundwater at this site. The original source and/or location of the TCE contamination in this area of the TWFF remains unknown, despite the gathering of historical information and the efforts of environmental sampling during two focused investigations. The TCE plume was delineated and a sentinel well was placed downgradient of the plume in order to determine, through subsequent sampling events, if contamination is approaching the Ensenada Honda.

It is recommended that a CMS proceed for this site. The CMS should include screening level risk assessments for cis 1,2-dichloroethene, 1,2-dichloroethane, 1,1,1-trichloroethane, trans 1,2-dichloroethene, and tetrachloroethene in the groundwater at this site. These compounds were detected during this investigation at levels above those found in previous investigations. Once any new CAOs are established, appropriate corrective measures to address the TCE contamination can be evaluated during the CMS process.

7.0 REFERENCES

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TABLES

TABLE 3-1

GROUNDWATER ELEVATIONS
TCE PLUME DELINEATION AND SOURCE INVESTIGATION, CTO-268
TOW WAY FUEL FARM
NAVAL STATION ROOSEVELT ROADS, CEIBA, PUERTO RICO
JANUARY 2004

Well Name	Rod Elevation (feet) [1]	Top of PVC Casing (ft, msl+100')	Depth to Water (ft) 9/22/03	Depth to Water (ft) 9/25/03	Groundwater Elevation (ft, msl) 9/22/03	Groundwater Elevation (ft, msl) 9/25/03
7MW07	1.09	115.35	12.22	13.08	3.13	2.27
7MW08	NA	111.33	NM	NM	NA	NA
GW-04	NA	112.83	8.09	8.53	4.74	4.30
GW-06	NA	110.95	8.68	8.56	2.27	2.39
UGW-10	NA	110.73	9.22	9.22	1.51	1.51
UGW-11	NA	109.64	8.01	8.35	1.63	1.29
UGW-16	NA	113.83	11.54	11.73	2.29	2.10
UGW-18	NA	114.55	12.02	11.95	2.53	2.60
UGW-26	NA	110.79	7.88	7.8	2.91	2.99
UGW-8	NA	110.24	5.62	6.96	4.62	3.28
7MW10	NA	107.64	NM	5.67	NA	1.97
7MW20	NA	113.25	7.86	9.22	5.39	4.03
7MW21 *	9.53	106.91	NM	5.6	NA	1.31
7MW22 *	4.4	112.04	10.18	10.84	1.86	1.2
7MW23 *	5.23	111.21	9.53	8.48	1.68	2.73
7MW24 *	3.1	113.34	NM	11.4	NA	1.94
7TCETW202	9.55	106.89	5.44	5.52	1.45	1.37
7TCETW203	9.57	106.87	5.61	5.68	1.26	1.19
7TCETW206	1.62	114.82	11.42	12.44	3.4	2.38
7TCETW207	2.28	114.16	11.91	12.21	2.25	1.95
7TCETW208	2.66	113.78	NM	11.31	NA	2.47
7TCETW209	7.09	109.35	NM	7.69	NA	1.66
7TCETW210	7.55	108.89	NM	6.08	NA	2.81

Notes:
[1] Temporary top of PVC casing elevations obtained from field survey.
PVC --polyvinyl chloride
* -- Permanent wells 7MW21-24 were not permanently installed at the time of the depth to water measurements. Top of PVC values are temporary.
NA--not applicable or not available
NM--not measured
msl--mean sea level

TABLE 4-1

MONITORING WELL CONSTRUCTION DETAILS
TCE PLUME DELINEATION AND SOURCE INVESTIGATION - CTO-268
TOW WAY FUEL FARM
NAVAL STATION ROOSEVELT ROADS, CEIBA, PUERTO RICO
JANUARY 2004

Well Identification	Type of Well	Date Installed	Top of PVC Casing Elevation (feet above msl)	Well Diameter (inch-OD)	Well Depth (feet bgs)	Screen Interval (feet bgs)	Depth to Sand (feet bgs)	Depth to Bentonite (feet bgs)	DNAPL Present? (Yes/No)
7TCETW202	Temporary	9/15/03	106.89	1.0	20.0	15.0 - 20.0	NA	NA	No
7TCETW203	Temporary	9/15/03	106.87	1.0	20.0	15.0 - 20.0	NA	NA	No
7TCETW206	Temporary	9/18/03	114.82	2.0	21.0	16.0 - 21.0	NA	NA	No
7TCETW207	Temporary	9/18/03	114.16	2.0	20.0	15.0 - 20.0	NA	NA	No
7TCETW208	Temporary	9/24/03	113.78	1.0	22.0	17.0 - 22.0	NA	NA	No
7TCETW209	Temporary	9/23/03	109.35	1.0	20.0	15.0 - 20.0	NA	NA	No
7TCETW210	Temporary	9/24/03	108.89	1.0	10.0	5.0 - 10.0	NA	NA	No
7MW21	Permanent	9/22/03	106.48	2.0	20.0	10.0 - 20.0	8.0 - 20.0	6.0 - 8.0	No
7MW22	Permanent	9/22/03	109.60	2.0	22.0	12.0 - 22.0	10.0 - 22.0	8.0 - 10.0	No
7MW23	Permanent	9/22/03	108.91	2.0	19.0	9.0 - 19.0	7.0 - 19.0	5.0 - 7.0	No
7MW24	Permanent	9/23/03	110.34	2.0	22.0	12.0 - 22.0	8.0 - 22.0	6.0 - 8.0	No

Notes:

msl - mean sea level, note all alevations are msl + 100' (NSRR Datum)

bgs - below ground surface

PVC - polyvinyl chloride

OD - Outside diameter

NA - Not applicable

DNAPL--dense, non-aqueous phase liquid

TABLE 4-2

SUMMARY OF SAMPLES COLLECTED
TCE PLUME DELINEATION AND SOURCE INVESTIGATION - CTO-268
TOW WAY FUEL FARM
NAVAL STATION ROOSEVELT ROADS, CEIBA. PUERTO RICO
JANUARY 2004

Sample ID	Date Sampled	Sample Interval (Feet, bgs)	Media		Analysis		Comments
			Solid	Aqueous	VOCs	Dye Shake Test	
Soil							
7TCESB01-01	9/17/2003	1.0 - 3.0	X		X		
7TCESB01-03	9/17/2003	5.0 - 5.7	X		X		
7TCESB03-03	9/15/2003	4.0 - 4.7	X		X		
7TCESB03-04	9/15/2003	6.0 - 7.4	X		X		
7TCESB04-02	9/16/2003	1.0 - 2.7	X		X		
7TCESB04-04	9/16/2003	7.0 - 9.0	X		X		
7TCESB05-05	9/16/2003	10.0 - 11.0	X		X		
7TCESB06-01	9/16/2003	1.0 - 2.4	X		X		
7TCESB06-03	9/16/2003	5.0 - 6.1	X		X		
7TCESB06-03D	9/16/2003	5.0 - 6.1	X		X		Duplicate Sample
7TCESB07-01	9/18/2003	1.0 - 1.3	X		X		
7TCESB07-01MS/MSD	9/18/2003	1.0 - 1.3	X		X		Matrix Spike/Matrix Spike Duplicate
7TCESB08-02	9/13/2003	3.0 - 5.0	X		X		
7TCESB08-05	9/13/2003	9.0 - 11.0	X		X		
7TCESB09-01	9/18/2003	1.0 - 1.4	X		X		
7TCEIDW01	9/24/2003	NA	X		X		Composite from 4 drums
Groundwater							
7TCETW201	9/16/2003	15.0 - 20.0		X	X	X	
7TCETW202	9/16/2003	15.0 - 20.0		X	X	X	
7TCETW203	9/16/2003	15.0 - 20.0		X	X	X	
7TCETW203D	9/16/2003	15.0 - 20.0		X	X		Duplicate Sample
7TCETW204	9/18/2003	17.0 - 22.0		X	X		
7TCETW205	9/18/2003	18.0 - 23.0		X	X		
7TCETW206	9/19/2003	16.0 - 21.0		X	X		
7TCETW207	9/19/2003	15.0 - 20.0		X	X		
7TCETW208	9/25/2003	17.0 - 22.0		X	X		
7TCETW209	9/24/2003	15.0 - 20.0		X	X		
7TCETW210	9/25/2003	5.0 - 10.0		X	X		
7MW07	9/16/2003	5.0 - 25.0		X	X		
7MW08	9/16/2003	8.0 - 28.0		X	X		
7MW10	9/16/2003	2.0 - 12.0		X	X		
7MW20	9/23/2003	5.0 - 15.0		X	X		
7MW20D	9/23/2003	5.0 - 15.0		X	X		Duplicate Sample
7MW20MS	9/23/2003	5.0 - 15.0		X	X		Matrix Spike
7MW20MSD	9/23/2003	5.0 - 15.0		X	X		Matrix Spike Duplicate
7MW21	9/25/2003	10.0 - 20.0		X	X		
7MW22	9/25/2003	12.0 - 22.0		X	X		
7MW23	9/24/2003	9.0 - 19.0		X	X		
7MW24	9/24/2003	12.0 - 22.0		X	X		
UGW11	9/22/2003	7.5 - 17.5		X	X		
7TCEIDW02	9/25/2003	NA		X	X		Composite from 7 drums

TABLE 4-2

SUMMARY OF SAMPLES COLLECTED
TCE PLUME DELINEATION AND SOURCE INVESTIGATION - CTO-268
TOW WAY FUEL FARM
NAVAL STATION ROOSEVELT ROADS, CEIBA. PUERTO RICO
JANUARY 2004

Sample ID	Date Sampled	Sample Interval (Feet, bgs)	Media		Analysis		Comments
			Solid	Aqueous	VOCs	Dye Shake Test	
QA/QC Samples							
7TCEFB01	9/17/2003	NA		X	X		Lab-grade DI water, field blank
7TCEFB02	9/17/2003	NA		X	X		Store-bought distilled water, field blank
7TCEFB03	9/17/2003	NA		X	X		Potable water at Harbor Police, field blank
7TCETB01	9/16/2003	NA		X	X		Trip blank
7TCETB02	9/17/2003	NA		X	X		Trip blank
7TCETB03	9/19/2003	NA		X	X		Trip blank
7TCETB04	9/23/2003	NA		X	X		Trip blank
7TCETB05	9/24/2003	NA		X	X		Trip blank
7TCEER01	9/23/2003	NA		X	X		Stainless steel spoon, equipment rinsate
7TCEER02	9/23/2003	NA		X	X		Split-spoon sampler, equipment rinsate
7TCEER03	9/23/2003	NA		X	X		Silicon and polyethylene tubing, equipment rinsate

Notes:
bgs--below ground surface
NA--not applicable
VOCs--volatile organic compounds

TABLE 4-3

SUMMARY OF GROUNDWATER FIELD PARAMETERS
TCE PLUME DELINEATION AND SOURCE INVESTIGATION, CTO-268
TOW WAY FUEL FARM
NAVAL STATION ROOSEVELT ROADS, CEIBA, PUERTO RICO
JANUARY 2004

Well ID/ Sample Date	Time Interval	Static Water Level (feet from top of PVC)	pH (S.U.)	Temperature (^oC)	Specific Conductance (umhos/cm)	Turbidity	Oxidation-Reduction Potential (mV)	Dissolved Oxygen (mg/L)
7MW07 09/16/03	1302	13.76	7.03	31.64	806	83.7	78.1	1.10
	1308	13.82	7.03	31.28	778	64.9	72.7	1.07
	1313	13.83	7.00	31.38	764	51.9	63.6	1.48
	1318	13.86	7.06	31.11	757	45.4	63.7	1.68
	1323	13.88	7.07	31.08	747	40.5	53.2	0.91
	1328	13.88	7.13	31.09	741	36.7	51.0	0.95
	1333	13.88	7.15	31.05	729	31.4	51.9	1.08
	1338	13.89	7.19	31.07	723	30.6	48.4	1.10
7MW10 09/22/03	1152	5.39	7.10	30.08	7,476	37.7	-96.8	0.87
	1159	5.40	7.22	29.83	5,844	5.90	-133.8	0.58
	1205	5.40	7.25	30.04	5,212	1.67	-138.6	0.70
	1210	5.40	7.26	29.89	4,997	0.76	-148.6	0.69
	1216	5.40	7.23	29.86	5,020	0.39	-157.3	0.86
	1222	5.40	7.22	29.98	4,939	0.24	-165.4	0.86
	1228	5.40	7.25	30.01	4,915	0.22	-174.2	0.89
	1234	5.40	7.25	30.01	4,880	0.12	-170.9	0.90
UGW11 09/22/03	1339	8.01	7.13	30.27	12,728	166.0	-19.8	0.71
	1344	8.01	7.87	30.12	1,324	18.2	-21.8	2.85
	1349	8.02	7.73	30.13	875	3.55	0.8	2.98
	1355	8.02	7.69	30.09	775	1.51	10.1	2.99
	1400	8.02	7.67	30.20	700	0.89	18.4	3.03
	1405	8.02	7.64	30.19	665	0.47	21.5	3.03
	1410	8.02	7.66	29.98	634	0.19	20.7	3.03
	1415	8.04	7.66	30.10	608	0.21	20.7	2.93
	1421	8.07	7.66	30.14	582	0.15	22.8	3.02
7MW08 09/22/03	1630	8.20	6.63	31.45	5,913	82.2	-57.8	0.83
	1637	8.20	6.61	31.37	5,213	47.9	-73.8	0.42
	1642	8.20	6.66	31.44	3,886	29.1	-65.9	0.47
	1647	8.21	6.68	31.46	2,285	14.8	-59.3	0.53
	1653	8.21	6.70	31.38	1,258	11.3	-51.1	0.59
	1659	8.21	6.64	31.14	951	9.68	-36.3	0.61
	1705	8.21	6.64	31.07	857	8.25	-17.2	0.68

TABLE 4-3

SUMMARY OF GROUNDWATER FIELD PARAMETERS
TCE PLUME DELINEATION AND SOURCE INVESTIGATION, CTO-268
TOW WAY FUEL FARM
NAVAL STATION ROOSEVELT ROADS, CEIBA, PUERTO RICO
JANUARY 2004

Well ID/ Sample Date	Time Interval	Static Water Level (feet from top of PVC)	pH (S.U.)	Temperature (^oC)	Specific Conductance (umhos/cm)	Turbidity	Oxidation-Reduction Potential (mV)	Dissolved Oxygen (mg/L)
7MW20 09/23/03	0751	6.97	6.73	29.04	844	452	108.0	2.17
	0757	7.35	6.91	29.10	843	444	93.5	2.16
	0803	7.63	6.96	29.05	841	333	89.2	2.22
	0809	7.89	6.98	29.16	843	39.7	79.7	2.25
	0815	8.17	6.97	29.15	837	14.7	75.5	2.22
	0820	8.18	6.99	29.17	833	10.46	71.2	2.36
	0826	8.18	7.06	29.27	825	11.1	65.4	2.46
7MW24 09/24/03	0848	11.36	6.92	31.08	3,513	2.09	75.5	0.93
	0854	11.35	6.80	30.90	3,789	6.40	68.6	0.66
	0900	11.35	6.74	30.83	4,345	4.10	65.7	0.75
	0905	11.35	6.75	30.85	4,530	2.39	62.2	0.70
	0911	11.36	6.77	30.70	4,578	2.26	63.6	0.71
	0917	11.36	6.79	30.84	4,573	1.68	59.0	0.53
	0923	11.38	6.76	30.57	4,544	1.64	59.1	0.56
	0928	11.38	6.78	30.81	4,528	1.63	57.0	0.65
7MW23 09/24/03	1025	8.58	7.27	30.59	5,791	405	45.0	1.04
	1031	8.60	7.20	30.24	5,741	271	45.1	1.08
	1038	8.60	7.23	30.39	5,815	146	40.1	1.08
	1044	8.61	7.21	30.40	5,811	94.0	41.5	1.05
	1050	8.60	7.20	30.51	5,704	47.5	44.7	1.01
	1056	8.60	7.17	30.42	5,602	23.3	47.5	0.97
	1104	8.60	7.21	30.34	5,572	20.1	41.7	0.99
	1110	8.60	7.25	30.49	5,461	17.5	43.2	0.96
	1117	8.60	7.23	30.60	5,318	16.9	43.1	0.93
	1123	8.60	7.21	30.61	5,282	15.0	46.1	0.91

TABLE 4-3

SUMMARY OF GROUNDWATER FIELD PARAMETERS
TCE PLUME DELINEATION AND SOURCE INVESTIGATION, CTO-268
TOW WAY FUEL FARM
NAVAL STATION ROOSEVELT ROADS, CEIBA, PUERTO RICO
JANUARY 2004

Well ID/ Sample Date	Time Interval	Static Water Level (feet from top of PVC)	pH (S.U.)	Temperature (^{o}C)	Specific Conductance (umhos/cm)	Turbidity	Oxidation-Reduction Potential (mV)	Dissolved Oxygen (mg/L)
7MW22 09/25/03	0810	10.85	6.56	30.33	7,606	8.99	104.4	1.12
	0817	10.86	6.63	30.2	7,556	7.45	87.3	1.04
	0823	10.87	6.68	30.47	7,554	8.47	82.3	1.11
	0829	10.87	6.73	30.39	7,592	7.02	78.8	1.38
	0834	10.88	6.69	30.38	7,484	6.57	80.1	1.19
	0841	10.88	6.70	30.38	7,413	4.54	74.5	1.13
	0847	10.88	6.72	30.38	7,458	4.16	75.2	1.16
	0852	10.88	6.73	30.38	7,494	4.12	72.5	1.07
	0858	10.88	6.73	30.38	7,412	4.17	75.8	1.09
7MW21 09/25/03	0845	5.62	7.07	29.33	7,555	60.6	-242.9	0.77
	0851	5.68	7.09	29.44	7,412	48.1	-273.3	0.77
	0858	5.67	7.06	29.59	7,284	13.3	-267.8	0.75
	1003	5.67	7.07	29.52	7,275	7.60	-269.1	0.95
	1010	5.67	7.08	29.62	7,330	4.87	-285.5	0.85
	1016	5.67	7.03	29.58	7,365	2.79	-284.6	0.65
	1023	5.68	7.06	29.67	7,374	2.08	-279.6	0.71
	1030	5.68	7.06	29.70	7,370	1.64	-284.3	0.69
	1037	5.69	7.04	29.58	7,308	1.25	-286.6	0.68

Notes:
PVC - Polyvinyl chloride.
^{o}C - Degrees Centigrade
S.U. - Standard Unit.
umhos/cm - micro ohms per centimeter.
mg/L--milligrams per liter
mV--millivolt

TABLE 5-1

POSITIVE DETECTIONS IN QUALITY ASSURANCE/QUALITY CONTROL SAMPLES
TCE PLUME DELINEATION AND SOURCE INVESTIGATION, CTO-268
TOW WAY FUEL FARM
NAVAL STATION ROOSEVELT ROADS, CEIBA, PUERTO RICO
JANUARY 2004

Site ID	7TCEFB01	7TCEFB02	7TCEFB03	7TCETB01	7TCETB02	7TCETB03	7TCETB04	7TCETB05	7TCEER01	7TCEER02	7TCEER03
Sample ID	7TCEFB01	7TCEFB02	7TCEFB03	7TCETB01	7TCETB02	7TCETB03	7TCETB04	7TCETB05	7TCEER01	7TCEER02	7TCEER03
Sample Date	09/17/03	09/17/03	09/17/03	09/16/03	09/17/03	09/19/03	09/23/03	09/24/03	09/23/03	09/23/03	09/23/03
Identifier	Field Blank	Field Blank	Field Blank	Trip Blank	Trip Blank	Trip Blank	Trip Blank	Trip Blank	Equipment Rinsate Blank	Equipment Rinsate Blank	Equipment Rinsate Blank
Volatile Organic Compounds (ug/L)											
Chloroform	5 U	5 U	160	1 U	5 U	1 U	1 U	1 U	1 U	1 U	1 U
Chloromethane	5 U	5 U	5 U	0.7 J	5 U	1 U	1 U	1 U	1 U	1 U	1 U
Methylene chloride	5 U	0.86 J	5 U	4.2 J	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Trichloroethene	5 U	5 U	5 U	1 U	5 U	1 U	1 U	0.34 J	1 U	1 U	1 U

Notes:
ug/L--micrograms per liter
U--non-detect
J--estimated concentration

TABLE 5-2

POSITIVE DETECTIONS IN SUBSURFACE SOIL SAMPLES
TCE PLUME DELINEATION AND SOURCE INVESTIGATION, CTO-268
TOW WAY FUEL FARM
NAVAL STATION ROOSEVELT ROADS, CEIBA, PUERTO RICO
JANUARY 2004

Site ID	7TCESB01-01	7TCESB01-03	7TCESB03-03	7TCESB03-04	7TCESB04-02	7TCESB04-04	7TCESB05-05
Sample ID	7TCESB01-01	7TCESB01-03	7TCESB03-03	7TCESB03-04	7TCESB04-02	7TCESB04-04	7TCESB05-05
Sample Date	09/17/03	09/17/03	09/15/03	09/15/03	09/17/03	09/17/03	09/13/03
Volatile Organic Compounds (ug/kg dw)							
Trichloroethene	3.6 U	4 U	5.4 U	4.2 U	3.6 U	3.5 U	110

Notes:
ug/kg dw--micrograms per kilogram, dry weight
U--non-detect
J--estimated concentration

TABLE 5-2

POSITIVE DETECTIONS IN SUBSURFACE SOIL SAMPLES
TCE PLUME DELINEATION AND SOURCE INVESTIGATION, CTO-268
TOW WAY FUEL FARM
NAVAL STATION ROOSEVELT ROADS, CEIBA, PUERTO RICO
JANUARY 2004

Site ID	7TCESB06-01	7TCESB06-03	7TCESB06-03	7TCESB07-01	7TCESB08-02	7TCESB08-05	7TCESB09-01
Sample ID	7TCESB06-01	7TCESB06-03	7TCESB06-03D	7TCESB07-01	7TCESB08-02	7TCESB08-05	7TCESB09-01
Sample Date	09/17/03	09/17/03	09/17/03	09/17/03	09/13/03	09/13/03	09/17/03
Volatile Organic Compounds (ug/kg dw)							
Trichloroethene	5.4 U	4.3 U	3.6 U	5.8 U	4.8 U	2.8 U	4.5 U

Notes:
ug/kg dw--micrograms per kilogram, dry weight
U--non-detect
J--estimated concentration

TABLE 5-3

POSITIVE DETECTIONS IN GROUNDWATER SAMPLES
TCE PLUME DELINEATION AND SOURCE INVESTIGATION, CTO-268
TOW WAY FUEL FARM
NAVAL STATION ROOSEVELT ROADS, CEIBA, PUERTO RICO
JANUARY 2004

Site ID Sample ID Sample Date	**Federal MCL (ug/L)**	USEPA Region III Tap Water RBC (ug/L)	***Corrective Action Objective (ug/L)***	7TCETW201 7TCETW201 09/16/03	7TCETW202 7TCETW202 09/16/03	7TCETW203 7TCETW203 09/16/03	7TCETW203 7TCETW203D 09/16/03	7TCETW204 7TCETW204 09/18/03
Volatile Organic Compounds (ug/L)								
1,1,1-Trichloroethane	**200**	320	***NE***	1 U	1 U	1 U	1 U	1 U
1,1,2-Trichloroethane	**5**	0.19	***NE***	1 U	0.42 J	1 U	0.89 J	1 U
1,1-Dichloroethene	**7**	35	***NE***	1 U	1 U	1 U	1 U	0.56 J
1,2-Dichloroethane	**5**	0.12	***NE***	1 U	0.51 J	1 U	0.89 J	1 U
Chloromethane (Methyl Chloride)	**NE**	19	***NE***	1 U	1.3 U	1 U	1 U	1 U
cis-1,2-Dichloroethene	**70**	6.1	***NE***	1 U	1 U	1 U	1 U	**83**
Tetrachloroethene	**5**	0.1	***NE***	1 U	0.5 J	1 U	1 U	1 U
trans-1,2-Dichloroethene	**100**	12	***NE***	1 U	1 U	1 U	1 U	1.1
Trichloroethene	**5**	0.026	***22***	1 U	0.26 J	1 U	0.21 J	**14**

NE--not established
RBC--Risk Based Concentration
MCL--Maximum Contaminant Level
ug/L--micrograms per liter
U--not detected
J--estimated concentration

TABLE 5-3

POSITIVE DETECTIONS IN GROUNDWATER SAMPLES
TCE PLUME DELINEATION AND SOURCE INVESTIGATION, CTO-268
TOW WAY FUEL FARM
NAVAL STATION ROOSEVELT ROADS, CEIBA, PUERTO RICO
JANUARY 2004

Site ID Sample ID Sample Date	**Federal MCL (ug/L)**	USEPA Region III Tap Water RBC (ug/L)	***Corrective Action Objective (ug/L)***	7TCETW205 7TCETW205 09/18/03	7TCETW206 7TCETW206 09/19/03	7TCETW207 7TCETW207 09/19/03	7TCETW208 7TCETW208 09/25/03	7TCETW209 7TCETW209 09/24/03
Volatile Organic Compounds (ug/L)								
1,1,1-Trichloroethane	**200**	320	***NE***	1 U	0.18 J	1 U	1 U	1 U
1,1,2-Trichloroethane	**5**	0.19	***NE***	1 U	1 U	1 U	1 U	1 U
1,1-Dichloroethene	**7**	35	***NE***	3.8	1 U	1 U	1 U	0.87 J
1,2-Dichloroethane	**5**	0.12	***NE***	1 U	1 U	1 U	1 U	1 U
Chloromethane (Methyl Chloride)	**NE**	19	***NE***	1 U	0.4 J	1 U	1 U	1 U
cis-1,2-Dichloroethene	**70**	6.1	***NE***	1 U	0.36 J	1 U	1 U	1 U
Tetrachloroethene	**5**	0.1	***NE***	1 U	4.5	0.51 J	1 U	1 U
trans-1,2-Dichloroethene	**100**	12	***NE***	1 U	1 U	1 U	1 U	1 U
Trichloroethene	**5**	0.026	***22***	0.32 J	***66***	0.2 J	0.68 U	1 U

NE--not established
RBC--Risk Based Concentration
MCL--Maximum Contaminant Level
ug/L--micrograms per liter
U--not detected
J--estimated concentration

TABLE 5-3

POSITIVE DETECTIONS IN GROUNDWATER SAMPLES
TCE PLUME DELINEATION AND SOURCE INVESTIGATION, CTO-268
TOW WAY FUEL FARM
NAVAL STATION ROOSEVELT ROADS, CEIBA, PUERTO RICO
JANUARY 2004

Site ID Sample ID Sample Date	**Federal MCL (ug/L)**	USEPA Region III Tap Water RBC (ug/L)	***Corrective Action Objective (ug/L)***	7TCETW210 7TCETW210 09/25/03	7MW07 7MW07 09/16/03	7MW08 7MW08 09/22/03	7MW10 7MW10 09/22/03	7MW20 7MW20 09/23/03
Volatile Organic Compounds (ug/L)								
1,1,1-Trichloroethane	**200**	320	***NE***	1 U	100 U	1 U	1 U	1 U
1,1,2-Trichloroethane	**5**	0.19	***NE***	1 U	100 U	1 U	1 U	1 U
1,1-Dichloroethene	**7**	35	***NE***	1 U	100 U	1 U	1 U	1 U
1,2-Dichloroethane	**5**	0.12	***NE***	1 U	100 U	1 U	1 U	1 U
Chloromethane (Methyl Chloride)	**NE**	19	***NE***	1 U	100 U	1 U	1 U	1 U
cis-1,2-Dichloroethene	**70**	6.1	***NE***	1 U	41 J	1 U	1 U	1 U
Tetrachloroethene	**5**	0.1	***NE***	1 U	100 U	1 U	1 U	1 U
trans-1,2-Dichloroethene	**100**	12	***NE***	1 U	100 U	1 U	1 U	1 U
Trichloroethene	**5**	0.026	***22***	1 U	***1,800***	0.15 J	1 U	1 U

NE--not established
RBC--Risk Based Concentration
MCL--Maximum Contaminant Level
ug/L--micrograms per liter
U--not detected
J--estimated concentration

TABLE 5-3

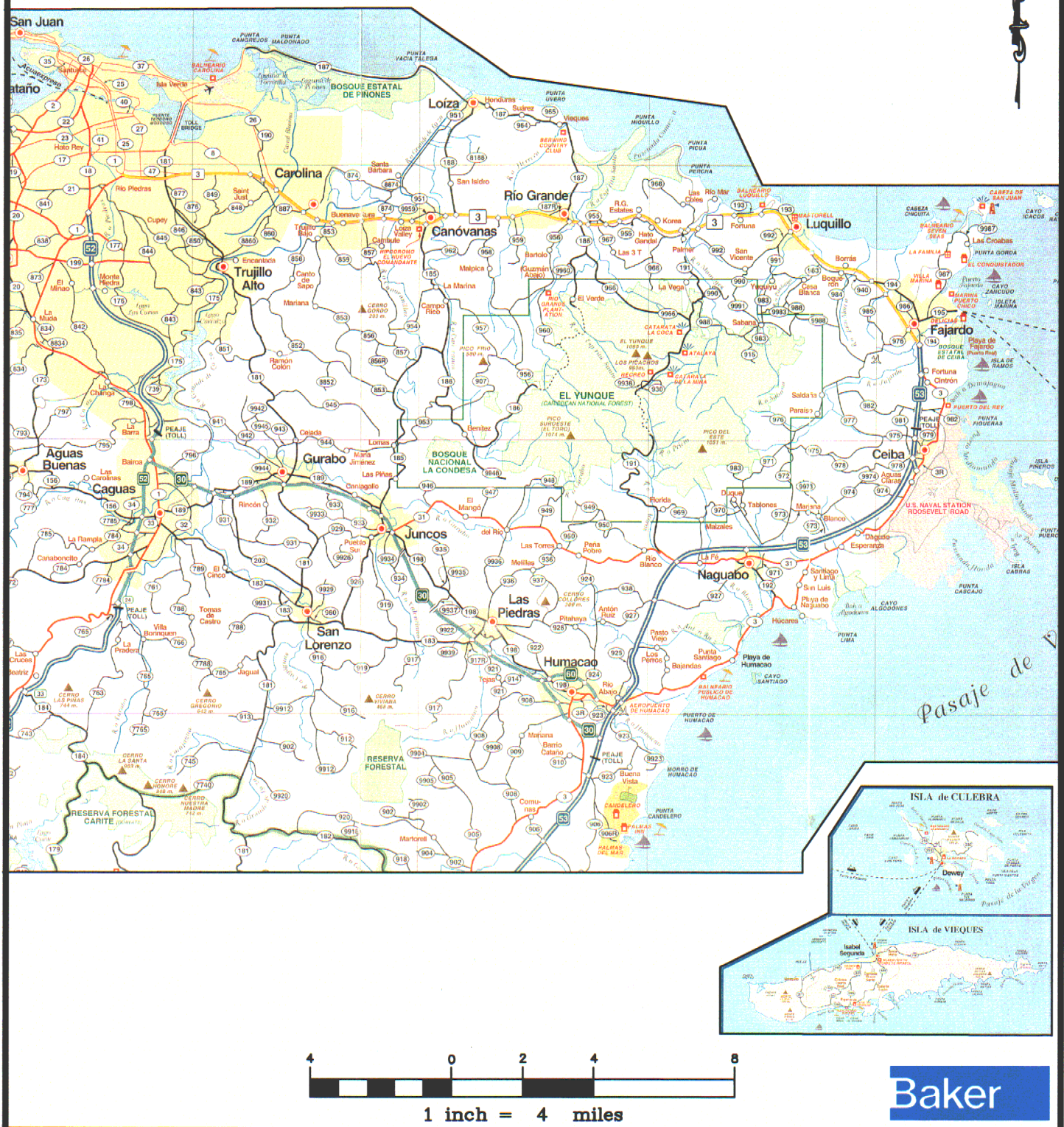
POSITIVE DETECTIONS IN GROUNDWATER SAMPLES
TCE PLUME DELINEATION AND SOURCE INVESTIGATION, CTO-268
TOW WAY FUEL FARM
NAVAL STATION ROOSEVELT ROADS, CEIBA, PUERTO RICO
JANUARY 2004

Site ID Sample ID Sample Date	**Federal MCL (ug/L)**	USEPA Region III Tap Water RBC (ug/L)	***Corrective Action Objective (ug/L)***	7MW20 7MW20D 09/23/03	7MW21 7MW21 09/25/03	7MW22 7MW22 09/25/03	7MW23 7MW23 09/24/03	7MW24 7MW24 09/24/03	UGW11 UGW11 09/22/03
Volatile Organic Compounds (ug/L)									
1,1,1-Trichloroethane	**200**	320	***NE***	1 U	1 U	1 U	1 U	1 U	1 U
1,1,2-Trichloroethane	**5**	0.19	***NE***	1 U	1 U	1 U	1 U	0.22 J	1 U
1,1-Dichloroethene	**7**	35	***NE***	1 U	1 U	5	1 U	2.5	1 U
1,2-Dichloroethane	**5**	0.12	***NE***	1 U	1 U	1 U	1 U	1 U	1 U
Chloromethane (Methyl Chloride)	**NE**	19	***NE***	1 U	1 U	1 U	1 U	1 U	1 U
cis-1,2-Dichloroethene	**70**	6.1	***NE***	1 U	1 U	1 U	1 U	1.5	1 U
Tetrachloroethene	**5**	0.1	***NE***	1 U	1 U	1 U	1 U	1 U	1 U
trans-1,2-Dichloroethene	**100**	12	***NE***	1 U	1 U	1 U	1 U	1 U	1 U
Trichloroethene	**5**	0.026	***22***	1 U	1.4 U	0.44 U	***87***	***1,600***	1 U

NE--not established
RBC--Risk Based Concentration
MCL--Maximum Contaminant Level
ug/L--micrograms per liter
U--not detected
J--estimated concentration

FIGURES

100299F10



4 0 2 4 8

1 inch = 4 miles

Baker

FIGURE 2–1
REGIONAL LOCATION MAP

NAVAL STATION ROOSEVELT ROADS
PUERTO RICO

SOURCE: METRODATA, INC., 1999.

k:\CH2M HILL\CTO268 (100299)\DRAFT TCE INV REPORT\CAD FIGURES\100299F12

Baker

LEGEND

1 – SWMUs

AOC D – AOCs

– AREA OF WHICH THIS INVESTIGATION PERTAINS TO

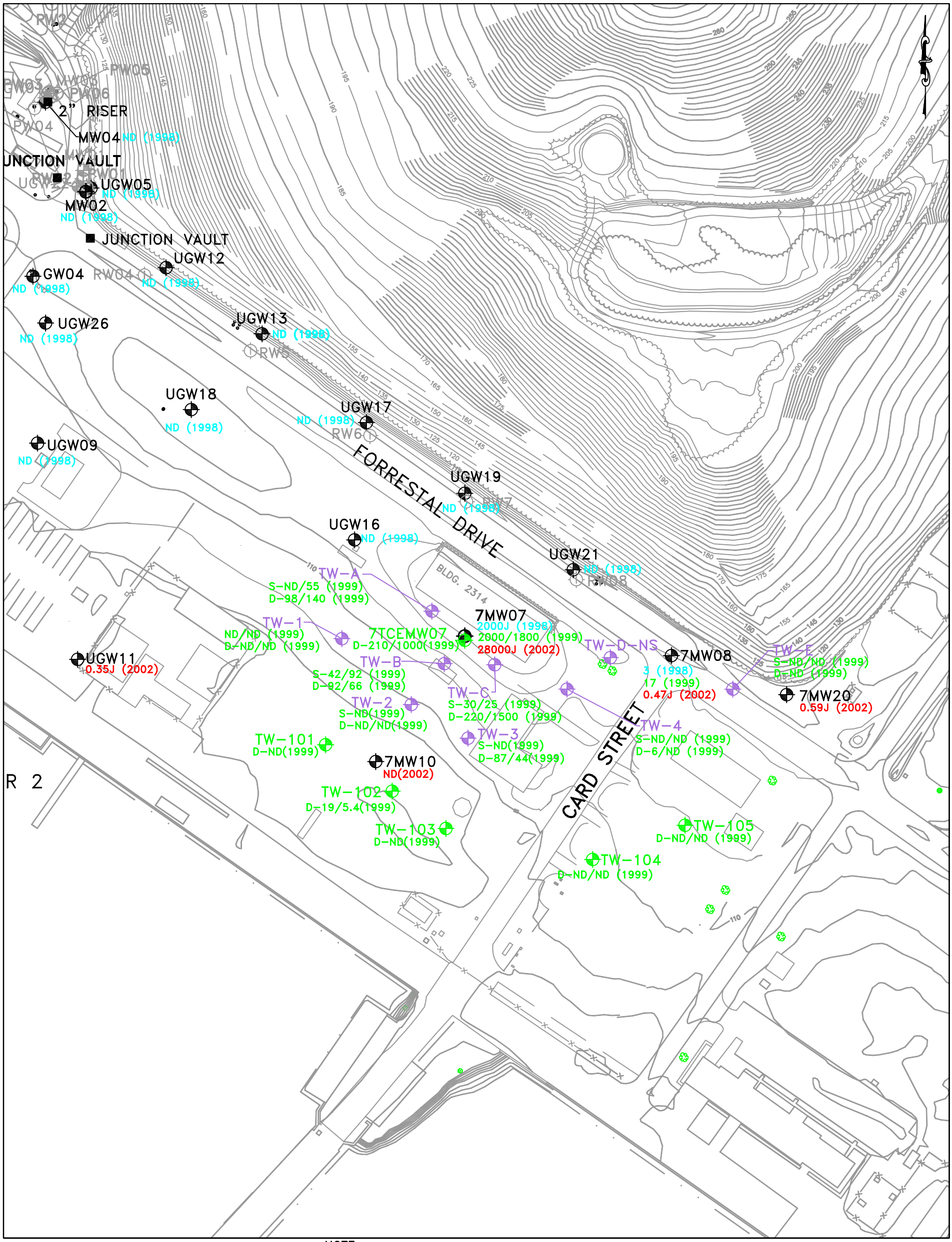
SOURCE: GEO-MARINE, INC., SEPTEMBER 6, 2000.

2500 0 1250 2500

1 inch = 2500 ft.

FIGURE 2-2
TCE INVESTIGATION AREA
TOW WAY FUEL FARM

NAVAL STATION ROOSEVELT ROADS
PUERTO RICO



120 0 60 120
1 inch = 120 ft.

NOTE:
DATUM PLAN USED IS MEAN LOW WATER = 100.00 FT.
AS ESTABLISHED BY U.S. NAVY SURVEY SECTION AS
OF NOVEMBER 1941. LOCATION OF TW-105 APPROXIMATED.

Baker

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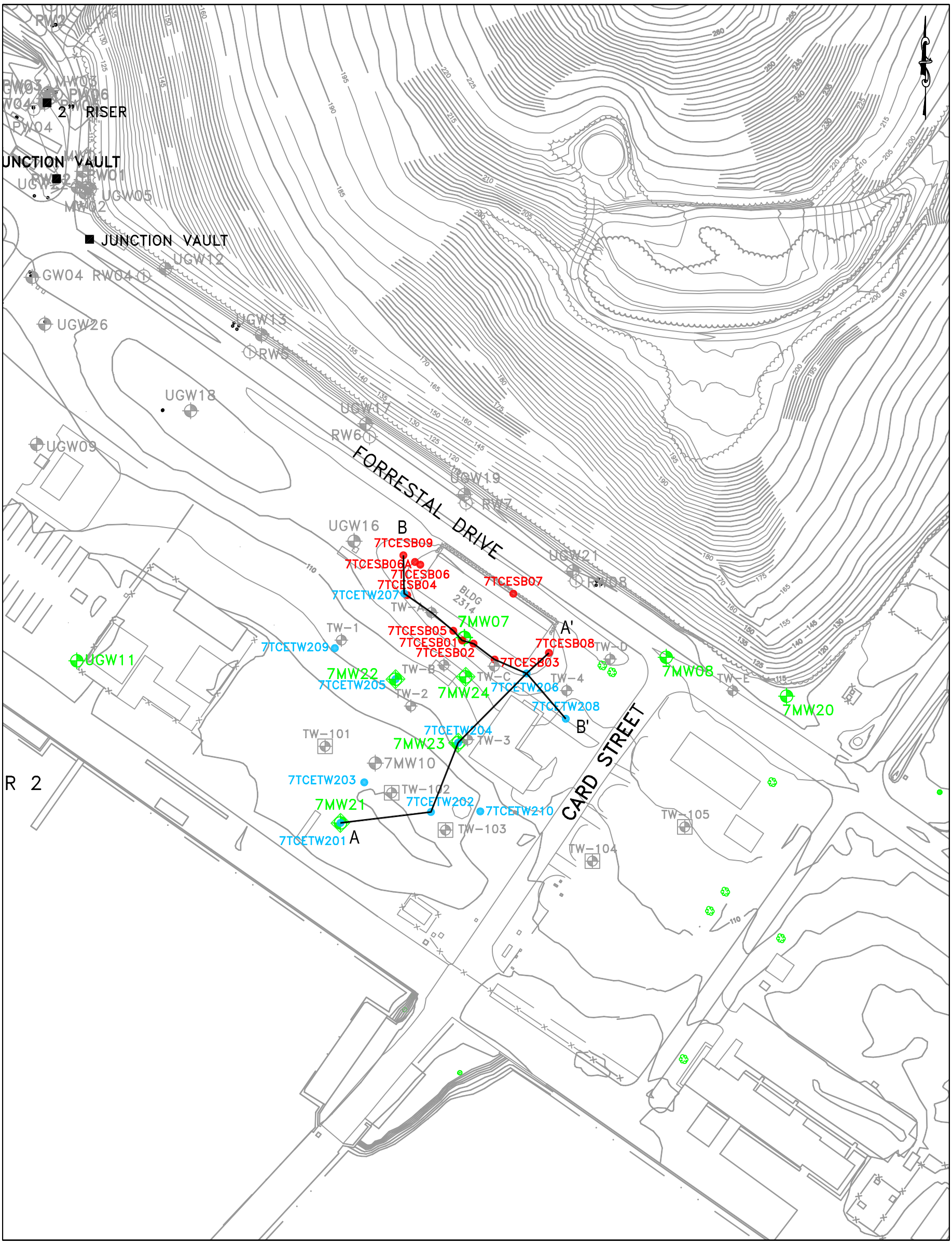
LEGEND
- EXISTING MONITOR WELL LOCATION
- 1999 TEMPORARY MONITOR WELL LOCATION (SHALLOW AND DEEP)
- 1999 TEMPORARY MONITOR WELL LOCATION (DEEP ONLY)
ND - NOT DETECTED
NS - NOT SAMPLED
S - SHALLOW WELL
D - DEEP WELL
J - ESTIMATED CONCENTRATION
1998 AND 2002 CONCENTRATIONS ARE STATESIDE LABORATORY ONLY
1999 CONCENTRATIONS ARE ONSITE / STATESIDE LABORATORY IF APPLICABLE,
1999 SINGLE VALUES ARE ONSITE LABORATORY ONLY

SOURCE: LANTDIV, FEB. 1992/1997

FIGURE 2-3
TCE CONCENTRATIONS FROM ALL
PREVIOUS INVESTIGATIONS
TOW WAY FUEL FARM
TCE INVESTIGATION REPORT, JANUARY 2004
NAVAL STATION ROOSEVELT ROADS
PUERTO RICO



120 0 60 120

1 inch = 120 ft.

NOTE:
–DATUM PLAN USED IS MEAN LOW WATER = 100.00 FT. AS ESTABLISHED BY U.S. NAVY SURVEY SECTION AS OF NOVEMBER 1941.

Baker

100299F02

SOURCE: LANTDIV, FEB. 1992/1997

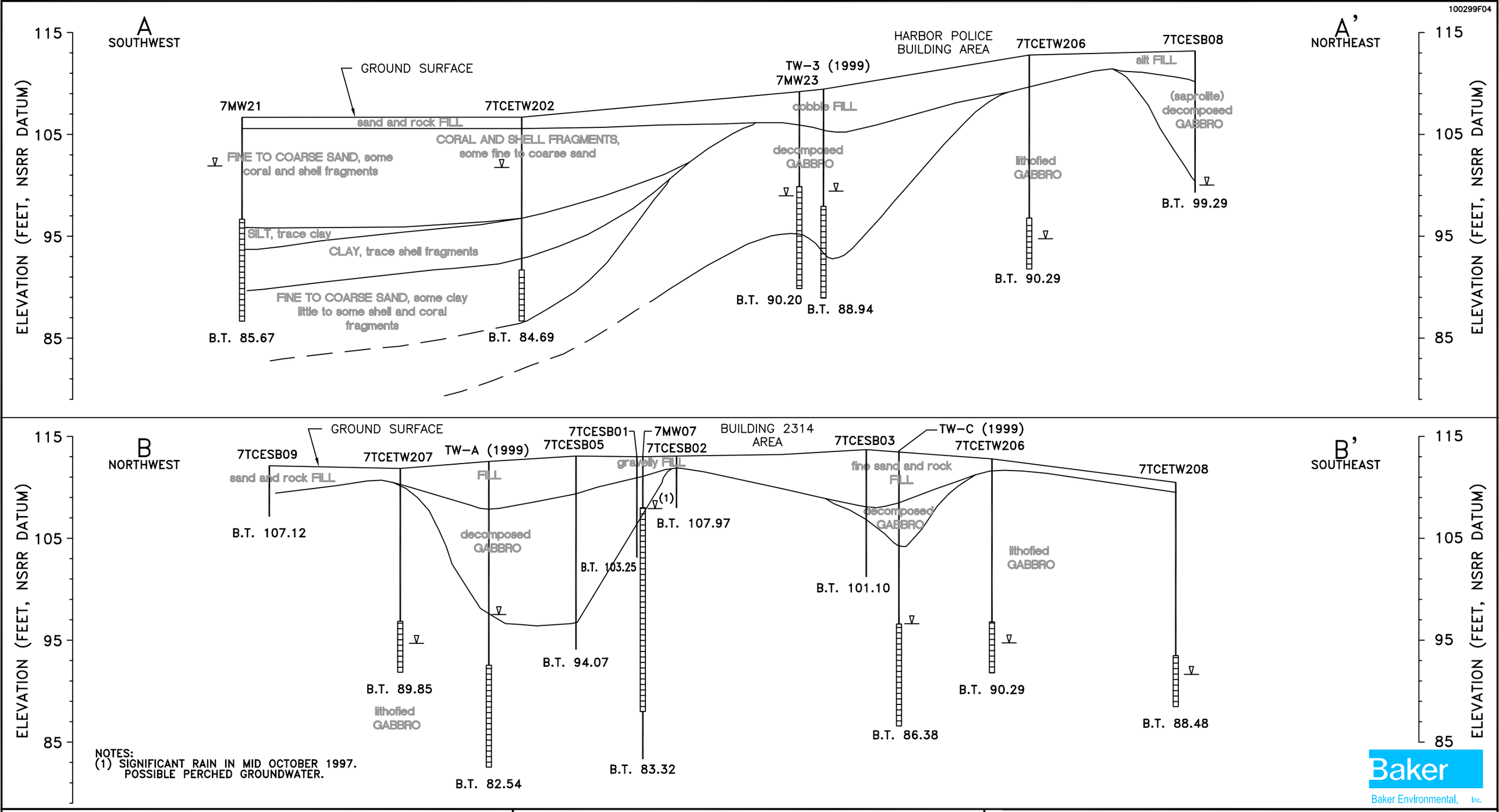
LEGEND

- EXISTING MONITOR WELL
- EXISTING MONITOR WELL LOCATION TO BE SAMPLED
- TEMPORARY WELL LOCATION – 2003
- SOIL SAMPLE LOCATION – 2003
- NEW MONITOR WELL LOCATION – 2003
- TEMPORARY MONITORING WELL LOCATION (SHALLOW AND DEEP) (1999)
- TEMPORARY MONITORING WELL LOCATION (DEEP ONLY) (1999)

FIGURE 3–1
GEOLOGIC CROSS–SECTION LOCATION MAP
TOW WAY FUEL FARM
TCE INVESTIGATION REPORT, JANUARY 2004

NAVAL STATION ROOSEVELT ROADS
PUERTO RICO

100299F04



NOTES:
(1) SIGNIFICANT RAIN IN MID OCTOBER 1997. POSSIBLE PERCHED GROUNDWATER.

Baker
Baker Environmental, Inc.

LEGEND

- GROUNDWATER ENCOUNTERED DURING DRILLING
- B.T. 83.32 BORING TERMINATED, ELEVATION (FEET NSRR DATUM)
- GROUNDWATER MONITORING WELL SCREEN INTERVAL
- ESTIMATED
- PROJECTED

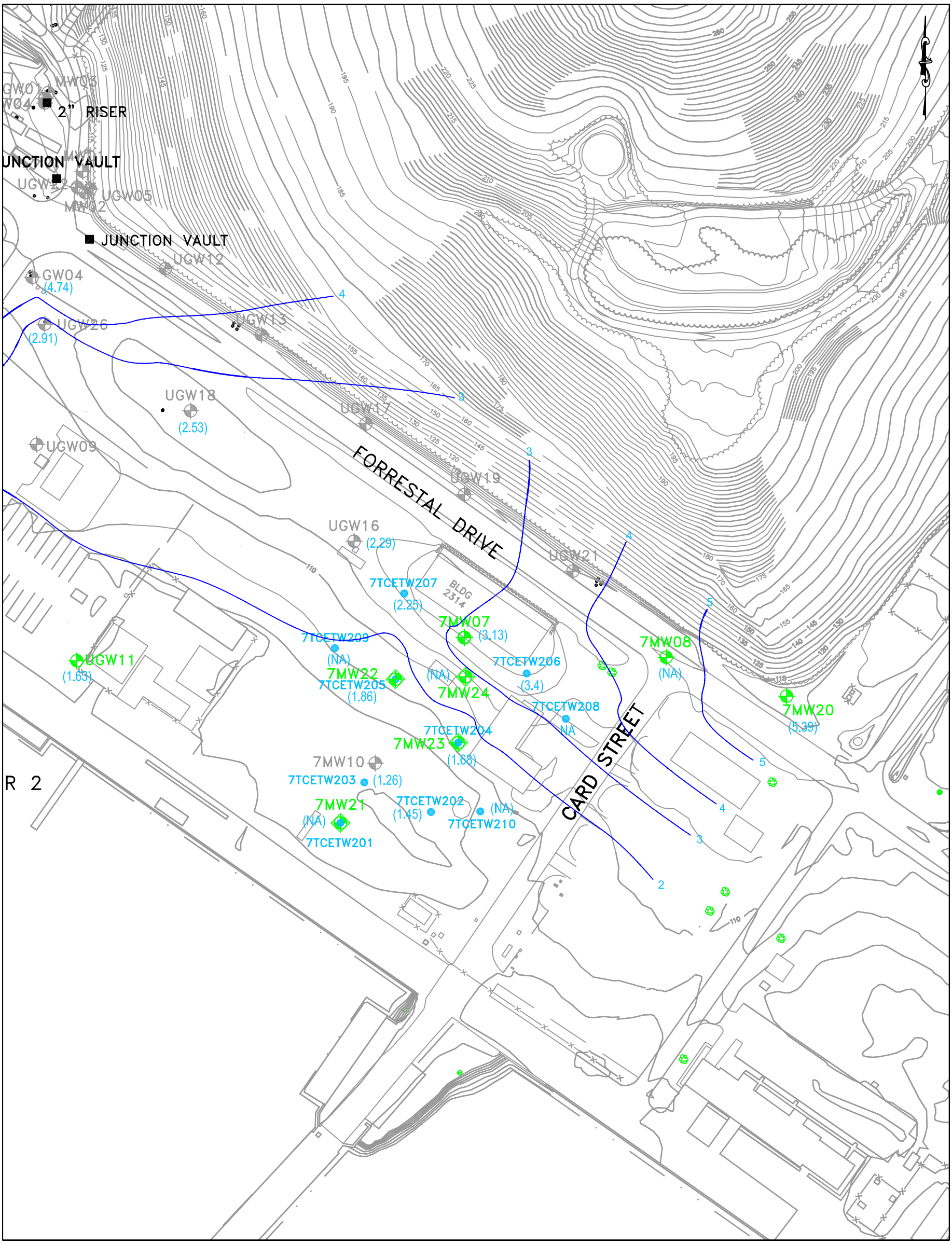
40 0 20 40 80
Horizontal Scale: 1 inch = 40 ft.

10 0 5 10 20
Vertical Scale: 1 inch = 10 ft.

THE SOIL BORING INFORMATION IS CONSIDERED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT THE RESPECTIVE BORING LOCATIONS. SUBSURFACE CONDITIONS INTERPOLATED BETWEEN BORINGS ARE ESTIMATED BASED ON ACCEPTED SOIL ENGINEERING PRINCIPLES AND GEOLOGIC JUDGEMENT.

FIGURE 3-2
GEOLOGIC CROSS-SECTIONS A-A' AND B-B'
TOW WAY FUEL FARM
TCE INVESTIGATION REPORT, JANUARY 2004

NAVAL STATION ROOSEVELT ROADS
PUERTO RICO



120 0 60 120

1 inch = 120 ft.

100299F03

NOTE:
–DATUM PLAN USED IS MEAN LOW WATER = 100.00 FT. AS ESTABLISHED BY U.S. NAVY SURVEY SECTION AS OF NOVEMBER 1941.

SOURCE: LANTDIV, FEB. 1992/1997

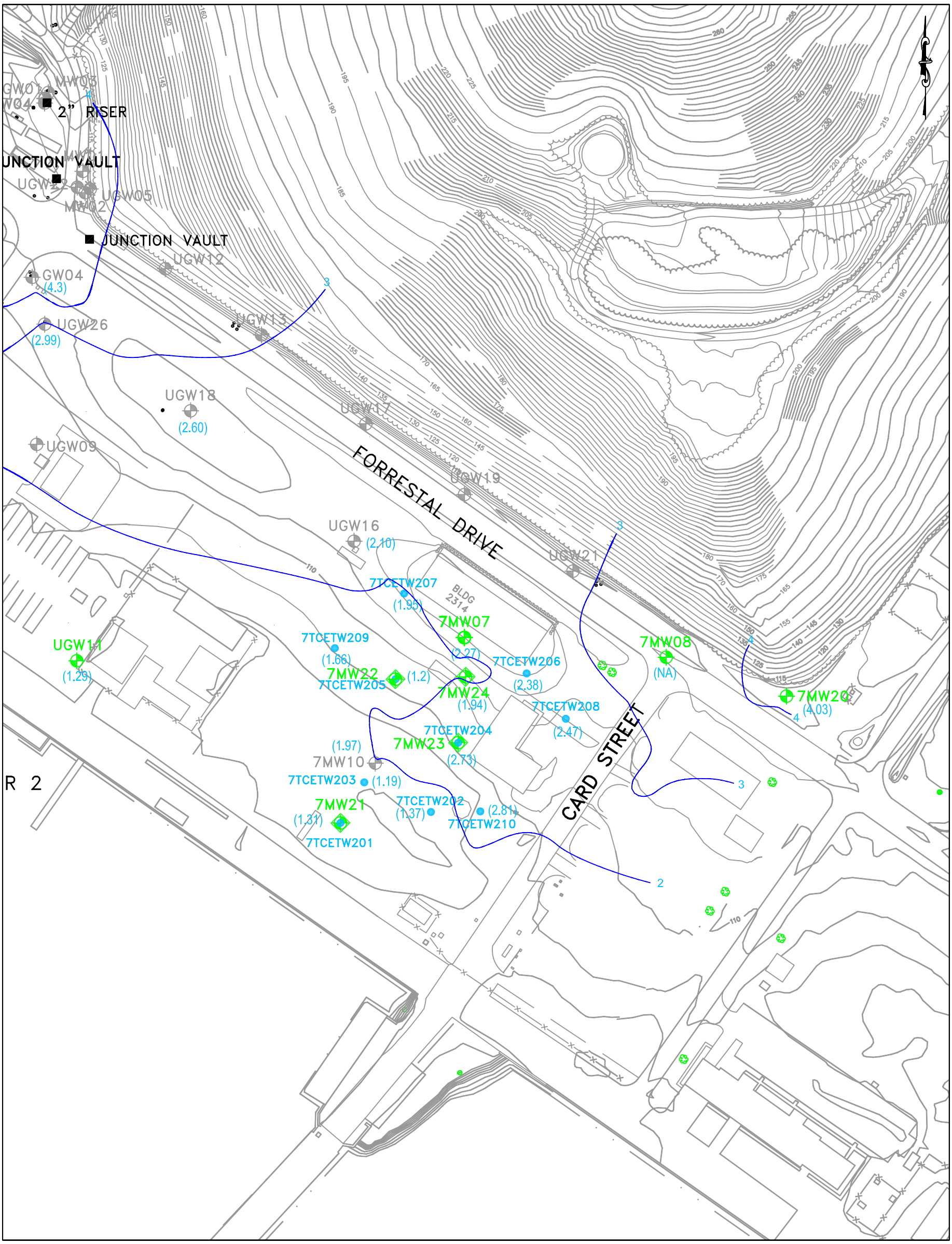
Baker

LEGEND

- – EXISTING MONITOR WELL
- – EXISTING MONITOR WELL – SAMPLED 2003
- – TEMPORARY WELL LOCATION – 2003
- – NEW MONITOR WELL LOCATION – 2003
- NA – NOT AVAILABLE
- (1.51) – GROUNDWATER ELEVATION (FEET, ABOVE MSL)
- —4— – GROUNDWATER ELEVATION CONTOUR (FEET, ABOVE MSL)

FIGURE 3–3
GROUNDWATER ELEVATIONS, SEPTEMBER 22, 2003
TOW WAY FUEL FARM
TCE INVESTIGATION REPORT, JANUARY 2004

NAVAL STATION ROOSEVELT ROADS
PUERTO RICO



NOTE:
–DATUM PLAN USED IS MEAN LOW WATER = 100.00 FT. AS ESTABLISHED BY U.S. NAVY SURVEY SECTION AS OF NOVEMBER 1941.

120 0 60 120
1 inch = 120 ft.

100299F05

SOURCE: LANTDIV, FEB. 1992/1997

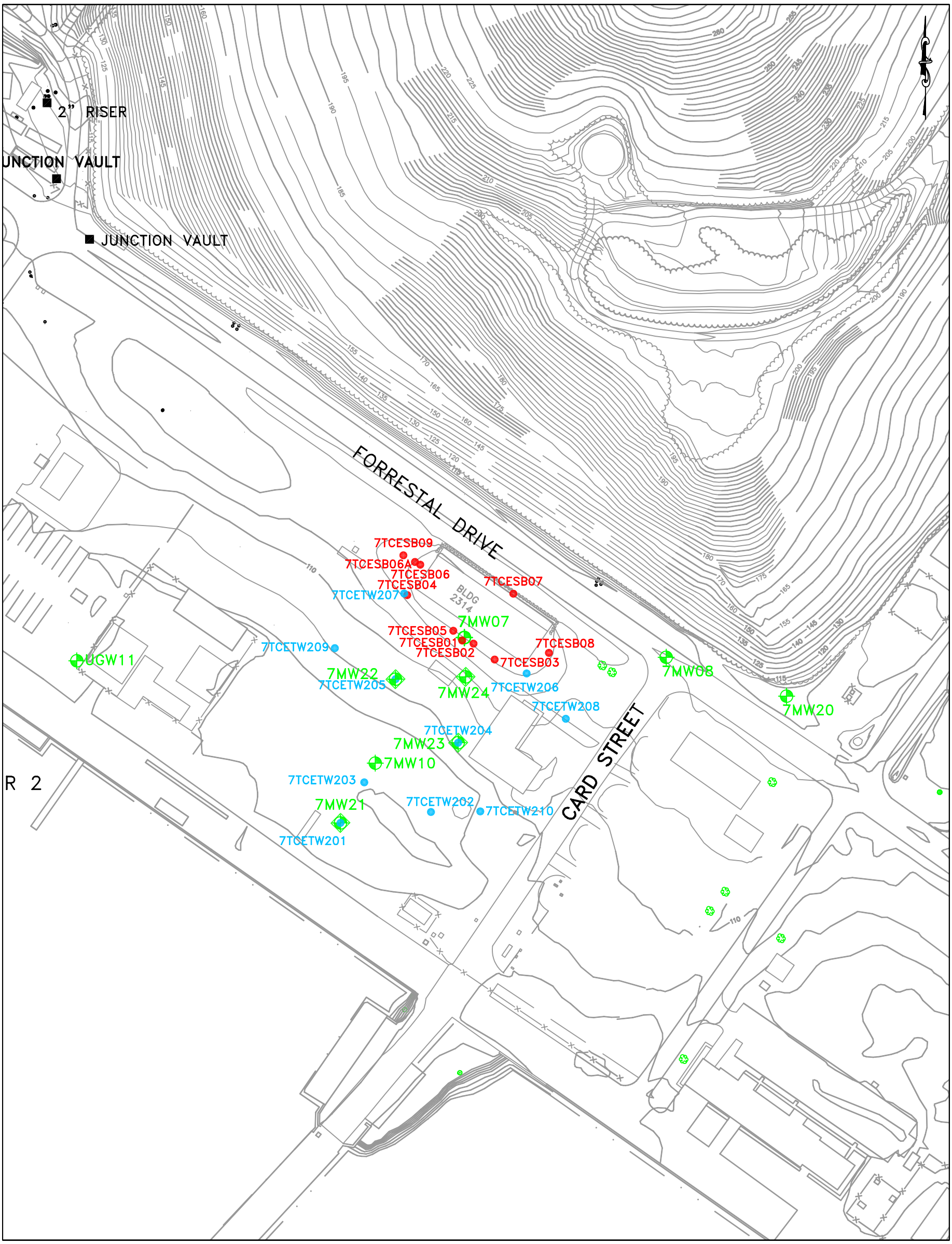
Baker

LEGEND

- EXISTING MONITOR WELL
- EXISTING MONITOR WELL – SAMPLED 2003
- TEMPORARY WELL LOCATION – 2003
- NEW MONITOR WELL LOCATION – 2003
- NA – NOT AVAILABLE
- (1.31) – GROUNDWATER ELEVATION (FEET, ABOVE MSL)
- —4— – GROUNDWATER ELEVATION CONTOUR (FEET, ABOVE MSL)

FIGURE 3–4
GROUNDWATER ELEVATIONS, SEPTEMBER 25, 2003
TOW WAY FUEL FARM
TCE INVESTIGATION REPORT, JANUARY 2004

NAVAL STATION ROOSEVELT ROADS
PUERTO RICO



120 0 60 120

1 inch = 120 ft.

100299F01

NOTE:
–DATUM PLAN USED IS MEAN LOW WATER = 100.00 FT. AS ESTABLISHED BY U.S. NAVY SURVEY SECTION AS OF NOVEMBER 1941.

SOURCE: LANTDIV, FEB. 1992/1997

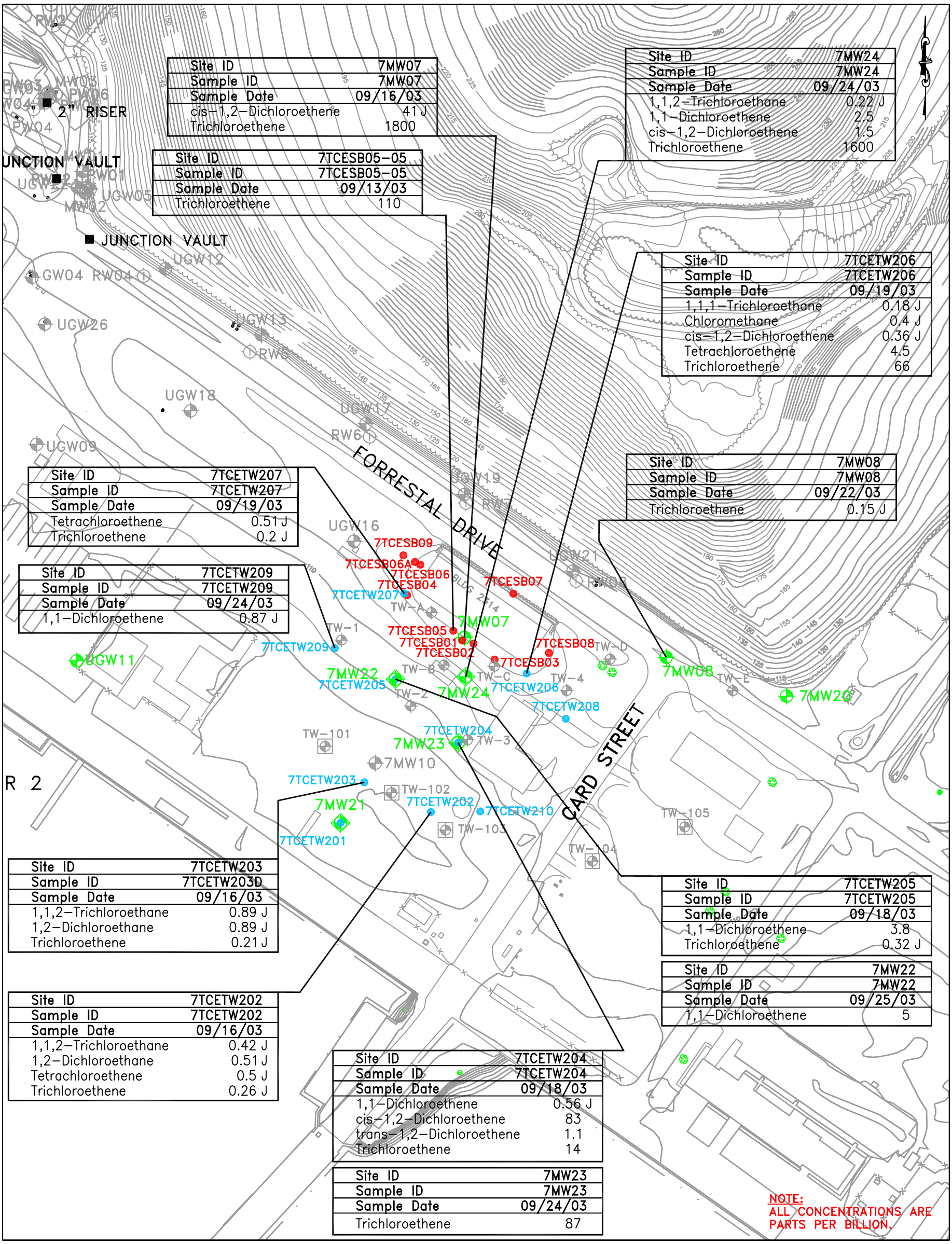
Baker

LEGEND

- EXISTING MONITOR WELL – SAMPLED 2003
- TEMPORARY WELL LOCATION – 2003
- SOIL SAMPLE LOCATION – 2003
- NEW MONITOR WELL LOCATION

FIGURE 4–1
SOIL AND GROUNDWATER SAMPLING LOCATIONS
TOW WAY FUEL FARM
TCE INVESTIGATION REPORT, JANUARY 2004

NAVAL STATION ROOSEVELT ROADS
PUERTO RICO



Site ID	7MW07
Sample ID	7MW07
Sample Date	09/16/03
cis-1,2-Dichloroethene	41 J
Trichloroethene	1800

Site ID	7TCESB05-05
Sample ID	7TCESB05-05
Sample Date	09/13/03
Trichloroethene	110

Site ID	7MW24
Sample ID	7MW24
Sample Date	09/24/03
1,1,2-Trichloroethane	0.22 J
1,1-Dichloroethene	2.5
cis-1,2-Dichloroethene	1.5
Trichloroethene	1600

Site ID	7TCETW206
Sample ID	7TCETW206
Sample Date	09/19/03
1,1,1-Trichloroethane	0.18 J
Chloromethane	0.4 J
cis-1,2-Dichloroethene	0.36 J
Tetrachloroethene	4.5
Trichloroethene	66

Site ID	7TCETW207
Sample ID	7TCETW207
Sample Date	09/19/03
Tetrachloroethene	0.51 J
Trichloroethene	0.2 J

Site ID	7MW08
Sample ID	7MW08
Sample Date	09/22/03
Trichloroethene	0.15 J

Site ID	7TCETW209
Sample ID	7TCETW209
Sample Date	09/24/03
1,1-Dichloroethene	0.87 J

Site ID	7TCETW203
Sample ID	7TCETW203D
Sample Date	09/16/03
1,1,2-Trichloroethane	0.89 J
1,2-Dichloroethane	0.89 J
Trichloroethene	0.21 J

Site ID	7TCETW205
Sample ID	7TCETW205
Sample Date	09/18/03
1,1-Dichloroethene	3.8
Trichloroethene	0.32 J

Site ID	7MW22
Sample ID	7MW22
Sample Date	09/25/03
1,1-Dichloroethene	5

Site ID	7TCETW202
Sample ID	7TCETW202
Sample Date	09/16/03
1,1,2-Trichloroethane	0.42 J
1,2-Dichloroethane	0.51 J
Tetrachloroethene	0.5 J
Trichloroethene	0.26 J

Site ID	7TCETW204
Sample ID	7TCETW204
Sample Date	09/18/03
1,1-Dichloroethene	0.56 J
cis-1,2-Dichloroethene	83
trans-1,2-Dichloroethene	1.1
Trichloroethene	14

Site ID	7MW23
Sample ID	7MW23
Sample Date	09/24/03
Trichloroethene	87

NOTE:
ALL CONCENTRATIONS ARE PARTS PER BILLION.

120 0 60 120
1 inch = 120 ft.

NOTE:
-DATUM PLAN USED IS MEAN LOW WATER = 100.00 FT. AS ESTABLISHED BY U.S. NAVY SURVEY SECTION AS OF NOVEMBER 1941.

100299F06

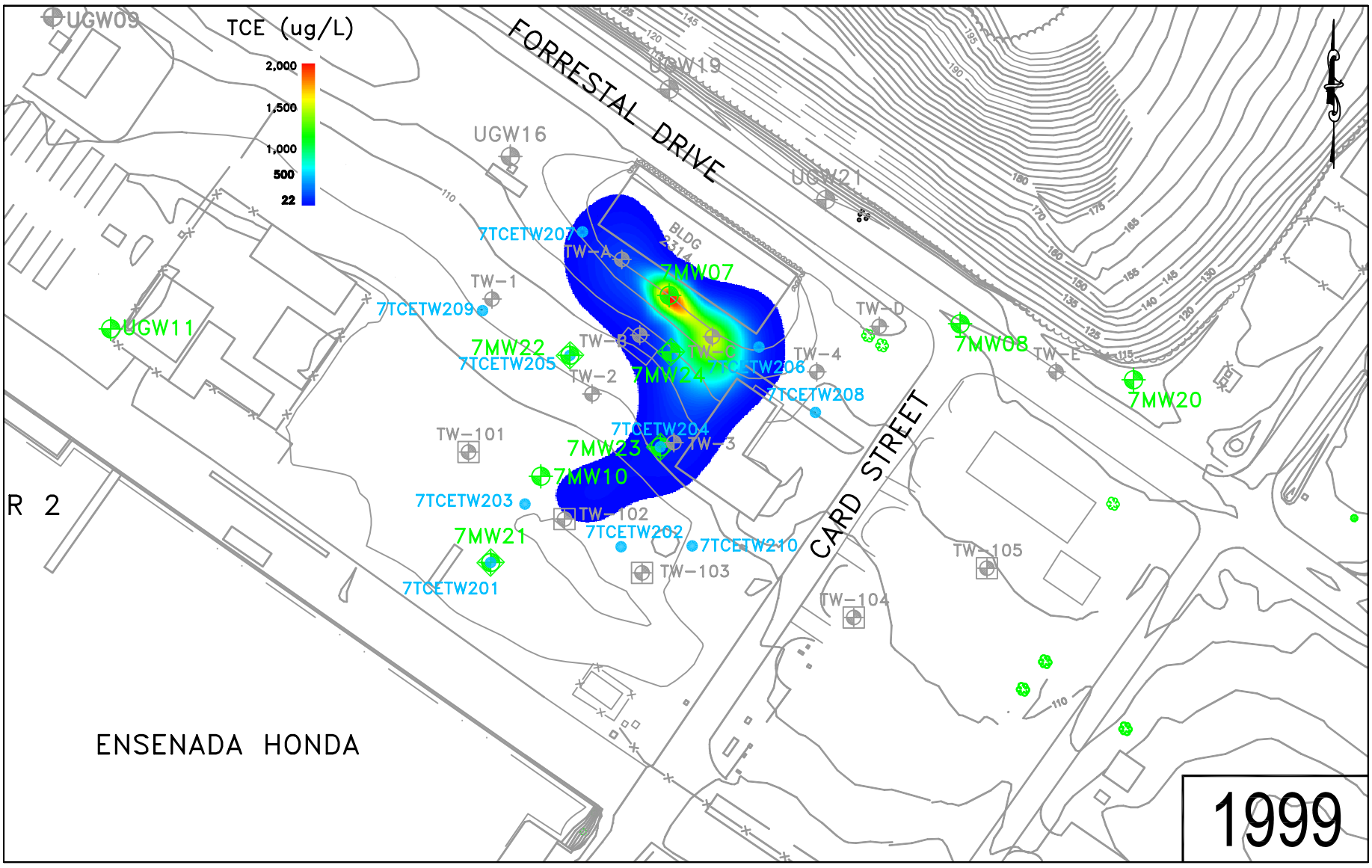
SOURCE: LANTDIV, FEB. 1992/1997

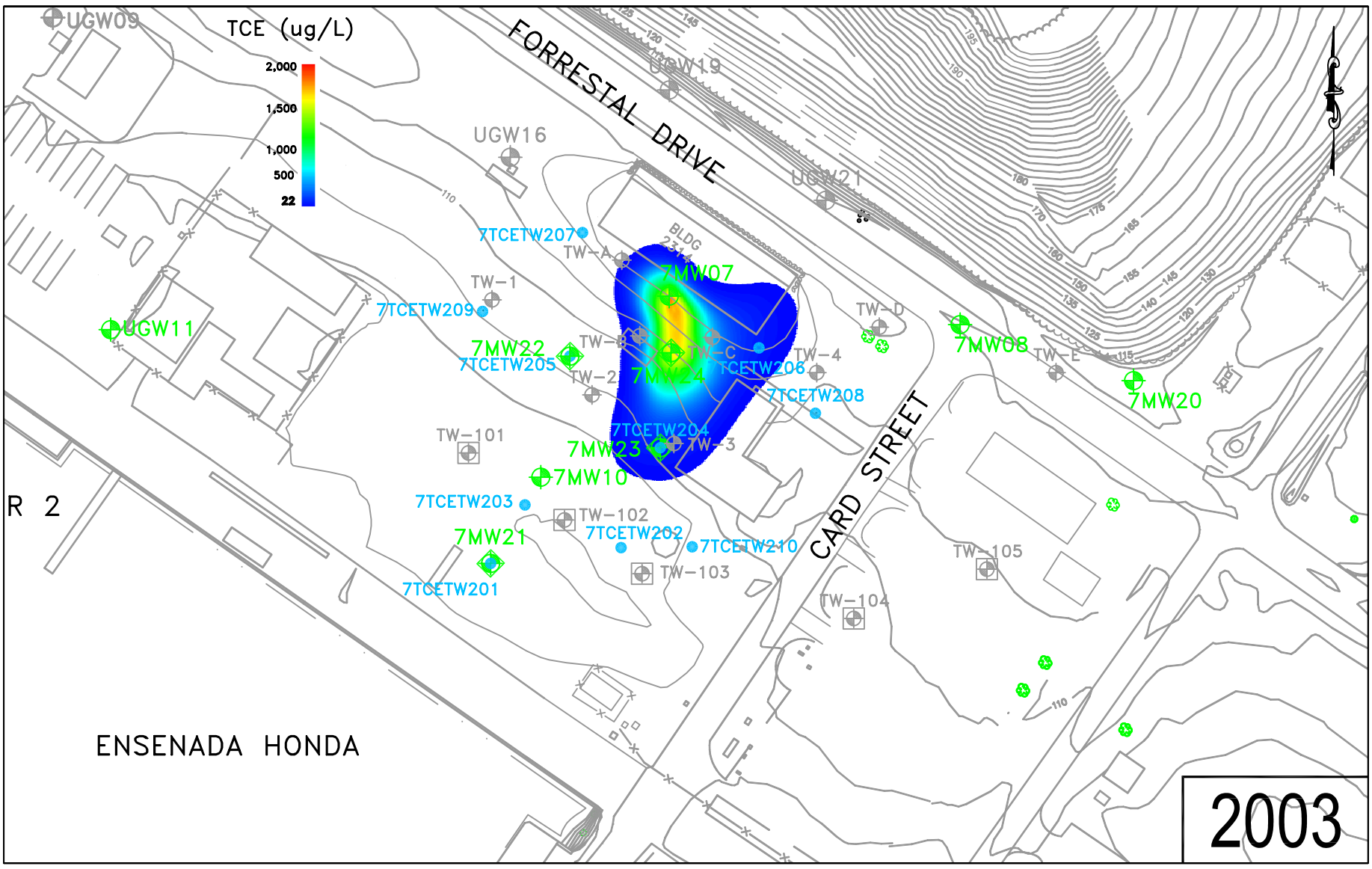
LEGEND

- EXISTING MONITOR WELL
- EXISTING MONITOR WELL LOCATION - SAMPLED 2003
- TEMPORARY WELL LOCATION - 2003
- SOIL SAMPLE LOCATION - 2003
- NEW MONITOR WELL LOCATION - 2003
- TEMPORARY MONITORING WELL LOCATION (SHALLOW AND DEEP) (1999)
- TEMPORARY MONITORING WELL LOCATION (DEEP ONLY) (1999)

FIGURE 5-1
VOCs DETECTED IN SOIL AND GROUNDWATER SAMPLES
TOW WAY FUEL FARM
TCE INVESTIGATION REPORT, JANUARY 2004

NAVAL STATION ROOSEVELT ROADS
PUERTO RICO





120 0 60 120
1 inch = 120 ft.

NOTE:
–DATUM PLAN USED IS MEAN LOW WATER = 100.00 FT. AS ESTABLISHED BY U.S. NAVY SURVEY SECTION AS OF NOVEMBER 1941.

Baker

100299F09

SOURCE: LANTDIV, FEB. 1992/1997

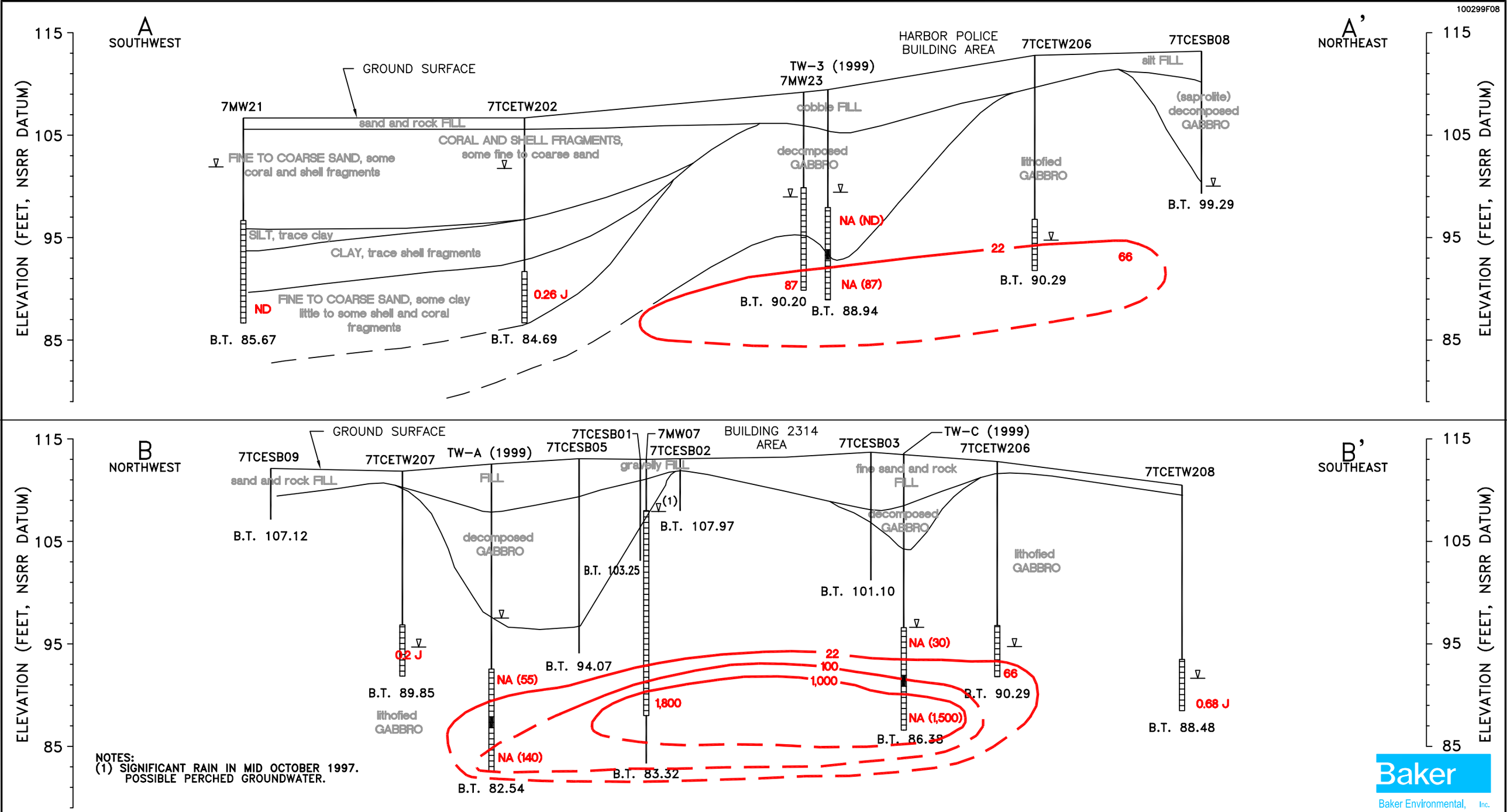
LEGEND

- EXISTING MONITOR WELL
- EXISTING MONITOR WELL – SAMPLED 2003
- TEMPORARY WELL LOCATION – 2003
- NEW MONITOR WELL LOCATION – 2003
- TEMPORARY MONITORING WELL LOCATION (SHALLOW AND DEEP) – 1999
- TEMPORARY MONITORING WELL LOCATION (DEEP ONLY) – 1999

FIGURE 5–2
TCE CONCENTRATIONS (ug/L), 1999 AND 2003
TOW WAY FUEL FARM
TCE INVESTIGATION REPORT, JANUARY 2004

NAVAL STATION ROOSEVELT ROADS
PUERTO RICO

100299F08



NOTES:
(1) SIGNIFICANT RAIN IN MID OCTOBER 1997. POSSIBLE PERCHED GROUNDWATER.

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LEGEND

▽	GROUNDWATER ENCOUNTERED DURING DRILLING
B.T. 83.32	BORING TERMINATED, ELEVATION (FEET NSRR DATUM)
▯	GROUNDWATER MONITORING WELL SCREEN INTERVAL
———	ESTIMATED CONCENTRATION CONTOUR
- - -	PROJECTED CONCENTRATION CONTOUR
ND	NOT DETECTED
NA (55)	NOT APPLICABLE (1999 CONCENTRATION, ug/L)
J	ESTIMATED CONCENTRATION
1,800	TCE CONCENTRATION (ug/L)

40 0 20 40 80
Horizontal Scale: 1 inch = 40 ft.

10 0 5 10 20
Vertical Scale: 1 inch = 10 ft.

THE SOIL BORING INFORMATION IS CONSIDERED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT THE RESPECTIVE BORING LOCATIONS. SUBSURFACE CONDITIONS INTERPOLATED BETWEEN BORINGS ARE ESTIMATED BASED ON ACCEPTED SOIL ENGINEERING PRINCIPLES AND GEOLOGIC JUDGEMENT.

FIGURE 5-3
VERTICAL CROSS-SECTIONS, TCE CONCENTRATIONS
TOW WAY FUEL FARM
TCE INVESTIGATION REPORT, JANUARY 2004

NAVAL STATION ROOSEVELT ROADS
PUERTO RICO

APPENDIX A
Test Boring and Well Construction Records

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TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: TCE Plume Delineation and Source Investigation
PROJ. NO.: 100299 FI.ZZ
BORING NO.: 7MW21 (7TCETW201)
COORDINATES: EAST: 782452.100
NORTH: 145279.33
ELEVATION: SURFACE: 106.67
TOP OF PVC CASING: 106.48

Rig: Mobile B-61	Split Spoon	Casing	Augers	Air Hammer	Date	Progress (Ft.)	Weather	Depth to Water (Ft.)
Size (ID)	2-in	--	2-1/4-in	--	9/15/2003	0.0 - 21.0	P sunny lt wind, 80s	5.0
Length	2-ft	--	5-ft	--	9/22/2003	Well installed		
Type	S Steel	--	HSA	--				
Hammer Wt.	140-lbs	--	--	--				
Fall	30-in	--	--	--				

Remarks:

SAMPLE TYPE
S = Split Spoon A = Auger
T = Shelby Tube W = Wash
R = Air Rotary C = Core
D = Direct Push P = Piston
N = No Sample

WELL INFORMATION

Type	Diam.	Top Depth (Ft.)	Bottom Depth (Ft.)
Sch. 40 PVC Casing	2-in	0.0	10.0
Sch. 40 PVC Screen (10-slot)	2-in	10.0	20.0

Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab ID	PID (ppm) ps/bg	Visual Description	Well Installation Detail	Elevation (Ft. MSL)
1, 2, 3, 4, 5 (5.0)	A-N	--	--	--	--	F SAND and ROCK frag; brown (FILL) (1.0)		105.67
6, 7 (7.0)	S-1	0.8 40%	7 6 7 6	--	0/0	F/C SAND, some shell & coral frag, trace clay; tan; m dense; wet (MARINE) (6.0)		100.67
8, 9 (9.0)	S-2	1.4 70%	7 4 5 4	--	0/0	trace clay, black & tan; loose; wet (8.0)		98.67
10	S-3	0.9 45%	4 2 2	--	0/0	F SAND, little m sand zones, trace clay; black & tan; loose; wet Match to Sheet 2 (10.0)		96.67

DRILLING CO.: GeoWorks, Inc.
DRILLER: William Rolon
BAKER REP.: Mark K. DeJohn
BORING NO.: 7MW21 SHEET 1 OF 2

Baker
Baker Environmental

TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: TCE Plume Delineation and Source Investigation
CTO NO.: 100299 FI.ZZ BORING NO.: 7MW21

SAMPLE TYPE
S = Split Spoon A = Auger
T = Shelby Tube W = Wash
R = Air Rotary C = Core
D = Denison P = Piston N = No Sample

DEFINITIONS
SPT = Standard Penetration Test (ASTM D1586)
PID = Photo Ionization Detector Measurement
MSL = Mean Sea Level
ps/bg = point source/background

Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab ID	PID (ppm) ps/bg	Visual Description	Well Installation Detail	Elevation (Ft. MSL)
11 — 11.0			2			Continued from Sheet 1 — 10.9		95.77
12 — 13.0	S-4	0.3 15%	6 3 WOH	--	0/0	SILT, trace clay; tan; v soft; moist sulfur odor — 13.0		93.67
14 — 15.0	S-5	1.4 70%	1 1 WOH	--	0/0	CLAY, trace shell frag & silt; brown; v soft; moist; sulfur odor		
16 — 17.0	S-6	0.5 25%	WOH	--	0/0	damp — 17.0		89.67
18 — 19.0	S-7	0.9 45%	WOH	--	0/0	F/C SAND, some clay, little shell frag; gray; v soft; wet; sulfur odor		
20 — 21.0	S-8	0.2 10%	WOH	--	0/0	21.0	20.0 — 21.0	86.67 — 85.67
22						BOH at 21.0-ft		
23								
24								
25								
26								
27								
28								
29								
30								

DRILLING CO.: GeoWorks, Inc. BAKER REP.: Mark K. DeJohn
DRILLER: William Rolon BORING NO.: 7MW21 SHEET 2 OF 2

Baker

Baker Environmental

WELL DEVELOPMENT RECORD

Project: TCE Plume Delineation and Source Investigation

Project. No: 100299 FI.ZZ

Monitoring Well ID: 7MW21

Date: 9/24/03

Depth to Water: 5.54 (uncut PVC)

Well Diameter: 2 (inches)

Total Well Depth: 20.00 (uncut PVC)

Gallons/foot: 0.163

Well Volume: 2.4 (Gallons)

Avg. Flow Rate: 1.4 gpm

Time	Gallons Removed	Well Volume	Temperature (°C)	Specific Conductance (µS/cm)	pH (SU)	Turbidity (NTU)	Comments
1433	5	2.1	30.3	10,734	7.19	Er3[1]	Milky gray, sulfur odor
1435	10	4.2	30.3	13,802	7.11	Er3	well pumped dry, slowed flow
1440	15	6.4	29.8	9,186	7.05	Er3	Milky gray, sulfur odor
1443	20	8.5	30.2	11,693	7.02	Er2	Slight clarity improvement
1446	25	10.6	30.3	9,035	7.04	552	
1449	30	12.7	30.4	10,525	7.02	454	Continued improvement
1453	35	14.8	30.5	11,189	7.00	366	
1459	40	17.0	30.9	11,258	7.07	Er3	
1503	45	19.1	30.6	11,813	6.99	1088	
1508	50	21.2	30.9	12,252	7.00	Er3	Milky gray again
1512	55	23.3	30.2	11,130	7.00	Er3	
1520	65	27.6	30.3	12,361	6.96	102	Slightly cloudy

Notes: [1] Value is over range of instrument

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TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT:	TCE Plume Delineation and Source Investigation		
PROJ. NO.:	100299 FI.ZZ	BORING NO.:	7MW22 (7TCETW205)
COORDINATES: EAST:	782518.340	NORTH:	145452.41
ELEVATION: SURFACE:	109.84	TOP OF PVC CASING:	109.60

Rig: Simco 2800

	Split Spoon	Casing	Augers	Air Hammer	Date	Progress (Ft.)	Weather	Depth to Water (Ft.)
Size (ID)	2-in	--	--	4-in	9/17/2003	0.0 - 22.0	M sunny mod wind, 80s	8.0
Length	2-ft	--	--	3.5-ft	9/22/2003	Well installed		
Type	S Steel	--	--	--				
Hammer Wt.	140-lbs	--	--	--				
Fall	30-in	--	--	--				

Remarks:

SAMPLE TYPE
S = Split Spoon A = Auger
T = Shelby Tube W = Wash
R = Air Rotary C = Core
D = Direct Push P = Piston
N = No Sample

WELL INFORMATION

Type	Diam.	Top Depth (Ft.)	Bottom Depth (Ft.)
Sch. 40 PVC Casing	2-in	0.0	12.0
Sch. 40 PVC Screen (10-slot)	2-in	12.0	22.0

Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab ID	PID (ppm) ps/bg	Visual Description	Well Installation Detail	Elevation (Ft. MSL)
1, 2, 3 (3.0)	R-N	--	--	--	--			
4, 5 (5.0)	S-1	0.9 45%	4 4 5 5	--	--	CLAY, some f gravel, little c sand; brown; m stiff; damp (FILL)		
6, 7, 8 (8.0)	R-N	--	--	--	--		7.0	102.84
9 (9.6)	S-2	1.1 69%	4 12 44-25/1"	--	5/0	CLAY, some f/c gravel (weathered GABBRO); brown; v dense; wet (unlithofied BEDROCK)		
10	R-N	--	--	--	--	Match to Sheet 2	10.0	99.84

DRILLING CO.:	GeoWorks, Inc.	BAKER REP.:	Mark K. DeJohn
DRILLER:	William Rolon	BORING NO.:	7MW22 SHEET 1 OF 2

Baker
Baker Environmental

TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: TCE Plume Delineation and Source Investigation
CTO NO.: 100299 FI.ZZ BORING NO.: 7MW22

SAMPLE TYPE
S = Split Spoon A = Auger
T = Shelby Tube W = Wash
R = Air Rotary C = Core
D = Denison P = Piston N = No Sample

DEFINITIONS
SPT = Standard Penetration Test (ASTM D1586)
PID = Photo Ionization Detector Measurement
MSL = Mean Sea Level
ps/bg = point source/background

Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab ID	PID (ppm) ps/bg	Visual Description	Well Installation Detail	Elevation (Ft. MSL)
11								
12	R-N	--	--	--	--		12.0	97.84
13 / 13.0						13.0		96.84
13.2	S-3	0.0	50/2"	--	--	No recovery - unweathered GABBRO frag; dark gray (lithofied BEDROCK)		
14	R-N	--	--	--	--			
15 / 15.0								
15.0	S-4	0.0	Refusal	--	--	spoon bouncing		
16	R-N	--	--	--	--			
17 / 17.0								
17.0	S-5	0.0	Refusal	--	--	spoon bouncing - black GABBRO frag in spoon, sl weathering		
18								
19								
20	R-N	--	--	--	--			
21								
22 / 22.0						22.0	22.0	87.84
23						BOH at 22.0-ft		
24								
25								
26								
27								
28								
29								
30								

DRILLING CO.: GeoWorks, Inc. BAKER REP.: Mark K. DeJohn
DRILLER: William Rolon BORING NO.: 7MW22 SHEET 2 OF 2

Baker

Baker Environmental

WELL DEVELOPMENT RECORD

Project: TCE Plume Delineation and Source Investigation

Project. No: 100299 FI.ZZ

Monitoring Well ID: 7MW22

Date: 9/24/03

Depth to Water: 10.80 (uncut PVC)

Well Diameter: 2 (inches)

Total Well Depth: 25.00 (uncut PVC)

Gallons/foot: 0.163

Well Volume: 2.3 (Gallons)

Avg. Flow Rate: 1.9 gpm

Time	Gallons Removed	Well Volume	Temperature (°C)	Specific Conductance (µS/cm)	pH (SU)	Turbidity (NTU)	Comments
1352	5	2.2	32.6	7,523	6.85	Er2[1]	Turbid, lt brown,, no odor
1357	10	4.3	32.2	7,634	6.78	309	Slight clarity improvement
1400	15	6.5	31.8	7,398	6.78	75	Slightly cloudy
1403	20	8.6	31.5	7,417	6.78	62	Slightly cloudy
1405	25	10.8	31.5	7,450	6.79	26	Nearly clear
1407	30	13.0	31.5	7,434	6.77	13	Clear
1410	35	15.1	31.5	7,243	6.78	156	Measured during surge
1412	40	17.3	31.5	7,263	6.78	30	Nearly clear
1414	45	19.4	31.4	7,998	6.74	230	Measured during surge
1416	53	22.9	31.5	7,800	6.77	10	Clear
1418	55	23.8	31.5	--	--	--	--

Notes: [1] Value is over range of instrument

Baker
Baker Environmental

TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT:	TCE Plume Delineation and Source Investigation		
PROJ. NO.:	100299 FI.ZZ	BORING NO.:	7MW23 (7TCETW204)
COORDINATES: EAST:	782593.840	NORTH:	145375.93
ELEVATION: SURFACE:	109.20	TOP OF PVC CASING:	108.91

Rig: Simco 2800

	Split Spoon	Casing	Augers	Air Hammer
Size (ID)	2-in	--	--	4-in
Length	2-ft	--	--	3.5-ft
Type	S Steel	--	--	--
Hammer Wt.	140-lbs	--	--	--
Fall	30-in	--	--	--

Date	Progress (Ft.)	Weather	Depth to Water (Ft.)
9/17/2003	0.0 - 22.0	M sunny mod wind, 80s	13.0
9/22/2003	Well installed		

Remarks:

SAMPLE TYPE
S = Split Spoon A = Auger
T = Shelby Tube W = Wash
R = Air Rotary C = Core
D = Direct Push P = Piston
N = No Sample

WELL INFORMATION

Type	Diam.	Top Depth (Ft.)	Bottom Depth (Ft.)
Sch. 40 PVC Casing	2-in	0.0	9.0
Sch. 40 PVC Screen (10-slot)	2-in	9.0	19.0

Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab ID	PID (ppm) ps/bg	Visual Description	Well Installation Detail	Elevation (Ft. MSL)
1, 2, 3 (3.0)	R-N	--	--	--	--	gravel and cobble (FILL)		
4, 5 (5.0)	S-1	0.8 40%	9 19 7 7	--	5.8/0	ROCK frag, some silt, trace f sand; brown; m dense; damp	5.0	104.20
6, 7, 8 (8.0)	R-N	--	--	--	--		7.0	102.20
9, 10 (10.0)	S-2	0.9 56%	3 1 1 1	--	0/0	CLAY, little f gravel & f/c sand; brown; soft; moist; greenish stains w/ sl petro odor	9.0	100.20
						Match to Sheet 2		

DRILLING CO.:	GeoWorks, Inc.	BAKER REP.:	Mark K. DeJohn
DRILLER:	William Rolon	BORING NO.:	7MW23 SHEET 1 OF 2

Baker

Baker Environmental

TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: TCE Plume Delineation and Source Investigation

CTO NO.: 100299 FI.ZZ BORING NO.: 7MW23

SAMPLE TYPE

S = Split Spoon A = Auger
T = Shelby Tube W = Wash
R = Air Rotary C = Core
D = Denison P = Piston N = No Sample

DEFINITIONS

SPT = Standard Penetration Test (ASTM D1586)
PID = Photo Ionization Detector Measurement
MSL = Mean Sea Level
ps/bg = point source/background

Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab ID	PID (ppm) ps/bg	Visual Description	Well Installation Detail	Elevation (Ft. MSL)
11								
12	R-N	--	--	--	--			
13 13.0						13.0		96.20
13.1	S-3	0.4	40-25/1"	--	0/0	GABBRO frag, little silt, trace f/c		
14	R-N	--	--	--	--	sand & clay; brown; v 14.0 dense; moist to wet		95.20
15 15.0						GABBRO (lithofied BEDROCK)		
15.0	S-4	0.0	Refusal	--	0/0	spoon bounced		
16								
17	R-N	--	--	--	--	Cuttings becoming less wet		
18								
19 19.0						19.0	19.0	90.20
20						BOH at 19.0-ft		
21								
22								
23								
24								
25								
26								
27								
28								
29								
30								

DRILLING CO.: GeoWorks, Inc. BAKER REP.: Mark K. DeJohn

DRILLER: William Rolon BORING NO.: 7MW23 SHEET 2 OF 2

Baker

Baker Environmental

WELL DEVELOPMENT RECORD

Project: TCE Plume Delineation and Source Investigation

Project. No: 100299 FI.ZZ

Monitoring Well ID: 7MW23

Date: 9/23/03

Depth to Water: 8.56 (uncut PVC)

Well Diameter: 2 (inches)

Total Well Depth: 20.00 (uncut PVC)

Gallons/foot: 0.163

Well Volume: 1.9 (Gallons)

Avg. Flow Rate: 1.4 gpm

Time	Gallons Removed	Well Volume	Temperature (°C)	Specific Conductance (µS/cm)	pH (SU)	Turbidity (NTU)	Comments
1111	5	2.7	30.5	4,093	7.15	Er3[1]	Milky brown, no odor
1114	10	5.4	31.2	4,189	7.27	Er3	Milky brown, no odor
1130	30	16.1	30.9	3,872	7.23	644	Turbid, brown, 5' of drawdown
1135	35	18.8	30.7	3,973	7.21	339	
1138	40	21.5	30.9	4,034	7.18	Er3	Turbid, brown, sl sulfur odor
1141	45	24.1	31.0	3,938	7.20	Er3	Increase in tubidity
1146	50	26.8	30.9	3,701	7.16	Er3	
1149	55	29.5	30.9	3,738	7.17	Er3	
1157	65	34.9	31.0	3,928	7.18	933	
1201	70	37.5	31.3	3,891	7.21	871	Surging over water column height
1207	75	40.2	31.8	3,964	7.20	Er3	

Notes: [1] Value is over range of instrument

Baker
Baker Environmental

TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT:	TCE Plume Delineation and Source Investigation		
PROJ. NO.:	100299 FI.ZZ	BORING NO.:	7MW24
COORDINATES: EAST:	782602.790	NORTH:	145455.23
ELEVATION: SURFACE:	110.56	TOP OF PVC CASING:	110.34

Rig: Simco 2800

	Split Spoon	Casing	Augers	Air Hammer	Date	Progress (Ft.)	Weather	Depth to Water (Ft.)
Size (ID)	2-in	--	--	4-in	9/23/2003	0.0 - 22.0	M sunny, lt wind, 80s	15.0
Length	2-ft	--	--	3.5-ft				
Type	S Steel	--	--	--				
Hammer Wt.	140-lbs	--	--	--				
Fall	30-in	--	--	--				

Remarks:

SAMPLE TYPE

S = Split Spoon A = Auger
T = Shelby Tube W = Wash
R = Air Rotary C = Core
D = Direct Push P = Piston
N = No Sample

WELL INFORMATION

Type	Diam.	Top Depth (Ft.)	Bottom Depth (Ft.)
Sch. 40 PVC Casing	2-in	0.0	12.0
Sch. 40 PVC Screen (10-slot)	2-in	12.0	22.0

Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab ID	PID (ppm) ps/bg	Visual Description	Well Installation Detail	Elevation (Ft. MSL)
1						F/C SAND and GRAVEL (FILL)		
2						GABBRO frag (f gravel, some f/c sand-sized); black & gray (lithofied BEDROCK)		
3								
4								
5								
6	R-N	--	--	--	--		6.0	104.56
7						f sand, little silt; brown; weathered zone		
8							8.0	102.56
9						less weathered, f/c sand, little f gravel; brown, trace black & gray		
10						Match to Sheet 2		

DRILLING CO.:	GeoWorks, Inc.	BAKER REP.:	Mark K. DeJohn
DRILLER:	William Rolon	BORING NO.:	7MW24 SHEET 1 OF 2

Baker
Baker Environmental

TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: TCE Plume Delineation and Source Investigation
CTO NO.: 100299 FI.ZZ BORING NO.: 7MW24

SAMPLE TYPE
S = Split Spoon A = Auger
T = Shelby Tube W = Wash
R = Air Rotary C = Core
D = Denison P = Piston N = No Sample

DEFINITIONS
SPT = Standard Penetration Test (ASTM D1586)
PID = Photo Ionization Detector Measurement
MSL = Mean Sea Level
ps/bg = point source/background

Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab ID	PID (ppm) ps/bg	Visual Description	Well Installation Detail	Elevation (Ft. MSL)
11								
12							12.0	98.56
13						f/c sand; brown; moist		
14								
15						f gravel, some f/c sand; brown & gray; wet		
16	R-N	--	--	--	--			
17						f gravel; black, brown & gray; good water flow in return		
18								
19								
20						f gravel, trace c gravel; black & gray, little brown		
21								
22						22.0	22.0	88.56
23						BOH at 22.0-ft		
24								
25								
26								
27								
28								
29								
30								

DRILLING CO.: GeoWorks, Inc. BAKER REP.: Mark K. DeJohn
DRILLER: William Rolon BORING NO.: 7MW24 SHEET 2 OF 2

Baker

Baker Environmental

WELL DEVELOPMENT RECORD

Project: TCE Plume Delineation and Source Investigation

Project. No: 100299 FI.ZZ

Monitoring Well ID: 7MW24

Date: 9/23/03

Depth to Water: 11.16 (uncut PVC)

Well Diameter: 2 (inches)

Total Well Depth: 25.00 (uncut PVC)

Gallons/foot: 0.163

Well Volume: 2.3 (Gallons)

Avg. Flow Rate: 1.4 gpm

Time	Gallons Removed	Well Volume	Temperature (°C)	Specific Conductance (µS/cm)	pH (SU)	Turbidity (NTU)	Comments
1017	0	0.0	--	--	--	--	Begin pumping; turbid, no odor
1020	5	2.2	31.8	3,951	6.87	Er2[1]	Brown, turbid
1023	10	4.4	31.7	3,977	6.8	153	Slightly cloudy
1030	15	6.6	31.1	3,909	6.8	77.1	Slightly cloudy
1033	20	8.9	31.7	3,952	6.79	203	Increased turbidity
1038	25	11.1	31.9	3,971	6.77	38.4	Nearly clear
1043	30	13.3	32.1	3,648	6.86	142	Slightly cloudy
1048	35	15.5	32.0	3,910	6.83	11.2	Clear
1050	37	16.4	--	--	--	--	Stopped pumping

Notes: [1] Value is over range of instrument

Baker
Baker Environmental

TEST BORING RECORD

PROJECT: TCE Plume Delineation and Source Investigation
PROJ. NO.: 100299 FI.ZZ BORING NO.: 7TCESB01
COORDINATES: EAST: 782598.700 NORTH: 145499.000
ELEVATION: SURFACE: 112.85

Rig: Simco 2800	Split Spoon	Casing	Augers	Air Hammer	Date	Progress (Ft.)	Weather	Depth to Water (Ft.)
Size (ID)	2-in	--	--	4-in	9/17/03	0.0 - 9.6	P sunny, occ rain, 80s	--
Length	2-ft	--	--	3.5-ft				
Type	S Steel	--	--	--				
Hammer Wt.	140-lbs	--	--	--				
Fall	30-in	--	--	--				

Remarks: Sample ID: 7TCESB01-__ (w/ suffix shown below)

SAMPLE TYPE
S = Split Spoon A = Auger
T = Shelby Tube W = Wash
R = Air Rotary C = Core
D = Direct Push P = Piston
N = No Sample

DEFINITIONS
SPT = Standard Penetration Test (ASTM D1586)
PID = Photo Ionization Detector Measurement
MSL = Mean Sea Level
BG/PS = Background/Point Source
ppm = parts per million

Depth (Ft.)		Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab ID	PID (ppm) ps/bg	Visual Description		Elevation (Ft. MSL)
1	1.0	R-N	--	--	--	--			
2		S-1	1.0 50%	15 12 12	01	0/0 0/0	F GRAVEL, little f/c sand, trace silt & clay; brown & gray; m dense; damp	2.5	110.35
3	3.0			40			weathered GABBRO, easily crumbled; brownish-gray; v dense; dry (unlithofied BEDROCK)		
4	4.8	S-2	0.5 63%	22 50/4"	--	0/0			
5	5.0	R-N	--	--	--	--			
6	5.7	S-3	0.3 43%	12 13/2"	03	0/0		6.0	106.85
7									
8	7.2	S-4	0.0	50/2"	--	--	No recovery - bouncing spoon		
9	9.0	R-N	--	--	--	--			
	9.6	S-5	0.2	22-30/1"			GABBRO frag; gray; v dense; damp (lithofied BEDROCK)	9.6	103.25
10							BOH at 9.6-ft		

DRILLING COMPANY: GeoWorks, Inc. BAKER REP.: Mark K. DeJohn
DRILLER: William Rolon BORING NO.: 7TCESB01 SHEET 1 OF 1

Baker
Baker Environmental

TEST BORING RECORD

PROJECT: TCE Plume Delineation and Source Investigation
PROJ. NO.: 100299 FI.ZZ
BORING NO.: 7TCESB02
COORDINATES: EAST: 782587.970
NORTH: 145510.730
ELEVATION: SURFACE: 113.07

Rig: Simco 2800	Split Spoon	Casing	Augers	Air Hammer	Date	Progress (Ft.)	Weather	Depth to Water (Ft.)
Size (ID)	2-in	--	--	4-in	9/17/03	0.0 - 5.1	P sunny, occ rain, 80s	--
Length	2-ft	--	--	3.5-ft				
Type	S Steel	--	--	--				
Hammer Wt.	140-lbs	--	--	--				
Fall	30-in	--	--	--				

Remarks:

SAMPLE TYPE
S = Split Spoon A = Auger
T = Shelby Tube W = Wash
R = Air Rotary C = Core
D = Direct Push P = Piston
N = No Sample

DEFINITIONS
SPT = Standard Penetration Test (ASTM D1586)
PID = Photo Ionization Detector Measurement
MSL = Mean Sea Level
BG/PS = Background/Point Source
ppm = parts per million

Depth (Ft.)		Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab ID	PID (ppm) ps/bg	Visual Description	Elevation (Ft. MSL)
1	1.0	R-N	--	--	--	--	gravelly FILL 1.0	112.07
	1.0	S-1	0.0	Refusal	--	--	No Recovery	
2		R-N	--	--	--	--		
3	3.0							
	3.2	S-2	0.0	50/2"	--	--	GABBRO frag; greenish-gray, trace rusty-brown faces; v dense; dry (lithofied BEDROCK)	
4		R-N	--	--	--	--		
5	5.0							
	5.1	S-3	0.0	37/1"	--	--	5.1	107.97
6							BOH at 5.1-ft	
7								
8								
9								
10								

DRILLING COMPANY: GeoWorks, Inc.
DRILLER: William Rolon
BAKER REP.: Mark K. DeJohn
BORING NO.: 7TCESB02 SHEET 1 OF 1

Baker
Baker Environmental

TEST BORING RECORD

PROJECT: TCE Plume Delineation and Source Investigation
PROJ. NO.: 100299 FI.ZZ BORING NO.: 7TCESB03
COORDINATES: EAST: 782637.770 NORTH: 145476.080
ELEVATION: SURFACE: 113.70

Rig: Mobile B-61/Simco 2800	Split Spoon	Casing	Augers	Air Hammer	Date	Progress (Ft.)	Weather	Depth to Water (Ft.)
Size (ID)	2-in	--	2-1/4-in	4-in	9/13/03	0.0 - 4.0	M sunny, lt wind, 80s	--
Length	2-ft	--	5-ft	3.5-ft	9/15/03	4.0 - 14.0	P sunny, lt wind, 80s	--
Type	S Steel	--	HSA	--				
Hammer Wt.	140-lbs	--	--	--				
Fall	30-in	--	--	--				

Remarks: Sample ID: 7TCESB03-__ (w/ suffix shown below)

SAMPLE TYPE
S = Split Spoon A = Auger
T = Shelby Tube W = Wash
R = Air Rotary C = Core
D = Direct Push P = Piston
N = No Sample

DEFINITIONS
SPT = Standard Penetration Test (ASTM D1586)
PID = Photo Ionization Detector Measurement
MSL = Mean Sea Level
BG/PS = Background/Point Source
ppm = parts per million

Depth (Ft.)		Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab ID	PID (ppm) ps/bg	Visual Description	Elevation (Ft. MSL)
1		S-1	0.7 35%	7 12 22 16		0/0	F SAND and ROCK fragments; brown; m dense; damp (FILL)	
2	2.0							
	2.5	S-2	0.3	50/6"		0/0	SILT, some f gravel, trace clay; brown; v dense; damp	
3		R-N	--	--	--	--		
4	4.0							
		S-3	0.3 43%	19 50/4"	03	0/0	As above	
5	4.7							
		R-N	--	--	--	--		
6	6.0						6.0	107.70
7	7.4	S-4	0.4 29%	15 31 50/5"	04	0/0	weathered GABBRO, highly fractured; rusty-brown; v dense; dry (unlithofied BEDROCK)	
8	8.0	R-N	--	--	--	--		
	8.6	S-5	0.0	34-25/1"			8.5	105.20
9		R-N	--	--	--	--	weathered GABBRO; gray & rusty-brown; v dense; dry (lithofied BEDROCK)	
10	10.0							
		S-6	0.5	23			Match to Sheet 2	

DRILLING COMPANY: GeoWorks, Inc. BAKER REP.: Mark K. DeJohn
DRILLER: William Rolon BORING NO.: 7TCESB03 SHEET 1 OF 2

Baker
Baker Environmental

TEST BORING RECORD

PROJECT: TCE Plume Delineation and Source Investigation
CTO NO.: 100299 FI.ZZ BORING NO.: 7TCESB03

SAMPLE TYPE
S = Split Spoon A = Auger
T = Shelby Tube W = Wash
R = Air Rotary C = Core
D = Denison P = Piston N = No Sample

DEFINITIONS
SPT = Standard Penetration Test (ASTM D1586)
PID = Photo Ionization Detector Measurement
MSL = Mean Sea Level
ps/bg = point source/background

Depth (Ft.)		Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab ID	PID (ppm) ps/bg	Visual Description	Elevation (Ft. MSL)
11	10.9		50/4"	50%			Continued from Sheet 1	
		R-N	--	--	--	--		
12	12.0						blocky w/ less fracturing; gray & rusty-brown	
	12.6	S-7	0.0	30-31/2"	--	--	faces; v dense; dry	
13							BOH @ 12.6-ft	
14								
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								
27								
28								
29								
30								

DRILLING COMPANY: GeoWorks, Inc. BAKER REP.: Mark K. DeJohn
DRILLER: William Rolon BORING NO.: 7TCESB03 SHEET 2 OF 2

Baker
Baker Environmental

TEST BORING RECORD

PROJECT: TCE Plume Delineation and Source Investigation
PROJ. NO.: 100299 FI.ZZ
BORING NO.: 7TCESB04
COORDINATES: EAST: 782532.450
NORTH: 145553.680
ELEVATION: SURFACE: 112.04

Rig: Simco 2800	Split Spoon	Casing	Augers	Air Hammer	Date	Progress (Ft.)	Weather	Depth to Water (Ft.)
Size (ID)	2-in	--	--	4-in	9/16/03	0.0 - 13.3	P sunny, windy, 90	12.0
Length	2-ft	--	--	3.5-ft				
Type	S Steel	--	--	--				
Hammer Wt.	140-lbs	--	--	--				
Fall	30-in	--	--	--				

Remarks: Sample ID: 7TCESB04-__ (w/ suffix shown below)

SAMPLE TYPE
S = Split Spoon A = Auger
T = Shelby Tube W = Wash
R = Air Rotary C = Core
D = Direct Push P = Piston
N = No Sample

DEFINITIONS
SPT = Standard Penetration Test (ASTM D1586)
PID = Photo Ionization Detector Measurement
MSL = Mean Sea Level
BG/PS = Background/Point Source
ppm = parts per million

Depth (Ft.)		Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab ID	PID (ppm) ps/bg	Visual Description	Elevation (Ft. MSL)
1	1.0	R-N	--	--	--	--	Gravel, some f/c sand (FILL)	
2	2.7	S-1	1.2 60%	8 19 50/3"	02	0/0	2.0 GABBRO frag, some silt; brown & rusty-brown; v dense; dry (unlithofied BEDROCK)	110.04
3	3.0	R-N	--	--	--	--		
4	4.5	S-2	1.0 50%	12 30 50/5"	--	0/0 0/0	weathered GABBRO, highly fractured & crumbly; brown & rusty-brown; v dense; damp	
5	5.0	R-N	--	--	--	--		
6	5.5	S-3	0.5	50/5"	--	0/0	GABBRO frag in a f sand matrix; rusty-brown; v dense; damp	
7	7.0	R-N	--	--	--	--		
8	9.0	S-4	1.0 50%	26 35 20 37	04	0/0 0/0	F/C SAND (gabbro frag), trace clay; rusty-brown; v dense; damp 9.0	103.04
9	9.5	S-5	0.4	50/6"			weathered GABBRO, fractured; rusty-brown & gray; v dense; damp (lithofied BEDROCK)	
10		R-N	--	--	--	--	Match to Sheet 2	

DRILLING COMPANY: GeoWorks, Inc.
DRILLER: William Rolon
BAKER REP.: Mark K. DeJohn
BORING NO.: 7TCESB04 SHEET 1 OF 2

Baker
Baker Environmental

TEST BORING RECORD

PROJECT: TCE Plume Delineation and Source Investigation
CTO NO.: 100299 FI.ZZ BORING NO.: 7TCESB04

SAMPLE TYPE
S = Split Spoon A = Auger
T = Shelby Tube W = Wash
R = Air Rotary C = Core
D = Denison P = Piston N = No Sample

DEFINITIONS
SPT = Standard Penetration Test (ASTM D1586)
PID = Photo Ionization Detector Measurement
MSL = Mean Sea Level
ps/bg = point source/background

Depth (Ft.)		Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab ID	PID (ppm) ps/bg	Visual Description		Elevation (Ft. MSL)
11	11.0						Continued from Sheet 1		
12	11.7	S-6	0.0 0%	11 33/2"	--	--	No recovery, but black & gray gabbro frag in spoon from slough		
13	13.0	R-N	--	--	--	--	trace water in cuttings		
14	14.1	S-7	0.0 0%	10 19-24/1"	--	--	No recovery, but black & gray gabbro frag in spoon from slough; wet	14.1	97.94
15							BOH at 14.1-ft		
16									
17									
18									
19									
20									
21									
22									
23									
24									
25									
26									
27									
28									
29									
30									

DRILLING COMPANY: GeoWorks, Inc. BAKER REP.: Mark K. DeJohn
DRILLER: William Rolon BORING NO.: 7TCESB04 SHEET 2 OF 2

Baker
Baker Environmental

TEST BORING RECORD

PROJECT: TCE Plume Delineation and Source Investigation
PROJ. NO.: 100299 FI.ZZ BORING NO.: 7TCESB05
COORDINATES: EAST: 782587.970 NORTH: 145510.730
ELEVATION: SURFACE: 113.07

Rig: Mobile B-61/Simco 2800								
	Split Spoon	Casing	Augers	Air Hammer	Date	Progress (Ft.)	Weather	Depth to Water (Ft.)
Size (ID)	2-in	--	2-1/4-in	4-in	9/13/03	0.0 - 16.5	M sunny, lt wind, 80s	--
Length	2-ft	--	5-ft	3.5-ft	9/16/03	16.5 - 19.0	P sunny, windy, 80s	--
Type	S Steel	--	HSA	--				
Hammer Wt.	140-lbs	--	--	--				
Fall	30-in	--	--	--				

Remarks: Sample ID: 7TCESB05-__ (w/ suffix shown below)

SAMPLE TYPE
S = Split Spoon A = Auger
T = Shelby Tube W = Wash
R = Air Rotary C = Core
D = Direct Push P = Piston
N = No Sample

DEFINITIONS
SPT = Standard Penetration Test (ASTM D1586)
PID = Photo Ionization Detector Measurement
MSL = Mean Sea Level
BG/PS = Background/Point Source
ppm = parts per million

Depth (Ft.)		Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab ID	PID (ppm) ps/bg	Visual Description	Elevation (Ft. MSL)
1		S-1	1.0 50%	10 15 21 12	--	0/0 0/0	F SAND, some f gravel trace clay: brown; dense; damp (FILL)	
2	2.0							
3		S-2	1.9 95%	30 33 42 43	--	0/0 0/0	F SAND and F GRAVEL, trace silt & clay; gray; v dense; dry	
4	4.0						4.0	109.07
5	4.9	S-3	0.7 78%	33 50/5"		0/0	F/C SAND (gabbro frag), trace f gravel & clay; brown; v dense; damp (unlithofied BEDROCK)	
6	6.0	A-N	--	--	--	--		
7	7.5	S-4	1.1 73%	32 40 50/6"	--	0/0 0/0	little silt, trace caly; rusty-brown & tan; v dense; damp	
8	8.0	A-N	--	--	--	--		
9	8.7	S-5	0.7 93%	30 50/3"	--	0/0	weathered GABRO, highly fractured & crumbly; gray & rusty-brown; v dense; damp	
10	10.0	A-N	--	--	--	--		
				13			Match to Sheet 2	

DRILLING COMPANY: GeoWorks, Inc. BAKER REP.: Mark K. DeJohn
DRILLER: William Rolon BORING NO.: 7TCESB05 SHEET 1 OF 2

Baker
Baker Environmental

TEST BORING RECORD

PROJECT: TCE Plume Delineation and Source Investigation
CTO NO.: 100299 FI.ZZ BORING NO.: 7TCESB05

SAMPLE TYPE
S = Split Spoon A = Auger
T = Shelby Tube W = Wash
R = Air Rotary C = Core
D = Denison P = Piston N = No Sample

DEFINITIONS
SPT = Standard Penetration Test (ASTM D1586)
PID = Photo Ionization Detector Measurement
MSL = Mean Sea Level
ps/bg = point source/background

Depth (Ft.)		Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab ID	PID (ppm) ps/bg	Visual Description	Elevation (Ft. MSL)
11		S-6	1.3	27%	05	2.3/0	Continued from Sheet 1	
			65%	32		1.6/0	orangish-brown & rust	
12	12.0			34				
				15				
13		S-7	1.4	20	--	0/0	SILT, little clay (weathered GABBRO); gray;	
			70%	21		0/0	hard; damp	
14	14.0			30		0/0		
		S-8	0.7	25	--	0/0	weathered GABBRO, highly fractured & crumbly;	
15	15.0		70%	50/6"			gray; v dense; damp	
		A-N	--	--	--	--		
16	16.0						16.0	97.07
	16.4	S-9	0.6	50/5"	--	--	weathered GABBRO frag; gray; v dense; damp	
17	17.0	R-N	--	--	--	--	(unlithofied BEDROCK)	
	17.0	S-10	0.0	--	--	--	spoon bouncing on rock	
18								
		R-N	--	--	--	--		
19	19.0						spoon bouncing on rock 19.0	94.07
	18.0	S-11	0.0	--	--	--	BOH at 19.0-ft	
20								
21								
22								
23								
24								
25								
26								
27								
28								
29								
30								

DRILLING COMPANY: GeoWorks, Inc. BAKER REP.: Mark K. DeJohn
DRILLER: William Rolon BORING NO.: 7TCESB05 SHEET 2 OF 2

Baker
Baker Environmental

TEST BORING RECORD

PROJECT: TCE Plume Delineation and Source Investigation
PROJ. NO.: 100299 FI.ZZ BORING NO.: 7TCESB06
COORDINATES: EAST: 782703.100 NORTH: 145484.130
ELEVATION: SURFACE: 113.19

Rig: Mobile B-61	Split Spoon	Casing	Augers	Air Hammer	Date	Progress (Ft.)	Weather	Depth to Water (Ft.)
Size (ID)	2-in	--	2-1/4-in	--	9/13/03	0.0 - 5.3	M sunny, lt wind, 80s	--
Length	2-ft	--	5-ft	--				
Type	S Steel	--	HSA	--				
Hammer Wt.	140-lbs	--	--	--				
Fall	30-in	--	--	--				

Remarks: Sample ID: 7TCESB08-__ (w/ suffix shown below)

SAMPLE TYPE
S = Split Spoon A = Auger
T = Shelby Tube W = Wash
R = Air Rotary C = Core
D = Direct Push P = Piston
N = No Sample

DEFINITIONS
SPT = Standard Penetration Test (ASTM D1586)
PID = Photo Ionization Detector Measurement
MSL = Mean Sea Level
BG/PS = Background/Point Source
ppm = parts per million

Depth (Ft.)		Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab ID	PID (ppm) ps/bg	Visual Description	Elevation (Ft. MSL)
1	1.0	A-N	--	--	--	--		
2	2.4	S-1	0.9 64%	18 24 50/5"		0/0	ROCK FRAG, some f sand, little silt; light brown; v dense; dry	
3	3.0	A-N	--	--	--	--	3.0	110.19
4	3.9	S-2	0.8 89%	20 50/5"		0/0	weathered GABBRO, highly fractured & crumbly; brown & rust; v dense; damp	
5	5.0	A-N	--	--	--	--		
	5.3	S-3	20%	50/3"	--	0/0	Spoon refusal	
6								
7								
8								
9								
10								

DRILLING COMPANY: GeoWorks, Inc. BAKER REP.: Mark K. DeJohn
DRILLER: William Rolon BORING NO.: 7TCESB06 SHEET 1 OF 1

Baker
Baker Environmental

TEST BORING RECORD

PROJECT: TCE Plume Delineation and Source Investigation
PROJ. NO.: 100299 FI.ZZ
BORING NO.: 7TCESB06A
COORDINATES: EAST: 782541.810
NORTH: 145593.590
ELEVATION: SURFACE: 112.42

Rig: Simco 2800	Split Spoon	Casing	Augers	Air Hammer	Date	Progress (Ft.)	Weather	Depth to Water (Ft.)
Size (ID)	2-in	--	--	4-in	9/16/03	0.0 - 9.0	P sunny, windy, 90	--
Length	2-ft	--	--	3.5-ft				
Type	S Steel	--	--	--				
Hammer Wt.	140-lbs	--	--	--				
Fall	30-in	--	--	--				

Remarks: Sample ID: 7TCESB06-__ (w/ suffix shown below)

SAMPLE TYPE
S = Split Spoon A = Auger
T = Shelby Tube W = Wash
R = Air Rotary C = Core
D = Direct Push P = Piston
N = No Sample

DEFINITIONS
SPT = Standard Penetration Test (ASTM D1586)
PID = Photo Ionization Detector Measurement
MSL = Mean Sea Level
BG/PS = Background/Point Source
ppm = parts per million

Depth (Ft.)		Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab ID	PID (ppm) ps/bg	Visual Description	Elevation (Ft. MSL)
1	1.0	R-N	--	--	--	--		
2	2.4	S-1	1.0 71%	12 24 23/5"	01	41/0	F/C SAND, some f gravel, trace clay; brownish-gray; v dense; dry; no odor or staining	
3	3.0	R-N	--	--	--	--	3.0	109.42
4		R-N	--	--	--	--		
5	5.0							
6	6.1	S-2	0.6 55%	17 15-30/1"	03	128/0	SILT, little rock frag GABBRO; rusty-brown; v dense; damp (unlithofied BEDROCK) 6.0	106.42
7	7.0	R-N	--	--	--	--		
8	7.0	S-3	--	--	--	--	Spoon refusal	
9		R-N	--	--	--	--	GABBRO frag; black & gray (lithofied BEDROCK)	
10							BOH at 9.0-ft	

DRILLING COMPANY: GeoWorks, Inc.
DRILLER: William Rolon
BAKER REP.: Mark K. DeJohn
BORING NO.: 7TCESB06A SHEET 1 OF 1

Baker
Baker Environmental

TEST BORING RECORD

PROJECT: TCE Plume Delineation and Source Investigation
PROJ. NO.: 100299 FI.ZZ
BORING NO.: 7TCESB07
COORDINATES: EAST: 782660.240
NORTH: 145555.380
ELEVATION: SURFACE: 110.77

Rig: Simco 2800	Split Spoon	Casing	Augers	Air Hammer	Date	Progress (Ft.)	Weather	Depth to Water (Ft.)
Size (ID)	2-in	--	--	4-in	9/18/03	0.0 - 4.0	M sunny, lt wind, 80s	--
Length	2-ft	--	--	3.5-ft				
Type	S Steel	--	--	--				
Hammer Wt.	140-lbs	--	--	--				
Fall	30-in	--	--	--				

Remarks: Sample ID: 7TCESB07-__ (w/ suffix shown below)

SAMPLE TYPE
S = Split Spoon A = Auger
T = Shelby Tube W = Wash
R = Air Rotary C = Core
D = Direct Push P = Piston
N = No Sample

DEFINITIONS
SPT = Standard Penetration Test (ASTM D1586)
PID = Photo Ionization Detector Measurement
MSL = Mean Sea Level
BG/PS = Background/Point Source
ppm = parts per million

Depth (Ft.)		Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab ID	PID (ppm) ps/bg	Visual Description		Elevation (Ft. MSL)
1	1.3	S-1	0.8 62%	5 7 23/3"	01	0/0	F/M SAND, little f gravel, trace silt; tan; dense; damp (FILL) trace clay	1.3	109.47
2	2.0	R-N	--	--	--	--			
	2.0	S-2	0.0	Refusal	--	--	GABBRO frag; black & gray; v dense; damp (lithofied BEDROCK)		
3		R-N	--	--	--	--			
4	4.0							4.0	106.77
	4.0	S-3	0.0	Refusal	--	--	BOH at 4.0-ft		
5									
6									
7									
8									
9									
10									

DRILLING COMPANY: GeoWorks, Inc.
DRILLER: William Rolon
BAKER REP.: Mark K. DeJohn
BORING NO.: 7TCESB07 SHEET 1 OF 1

Baker
Baker Environmental

TEST BORING RECORD

PROJECT: TCE Plume Delineation and Source Investigation
PROJ. NO.: 100299 FI.ZZ BORING NO.: 7TCESB08
COORDINATES: EAST: 782703.100 NORTH: 145484.130
ELEVATION: SURFACE: 113.19

Rig: Mobile B-61/Simco 2800								
	Split Spoon	Casing	Augers	Air Hammer	Date	Progress (Ft.)	Weather	Depth to Water (Ft.)
Size (ID)	2-in	--	2-1/4-in	4-in	9/13/03	0.0 - 13.3	M sunny, lt wind, 80s	13.0
Length	2-ft	--	5-ft	3.5-ft				
Type	S Steel	--	HSA	--				
Hammer Wt.	140-lbs	--	--	--				
Fall	30-in	--	--	--				

Remarks: Sample ID: 7TCESB08-__ (w/ suffix shown below)

SAMPLE TYPE
S = Split Spoon A = Auger
T = Shelby Tube W = Wash
R = Air Rotary C = Core
D = Direct Push P = Piston
N = No Sample

DEFINITIONS
SPT = Standard Penetration Test (ASTM D1586)
PID = Photo Ionization Detector Measurement
MSL = Mean Sea Level
BG/PS = Background/Point Source
ppm = parts per million

Depth (Ft.)		Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab ID	PID (ppm) ps/bg	Visual Description	Elevation (Ft. MSL)
1	1.0	A-N	--	--	--	--		
2		S-1	1.2 60%	7 9 13		0/0 0/0	SILT, trace f gravel & clay; brown; m dense; damp (FILL)	
3	3.0			50/4"			3.0	110.19
4		S-2	1.3 65%	25 40 42	02	0/0 0/0	SAPPROLITE, brown & rust; v dense; damp	
5	5.0			22				
6	6.5	S-3	0.5 25%	16 34 50/6"		0/0	tan, rusty-brown, & black	
7	7.0	R-N	--	--	--	--		
8		S-4	0.7 35%	9 21 23		0/0	dark gray & white; dense	
9	9.0			28				
10		S-5	0.5 25%	24 25 27	05	0/0	Weathered GABBRO, highly fractured, crumbly rusty-brown & tan; v dense; damp (BEDROCK) Match to Sheet 2	

DRILLING COMPANY: GeoWorks, Inc. BAKER REP.: Mark K. DeJohn
DRILLER: William Rolon BORING NO.: 7TCESB08 SHEET 1 OF 2

Baker
Baker Environmental

TEST BORING RECORD

PROJECT: TCE Plume Delineation and Source Investigation
CTO NO.: 100299 FI.ZZ BORING NO.: 7TCESB08

SAMPLE TYPE
S = Split Spoon A = Auger
T = Shelby Tube W = Wash
R = Air Rotary C = Core
D = Denison P = Piston N = No Sample

DEFINITIONS
SPT = Standard Penetration Test (ASTM D1586)
PID = Photo Ionization Detector Measurement
MSL = Mean Sea Level
ps/bg = point source/background

Depth (Ft.)		Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab ID	PID (ppm) ps/bg	Visual Description		Elevation (Ft. MSL)
11	11.0			23			Continued from Sheet 1		
12	12.5	S-6	0.0 0%	8 23 50/5"		--	No recovery		
13	13.0	R-N						13.0	100.19
14	13.9	S-7	0 0%	10 40/4"		0/0	unweathered GARRBO; black; v dense; wet in air return sample (lithofied BEDROCK)	13.9	99.29
15							BOH @ 13.9-ft		
16									
17									
18									
19									
20									
21									
22									
23									
24									
25									
26									
27									
28									
29									
30									

DRILLING COMPANY: GeoWorks, Inc. BAKER REP.: Mark K. DeJohn
DRILLER: William Rolon BORING NO.: 7TCESB08 SHEET 2 OF 2

Baker
Baker Environmental

TEST BORING RECORD

PROJECT: TCE Plume Delineation and Source Investigation
PROJ. NO.: 100299 FI.ZZ BORING NO.: 7TCESB09
COORDINATES: EAST: 782527.870 NORTH: 145601.630
ELEVATION: SURFACE: 112.12

Rig: Simco 2800								
	Split Spoon	Casing	Augers	Air Hammer	Date	Progress (Ft.)	Weather	Depth to Water (Ft.)
Size (ID)	2-in	--	--	4-in	9/18/03	0.0 - 5.0	M sunny, lt wind, 80s	--
Length	2-ft	--	--	3.5-ft				
Type	S Steel	--	--	--				
Hammer Wt.	140-lbs	--	--	--				
Fall	30-in	--	--	--				

Remarks: Sample ID: 7TCESB09-__ (w/ suffix shown below)

SAMPLE TYPE
S = Split Spoon A = Auger
T = Shelby Tube W = Wash
R = Air Rotary C = Core
D = Direct Push P = Piston
N = No Sample

DEFINITIONS
SPT = Standard Penetration Test (ASTM D1586)
PID = Photo Ionization Detector Measurement
MSL = Mean Sea Level
BG/PS = Background/Point Source
ppm = parts per million

Depth (Ft.)		Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab ID	PID (ppm) ps/bg	Visual Description		Elevation (Ft. MSL)
		R-N	--	--	--	--			
1	1.0								
	1.4	S-1	0.4	50/5"	01	0/0	F/C SAND, some f/c gravel, trace silt & clay; gray; v dense; dry (FILL)		
2									
3	3.0							3.0	109.12
	3.1	S-2	0.0	30/1"			GABBRO pieces; black & gray; v dense damp (lithofied BEDROCK)		
4									
5	5.0						Spoon bouncing	5.0	107.12
	5.0	S-3	0.0	Refusal			BOH at 5.0-ft		
6									
7									
8									
9									
10									

DRILLING COMPANY: GeoWorks, Inc. BAKER REP.: Mark K. DeJohn
DRILLER: William Rolon BORING NO.: 7TCESB09 SHEET 1 OF 1

Baker
Baker Environmental

TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT:	TCE Plume Delineation and Source Investigation		
PROJ. NO.:	100299 FI.ZZ	BORING NO.:	7TCETW202
COORDINATES:	EAST: 782561.080	NORTH:	145292.46
ELEVATION:	SURFACE: 106.69	TOP OF PVC CASING:	

Rig: Mobile B-61	Split Spoon	Casing	Augers	Air Hammer	Date	Progress (Ft.)	Weather	Depth to Water (Ft.)
Size (ID)	2-in	--	2-1/4-in	--	9/15/2003	0.0 - 22.0	P sunny lt wind, 80s	5.0
Length	2-ft	--	5-ft	--				
Type	S Steel	--	HSA	--				
Hammer Wt.	140-lbs	--	--	--				
Fall	30-in	--	--	--				

Remarks:

SAMPLE TYPE

S = Split Spoon A = Auger
T = Shelby Tube W = Wash
R = Air Rotary C = Core
D = Direct Push P = Piston
N = No Sample

WELL INFORMATION

Type	Diam.	Top Depth (Ft.)	Bottom Depth (Ft.)
Sch. 40 PVC Casing	1-in	0.0	15.0
Sch. 40 PVC Screen (10-slot)	1-in	15.0	20.0

Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab ID	PID (ppm) ps/bg	Visual Description	Well Installation Detail	Elevation (Ft. MSL)
1	A-N	--	--	--	--	F SAND and ROCK frag; brown (FILL) 1.0		105.69
2								
3								
4								
5 5.0								
6	S-1	1.1 55%	5 4 5 6	--	6818/ 0	CORAL and SHELL frag, some f/c sandtrace silt & clay; tan; loose; wet; no stains or odors anomalous PID (MARINE)		
7 7.0								
8	A-N	--	--	--	--			
9								
10 10.0						10.0		96.69
						Match to Sheet 2		

DRILLING CO.:	GeoWorks, Inc.	BAKER REP.:	Mark K. DeJohn
DRILLER:	William Rolon	BORING NO.:	7TCETW202 SHEET 1 OF 2

Baker
Baker Environmental

TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: TCE Plume Delineation and Source Investigation
CTO NO.: 100299 FI.ZZ BORING NO.: 7TCETW202

SAMPLE TYPE
S = Split Spoon A = Auger
T = Shelby Tube W = Wash
R = Air Rotary C = Core
D = Denison P = Piston N = No Sample

DEFINITIONS
SPT = Standard Penetration Test (ASTM D1586)
PID = Photo Ionization Detector Measurement
MSL = Mean Sea Level
ps/bg = point source/background

Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab ID	PID (ppm) ps/bg	Visual Description	Well Installation Detail	Elevation (Ft. MSL)
11	S-2	0.9 45%	WOH	--	0/0	Continued from Sheet 1 CLAY, little shell frag, trace f sand & silt; gray; v soft; wet sulfur odor		
12 12.0								
13	S-3	0.0 0%	WOH	--	--	No recovery		
14 14.0						14.0		92.69
15	S-4	2.0 100%	WOH	--	0/0	F/C SAND, some shell & coral frag, clay; gray; v loose; wet; sulfur odor	15.0	91.69
16 16.0								
17	S-5	2.0 100%	WOH	--	0/0	some clay, little shell & coral frag; gray; v loose; wet		
18 18.0						18.0		
19	S-6	0.2 10%	1 1 10 9	--	0/0	CLAY, trace shell frag & f sand; dark gray; m stiff; plastic; moist; sulfur odor		
20 20.0							20.0	86.69
21	S-7	0.0 0%	12 18 18 18	--	--	No recovery		
22 22.0						22.0	22.0	84.69
23						BOH at 22.0-ft		
24								
25								
26								
27								
28								
29								
30								

DRILLING CO.: GeoWorks, Inc. BAKER REP.: Mark K. DeJohn
DRILLER: William Rolon BORING NO.: 7TCETW202 SHEET 2 OF 2

Baker
Baker Environmental

TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: TCE Plume Delineation and Source Investigation
PROJ. NO.: 100299 FI.ZZ
BORING NO.: 7TCETW203
COORDINATES: EAST: 782480.780
NORTH: 145328.16
ELEVATION: SURFACE: 106.86
TOP OF PVC CASING:

Rig: Mobile B-61	Split Spoon	Casing	Augers	Air Hammer	Date	Progress (Ft.)	Weather	Depth to Water (Ft.)
Size (ID)	2-in	--	2-1/4-in	--	9/15/2003	0.0 - 22.0	P sunny lt wind, 80s	5.0
Length	2-ft	--	5-ft	--				
Type	S Steel	--	HSA	--				
Hammer Wt.	140-lbs	--	--	--				
Fall	30-in	--	--	--				

Remarks:

SAMPLE TYPE
S = Split Spoon A = Auger
T = Shelby Tube W = Wash
R = Air Rotary C = Core
D = Direct Push P = Piston
N = No Sample

WELL INFORMATION

Type	Diam.	Top Depth (Ft.)	Bottom Depth (Ft.)
Sch. 40 PVC Casing	1-in	0.0	15.0
Sch. 40 PVC Screen (10-slot)	1-in	15.0	20.0

Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab ID	PID (ppm) ps/bg	Visual Description	Well Installation Detail	Elevation (Ft. MSL)
1						F SAND and ROCK frag; brown (FILL) 1.0		105.86
2	A-N	--	--	--	--			
3								
4								
5 5.0								
6	S-1	0.8 40%	6 4 6 4	--	0/0	F/C SAND, some shell & coral frag, trace clay; tan; m dense; wet (MARINE)		
7 7.0								
8	S-2	0.9 45%	4 3 3 2	--	0/0	trace coral & shell frag, clay; black & gray; loose; wet; sulfur odor		
9 9.0								
10	S-3	0.8 40%	3 1 1	--	0/0	Match to Sheet 2		

DRILLING CO.: GeoWorks, Inc.
DRILLER: William Rolon
BAKER REP.: Mark K. DeJohn
BORING NO.: 7TCETW203 SHEET 1 OF 2

Baker
Baker Environmental

TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: TCE Plume Delineation and Source Investigation
CTO NO.: 100299 FI.ZZ BORING NO.: 7TCETW203

SAMPLE TYPE
S = Split Spoon A = Auger
T = Shelby Tube W = Wash
R = Air Rotary C = Core
D = Denison P = Piston N = No Sample

DEFINITIONS
SPT = Standard Penetration Test (ASTM D1586)
PID = Photo Ionization Detector Measurement
MSL = Mean Sea Level
ps/bg = point source/background

Depth (Ft.)		Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab ID	PID (ppm) ps/bg	Visual Description	Well Installation Detail	Elevation (Ft. MSL)
11	11.0			1			Continued from Sheet 1		
12		S-4	1.2 60%	WOH	--	0/0	F SAND, some silt; tan; v loose; moist to wet		
							12.3		94.56
13	13.0						CLAY, trace shell frag & f sand; brown; v soft; damp		
14		S-5	0.9 45%	WOH	--	0/0	some shell frag; brown; v soft; moist; sulfur odor		
15	15.0						wet 15.0	15.0	91.86
16		S-6	0.6 30%	WOH	--	0/0	CORAL and SHELL frag, trace f sand & clay; gray; v loose; wet		
17	17.0								
18		S-7	0.8 40%	1 1 1 1	--	0/0	some clay; brown & gray; v loose; wet; sulfur odor		
19	19.0						19.0		87.86
20		S-8	1.0 50%	4 8 7 1	--	0/0	CLAY, trace silt; dark green; stiff; damp	20.0	86.86
21	21.0						21.0	21.0	85.86
22							BOH at 21.0-ft		
23									
24									
25									
26									
27									
28									
29									
30									

DRILLING CO.: GeoWorks, Inc. BAKER REP.: Mark K. DeJohn
DRILLER: William Rolon BORING NO.: 7TCETW203 SHEET 2 OF 2

Baker
Baker Environmental

TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: TCE Plume Delineation and Source Investigation
PROJ. NO.: 100299 FI.ZZ — BORING NO.: 7TCETW206
COORDINATES: EAST: 782676.290 — NORTH: 145459.34
ELEVATION: SURFACE: 112.79 — TOP OF PVC CASING:

Rig: Simco 2800	Split Spoon	Casing	Augers	Air Hammer	Date	Progress (Ft.)	Weather	Depth to Water (Ft.)
Size (ID)	2-in	--	--	4-in	9/18/2003	0.0 - 22.5	M sunny mod wind, 80s	18.0
Length	2-ft	--	--	3.5-ft				
Type	S Steel	--	--	--				
Hammer Wt.	140-lbs	--	--	--				
Fall	30-in	--	--	--				

Remarks:

SAMPLE TYPE
S = Split Spoon A = Auger
T = Shelby Tube W = Wash
R = Air Rotary C = Core
D = Direct Push P = Piston
N = No Sample

WELL INFORMATION

Type	Diam.	Top Depth (Ft.)	Bottom Depth (Ft.)
Sch. 40 PVC Casing	2-in	0.0	16.0
Sch. 40 PVC Screen (10-slot)	2-in	16.0	21.0

Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab ID	PID (ppm) ps/bg	Visual Description	Well Installation Detail	Elevation (Ft. MSL)
1								
2								
3						GABBRO cuttings (f/c sand); brown, trace dark gray; dry		
4								
5	R-N	--	--	--	--			
6								
7						f gravel sized; brown, some black & gray; dry; harder fm		
8								
9						mainly grayin color		
10						f/c sand, trace f gravel; gray, trace black		

DRILLING CO.: GeoWorks, Inc. — BAKER REP.: Mark K. DeJohn
DRILLER: William Rolon — BORING NO.: 7TCETW206 SHEET 1 OF 2

Baker
Baker Environmental

TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: TCE Plume Delineation and Source Investigation
CTO NO.: 100299 FI.ZZ BORING NO.: 7TCETW206

SAMPLE TYPE
S = Split Spoon A = Auger
T = Shelby Tube W = Wash
R = Air Rotary C = Core
D = Denison P = Piston N = No Sample

DEFINITIONS
SPT = Standard Penetration Test (ASTM D1586)
PID = Photo Ionization Detector Measurement
MSL = Mean Sea Level
ps/bg = point source/background

Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab ID	PID (ppm) ps/bg	Visual Description	Well Installation Detail	Elevation (Ft. MSL)
11						f gravel; mainly gray, trace black		
12								
13								
14						f/c sand, trace f gravel; gray		
15								
16	R-N	--	--	--	--		16.0	96.79
17						increase in gravel-sized cuttings		
18								
19						less dry cuttings, evidence of water?		
20						trace moist cuttings		
21							21.0	91.79
22								
22.5						22.5	22.5	90.29
23						BOH at 22.5-ft		
24								
25								
26								
27								
28								
29								
30								

DRILLING CO.: GeoWorks, Inc. BAKER REP.: Mark K. DeJohn
DRILLER: William Rolon BORING NO.: 7TCETW206 SHEET 2 OF 2

Baker
Baker Environmental

TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT:	TCE Plume Delineation and Source Investigation		
PROJ. NO.:	100299 FI.ZZ	BORING NO.:	7TCETW207
COORDINATES:	EAST: 782528.820	NORTH:	145555.63
ELEVATION:	SURFACE: 111.85	TOP OF PVC CASING:	

Rig: Simco 2800	Split Spoon	Casing	Augers	Air Hammer	Date	Progress (Ft.)	Weather	Depth to Water (Ft.)
Size (ID)	2-in	--	--	4-in	9/18/2003	0.0 - 22.0	M sunny mod wind, 80s	17.0
Length	2-ft	--	--	3.5-ft				
Type	S Steel	--	--	--				
Hammer Wt.	140-lbs	--	--	--				
Fall	30-in	--	--	--				

Remarks:

SAMPLE TYPE

S = Split Spoon A = Auger
T = Shelby Tube W = Wash
R = Air Rotary C = Core
D = Direct Push P = Piston
N = No Sample

WELL INFORMATION

Type	Diam.	Top Depth (Ft.)	Bottom Depth (Ft.)
Sch. 40 PVC Casing	2-in	0.0	15.0
Sch. 40 PVC Screen (10-slot)	2-in	15.0	20.0

Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab ID	PID (ppm) ps/bg	Visual Description	Well Installation Detail	Elevation (Ft. MSL)
1								
2						GABBRO frag; brown & gray, trace black (f gravel sized)		
3								
4						black & dark gray cuttings, some light brown (f gravel sized)		
5	R-N	--	--	--	--			
6								
7						zone of mainly brown cuttings		
8								
9								
10								

DRILLING CO.:	GeoWorks, Inc.	BAKER REP.:	Mark K. DeJohn
DRILLER:	William Rolon	BORING NO.:	7TCETW207 SHEET 1 OF 2

Baker
Baker Environmental

TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: TCE Plume Delineation and Source Investigation
CTO NO.: 100299 FI.ZZ BORING NO.: 7TCETW207

SAMPLE TYPE
S = Split Spoon A = Auger
T = Shelby Tube W = Wash
R = Air Rotary C = Core
D = Denison P = Piston N = No Sample

DEFINITIONS
SPT = Standard Penetration Test (ASTM D1586)
PID = Photo Ionization Detector Measurement
MSL = Mean Sea Level
ps/bg = point source/background

Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab ID	PID (ppm) ps/bg	Visual Description	Well Installation Detail	Elevation (Ft. MSL)
11								
12								
13								
14						f/c sand-sized cuttings; brown; softer		
15							15.0	96.85
16	R-N	--	--	--	--			
17								
18						some water in bore hole, slow recharge evident		
19								
20							20.0	91.85
21								
22	22.0					22.0	22.0	89.85
23						BOH at 22.0-ft		
24								
25								
26								
27								
28								
29								
30								

DRILLING CO.: GeoWorks, Inc. BAKER REP.: Mark K. DeJohn
DRILLER: William Rolon BORING NO.: 7TCETW207 SHEET 2 OF 2

Baker
Baker Environmental

TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: TCE Plume Delineation and Source Investigation
PROJ. NO.: 100299 FI.ZZ — BORING NO.: 7TCETW208
COORDINATES: EAST: 782723.430 — NORTH: 145404.75
ELEVATION: SURFACE: 110.48 — TOP OF PVC CASING:

Rig: Simco 2800	Split Spoon	Casing	Augers	Air Hammer	Date	Progress (Ft.)	Weather	Depth to Water (Ft.)
Size (ID)	2-in	--	--	4-in	9/24/2003	0.0 - 22.0	M sunny, lt wind, 80s	19.0
Length	2-ft	--	--	3.5-ft				
Type	S Steel	--	--	--				
Hammer Wt.	140-lbs	--	--	--				
Fall	30-in	--	--	--				

Remarks:

SAMPLE TYPE
S = Split Spoon A = Auger
T = Shelby Tube W = Wash
R = Air Rotary C = Core
D = Direct Push P = Piston
N = No Sample

WELL INFORMATION

Type	Diam.	Top Depth (Ft.)	Bottom Depth (Ft.)
Sch. 40 PVC Casing	1-in	0.0	17.0
Sch. 40 PVC Screen (10-slot)	1-in	17.0	22.0

Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab ID	PID (ppm) ps/bg	Visual Description	Well Installation Detail	Elevation (Ft. MSL)
1						gravel FILL 1.0		109.48
2						GABBRO frag (f/c gravel-sized); black & gray (lithofied BEDROCK)		
3								
4						f/c sand; gray & tan		
5								
6	R-N	--	--	--	--	f/m sand; gray & greenish gray; unweathered		
7								
8						f/c sand, some f gravel; gray & greenish gray (unweathered)		
9								
10						trace clay; gray, little weathering		

DRILLING CO.: GeoWorks, Inc. — BAKER REP.: Mark K. DeJohn
DRILLER: William Rolon — BORING NO.: 7TCETW208 SHEET 1 OF 2

Baker
Baker Environmental

TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: TCE Plume Delineation and Source Investigation
CTO NO.: 100299 FI.ZZ BORING NO.: 7TCETW208

SAMPLE TYPE
S = Split Spoon A = Auger
T = Shelby Tube W = Wash
R = Air Rotary C = Core
D = Denison P = Piston N = No Sample

DEFINITIONS
SPT = Standard Penetration Test (ASTM D1586)
PID = Photo Ionization Detector Measurement
MSL = Mean Sea Level
ps/bg = point source/background

Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab ID	PID (ppm) ps/bg	Visual Description	Well Installation Detail	Elevation (Ft. MSL)
11						unweathered		
12								
13								
14						f/c sand,little f gravel; gray; unweathered		
15								
16	R-N	--	--	--	--			
17							17.0	93.48
18								
19						brown in color, increased weathering; damp		
20								
21								
22	22.0					22.0	22.0	88.48
23						BOH at 22.0-ft		
24								
25								
26								
27								
28								
29								
30								

DRILLING CO.: GeoWorks, Inc. BAKER REP.: Mark K. DeJohn
DRILLER: William Rolon BORING NO.: 7TCETW208 SHEET 2 OF 2

Baker
Baker Environmental

TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: TCE Plume Delineation and Source Investigation
PROJ. NO.: 100299 FI.ZZ
BORING NO.: 7TCETW209
COORDINATES: EAST: 782445.330
NORTH: 145489.79
ELEVATION: SURFACE: 109.20
TOP OF PVC CASING:

Rig: Simco 2800	Split Spoon	Casing	Augers	Air Hammer	Date	Progress (Ft.)	Weather	Depth to Water (Ft.)
Size (ID)	2-in	--	--	4-in	9/23/2003	0.0 - 20.0	M sunny mod wind, 90	17.0
Length	2-ft	--	--	3.5-ft				
Type	S Steel	--	--	--				
Hammer Wt.	140-lbs	--	--	--				
Fall	30-in	--	--	--				

Remarks:

SAMPLE TYPE
S = Split Spoon A = Auger
T = Shelby Tube W = Wash
R = Air Rotary C = Core
D = Direct Push P = Piston
N = No Sample

WELL INFORMATION

Type	Diam.	Top Depth (Ft.)	Bottom Depth (Ft.)
Sch. 40 PVC Casing	1-in	0.0	15.0
Sch. 40 PVC Screen (10-slot)	1-in	15.0	20.0

Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab ID	PID (ppm) ps/bg	Visual Description	Well Installation Detail	Elevation (Ft. MSL)
1						f sand FILL		
2						CLAY, trace black rock frag; brown		
3								
4								
5	R-N	--	--	--	--	5.0		104.20
6						GABBRO frag (f/c sand & f gravel-sized); gray (lithofied BEDROCK)		
7								
8						hammer refusal; offset 5-ft		
9						f/c sand; black		
10						gray & brown		

DRILLING CO.: GeoWorks, Inc.
DRILLER: William Rolon
BAKER REP.: Mark K. DeJohn
BORING NO.: 7TCETW209 SHEET 1 OF 2

Baker
Baker Environmental

TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: TCE Plume Delineation and Source Investigation
CTO NO.: 100299 FI.ZZ BORING NO.: 7TCETW209

SAMPLE TYPE
S = Split Spoon A = Auger
T = Shelby Tube W = Wash
R = Air Rotary C = Core
D = Denison P = Piston N = No Sample

DEFINITIONS
SPT = Standard Penetration Test (ASTM D1586)
PID = Photo Ionization Detector Measurement
MSL = Mean Sea Level
ps/bg = point source/background

Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab ID	PID (ppm) ps/bg	Visual Description	Well Installation Detail	Elevation (Ft. MSL)
11								
12								
13						mainly brown, softer frag		
14								
15						f/c sand, some f gravel; brown & gray	15.0	94.20
16	R-N	--	--	--	--			
17								
18						trace water		
19						slighlty wet frag		
20	20.0					20.0	20.0	89.20
21						BOH at 20.0-ft		
22								
23								
24								
25								
26								
27								
28								
29								
30								

DRILLING CO.: GeoWorks, Inc. BAKER REP.: Mark K. DeJohn
DRILLER: William Rolon BORING NO.: 7TCETW209 SHEET 2 OF 2

Baker
Baker Environmental

TEST BORING AND WELL CONSTRUCTION RECORD

PROJECT: TCE Plume Delineation and Source Investigation
PROJ. NO.: 100299 FI.ZZ
BORING NO.: 7TCETW210
COORDINATES: EAST: 782620.490
NORTH: 145293.17
ELEVATION: SURFACE: 107.36
TOP OF PVC CASING:

Rig: Mobile B-61/Simco 2800	Split Spoon	Casing	Augers	Air Hammer	Date	Progress (Ft.)	Weather	Depth to Water (Ft.)
Size (ID)	2-in	--	2-1/4-in	4-in	9/24/2003	0.0 - 10.0	M sunny, lt wind, 80s	9.0
Length	2-ft	--	5-ft	3.5-ft				
Type	S Steel	--	HSA	--				
Hammer Wt.	140-lbs	--	--	--				
Fall	30-in	--	--	--				

Remarks:

SAMPLE TYPE
S = Split Spoon A = Auger
T = Shelby Tube W = Wash
R = Air Rotary C = Core
D = Direct Push P = Piston
N = No Sample

WELL INFORMATION

Type	Diam.	Top Depth (Ft.)	Bottom Depth (Ft.)
Sch. 40 PVC Casing	1-in	0.0	15.0
Sch. 40 PVC Screen (10-slot)	1-in	15.0	20.0

Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab ID	PID (ppm) ps/bg	Visual Description	Well Installation Detail	Elevation (Ft. MSL)
1						mainly SAND, some f/c gravel (FILL)		
2						2.0		105.36
3						F/C SAND, some f/c coral frag; tan; moist		
4	A-N	--	--	--	--			
5						5.0		102.36
6								
7	7.0					auger refusal, switch to hammer		
8								
9	R-N	--	--	--	--	trace sand mud in return flowing water		
10	10.0					10.0	10.0	97.36
						gray & brown		

DRILLING CO.: GeoWorks, Inc.
DRILLER: William Rolon
BAKER REP.: Mark K. DeJohn
BORING NO.: 7TCETW210 SHEET 1 OF 1

APPENDIX B
Field Notes

Fri. Sept. 12, 2003. Today's Tasks-
Setup for TCE Source Investigation
Weather Conditions-
AM: Sunny, lt. NE winds, low 80's
PM: M. Sunny, lt. north wind, high 80's

0640 Arrive at PWD/Box truck. Get equip. to locate borings at SWMU 7.

0652 Arrive at SWMU 7 to locate borings

0808 Borings & Temp Wells located. JCE & I look for drains (or evidence of) in and around the foundation of Bldg 2314 (Former Small Craft Bldg). We saw no signs of drains.

0905 Visited Madeline to update her on our progress and plans for the remainder of the trip.

0909 Depart Base to return generator & extra extention cords.

0944 Arrive at CGS. Notes on SWMU 7 building use: Deli (Base Real Estate) gave Madeline/Baker inventory records of building(s); current & historic. They provide no detail regarding specific activity. Deli no Madeline can offer any addition information

MKO 9/12

(cont.) beyond the inventory sheets. Personal working at the Small Craft Bldg. no longer are stationed at NSRR (according to Madeline). So, there is little chance to garner any specifics regarding solvent use.

1010 Back on Base. Stop to talk to Carlos at Fuels. He said that the Small Craft Bldg. was for storage and light repairs/maintenance. Also, the 3 fuel lines are to 4-ft from road. Look for PVC casing. Those are "sniff" holes. Fuel line is right below. Lines also turn into, closer to harbor near surface ops

1033 Collect round of PTW from SWMU 3 (Base Landf.)) Monitoring wells. JCE to record details in a separate log book for SWMU 3.

1201 Lunch break.

1233 Return PWD Resp. for GW sampling.

1313 GeoWorks on-site w/ B-90 rig & support equipment.

9/12 MKO

Fri. Sept. 19, 2003. Today's Tasks-
Sample TW206 & 207, plus travel
Weather Conditions-
AM: M. Sunny, lt NE winds, low 80's
PM: M. Sunny, mod SE winds, high 80's

0914 Arrive at PWD to pickup box truck.
0921 Setup to sample 7TCETW207
0946 Setup to sample 7TCETW206. JCE to keep record of sampling details.
1004 Complete sampling. We will next prep. samples for shipment & cleanup securing equipment for the weekend.
1130 Depart NSRR - travel to PIT

9/19/03

Sunday Sept. 21, 2003. Today's Tasks-
Travel to NSRR
1445 Arrive at PIT. Travel to SJU via PHL.
~~2005~~
2125 Arrive at SJU, Pickup vehicle rental & drive to condo.

SWMU 7

1328 GeoWorks dropped rig & supplies. They have decon'ed tools & will be ready to drill first thing 9/13 @ 0645. Omar rushed for meeting elsewhere this afternoon.

1729 Landfill groundwater sampling completed. Cleanup time. Also, prep. for the SWMU 7 TCE source investigation.

1800 Depart PWD - done for the day.

MAD 9/12

SWMU 7

9/12 MAD

Sat. Sept. 13, 2003. Todays Tasks -
Begin TCE Source investigation
Weather Conditions -
AM: M. Sunny, Sl. north wind w/gusts, low 80's
PM: Incr clouds, lt N wind, high 80's

0635 Arrive at PVVD. Move to drilling staging area.
0649 GeoWorks on site. PID calibration
Zero - 0.0 ppm
100 ppm Cal. Gas - 100 ppm. GeoWorks preparing rig(s) for drilling
0726 Relocate to SWMU 7
0732 Setup at 7TCE-SB08
0802 GeoWorks to use "Orange Aid" as lubricant, says it contains TFE, Lead Free and hydrocarbon free. Manufacturer is Western Rubber & Mfg. (Omar say corn oil & orange peel grindings). JCE conducts H&S Briefing
0809 Begin augering
0819 Auger refusal at 3-ft. Will collect split spoon here.
0823 Able to collect sample (weathered rock) but not able to auger.

MKD 9/13

(cont.) We will locate to another boring & revist SB08 w/air rig.
0859 Auger & spoon refusal at 5-ft
0904 Relocate to 7TCESB05
0945 Note on saprolite. in place weathered bedrock w/ remanent of crystal structure
1020 Auger refusal at 16'. sample attempted from 16-18-ft bgs.
1037 Mob off of SB05.
1052 Relocate to 7TCESB06.
1106 some hard at 0.5-ft in the area of SB06; had to off 1' to NW twice.
1132 Auger refusal @ 6-ft bgs. I instructed GeoWorks to break for lunch. They will decon when back & switch to air rotary.
1141 Lunch break
1231 JCE & I back on site. We tend to SWMU 3 groundwater samples.
1300 GeoWorks back on site. Prep to switch over to air rotary
1351 GeoWorks sets up at SB08 w/ air rig.

9/13 MKD

SWMU 7

7TCES B08

Time	Depth (ft-bgs)	ID	Recovery (ft)	Blow counts PID PS	PID PS/BG
0810	0-1	A-N	–	–	–
0814	1-3	S-1	1.2	7-9	0/0
				13-50/4"	0/0
0822	3-5	S-2	1.3	25-40	0/0
7TCES B08-02				42-22	0/0
1416	5-7	S-3	0.5	16-34-	0/0
				50/6"	
1436	7-9	S-4	0.7	9-21-	0/0
				23-28	
1453	9-11	S-5	0.5	24-25-	0/0
7TCES B08-05				27-23	
1511	11-13	S-6	0.0	8-23-	–
				50/5"	
1537	13-13.3'	S-7		10-40/4"	0/0
	BOHQ	13.3'			

MRD 9/13

SWMU 7

Rig: B-90 Augers: 2-1/4 inch HSA
Simco 2800 w/4" Hammer

Description

SILT, trace f gravel; clay; brown; damp; m. dense (FILL) 3.0

SAPROLITE, brown; rust; v. dense; damp

tan, rusty-bro; black; v. dense; damp

dark gray; white; dense; damp

WEATHERED GABBRO, high fractured, crumbles; rusty-brn; tan; v. dense; damp

No recovery

13.0 <L

Unweathered GABBRO; black; v. dense; wet water @ 13.0-ft sample in pieces

sample of air hammer frag. no in place rock recovered.

9/13 MRD

20

SWMU7

7TCE SB03

Time	Depth (ft-bgs)	ID	Recovery (ft)	Blow Counts	PID PS/BG
0844	0-2	S-1	0.7	7-12-22-16	0/0
0952	2-4	S-2	0.3	50/6"	0/0
	9/15/03				
1533	4-6	S-3		9-50/4" ~~33-50/6"~~	0/0
7TCESB03-03					
1543	6-8	S-4	0.4	15-31-50/5"	0/0
7TCESB03-04					
1557	8-10	S-5	0.0	34-25/1"	
1612	10-12	S-6	0.5	23-50/4"	
1633	12-14	S-7	0.0	30-31/2"	

BOH @ 14.0 ft

MKD 9/13 & 15

SWMU7

Rig: B-90 Augers - 2-1/4" HSA

	Description
1	F SAND; ROCK FRAG (FILL)
2	
3	SILT, some F gravel, trace clay; brown; V. dense; damp (FILL)
4	
5	As above
6	6.0
7	WEATHERED GABBRO, highly fractured; rusty brown; V. dense; dry
8	
9	No recovery *8.5' <L
10	MKD
11	~~Same as 6-8'~~ WEATHERED GABBRO, gray; rusty brown fragments
12	WEATHERED GABBRO, blocky w/ less fracturing; gray w/ rust-brown face; V. dense; dry
13	
14	
15	
16	
17	
18	
19	
20	
21	

9/13 & 15 MKD

SWMU 7

7TCESB05

Time	Depth (ft-bgs)	ID	Recovery (Ft)	Blow counts	PID PS/BG
0909	0-2	S-1	1.0	10-15-	0/0
				21-12	0/0
0918	2-4	S-2	1.9	30-33	- 0/0
				42-43	0/0 0/0
0925	4-6	S-3	0.7	33-50/6"	0/0
0931	5-6	A-N	-	-	-
0934	6-7.5	S-4	1.1	32-40-	0/0
	7.5-8	A-N		50/6"	0/0
0944	8-10	S-5	0.7	30-50/3"	0/0
7TCESB05-04 (8-9')					MKD
0953	10-12	S-6	1.3	13-27-	2.3/0
7TCESB05-05 (10-11')				32-34	1.6/0
1000	12-14	S-7	1.4	15-20-	-0/0
				21-30	0/0 0/0
1008	14-16	S-8	0.7	25-50/6"	0/0
1024	16-18	S-9	0.6	50/5"	0/0

Auger/sampler refusal

MKD 9/13

Rig: B-90 Augers - 2 1/4 inch HSA

Description

F SAND, some F gravel, trace clay; brown; dense; damp (FILL)

F SAND; F GRAVEL, trace silt; clay; gray; v. dense; dry (FILL)

4.0

F/C SAND (broken rock frag), trace F gravel; clay; brown; v. dense; damp

F/C SAND (broken rock frag), little silt, trace clay; rusty-brn; tan; v. dense; damp

WEATHERED GABBRO, highly fractured; crumbles in hand gray; rusty-brn; v. dense; damp

As above; orange-brn; rust color

SILT, little clay (as weathered gabbro); gray; dense; damp

WEATHERED GABBRO, highly fractured, crumbles in hand; gray; v. dense; damp 1/8" < L

WEATHERED GABBRO (as F/C gravel); gray; v. dense; damp

9/13 MKD

SWMU 7

7TCE-SB06

Time	Depth (ft-bgs)	ID	Recovery (ft)	Blow Counts	PID PS/BG
1106	0-1	A-N	-	-	-
1110	1-3	S-1	0.9	18-24-	0/0
				50-5"	0/0
1118	3-5	S-2	0.8	20-50/5"	0/0
1124	5-7	S-3	0.2	50/3"	0/0

MKD 9/13

SWMU 7

Rig: B-90 Augers: 2-1/4" HSA

Description

2 ROCK FRAG, some F sand, little silt; lt. brown; v. dense; dry 3.0

3 WEATHERED GABBRO, highly fractured, crumbles in hand; brown; rust; v. dense; damp 5' < L

4

5 As above; tan auger/spoon refusal

6

7

8

9

10

11

12

13

14

15

16

17

18

19

20

21

9/13 MKD

SWMU7

1404 Begin air rotary at TTCESB08 (0-5 ft bgs).

1545 Distinct change in downward pressure at ~13.0-ft bgs. Change in cutting color & size attendant. Unable to obtain sample of native rock, but evidence suggest un-weathered bedrock.

1554 GeoWorks to mob equip back to SWMU11 staging area. Also will decon. for Monday

1611 JCE & I relocate to staging area. Prep. for groundwater sampling at Base Landfill.

1711 GeoWorks depart ~~SW~~ MW staging area. Done for the day.

1717 Relocate to PWD to park day truck

1730 Depart PWD - Done for the day. Plan of attack for SWMU7:
Monday: Temp. wells (~3)
Tuesday: JCE ~~sample Temp wells~~ / MKD MKD Temp Wells (2) & Soil Borings (1)

MKD 9/13

(cont.) Wednesday: JCE sample 5 temp wells / MKD soil borings (3)
Thursday: MKD & JCE soil borings (3)
Friday: MKD & JCE travel to PIT
MEK & CLH review TW data
Saturday: off
Sunday: MKD & JCE travel to PR
Monday: Add'l Temp wells
Tuesday: Add'l soil borings / MW
Wednesday: MW install / Develop
Thursday: MW install / Develop
Friday: well sampling

9/13/03

9/13 MKD

SWMU 3

Sun. Sept. 14, 2003. Today's Task's -
Complete Base Landfill GW sampling
Weather Conditions -
AM: M. Sunny, Mod. SW wind, low 80's
PM: M. Sunny, mod. SW wind, near 90

0636 Arrive at PWD - Prep for groundwater sampling.

1130 Lunch break

1200 Back inside Landfill. Note: JCE Keeping detailed notes regarding sampling.

1640 MKD collects R7FB01-08 from lab-grade DI water.

1725 MKD collects R7ER01-08 from silicone & PE tubing.

1836 Depart PWD - Done for the day.

MKD 9/14

SWMU 3

9/14 MKD

Mon. Sept. 15, 2003. Today's Tasks
Continued TCE source Investigation
Weather Conditions-
AM: P. Sunny, lt. SE winds, low 80's
PM:

0645 Arrive at PW. MEK calls to discuss our proposed scheduled for this week (p. 27) vs. Work Plan scope. We agreed to proceed with temp. wells TW201 - TW203. We will hold TW204 and TW205 until completion of borings SB01 and SB02 (case we need soil samples to delineate source).

0700 GeoWorks on site

0704 set up air rig at 7TCE TW202.

0729 JCE to go to PWD/Environmental to get confirmation on clearance to restricted area (TW201; TW203), and addt'l utility clearance

0741 Begin air rotary drilling at TW202

0819 Bore hole collapsing; cannot collect 12-14 foot sample. GeoWorks to switch over to augers (4-1/4" HSA) then we can air hammer inside if necessary.

MKD 9/15

0838 Auger rig sets up at TW202

0952 Prepare to install temporary well at TW202. 1" PVC 0.01" slot (5-ft) 15-20-ft bgs. Based on my findings (11.2-35) and DDS work in 1999 (TW-103) a clay layer was encountered at ~18-ft bgs, where water content decreased. So, there is no reason to go to 22-ft w/well. Allow formation to collapse around screen like the previous investigation.

1022 Prep. to mob to TW201

1030 Set rig at 7TCE TW201

1140 Driller's lunchbreak. MKD also...

1210 Relocate to Marina for ice.

1230 Return to SWMU 7. I help JCE with SWMU 3 sample packing

1300 GeoWorks back on site. Setup at 7TCE TW203

1357 Boring complete. Set temp. well. I help JCE finish sample packing while GeoWorks breaks down augers and mobs off of TW203.

1450 Setup at 7TCE SB03 again. Log continued on pp 20-21

9/15 MKD

SWMU7

7TCETW202

Time	Depth (ft-bgs)	ID	Recovery (ft)	Blow counts	PID PS/BG
0746	0-5	R-N	-	-	-
0748	5-7	S-1	1.1	5-4-5-6	6818/0
0757	7-10	R-N	-	-	-
0800	10-12	S-2	0.9	WOH	0/0
0912 MKD	Switch to Mobile B-90 rig				
~~0812~~	12-14	S-3	0.0	WOH	-
0918	14-16	S-4	2.0	WOH	0/0
0931	16-18	S-5	2.0	WOH	0/0
0937	18-20	S-6	0.2	1-1-10-9	0/0
0947	20-22	S-7	0.0	12-18-18-18	-

MKD 9/15

SWMU7

Rig:

Description

1.0

FILL Material

MKD 5.0

CORAL and SHELL FRAGMENTS, some F/c sand; trace silt; clay; tan; loose; moist - (MARINE) wet @ 5.5 ft; no stains or odors 5.0 MKD PID hit appear anomalous

10.0

CLAY, little shell frag, trace F sand; silt; gray; v. soft; wet; sulfur odor (MARINE)

No recovery

14.0

F/C SAND, some shell; coral frag and clay; gray; v. soft; wet; sulfur odor (MARINE)

some clay, little shell; coral frag; gray; v. soft; wet

18.0

CLAY, trace shell Frag; F sand; dark gray; M. stiff; moist; plastic (MARINE)

No Recovery

9/15 MKD

SWMU 7

7TCETW201

Time	Depth (ft-bgs)	ID	Recovery (ft)	Blow Counts	PID PS/BG
1048	0-5	A-N	-	-	-
1050	5-7	S-1	0.8	7-6-7-6	0/0
1055	7-9	S-2	1.4	7-4-5-4	0/0
1059	9-11	S-3	0.9	4-2-2-2	0/0
1104	11-13	S-4	0.3	6-3-WOH	0/0
1107	13-15	S-5	1.4	1-1-WOH	0/0
1112	15-17	S-6	0.5	WOH	0/0
1117	17-19	S-7	0.9	WOH	0/0
1121	19-21	S-8	0.2	WOH	0/0
	BOH @ 21.0 ft				

MKD 9/15

Description

F SAND; ROCK FRAG; brown (FILL) 1.0

F/C SAND, some shell; coral frag; trace clay; tan; wet @ 5.0 ft, moderate (MARINE)

little shell; coral frag, trace clay; black; tan; loose; wet

F SAND, little M sand zones, trace clay; black; tan; loose; wet 10.9

SILT, trace clay; tan; v. soft; moist; sulfur odor (MARINE) 13.0

CLAY, trace shell frag; grit; brown; v. soft; moist; sulfur odor

as above, but damp (MARINE) 15.0

F/C SAND, some clay, little shell frag; gray; v. soft; wet; sulfur odor 17.0

as above (MARINE) 20.

9/15 MKD

SWMU 7

7TCETW203

Time	Depth (ft-bgs)	ID	Recovery (Ft)	Blow Counts	PID PS/BG
1317	0-5	A-N	-	-	-
1320	5-7	S-1	0.8	6-4-6-4	0/0
1324	7-9	S-2	0.9	4-3-3-2	0/0
1327	9-11	S-3	0.8	3-1-1-1	0/0
1334	11-13	S-4	1.2	WOH	0/0
1336	13-15	S-5	0.9	WOH	0/0
1340	15-17	S-6	0.6	WOH	0/0
1345	17-19	S-7	0.8	1-1-1-1	0/0
1350	19-21	S-8	1.0	4-8-7-1	0/0

MKD 9/15

SWMU 7

Description

F SAND; ROCK FRAG (FILL) 1.0

F/C SAND, some shell; coral frag, trace clay; tan; m. dense; wet @ 5'

trace f coral; shell frag and clay; black; gray; loose; wet; sulfur odor (MARINE)

F SAND, some silt; tan; v. soft; wet odor 12.5

CLAY, trace shell frag; f sand; brown; v soft; damp

13'↓ some shell frag; brown; v. soft; moist to wet (bottom) odor (MARINE) 15.0

CORAL; SHELL FRAG, trace f sand and clay; gray; v. loose; wet

As above, but some clay; brown; gray; v. loose; wet; sulfur odor 19.0

wet 19.0

CLAY, trace silt; dark green; stiff; damp (MARINE)

15.0

20.0

9/15 MKD

SWMU 7

1521 Begin air hammering from 0 ft bgs to 4 ft bgs at 7TCESB03

1645 Complete SB03. Cleanup time. GeoWorks to move all augers, rods, and hammers to decon area. I instructed them to decon tomorrow so that JCE & I can sample the TWs.

1712 GeoWorks moves last of equipment to decon area. JCE to follow. I relocate to PWD parking lot.

1717 Inventory expendable supplies.

1730 JCE & I depart PWD - done for the day. Remaining tasks
- Complete borings SB05 & SB06
- Advance borings SB01, SB02, SB04, and SB07.
- Install temp wells TW204 and TW205
- Sample all TWs
- Don't forget QA/QC samples

MAD 9/15

SWMU 7

9/15/03

9/15 MAD

SWMU 7

Tuesday; Sept. 16, 2003. Today's Tasks -
Soil Borings at SWMU 7
Weather Conditions -
AM: P. Sunny, mod SE winds, low 80's
PM: P. Sunny, mod SE winds, near 90°

0640 Arrive at PWD. (GeoWorks passed us).
0649 Setup at SWMU 7 for TW sampling. JCE to record sampling events
0723 DTW @ 7MW07 = 13.63' T/PVC
0729 GeoWorks backfilling completed borings (and grouting the upper several feet). They need 1.5 - 2 hours for decon this morning.
0802 MEK wants us to install 2" OD wells for the remaining 2 TWs. The interface probe that we have does not fit in 1" OD wells. For the 3 TWs already installed we are to place the intake to the bottom of the well and collect a sample of water there. To enhance DNAPL detection I will add Sudan IV to jars.
0809 Sample from 7TCE TW203 exhibits no evidence of DNAPL. Since TW203 is hydraulically upgradient of

MA 9/16

SWMU 7

(Cont.) TW201 and since TW203 showed no evidence of DNAPL, we will not go back to TW201 and pump out water to test for DNAPL.
0833 Bottom sample from 7TCETW202 exhibits no evidence for the presence of DNAPL.
0942 GeoWorks mobs air rig back to SWMU 7; setup at SB05.
1001 setup compressor.
1014 GeoWorks begins hammer (air) at 7TCESB05. Hammer to 17-ft bgs until sampling (see pp. 22-23)
1025 Calibrated Mini RAE 2000 PID (#5015)
Fresh Air = 0.0 ppm
Isobutylene (100 ppm) = 100 ppm
1137 Talked to MEK about eliminating "2nd" tier borings 7TCESB01 & SB02. considering no evidence of soil contamination. MEK suggesting moving SB01 as close to 7MW07 as possible, then assess the need for SB02. Also, he suggested that JCE interview Harbor Police about work performed.

9/16

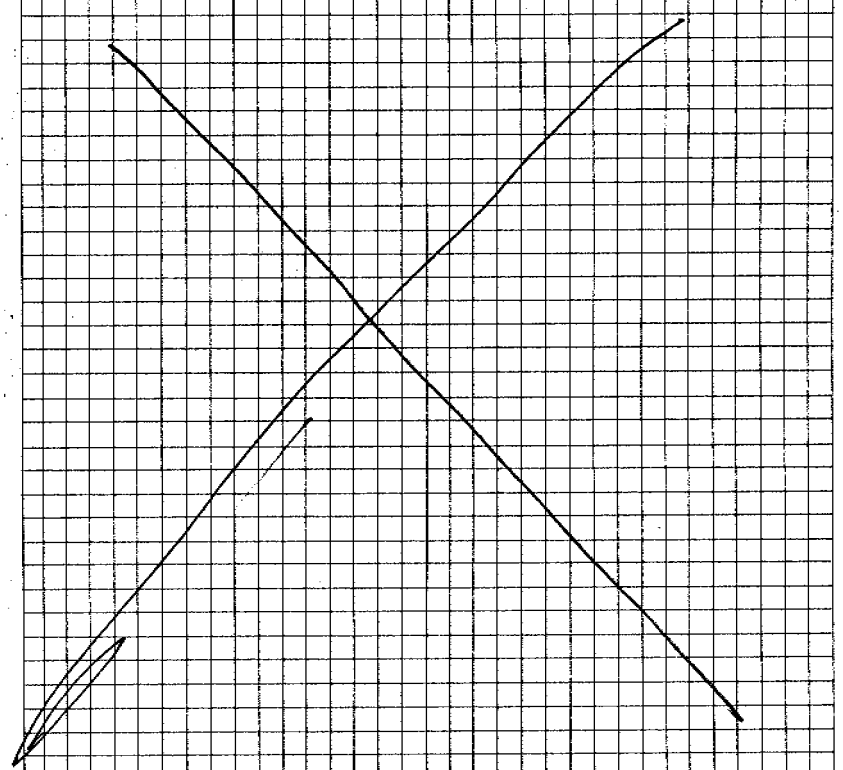
SWMU 7

1150	Lunchbreak
1221	Back on site. MEK asked JCE to
1301	GeoWorks sets up at 7TCE-SB04
1447	Boring completed.
1456	Relocate rig to 7TCESB06 to complete (pp. 24-25).
1505	Problems with air hammer.
1522	Resume drilling.
1534	Drilling stopped. Omar says particles are blocking flow. GeoWorks to steam clean hammer.
1557	Resume drilling at SB06. (7TCESB06A)
1608	GeoWorks had to offset boring; very large bloulder causing wide hole
1650	Boring completed. GeoWorks cleanup time
1658	GeoWorks departs site. Done for the day. JCE completing soil sampling. Boring 7TCESB06 exhibited minimal PID hits, but no odor or solvent.
1717	Relocate box truck to PWD.
1730	Depart PWD. Done for the day

MAD 9/16

SWMU 7

1750 Note on 7TCE SB06: The original location of SB06 (based on Figure 5-1) showed no PID hits. Today, the offset boring (~5-ft NE of original) showed PID hits above lithified gabbro. These intervals were sampled.



9/16 MAD

SWMU 7

TCESB05

(continued from pp. 22-23)

Time	Depth (ft-bgs)	ID	Recovery (ft)	Blow Counts	PID PS/BG
1044	0-17	H-N			
1054	17-19	S-10	0.0	-	-
1107	17-19	H-N	-	-	-
1120	19-~~20~~ 19	S-11	0.0	-	-
	Bottom	19.0'			

MKD 9/16

SWMU 7

Rig: Simco 2800

	Description
15	
16	
17	
18	split spoon refusal, spoon bouncing on rock
19	evidence of water in this interval
20	As above
21	
22	
23	
24	
25	
26	
27	
28	

9/16 MKD

SWMU 7

7TCES B04

Time	Depth (ft-bgs)	ID	Recovery (ft)	Blow counts	PID PS/BG
MPQ 1325	0-1	H-N	-	-	-
1329	1-3	S-1	1.2	8-19-50/3"	0/0
7TCES B04-02					
1338	3-5	S-2	1.0	12-30-50/5"	0/0
					0/0
1346	5-7	S-3	0.5	50/5"	0/0
1357	7-9	S-4	1.0	26-35	0/0
7TCES B04-04				20-37	0/0
1409	9-11	S-5	0.4	50/6"	0/0
1423	11-13	S-6	0.0	11-33/2"	-
1445	13-15	S-7	0.0	10-19-24/1"	-

BOHE 15.0-ft.

MKD 9/16

Rig: Simco 2800 w/ 4" Hammer

Description

Gravel FILL w/ f/c sand

2.0

ROCK FRAG, some silt (weathered Gabbro); brown; rusty-brown; v. dense; dry

WEATHERED GABBRO, highly fractured, crumbles in hand; rusty-brown; brown; v. dense; damp

c GRABBRO FRAG; gray; in a F sand rusty-brown matrix; v. dense; damp

F/c SAND, trace clay; rusty brown; v. dense; damp

~9' <L

WEATHERED GABBRO, fractured, harder to crumble; rusty-brown; gray; v. dense; damp

No recovery, but black; gray gabbro frag slough in spoon

[black; gray gabbro cuttings, trace water]

black no recovery, but black; gray gabbro frag in spoon (wet).

9/16 MKD

7TCES06A

Time	Depth (ft-bgs)	ID	Recovery (ft)	Blow counts	PID PS/BG
1603	0-1	H-N	-	-	-
1605	1-3	S-1	1.0	12-24-23/5"	41/0
7TCES06-01		MKD			
1617	3-5	~~S-2~~ H-N	-	-	-
7TCES06-03		(collect duplicate)			
1620	5-7	S-2	0.6	17-15-30/1"	128/0
1638	7-~~8~~ 7 MKD	S-3	0.0	-	-
1645	7-9	H-N	0.0	15-22/2"	-

BOH @ 9.0 ft

MKD 9/16

Description

F/C SAND, some f gravel, trace clay; brownish-gray; v. dense; dry (FILL) no odor or staining

5.0

SILT, little rock frag (weathered gabbro); rusty-brown; v. dense; damp

Refusal of split spoon ~~at~~ 6.7' BGL

Black: gray gabbro fragments

gabbro fragments in spoon (black)

Mark Dorr 9/16/03

9/16 MKD

SWMU 7

Wed. Sept. 17, 2003. Today's Task's
Temp wells (and soil boring) @ SWMU 7
Weather Conditions-
AM: M, Sunny, mod SE winds, mid 80's
PM: P. Sunny, occ rain, lt SE wind w/gusts, high 80's

0638 Arrive at PWD; mob box truck to SWMU 7.
0705 GeoWorks on site.
0715 I talked with MEK regarding the PID hit at SB06. We agreed to one additional shallow boring in ~~the~~ MKD 10 to 15 ft further NE from SB06. 128 ppm on the PID is not indicative of a source, but the additional boring might suggest whether or not this hit is meaningful
0723 GeoWorks grouted SB06. Now they relocate to 7TCETW205.
0736 Begin drilling at TW205
0859 Talked to CLH about where to set TW205. The work plan say 1-2 feet below lithified rock, which would be 15 ft. TW201-203 are ~20 ft bgs and TW-2 was at 25 ft. We decided to set well at similar

MKD

(cont.) elevation as TW201-203, which would be ~22-ft bgs.
0946 7TCETW205 installated. Cleanup & PICP for decon.
0956 GeoWorks to decon. JCE & I measure DTW at SWMU7-area wells.
1019 GeoWorks returns to SWMU 7 (Metco)
1034 Begin drilling 7TCETW204.
1203 Drilling completed. Install temp well.
1213 GeoWorks lunch break.
1225 JCE/MKD lunch break
1258 Return to SWMU7.
1308 GeoWorks back at SWMU7. Pickup tools & rig for decon.
1343 GeoWorks locates rig at 7TCESB01 ft SW of 7MW07. (Moved from planned location.
1401 Begin boring 7TCESB01.
1445 Boring completed. Heavy rain starts
1517 I called MEK regarding findings of SB01. There are subjective differences between logs for 7MW07 & 7TCESB01 (descriptions of "lithified" in SB01 and apparent decomposed in 7MW07).
[Cont. on p. 54]

MKD

SWMU 7

TTCETW205

Time	Depth (ft-bgs)	ID	Recovery (ft)	Blow Counts	PID (ps/BG)
0738	0-3	H-N	-	-	-
0741	3-5	S-1	0.9	4-4-5-5	(1)
0755	5-8	H-N	-	-	-
0758	8-10	S-2	1.1	4-12-44-25/1"	5.0/0
0810	10-13	H-N	-	-	-
0815	13-15	S-3	0.0	50/2"	-
0832	15-17	S-4	0.0	Refusal	-
0852	17-19	S-5	0.0	Refusal	-
0925	19-22	H-N	-	-	-

Notes: (1) PID not responding properly, probably a moisture issue.
(2) The amount of water in bore hole appears to have increased with depth.

MKD

Rig: Simco 2800 w/ 4" Air hammer

Description

CLAY, some f gravel, little c sand; brown; M. stiff; damp (FILL)

8.0

CLAY, some f/c gravel (weathered bedrock); brown; v. dense; wet

13' <L

No recovery; dark gray gabbro frag in spoon [brown & black rock frag w/ clay in cuttings]
Spoon bouncing

spoon bouncing black gabbro frags in spoon w/ rusty weathered face (indicating some fracturing (?)

TW205 well construction
screen: 2" ϕ sch 40 PVC (10-slot)
18-23 ft bgs
riser: 2" ϕ sch 40 PVC
18 - ~~ground surface~~ + 2 ft
MKD

MKD

SWMU 7

(cont.) There are also objective differences (blow counts higher in SB01 than MW07, and recoveries are lower in SB01). We will move SB02 between 7MW07 & SB03.

1532 GeoWorks sets up on relocated 7TCESB02.

1542 Begin boring 7TCESB02.

1605 Boring completed. Lithofied bedrock shallow (~1 ft bgs).

1610 GeoWorks Mob tools to decon area

1624 JCE saw GeoWorks drive down Forestall Road; apparently done for the day.

1645 Collect 7TCEFB03 from Harbor Police water supply

1650 Collect 7TCEFB02 from store-bought distilled water

1700 Collect 7TCEFB01 from lab-grade DI

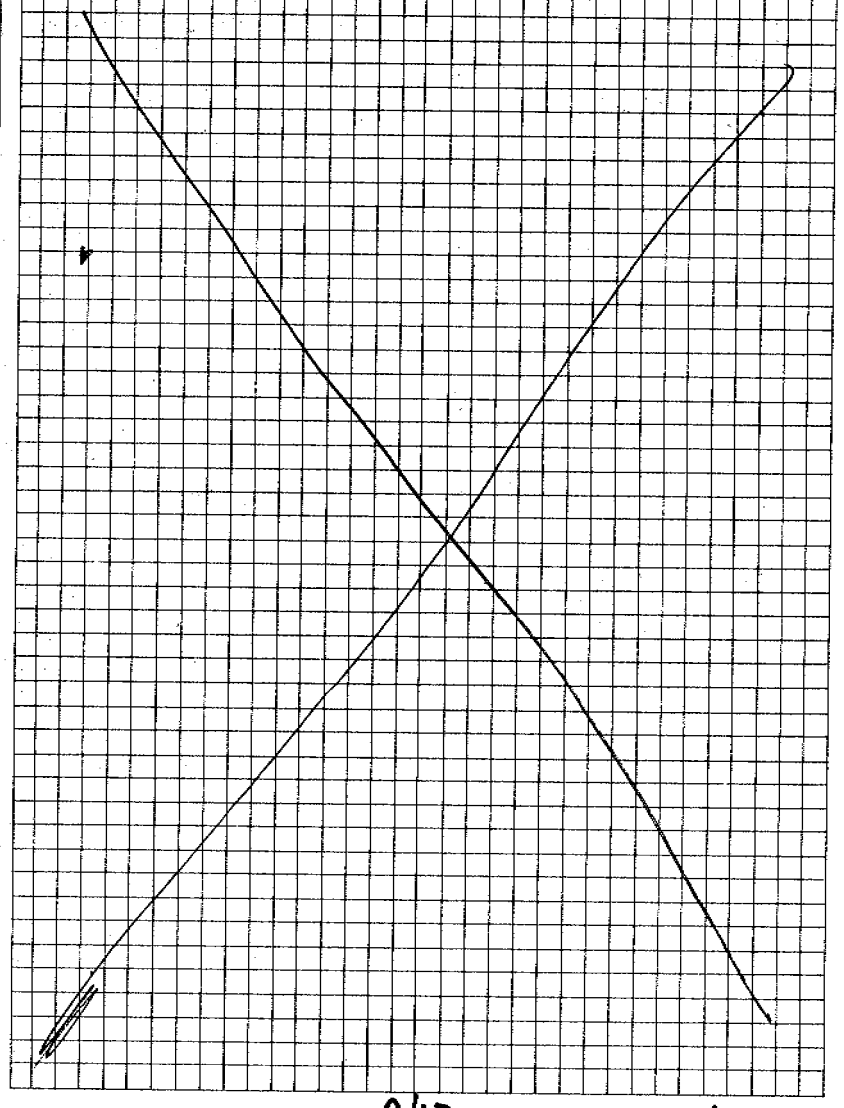
1648 Prepared a trip blank for SWMU 7 samples called, "7TCETB02" with a date and time of "9/17/2003 @ 1635

1701 Relocated to PWD; drop off box truck

MKO 9/17

SWMU 7

1715 Depart PWD - done for the day.



9/17 MKO

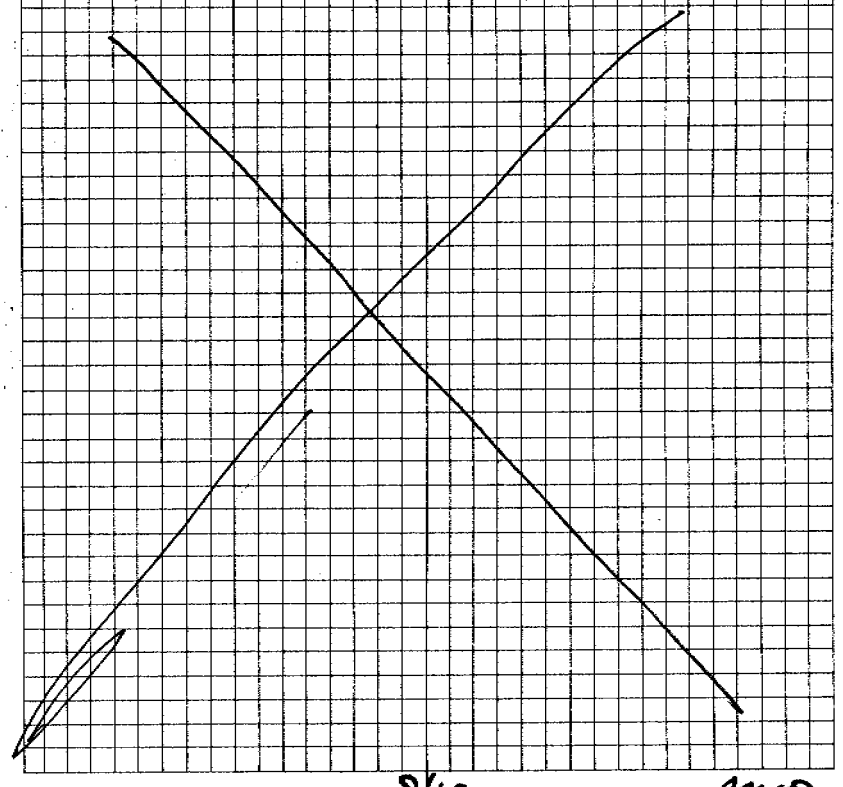
SWMU 7

1150	Lunchbreak
1221	Back on site. MEK asked JCE to
1301	GeoWorks sets up at 7TCE-SB04
1447	Boring completed.
1456	Relocate rig to 7TCESB06 to complete (pp. 24-25).
1505	Problems with air hammer.
1522	Resume drilling.
1534	Drilling stopped. Omar says particles are blocking flow. GeoWorks to steam clean hammer.
1557	Resume drilling at SB06. (7TCESB06A)
1608	GeoWorks had to offset boring; very large bloulder causing wide hole
1650	Boring completed. GeoWorks cleanup time
1658	GeoWorks departs site. Done for the day. JCE completing soil sampling. Boring 7TCESB06 exhibited minimal PID hits, but no odor or solvent.
1717	Relocate box truck to PWD.
1730	Depart PWD. Done for the day

MKD 9/16

SWMU 7

1750 Note on 7TCE SB06: The original location of SB06 (based on Figure 5-1) showed no PID hits. Today, the offset boring (~5-ft NE of original) showed PID hits above lithified gabbro. These intervals were sampled.



9/16 MKD

SWMU 7

TCESB05

(continued from pp. 22-23)

Time	Depth (ft-bgs)	ID	Recovery (ft)	Blow Counts	PID PS/BG
1044	0-17	H-N			
1054	17-19	S-10	0.0	-	-
1107	17-19	H-N	-	-	-
1120	19-~~20~~ 19	S-11	0.0	-	-
	Bottom	19.0'			

MKD 9/16

SWMU 7

Rig: Simco 2800

	Description
15	
16	
17	
18	split spoon refusal, spoon bouncing on rock
19	evidence of water in this interval
20	As above
21	
22	
23	
24	
25	
26	
27	
28	

9/16 MKD

SWMU 7

7TCES B04

Time	Depth (ft-bgs)	ID	Recovery (ft)	Blow counts	PID PS/BG
MPQ 1325	0-1	H-N	-	-	-
1329	1-3	S-1	1.2	8-19-50/3"	0/0
7TCES B04-02					
1338	3-5	S-2	1.0	12-30-50/5"	0/0
					0/0
1346	5-7	S-3	0.5	50/5"	0/0
1357	7-9	S-4	1.0	26-35	0/0
7TCES B04-04				20-37	0/0
1409	9-11	S-5	0.4	50/6"	0/0
1423	11-13	S-6	0.0	11-33/2"	-
1445	13-15	S-7	0.0	10-19-24/1"	-

BOHE 15.0-ft.

MKD 9/16

Rig: Simco 2800 w/ 4" Hammer

Description

Gravel FILL w/ f/c sand

2.0

ROCK FRAG, some silt (weathered Gabbro); brown; rusty-brown; v. dense; dry

WEATHERED GABBRO, highly fractured, crumbles in hand; rusty-brown; brown; v. dense; damp

c GRABBRO FRAG; gray; in a F sand rusty-brown matrix; v. dense; damp

F/c SAND, trace clay; rusty brown; v. dense; damp

~9' <L

WEATHERED GABBRO, fractured, harder to crumble; rusty-brown; gray; v. dense; damp

No recovery, but black; gray gabbro frag slough in spoon

[black; gray gabbro cuttings, trace water]

black no recovery, but black; gray gabbro frag in spoon (wet).

9/16 MKD

7TCES06A

Time	Depth (ft-bgs)	ID	Recovery (ft)	Blow counts	PID PS/BG
1603	0-1	H-N	-	-	-
1605	1-3	S-1	1.0	12-24-23/5"	41/0
7TCES06-01		MKD			
1617	3-5	~~S-2~~ H-N	-	-	-
7TCES06-03		(collect duplicate)			
1620	5-7	S-2	0.6	17-15-30/1"	128/0
1638	7-~~8~~ 7 MKD	S-3	0.0	-	-
1645	7-9	H-N	0.0	15-22/2"	-

BOH @ 9.0 ft

MKD 9/16

Description

F/C SAND, some f gravel, trace clay; brownish-gray; v. dense; dry (FILL) no odor or staining

5.0

SILT, little rock frag (weathered gabbro); rusty-brown; v. dense; damp

Refusal of split spoon ~~at~~ 6.7' BGL

Black: gray gabbro fragments

gabbro fragments in spoon (black)

Mark Dorr 9/16/03

9/16 MKD

SWMU 7

Wed. Sept. 17, 2003. Today's Task's
Temp wells (and soil boring) @ SWMU 7
Weather Conditions-
AM: M. Sunny, mod SE winds, mid 80's
PM: P. Sunny, occ rain, lt SE wind w/gusts, high 80's

0638 Arrive at PWD; mob box truck to SWMU 7.

0705 GeoWorks on site.

0715 I talked with MEK regarding the PID hit at SB06. We agreed to one additional shallow boring in ~~the~~ MKD 10 to 15 ft further NE from SB06. 128 ppm on the PID is not indicative of a source, but the additional boring might suggest whether or not this hit is meaningful

0723 GeoWorks grouted SB06. Now they relocate to 7TCE TW205.

0736 Begin drilling at TW205

0859 Talked to CLH about where to set TW205. The work plan say 1-2 feet below lithified rock, which would be 15 ft. TW201-203 are ~20 ft bgs and TW-2 was at 25 ft. We decided to set well at similar

MKD

(cont.) elevation as TW201-203, which would be ~22-ft bgs.

0946 7TCE TW205 installated. Clean up & PCP for decon.

0956 GeoWorks to decon. JCE & I measure DTW at SWMU 7-area wells.

1019 GeoWorks returns to SWMU 7 (Metco)

1034 Begin drilling 7TCE TW204.

1203 Drilling completed. Install temp well.

1213 GeoWorks lunch break.

1225 JCE / MKD lunch break

1258 Return to SWMU 7.

1308 GeoWorks back at SWMU 7. Pickup tools & rig for decon.

1343 GeoWorks locates rig at 7TCESB01 ft SW of 7MW07. (Moved from planned location.

1401 Begin boring 7TCESB01

1445 Boring completed. Heavy rain starts

1517 I called MEK regarding findings of SB01. There are subjective differences between logs for 7MW07 & 7TCESB01 (descriptions of "lithified" in SB01 and apparent decomposed in 7MW07).
[Cont. on p. 54]

MKD

SWMU 7

TTCETW205

Time	Depth (ft-bgs)	ID	Recovery (ft)	Blow Counts	PID (ps/BG)
0738	0-3	H-N	-	-	-
0741	3-5	S-1	0.9	4-4-5-5	(1)
0755	5-8	H-N	-	-	-
0758	8-10	S-2	1.1	4-12-44-25/1"	5.0/0
0810	10-13	H-N	-	-	-
0815	13-15	S-3	0.0	50/2"	-
0832	15-17	S-4	0.0	Refusal	-
0852	17-19	S-5	0.0	Refusal	-
0925	19-22	H-N	-	-	-

Notes: (1) PID not responding properly, probably a moisture issue.
(2) The amount of water in bore hole appears to have increased with depth.

MKD

Rig: Simco 2800 w/ 4" Air hammer

Description

CLAY, some f gravel, little c sand; brown; M. stiff; damp (FILL)

8.0

CLAY, some f/c gravel (weathered bedrock); brown; v. dense; wet

13' <L

No recovery; dark gray gabbro frag in spoon [brown & black rock frag w/ clay in cuttings]
Spoon bouncing

spoon bouncing black gabbro frags in spoon w/ rusty weathered face (indicating some fracturing (?)

TW205 well construction
screen: 2" ϕ sch 40 PVC (10-slot)
18-23 ft bgs
riser: 2" ϕ sch 40 PVC
18 - ~~ground surface~~ + 2 ft
MKD

MKD

SWMU 7

(cont.) There are also objective differences (blow counts higher in SB01 than MW07, and recoveries are lower in SB01). We will move SB02 between 7MW07 & SB03.

1532 GeoWorks sets up on relocated 7TCESB02.

1542 Begin boring 7TCESB02.

1605 Boring completed. Lithofied bedrock shallow (~1 ft bgs).

1610 GeoWorks Mob tools to decon area

1624 JCE saw GeoWorks drive down Forestall Road; apparently done for the day.

1645 Collect 7TCEFB03 from Harbor Police water supply

1650 Collect 7TCEFB02 from store-bought distilled water

1700 Collect 7TCEFB01 from lab-grade DI

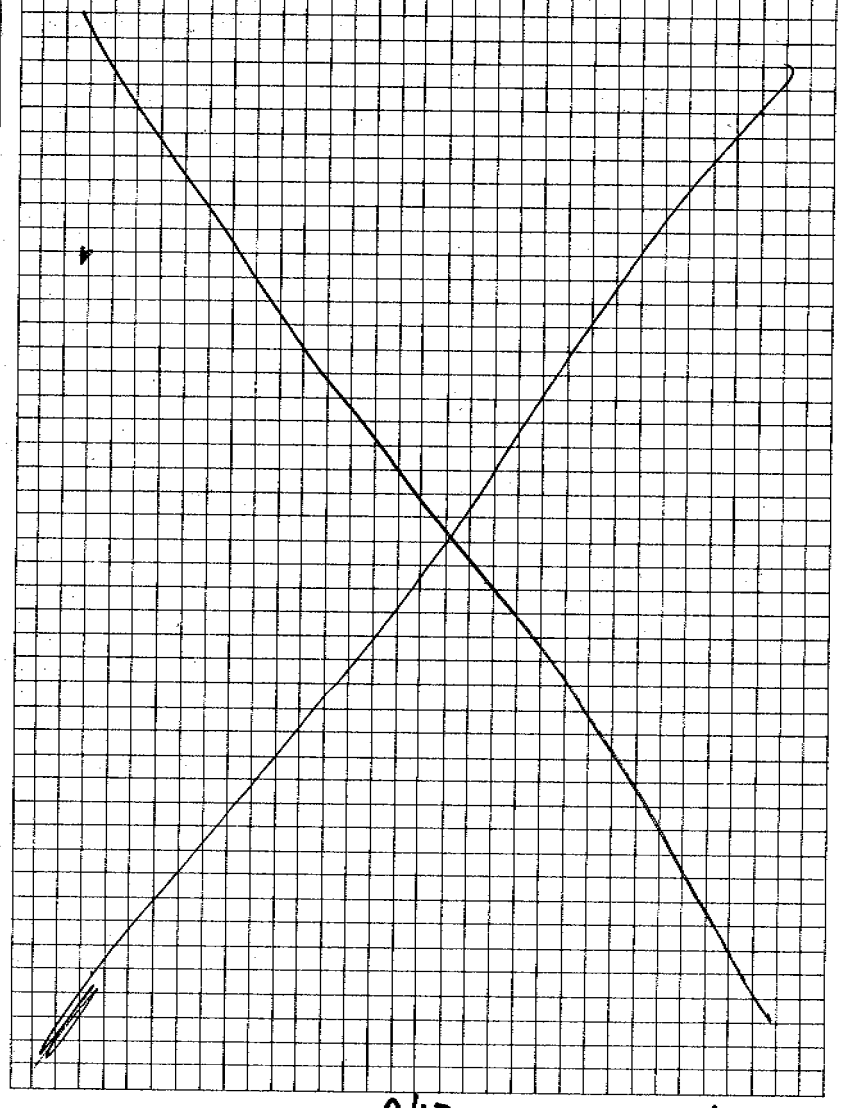
1648 Prepared a trip blank for SWMU 7 samples called, "7TCETB02" with a date and time of "9/17/2003 @ 1635

1701 Relocated to PWD; drop off box truck

MKO 9/17

SWMU 7

1715 Depart PWD - done for the day.



9/17 MKO

SWMU 7

TTCETW204

Time	Depth (ft-bgs)	ID	Recovery (ft)	Blow Counts	PID PS/BG
1050	0-3	H-N	-	-	-
1052	3-5	S-1	0.8	9-19-7-7	5.8/0
1103	5-8	H-N	-	-	-
1107	8-10	S-2	0.9	3-1-1-1	0/0
1118	10-13	H-N			
1124	13-15	S-3	0.4	40-25/1"	0/0
1141	15-17	S-4	0.0	Refusal	-
1157	17-22	H-N	-	-	-

MRD 9/17

Description

problems w/ cobble cave-in

ROCK FRAG, some silt, trace f sand; brown; M dense; damp (FILL)

CLAY, little F gravel; f/c sand; brown; soft; moist; greenish staining @ ~9.5' w/ slight petro odor (FILL)

MRD

~~broken~~ GABBRO FRAG, little silt, trace f/c sand and clay (weathered bedrock); brown; v. dense; moist to wet ~~13.0 <L~~ 14 <L

[mud on rods]

spoon bounced at 15.0 ft

dusty cuttings - indicative that there is no water in this portion of bedrock and the MRD water at 13-15 is low yield aquifer

TW204 Well Construction

Screen: 2" ϕ sch 40 PVC (10-slot)
17-22 ft bgs

Riser: 2" ϕ sch 40 PVC
17 - ~+2 ft

9/17 MRD

SWMU 7

TTCETW204

Time	Depth (ft-bgs)	ID	Recovery (ft)	Blow Counts	PID PS/BG
1050	0-3	H-N	-	-	-
1052	3-5	S-1	0.8	9-19-7-7	5.8/0
1103	5-8	H-N	-	-	-
1107	8-10	S-2	0.9	3-1-1-1	0/0
1118	10-13	H-N			
1124	13-15	S-3	0.4	40-25/1"	0/0
1141	15-17	S-4	0.0	Refusal	-
1157	17-22	H-N	-	-	-

MRD 9/17

Description

problems w/ cobble cave-in

ROCK FRAG, some silt, trace f sand; brown; M dense; damp (FILL)

CLAY, little F gravel; f/c sand; brown; soft; moist; greenish staining @ ~9.5' w/ slight petro odor (FILL)

MRD

~~broken~~ GABBRO FRAG, little silt, trace f/c sand and clay (weathered bedrock); brown; v. dense; moist to wet ~~13.0 <L~~ 14 <L

[mud on rods]

spoon bounced at 15.0 ft

dusty cuttings - indicative that there is no water in this portion of bedrock and the MRD water at 13-15 is low yield aquifer

TW204 Well Construction

Screen: 2" ϕ sch 40 PVC (10-slot)
17-22 ft bgs

Riser: 2" ϕ sch 40 PVC
17 - ~+2 ft

9/17 MRD

SWMU 7

7TCESB01

Time	Depth (ft-bgs)	ID	Recovery (Ft)	Blow counts	PID PS/BG
1403	0-1	H-N	-	-	-
1406	1-3	S-1	1.0	15-12-	0/0
7TCESB01-01		(1)		12-40	0/0
1415	3-5	S-2	0.5	22-50/4"	0/0
1421	5-7	S-3	0.3	12-13/2"	0/0
7TCESB01-03					
1430	7-9	S-4	0.0	50/2"	-
1441	9-11	S-5	0.2	~~22/~~ 22-30/1"	-

(1) Sample Fizzed.

MKD 9/17

Rig: Simco 2800 w/ 4" Air hammer

Description

F Gravel, little f/c sand, trace silt & clay; brown; gray; m. dense; damp 2.5

WEATHERED GABBRO, crumbles easily; brownish-gray; v. dense; dry [F gravel; f/c sand]

As above, but crumbles to F sand & silt ~6'

No recovery; started to bounce

GABBRO FRAG; gray; v. dense; dry

9/17 MKD

SWMU 7

7TCE SB02

Time	Depth (ft-bgs)	ID	Recovery (ft)	Blow Counts	PID PS/BG
1547	0-1	H-N			
1549	1-3	S-1	0.0	Refusal	—
1555	3-5	S-2	0.0	50/2"	—
1601	5-7	S-3		37/1"	
	~~7-9~~	~~S-3~~ MKD			
	~~9-11~~	~~S-4~~ MKD			

MKD 9/17

Description

No recovery 1' <L

No recovery greenish-gray rock frag w/ trace rusty-brown faces in cuttings

cuttings show greenish-gray rock frag.

hard bedrock from 1 ft bgs

MKD 9/17/93

9/17 MKD

Thurs. Sept. 18, 2003. Today's Tasks - Complete borings/ start perm. wells?
Weather Conditions
AM: M. Sunny, lt var winds, low 80's
PM: M. Sunny, mod SE winds, high 80's

0637 Arrive at PWD to pickup box truck.
0643 Prep. for temp well sampling.
0707 GeoWorks on base; on their way to decon.
0733 GeoWorks sets up rig at 7TCESB09
0754 Begin ~~augering~~ MKD air hammering at boring 7TCESB09 (~15' NW of SB06A) PID calibrated as well. Fresh air - 0 ppm / Isobutylene (100ppm) - 100ppm
0815 Boring SB09 completed. Showed GeoWorks SB07 location.
0827 Rig is set at 7TCESB07.
0855 Boring completed. Madeline on-site (Environmental).
0928 Madeline Rivera off-site. Base communications in down. Our drilling operations were suspected (SB07). There is no evidence that we hit anything. JCE note book will provide more details.

MKD

(cont.) Also, GeoWorks off site to buy cement to grout borings.
0954 MEK called JCE. Initial report is that samples from TW201, 202, and 203 are "ND" for TCE. Final data due circa lunchtime.
1010 GeoWorks back on site to backfill/ grout open bore holes and temporarily containerize soil cuttings. Note that 7TCESB07 will be left open to the end of the day, pending resolution of the communications issue.
1044 MEK called with change in scope. 2 TW installed. TW207 will be by SB04 and TW206 will be off SE corner near SB03. Both wells will be 1-2 ft into lithofied rock if water present
1050 GeoWorks off site will get lunch and be back at noon to install new TWs
1100 JCE & I break for lunch
1143 JCE & I to PWD to get TCE invest. boring info.

MKD

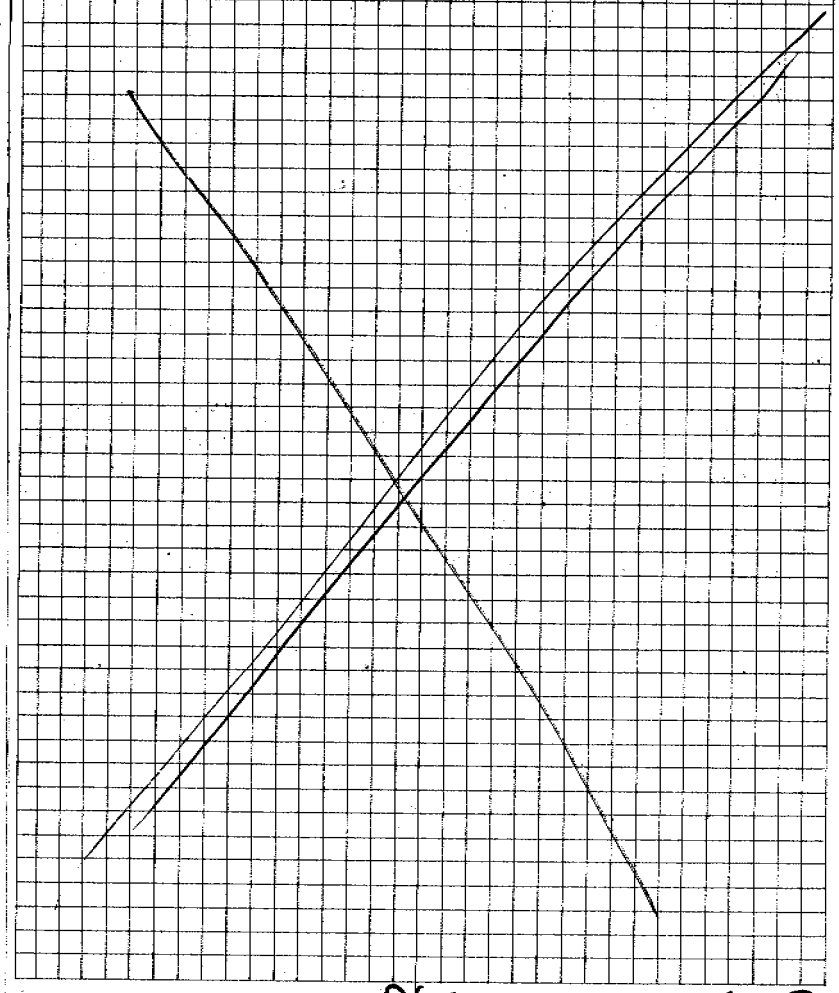
SWMU 7

1200	JCE & I back at SWMU 7.
1219	GeoWorks back on Base. Will bring Rig shortly.
1229	Set up Rig at 7TCETW207
1251	Begin air hammer at TW207, which is ~ 4' NW of SB04.
1336	Let boring sit ~ 5 min. and blow out contents - water in bore hole. Will install 7TCETW207 to 20.5 ft bgs
1352	Move equipment to 7TCETW206
1407	Begin air hammering at 7TCETW206.
1438	Gabbro seems much harder on the SE side of the bldg. pad.
1504	Bore hole at 22.5 ft little evidence of water yet. We will wait ~5 min and check for water accumulation.
1515	Water in the hole. Prepare to install temp well.
1529	7TCETW206 installed. Cleanup time.
1544	GeoWorks to decon, pick up addt'l TW cuttings and prepare to drill at TW201 first thing Monday A.M.
1618	Relocate to decon. area. GeoWorks still decon.'ing.

MAD 9/18

SWMU 7

1704	GeoWorks departs decon area - Done for the shift
1706	I relocate to PWD.
1715	Depart PWD. Done for the day.



9/18 MAD

SWMU 7

7TCES809

Time	Depth (ft-bgs)	ID	Recovery (ft)	Blow counts	PID PS/BG
0755	0-1	H-N	–	–	–
0758	1-3	S-1	0.5	50/5"	0/0
7TCES809-01					
0803	3-5	S-2	Refusal	30/1"	–
0812	5-7	S-3	Refusal	–	–
	BOHe	5.0 ft			

7TCES807

Time	Depth	ID	Recovery	Blow Counts	PID PS/BG
0838	0-2	S-1	0.8	5-7-	0/0
7TCES807-01		(1)		23/3"	
0844	2-4	S-2	Refusal	–	–
0852	4-6	S-3	Refusal	–	–

(1) Sample fizzed
Collected MS/MSD

MKD 9/18

SWMU 7

Rig: Simco 2800 w/ Air hammer

Description

F/C SAND, some F/C gravel, trace silt: clay; gray; v. dense; dry (FILL) 3.0 <L

GABBRO pieces black; gray; v. dense; damp

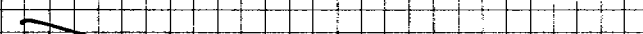
spoon bouncing

Description

F/M SAND, little F. gravel, trace silt w/ clay @ bottom; tan; dense; damp (FILL) 2.0 <L

Black; gray gabbro frag in spoon
same in cuttings

spoon bouncing



9/18 MKD

SWMU 7

TCE TW207

Time	Depth (ft-bgs)	ID	Recovery (ft)	Blow counts	PID PS/BG
1320	0-22	H-N	–	–	–

MKD

9/18

Rig: Simco 2800 w/ 4" Air hammer

Description

Brown; gray (lt) cuttings, trace black cuttings (sub angular f gravel)

Black; dk gray cuttings, some lt brown cuttings (sub angular f gravel)

zone of mainly brown cuttings

13' cuttings brown & moist, softer fm. (f/c sand-size)

15.0

same as above, some water in bore hole slow recharge

~~lets dust, some evidence of water?~~

~~trace moist cuttings~~ MKD

20.0

2"

9/18

MKD

SWMU 7

7TCETW206

Time	Depth (ft-bgs)	ID	Recovery (ft)	Blow counts	PID PS/BG
1504	0-22.5	H-N	-	-	-

MKD 9/18

Description

cuttings are mainly f/c sand, brown trace dk gray; dry

harder drilling

cuttings are f gravel sized, brown, some black; gray; dry

mainy gray in color

f/c sand, trace f gravel sized; gray, trace black

f gravel sized, mainly gray, trace black

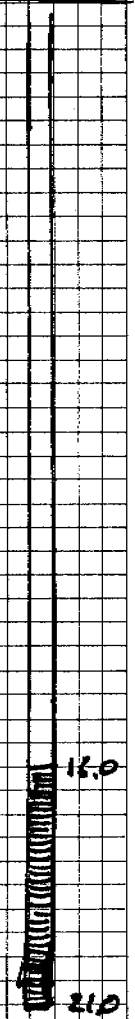
f/c sand trace F gravel sized cuttings; gray

more f gravel

less dust; evidence of water?

trace moist cuttings

9/18/03



9/18 MKD

Mon. Sept. 22, 2003. Today's Tasks-
Begin well installation
Weather Conditions-
AM: M. Sunny, lt. var. winds low 80's
PM: M. Sunny, lt. var. winds, high 80's

0632 Arrive at Main Gate (#1) to obtain passes for the remainder of the project

0700 Arrive at PWD to pickup boy truck.

0704 Relocate to driller decon. area. GeoWorks not on site yet.

0717 GeoWorks arrive at decon area. They need some time to replace an engine belt on the B90, and some other minor repairs.

0802 Relocate to SWMU 7 w/GeoWorks

0834 GeoWorks sets up at TW201 bore hole. They will install one permanent well here (7MW21). GeoWorks has mismatched threads on PVC riser & screen. They will meet the supplier circa lunch to get correct threaded riser (1 hr away). For the sake of progress GeoWorks proposed to

MKD 9/22

(Cont.) use PVC coupling & stainless steel rivets. MEK was advised. He would rather see appropriate threads for all wells.

0904 GeoWorks off site to pick up the correct riser. JCE & I to measure SWLs.

1045 Take an early lunch break.

1118 Return to SWMU 7. Prep. for Groundwater sampling. (7MW10)

1142 GeoWorks back on site.

1147 Begin over-drilling TW201 bore hole using 4-1/4" HSA

1252 ~~Bor~~ MW Well 7MW21 completed to bentonite seal.

1257 I am waiting for work from MEK regarding next location. GeoWorks to get air rig and compressor. JCE to sample UGW-11.

1342 GeoWorks back on site w/ air rig and compressor. MEK says that he has not heard from the lab yet.

1402 MEK called. We will install 7MW28 at 7TCETW204 and 7MW22 at 7TCETW205. They (MEK & CLH)

9/22 MKD

SWMU 7

Mon. Sept. 22, 2003. Today's Tasks-
Begin well installation
Weather Conditions-
AM: M. Sunny, lt. var. winds, low 80's
PM: M. Sunny, lt. var. winds, high 80's

0632 Arrive at Main Gate (#1) to obtain passes for the remainder of the project

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MKD 9/22

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1142 GeoWorks back on site.

1147 Begin over-drilling TW201 bore hole using 4-1/4" HSA

1252 ~~Bor~~ MW Well 7MW21 completed to bentonite seal.

1257 I am waiting for work from MEK regarding next location. GeoWorks to get air rig and compressor. JCE to sample UGW-11.

1342 GeoWorks back on site w/ air rig and compressor. MEK says that he has not heard from the lab yet.

1402 MEK called. We will install 7MW28 at 7TCETW204 and 7MW22 at 7TCETW205. They (MEK & CLH)

9/22 MKD

(cont.) also want ~~and~~ MKD 7TCETW208 to be installed near planned 7TCESB02. May put a permanent well there for natural attenuation monitoring.

1409 7TCETW204 stickup = 2.06 ft

1411 7TCETW205 stickup = 2.31 ft

1429 Bore hole for 7TCETW205 open to 22'10". Will set well at 22 ft bgs.

1437 Begin installation of 7MW22

1452 7MW22 installed to bentonite seal.

1454 Pull 7TCETW204 and check depth of open bore hole (19.6 ft bgs).

1516 TW204: TCE @ 14 J ppb; and well TW205: TCE @ 0.32 J ppb

1526 Begin air hammer to clean out borehole. Called MEK to discuss task strategy. Decided that the temp well near 7TCESB02 would be a permanent well regardless of the results of the TW sampling. So, we will just install 7MW24 w/o TW.

1549 Attempted to install well but something is block bore hole ~ 12 ft bgs. Redrill bore hole.

MKD 9/22

1622 Attempted to drill out to 22 ft bgs, but boring collapsed to 19.0

1644 7MW23 installed to bentonite seal. GeoWorks left site before I could give them cleanup instructions.

I assist JCE w/ sampling 7MW08.

0725 Sampling completed cleanup time.

1736 GeoWorks note:

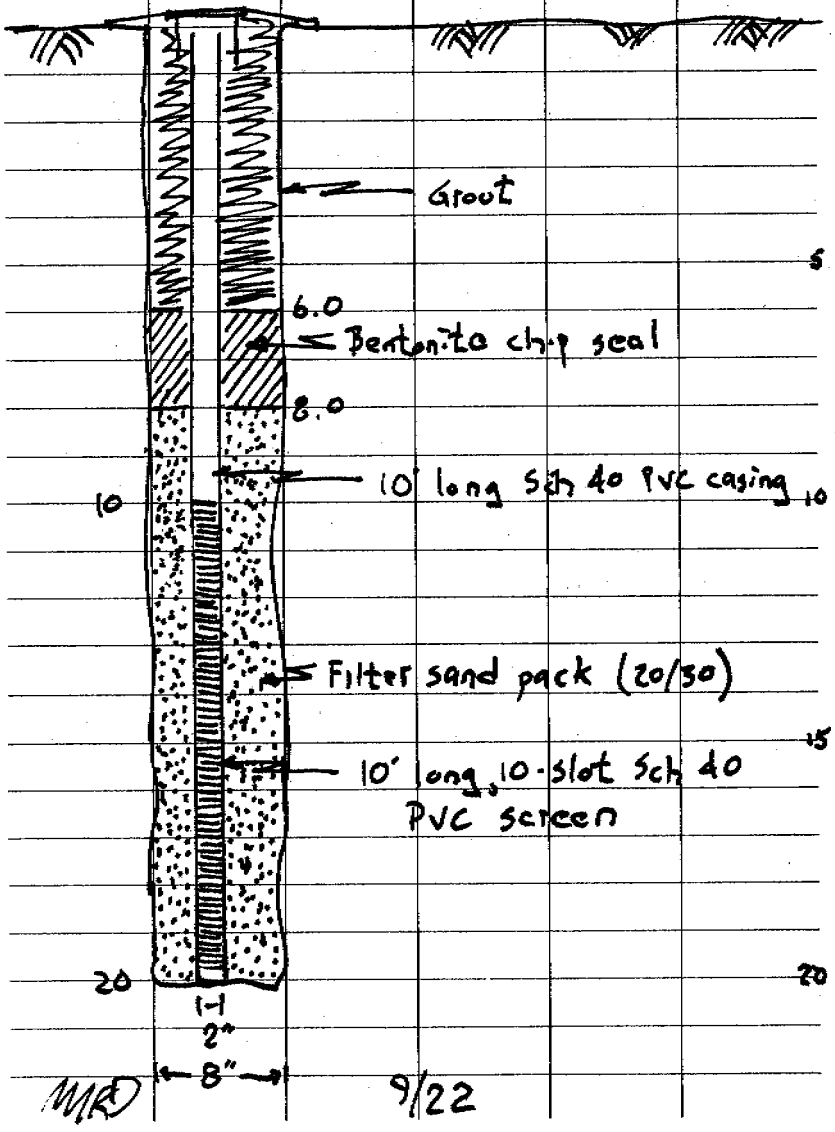
Drill crew left B90 rig at 7MW21 ("restricted" area). They also left the Simco 2800 rig; compressor by 7MW23. Task list for week

- Tues.: Install 7MW24; 7TCETW208 and develop 3 wells (pads)
- ~~Install 7TCETW~~ MKD
- Wed.: Install 7MW25? and develop 2 wells (pads)
- Thurs: Abandon & backfill TWs demob?
- Contingency day on Fri?

9/22 MKD

SWMU 7

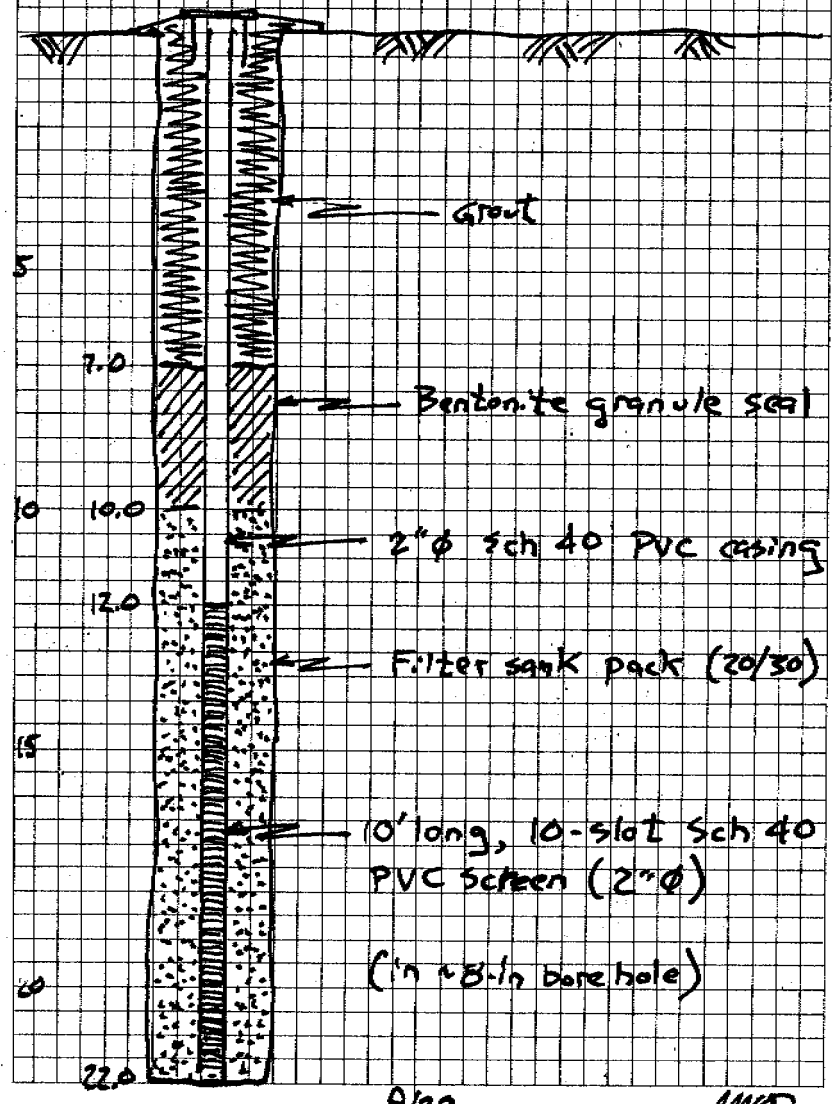
7MW21 Well Construction Detail
(site of 7TCETW201)



MKD 9/22

SWMU 7

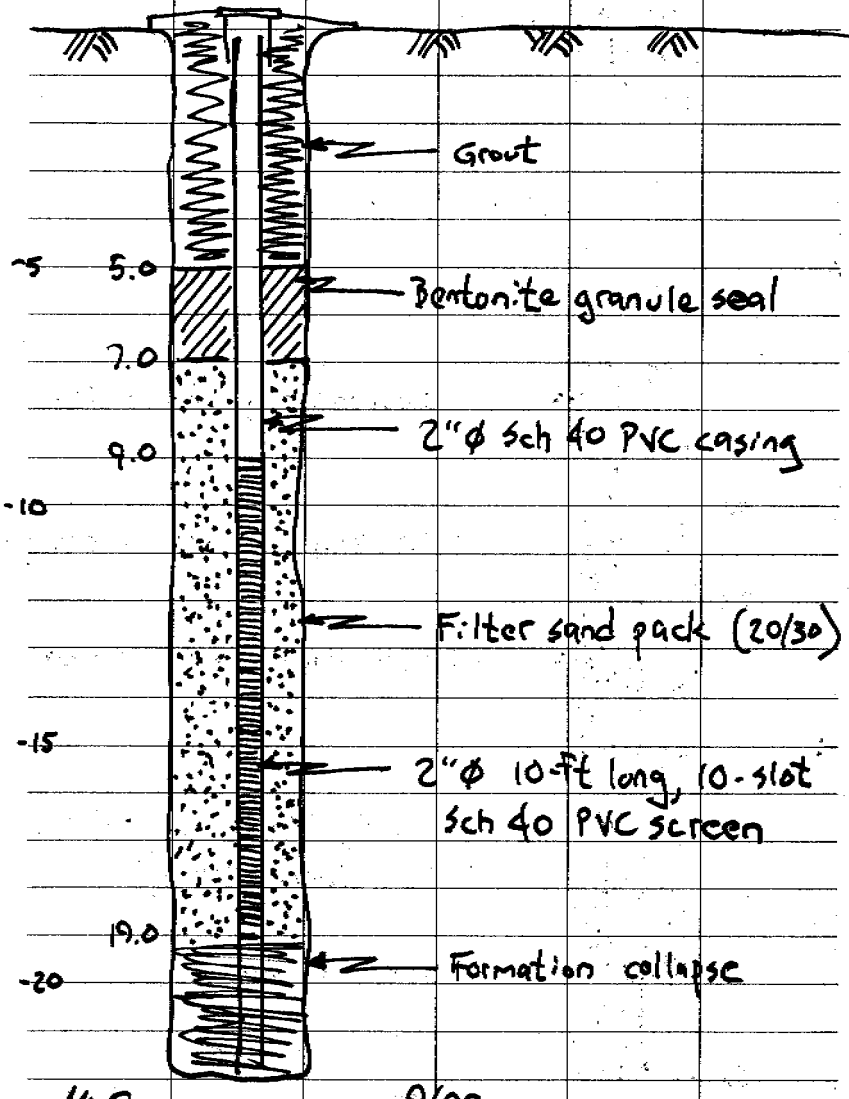
7MW22 Well Construction Detail
(site of 7TCETW205)



9/22 MKD

SWMU 7

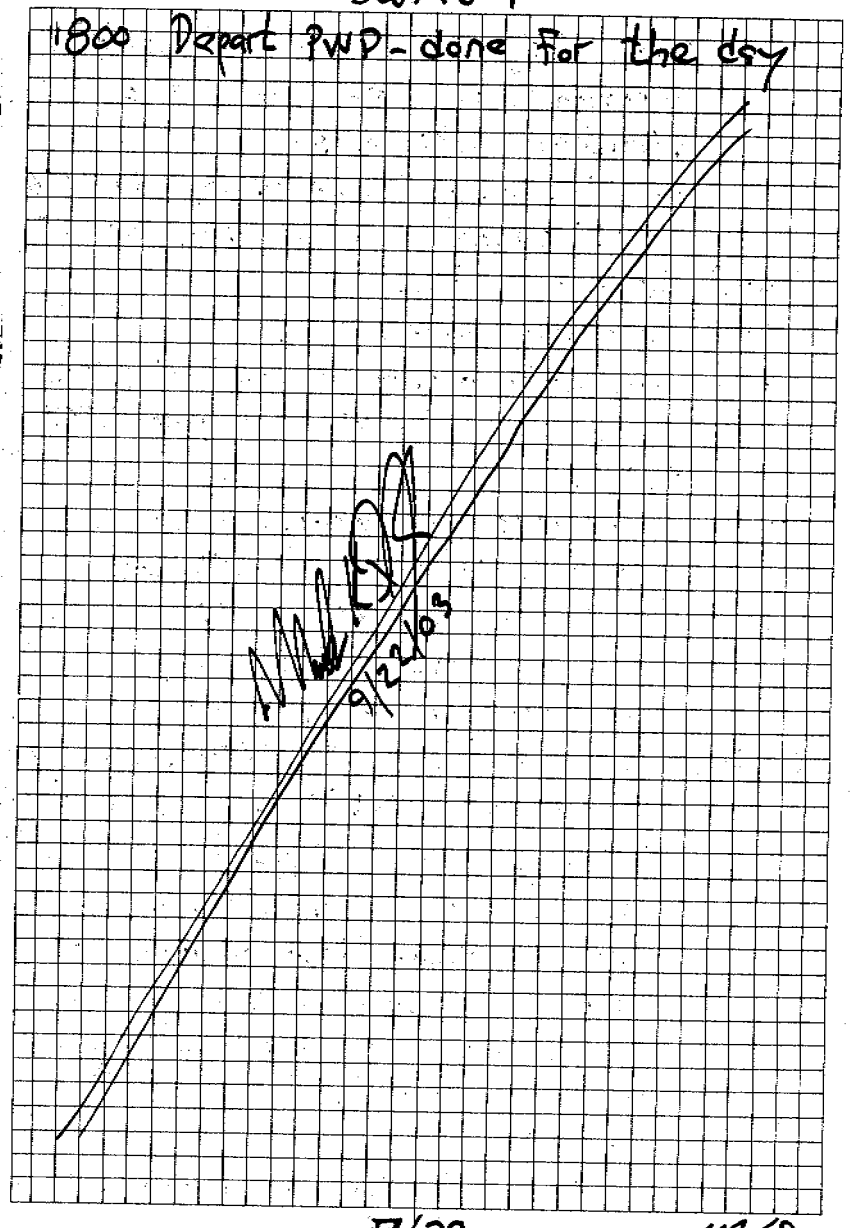
7MW23 Well Construction Detail
(Site of 7TCETW204)



MKD 9/22

SWMU 7

1800 Depart PWP - done for the day



9/22 MKD

SWMU 7

Tues. Sept. 23, 2003. Today Task's - Permanent and Temporary wells

Weather Conditions - ...

AM: M. Sunny, lt. var winds, mid 80's

PM: M. Sunny lt-mod SE wind, near 90°

0642 Arrive at PWD

0646 Relocate to SWMU 7.

0659 GeoWorks arrive at SWMU 7. Prep. to set up on 7MW24 (original 7TCE SB02).

0711 GeoWorks to decon. area

0745 GeoWorks sets up at 7MW24.

0802 Begin drilling for 7MW24.

0852 Begin well installation.

0910 GeoWorks to decon. area

0918 MEK called. 7TCETW206 prelim. data showed "ND", while 7TCE TW207 showed 80 ppb for TCE. It should be noted that the peak is outside retention time window so this may not be a TCE hit. We will develop wells and build pads until we hear from the lab on final numbers.

1010 Setup at 7MW24 for development

MAD 9/23

SWMU 7

(Cont.) Development procedures - use Baker foot valve w/ surge block & PE tubing (new). Use GeoWorks trash pump to pump w/ hand surging over the screen length (a couple feet at a time), starting from the bottom.

1126 MEK called. NTR wants to define plume. So, 3 addt'l temp wells are added to Figure 3-1. MEK wants them installed today.

1209 Complete development.

1220 Lunch break

1304 Stop at Marina for ice. TW208 is directly in front of AC unit. Left message w/ MEK. He says can move, but should be away from source area.

1323 Set rig at 7TCETW209 (old TW-1)

1358 Hammer refusal - off set approx 5 ft to the NW.

1418 Resume drilling at off set after a little struggle for proper rod alignment.

1429 Problem w/ ~~air hammer or~~ MKD compressor

1454 GeoWorks cleaned air filters. Compressor seems fine

9/23 MAD

SWMU 7

7MW24

Time	Depth (ft-bgs)	ID	Recovery (ft.)	Blow Counts	PID PS/BG
0844	0-22	H-N	-	-	-

MMLD 9/23

SWMU 7

Description	Well Const.
F/C SAND; F GRAVEL FILL	
GABBRO FRAG; f/c sand, trace f gravel; dark brown; gray (Much dust to 3')	1.0 MKD
	3.0 MKD
GABBRO FRAG (f gravel, some f/c sand; black; gray) lithified	
f sand sized, little silt; brown weathered zone	6.0
	8.0
less weathered ~9' still mainly brn	
weathered: brown, trace black; gray (f/c sand some silt, little f gravel sized)	
f/c sand, brown; moist	
f gravel, some f/c sand; wet; brown; gray	
f gravel; black, brown; gray lots of water in hole	
f gravel, trace c gravel; black; gray, little brown	

9/23 MMD

TMW24 Well Development

DTW = 11.16' T/unkot PVC

TD = 25.00

Well Vol ≈ 2.3 gal.

Time	Gallons Removed	Well Vol	Sp. Cond	pH	Temp
1017	0	0	-	-	-
1020	5	2.2	3,951	6.87	31.8°C
1023	10	4.3	3,977	6.80	31.7
1030	15	6.5	3,909	6.80	31.1
1033	20	8.7	3952	6.79	31.7
1038	25	10.9	3971	6.77	31.9
1043	30	13.0	3648	6.86	32.1
1048	35	15.2	3910	6.83	32.0
1050	37	-	-	-	-

1549 Due to overhead power line, rig could not be located at MEK - proposed TW210 location. It is ~ 15 ft closer to Harbor Police bldg.

1558 Begin drilling at TW210.

1630 Collapse around 7 ft bgs after hammering to 13 ft bgs (likely marine sands.

MLD 9/23

Begin pumping @ 1017

End pumping @ 1050

Turb	Comments
~~Br2~~	Begin pumping, no odor
Cr2	Brown, turbid
153	Sl cloudy
77.1	" "
203	Sl. turbid
38.4	Nearly clear
142	Sl. cloudy
11.2	Clear
-	Development stopped

1725 Geoworks off site

1730 Relocate to PWD. Note cars are interfering w/ TW208 installation and no one at Harbor Police is around. Coned-off approx. area - will talk w/ folks first thing tomorrow

9/23 MLD

SWMU 7

7MW23 Well Development record

TD = 20.00 ft (T/uncut PVC)

DTW = 8.56 ft (T/uncut PVC)

Well Vol ≈ 1.9 Gal

Time	Gallons Removed	Well Volume	Sp. Cond (uS/cm)	pH (s.u.)	Temp. (°C)
1111	5	2.6	4,093	7.15	30.5
1114	10	5.3	4,189	7.27	31.2
1130	30	15.8	3,872	7.23	30.9
1135	35	18.4	3,973	7.21	30.7
1138	40	21.1	4,034	7.18	30.9
1141	45	23.7	3,938	7.20	31.0
1146	50	26.3	3,701	7.16	30.9
1149	55	28.9	3,738	7.17	30.9
1157	65	34.2	3,928	7.18	31.0
1201	70	36.8	3,891	7.21	31.3
1207	75	39.5	3,964	7.20	31.8

MKQ

9/23

Begin pumping @ 1109

End pumping @ 1209

Turb (NTU)	Comments
Er3	Milky brown, opaque; no odor (8-10)
Er3	Same as above
644	Turbid, brown (5-7) top of drawdown
339	As above
Er3	As above sl sulfur odor (8-10)
Er3	More turbid
Er3	Brown, turbid
Er3	As above
933	As above
871	surging over water column height
Er3	" " " " "

9/23

SWMU 7

TTCE TW209

Time	Depth (ft-bgs)	ID	Recovery (ft)	Blow counts	PID PS/BG
1529	0-20	H-N	-	-	-

MKD

9/23

SWMU 7

Simco 2800 w/ 4-in hammer

Temp well

Description

F SAND FILL (Mainly dust; f sand size

CLAY, trace black rock frag, brown (Fill or unlithofied rock - not sure)

5.0

GABBRO frag (f/c sand/f gravel sized); gray (lithofied rock)

Hammer refusal - off set

→ no return on off set (5-10')

GABBRO FRAG, black f/c sand size

gray & brown

mainly brown, softer frag

f/c sand, some gravel sized; brown & gray

as above w/ trace water

slightly wet rock frag

off set description

15

20

9/23

MKD

SWMU 7

TTCETW210

Time	Depth	ID	Recovery	Blow Counts	PID PS/BG
1630	0-13	H-N	–	–	–

will try off set tomorrow w/ 2-1/4 HSAs using B-90 rig

MKD 9/23

SWMU 7

Simco 2800 w/ 4-in hammer

Description
Gravelly Fill MKD
GABBRO FRAG (f/c sand sized); gray (FILL)
same as above, but gray & black - very hard
SAND fm (unknown size) no return; loss of air into fm 7.0

No well - 9/23/03

Mark Kelly 9/23/03

9/23 MKD

SWMU 7

Wed. Sept. 24, 2003. Todays Task's - temp well install (2). Well development and completion

Weather Conditions -

AM: M. Sunny, lt SE wind (lt), mid 80's

PM: M. Sunny, lt SE wind, high 80's

0640 Arrive at PWD to pickup box truck.

0643 Relocate to SWMU 7

0654 GeoWorks on site.

0702 Setup at 7TCETW210 (MEK location)

0710 Begin augering w/ 4-1/4" HSA

0717 GeoWorks used 4-1/4" HSA's to start to get a feel of the fill situation.

0730 Begin augering w/ 2-1/4" HSA

0741 Auger refusal @ 6.0-ft. Also, lost lead auger in hole.

0818 TW210 must be advanced using 4-1/4" HSA & 4" air hammer combo

0852 Very difficult drilling in this area: auger refusal at 7 ft bgs and hammer refusal at 10 ft. Because water is at 5-8 ft bgs, I instructed GeoWorks to install the well at

MKD 9/24

(Cont.) 10-ft bgs

0909 Setup at 7TCETW208

0915 Begin hammering

1016 Hammered to target depth of ~22 ft bgs. Full rods/hammer.

1025 Well installed. Cleanup time, and transition to well development.

1119 GeoWorks to collect soil cuttings

1156 GeoWorks completes tasks.

1200 Lunchbreak

1246 Return to SWMU 7 via marina.

1307 GeoWorks back on base; prep for well development

1333 Setup at 7MW22.

1419 Complete development of 7MW22.

1423 Setup at 7MW21.

1522 Complete development. Turbidity down to ~100 NTU, apparently unable to completely remove all fines.

1536 GeoWorks to off load drums & clean up. Full day tomorrow; will include Decon, GWOTR replacement (abandonment, & grouting/pads. Worst case; GeoWorks needs Fri. morning to finishup.

9/24 MKD

SWMU7

1538 GeoWorks to decon. Area. JCE and I measure elevations of temp and permanent wells. JCE to keep track of measurements and details

1633 Complete task. Relocate to decon. area (SWMU 11)

1638 Prep. to collect solid IDW sample.

1710 JCE and I collect one composite sample of IDW solids from 3 1/4 drums at decon. area. Sample ID is 7TCEIDW01.

1718 Relocate to PWD.

1725 Depart PWD - done for the day.

MKD 9/24

9/24 MKD

SWMU 7

7TCETW210 Revisited.

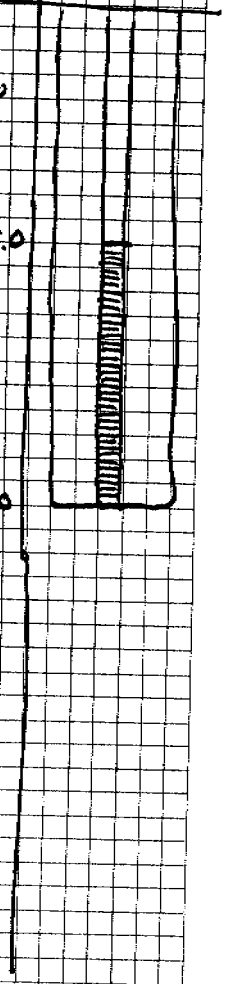
Time	Depth	ID	Recovery	Blow counts	PID PS/BG
0800	0-7	A-N	-	-	-
0843	7-10	H-N	-	-	-

Hammer refusal @ 10.0 ft bgs

MKD 9/24

B90 (Simco 2800

Description	Temp well
Mainly SAND, some f/c gravel (FILL)	
f/c sand, some f/c coral frag; tan; moist	



no return
trace c. sand return
mud return
flowing water

9/24 MKD

SWMU 7

7TCETW208

Time	Depth	ID	Recovery	Blow counts	PID PB/BG
1012	0-22	H-N	-	-	-

Driller can hear water entering the bore hole.

MRD 9/24

Rig: Simco 2800

Description

Gravel/dirt fill

F/c gravel sized gabbro frag; black and gray 1.0

F/c sand sized GABBRO frag; gray; tan

F/M sand sized GABBRO frag; gray; greenish-gray (unweathered)

F/c sand, some F gravel sized GABBRO gray; greenish-gray (unweathered)

gray, trace clay, little weathering F/c sand sized GABBRO unweathered

F/c sand, little F gravel-sized GABBRO frag; gray; unweathered

17.0

More brown in color, increased weathering; damp

22.0

9/24 MRD

SWMU 7

7MW22 Well Development Record

TD = 25.00 (T/uncut PVC)

DTW = 10.80 "

Well Vol ≈ 2.3 Gallons

Time	Gallons Removed	Well Volume	Sp. Cond. (µS/cm)	pH (S.U.)	Temp. (°C)
1352	5	2.2	7,523	6.85	32.6
1357	10	4.4	7,634	6.78	32.2
1400	15	6.5	7,398	6.78	31.8
1403	20	8.7	7,417	6.78	31.5
1405	25	10.9	7,450	6.79	31.5
1407	30	13.0	7,434	6.77	31.5
1410	35	15.2	7,243	6.78	31.5
1412	40	17.4	7,283	6.78	31.5
1414	45	19.6	7,998	6.74	31.4
1416	53	23.0	7,800	6.77	31.5
1418	55	23.9	–	–	–

MKD 9/24

SWMU 7

Begin pumping @ 1348

End pumping @ 1418

Turb (NTU)		
Er 2	Turbid, lt brown, no odor	10
309	Slight clarity improvement	9
75	sl. cloudy	8
62	" "	7
26	Nearly clear	6
13	Clear	5
156	Measured during surge	4
30	Nearly clear	3
230	Measured during surge	2
10	Clear	1
–		

9/24 MKD

SWMU 7

7MW21 Well Development Record

TD 5.54 ft (T/uncut PVC)

DTW 20.00 ft "

Well Volume 2.4 Gallons

Time	Gallons Removed	Well Volume	Sp. Cond. (µS/cm)	pH (S.U.)	Temp (°C)	Turb (NTU)	Comments
1433	5	2.1	10,734	7.19	30.3	Er 3	Milky gray, hydrogen sulfide odor
1435	10	4.2	13,802	7.11	30.3	Er 3	Well pumped dry; cut back rate
1440	15	6.3	9,186	7.05	29.8	Er 3	Milky gray, strong odor continues
1443	20	8.4	11,693	7.02	30.2	Er 2	Slight improvement in clarity
1446	25	10.4	9,035	7.04	30.3	552	
1449	30	12.5	10,525	7.02	30.4	454	Continued improvement
1453	35	14.6	11,189	7.00	30.5	366	
1459	40	16.8 11,258	~~1,847~~ mho	7.07	30.9	Er 3	Milky gray again
1503	45	18.8	11,813	6.99	30.6	1,088	
1508	50	20.8	12,252	7.00	30.9	Er 3	
1512	55	22.9	11,130	7.00	30.2	Er 3	
1520	65	27.1	12,361	~~7.96~~ 6.96 MKD	30.3	102	Sl. cloudy

MKD 9/24

SWMU 7

Begin pumping @ 1431

End pumping @ 1520

MKD 9/24/03

9/24 MKD

SWMU 7/3

Thurs. Sept. 25, 2003. Todays Tasks-
Landfill well replace/well completion
Weather Conditions-
AM: M. Sunny, lt-mod SE wind, mid 80's
PM: P. Sunny, mod NE wind, high 80's

0642 JCE & I scope out alternate locations for R7GW07R2. We also contacted MEK about abandonment and IDW. MEK said collect soil in drums. For abandonment, I can do what I see fit and is consistent w/ past work.

0658 Relocate to SWMU 7. GeoWorks heads to decon area. They will decon rigs and tools first thing (and go off-site for cement). I will assist JCE in the meantime. He is sampling TWs & MWs.

0809 GeoWorks back on site. I relocate to environmental office for digging permit.

0900 GeoWorks sets up at R7GW07R2

0922 Begin drilling. New well is located approximately 5-ft to the east of the first replacement. Omar of GeoWorks says EQB allows inplace

MKD 9/25

SWMU 7/3

(cont.) well abandonment as well as over drill. They further specify that if a facility is to remain active, then inplace abandonment is okay. Omar recalls us doing both in 1999 at the landfill. I'll have to check notebook to verify.

1057 I spoke to MEK regarding replacement well. With bedrock at 23 ft and roots to 16, we decided on a 5-ft screen (18-23 ft bgs). Driller started well installation w/ 10-ft screen while I was on the phone. He must remove well & drill out to 23-ft again.

1105 Begin well installation.

1140 Well completed to bentonite seal. Cleanup after lunch. I go to assist JCE w/ liquid IDW sampling.

1250 Stop by Marino for ice.

1258 Return to SWMU 7. I prep for SWL measurements, while JCE prep's lab shipment.

1421 I complete my task. GeoWorks on site-grouting/pads for new

9/25 MKD

SWMU3

R7GW07R2

Time	Depth (ft-bgs)	ID	Recovery (ft)	Blow counts	PID ps/BG
0945	0-14	A-N	-	-	-
0948	14-16	S-1	1.4	WOH	-
0955	16-18	S-2	1.3	WOR	-
0958	18-20	S-3	1.6	WOR	
1031	20-23.5	A-N	-	-	-

(Auger refusal at 23.5-ft bgs)

MKD 9/25

Rig: Mobile B-90 w/ 4¼" HSAs

Description

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22

See log for R7GW07R

13.0 MKD

16.0 MKD

F SAND, some silt; roots, trace shell frag; clay; tan; wet; v loose

and some SILT, little clay, trace shells; fossils; tan; v. soft; wet

18.0

F SAND and SILT, little clay, trace m/c sand (shells); shell frag; tan; v. soft; wet

9/25 MKD

SWMU 3

R7GW07R2 Continued

Time	Depth	ID	Recovery	Blow counts	PID ppB/BG
1036	23.5-24.5	S-4	1.0	2-42-30-20	–
	25-27 MKD				

(cont.) permanent monitoring wells.

1518 GeoWorks now grouting borings and temporary wells. Also pulling TWs.

1628 R7GW07R2 DTW - 14.61
TD - 25.10

1701 GeoWorks departs SWMU 7 - Done for the day. They will complete grouting tomorrow.

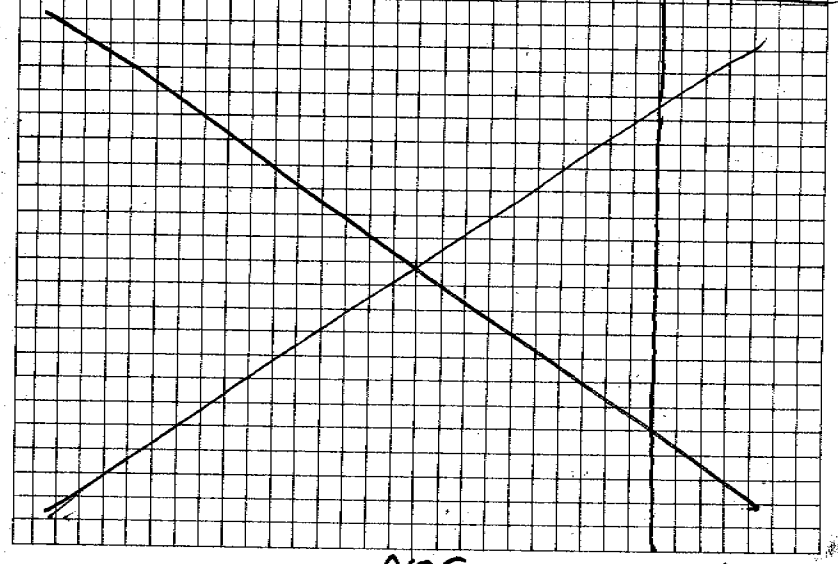
1702 JCI: I relocate to IDW storage area

1713 Relocate to PWD.

MKD 9/25

Description

23 23.0
24 23.5 GABBRO frag black; brown angular to subangular in a brown clay matrix; v. dense; ~~MKD~~ damp
25
26
27 (f/c gravel sized frag)
28
29
30
31
32



9/25 MKD

SWMU 7

Time	Well ID	DTW	Comments
1345	7MW20	9.22	
1356	GW04	8.53	
1353	UGW26	7.80	
1348	UGW8	6.96	
1350	GW06	8.56	Cap doesn't tighten/no lid
1417	UGW14	8.35	
	~~[illegible]~~	MKD	
1400	UGW10	9.22	
1406	UGW18	11.95	Loose PVC casing (Top 2')
1409	UGW16	11.73	" " " "
1339	7MW07	13.08	
1359	UGW9	7.28	
0935	7MW21	5.60	
0800	7MW22	10.84	
1323	7MW23	8.48	
1325	7MW24	11.40	
1327	TW202	5.52	
1332	TW203	5.68	
1320	TW206	12.44	
0714	TW208	11.31	
1337	TW207	12.21	
1335	TW209	7.69	
0740	TW210	6.08	
MKD		9/25	

SWMU 7

Time	Well ID	DTW	Comments
1329	7MW10	5.67	

Disposition of Borings/TWs

SB01 - grouted (9')
SB02 - Grouted (5')
SB03 - Grouted (12')
SB04 Grouted (13')
SB05 - Grouted (10')(3')
SB06 - Grouted (5')(7')
SB07 - Grouted (4')
SB08 - Grouted (13')
SB09 - Grouted (5')
TW201 - 7MW21; pad built
TW202 - Grouted (20')
TW203 - Grouted (19')
TW204 - 7MW23; pad built
TW205 - 7MW22; pad built
TW206 - Grouted (22.5')
TW207 - Grouted (22')
TW208 - Grouted (22')
TW209 - Grouted (20')
TW210a - Grouted (7')
TW210b - Grouted (13')
7MW24 - pad built
Open hole - Grouted

9/25/03

9/25 MKD

SWMU 7

Fri. Sept. 26, 2003. Today's Tasks-
R7GW07R2 completion/development and demobilization
Weather Conditions-
AM: M. Sunny, mod. NE wind, mid 80's
PM: M. Sunny, mod. NE wind, high 80's

0642 Arrive at PWD to pickup box truck
0648 Relocate to decon/IDW area. Note: auger rig is a Mobile B-61, not a B-90 as indicated on earlier pages of this notebook.
0729 GeoWorks on site. They stopped for oddt'l grouting materials before coming on base.
0801 GeoWorks is picking up spent PVC and cleanup.
0815 GeoWorks: I to decon area. Drop off PVC and prep. for well development.
0824 Relocate to R7GW07R2.
0940 Development completed. GeoWorks prep's for R2 completion an R abandonment. JCE: I pack up equipment boxes.
1010 GeoWorks back on site to grout R7GW07R2 and abandon R7GW07R.
1107 GeoWorks completes above tasks.

MRD 9/26

1132 GeoWorks lunchbreak. JCE does FedEx Airbill.
1146 Lunchbreak for Baker Boy's
1229 Return to decon/IDW area.
1250 GeoWorks return to decon area. Decon. & cleanup time for crew.
1413 Omar: I complete paperwork. JCE to relocate to Madeline etc. for debriefing. Omar calculated a total invoice of nearly $33 K, which includes the new landfill well.
1421 General notes:
- Well R7GW07R was abandoned in place. Ballards were reused for new well. GeoWorks will dispose the protective casing.
- Work plan said 20/40 sand for screen filter pack. GeoWorks had only 20/30 sand. It appears to be a good filter for bedrock wells; but at continued high-stress pumping of wells in the marine sediments, fines could not be eliminated/reduced significantly. At normal sampling (low-flow) rates, this should not be a problem.

9/26 MRD

SWMU 7

R7GW07R2 Well Development Record

TD = 25.00 ft (T/uncut/PVC)

DTW = 14.65 " "

Well Volume = 1.7 Gallons

Time	Gallons Removed	Well Volume	Sp. Cond. (µS/cm)	pH (S.U.)	Temp (°C)
0836	5	2.9	5,366	6.78	31.6
0838	8	pumped dry, slow down flow			
0842	10	5.9	7,593	6.94	32.9
0857	15	8.8	6,816	6.94	32.9
0900	flow rated increased again will dry				
0919	18	10.6	-	-	-
0924	20	11.8	7,370	6.95	35.3
0933	25	14.7	7,354	6.95	33.3
0934	27	Well dry again			

(Cont.) - Work plan said that solid IDW from temp wells would be temporarily stored in drums and returned to original bore hole & approx. depth. This would have generated 10 partially full drums to be moved back & forth from IDW storage and SWMU 7. Due to limited volume of cuttings and excessive management of the above scenario, I decided

MKD 9/26

Begin pumping : 0835

End pumping : 0934

Turbidity (NTU)	Comments
Er3	Milky brown, no odor
rate	—
Er3	As above
Er3	Slightly less turbid
wait for recovery	
373	cloudy
341	" temp affected by ambient air
Er3	Turbid, gray increased flow rate

(cont.) to permanently containerize cuttings. Four drums of soil were generated, including R7GW07R2.

1516 Geoworks departs IDW area Project completed. They leave B-61 & Simco 8800 rigs and compressor; will pickup Monday. Is relocate to PWD

1530 I depart in box truck to return to Leaseway.

9/26 MKD

SWMU 7

1548 Gas up at Gulf, next to Leaseway
1610 Meet JCE & head back to NSRR.
1635 Arrive at Gate 1 spot Del Brown Surveyor. JCE get him a pass. We the tour SWMU 7
1658 Depart SWMU7. My work is Finished here.

9/26/03

MMD 9/26

SWMU 7

Sat. Sept. 27 2003 Today's Tasks -
Travel to PIT.

0640 Arrive at SJU
1200 Arrive at PHL. Flight to PIT cancelled. Rebooked the next flight (3:40p). Rats!

10/17 @ 1435 called Gordon Martin at PWD about history of Bldg 2314 per CPO Rodriguez direction. He has no history knowledge of the bldg.

9/27 MMD

Friday September 12, 2003

0630 Mike and I arrive through Gate 3 at USRR.

0645 We arrive at PWD to pick up some equipment to start working.

0654 Mike and I are proceeding to the TCE investigation area to flag sample locations.

0657 Arrive at TCE area to flag locations.

0744 Mark Kimes called to check the status of everything.

0811 Mike and I have staked out the initial locations around former Bldg. 2314. We could find no evidence of any drains coming from the concrete pad where B106. 2314 once stood.

0825 Mark Kimes called again to say both coolers cert yesterday are on truck to be delivered.

0830 Arrive back at PWD to talk to Madeline.

0910 Arrive back at truck after speaking with Madeline. We briefed here on the status of SWMU 11 and

Friday September 12, 2003

the TCE investigation. She said the proposed decon pad location for the TCE investigation in file.

0916 Mike and I are off to CGS to return generator.

0952 Arrived at CGS to return generator.

0955 Leaving CGS to head back to the base.

1010 Arrive back on base through Gate 1.

1015 Arrive at the fuels office to speak with Carlos Brown. I mentioned that we will be collecting three surface soil samples from inside the TWFF next week. He said no problem. We talked to him about locating location North of concrete pad. He said the fuel lines run inward and parallel the old road that went through there. He said to look for PVC and the lines will be right underneath. He didn't have much information on the history of that location with the exception that at one time they repaired outboard engines.

1024 Leaving to go to PWD. Carlos also said that our utilities figure isn't accurate depicting the fuel lines ~~in~~ east of that area.

1028 Arrive back at PWD to get equipment ready for the landfill. (Carlos said that fuel lines are parallel to the old road

Friday September 12, 2003

east of our location. These lines angle to Ensenada Honda at about Surface ops building.

1037 Proceeding to landfill to talk to the person in charge there.

1500 MKA and I are leaving PWD after unloading samples and supplies into the box truck. See SUMU 3 logbook for details. offsite. Weather today was hot, humid, and sunny.

Jon C. Edel Jr.

Saturday September 13, 2003

0630 Arrive at NSRR through Gate 3.

0642 Arrive at PWD to pick up box truck. We will proceed over to Bldg. 38 to meet Omar at the decon area.

0646 Arrive at Bldg. 38 to prepare for the day.

0651 Omar and two others arrive at Bldg. 38.

0729 We are all moving over to the site after Omar and crew get their stuff ready.

0740 Arrive at the site (TCE investigation) after getting potable water for decon. However, Omar said they will decon following Region II guidelines with methanol, etc. provided by us. Their potable water comes from the Harbor Police Building.

0745 Drillers are set up on TCES808 to perform a soil boring.

0805 I gave a Health and Safety speech to all the guys from Baker and Geoworks. They all signed our Health and Safety Sheet.

0810 We are beginning to drill. See MKA's logbook for specific details per location.

Saturday September 13, 2003

1140 We are all taking a lunch break at this time. The drillers will be back in one Hour.

1240 Mark Kimes called to check on status of the TEE investigation.

1255 Arrive back at the box truck after getting more ice.

1300 Drillers arrived back at site. They will need to go decon their equipment.

1312 Arrive at BLDG. 35 where the drillers are set-up to decon the equipments from the TEE investigation.

1354 Drillers arrive back at TEE investigation area to start drilling with an air hammer.

1600 Drilling is finished for the day. Drillers are heading back to decon area to decon all the equipment for Monday Morning.

1615 MKD and I are heading to decon area after securing site.

1620 MKD and I ~~arrived~~ secured. arrived back at decon area.

1710 Drillers have left decon area. They are offsite for the day. They will

Saturday September 13, 2003

be back Monday. I labeled drum in which their decon fluid from SWMU 7/8 went into.

1720 MKD and I are proceeding over to BWD to park the box truck. The decon area is secured.

1726 MKD and I are finished for the day. offsite. Weather today was hot, humid, sunny in the morning with some clouds in the afternoon.

Jon E. Eller Jr.

Sunday September 14, 2003

0624 Arrive at NSRR through GATE 3.

0639 Arrive at PWD to pick supplies and equipment up for sampling at the landfill. See the SWMU 3 logbook for details of that investigation.

1835 Arrive back at PWD to drop off box truck. Offsite for the day.

Jon C Edelly Jr.

Monday September 15, 2003

0625 Arrive at NSRR through GATE 3.

0645 Arrive at PWD to pick up box truck. Mark Kimes called to discuss the TWFF status.

0659 Arrive at BIDG. 38 (decon area) to wait for drillers and to get supplies and equipment ready.

0702 Drillers arrive onsite at decon area.

0710 Arrive at TEE area to get set-up on the first location.

0730 Arrive at PWD to speak with Caleb Romero, Pedro Ruiz, and Madeline Rivera. Caleb (utilities) said that as far as my question about the one boring around the area of a utility line, that there should be no problem sampling there. He and Pedro both said that as long as the boring is as close to the concrete pad along the North, there should not be a problem. Caleb lent me a couple of meters to try and check. The fuel line is down about 9'.

TEE (2-3')

0844 Proceeding back to TEE investigation area.

0849 Arrive back TEE area.

0910 Spoke with a gentleman from Surface Ops about driving down the bulkhead to get to our other locations. He said to

Monday September 15, 2003

go ahead when ready and drive down.

0920 I am packing up sample containers while MKD work with the drillers.

1335 I called FedEx to schedule a pick up here at BIDG. 2351 (Harbor Police Building.)

1340 Danny from FedEx called and said he will be here at 2351 at 1430. The master airwaybill is 8892 8923 1954.

1450 FedEx came to pick up the 13 coolers.

1456 I am going to Marina to get more ice.

1505 Arrive back at TEE area to help MKD with soil borings.

1710 Leaving TEE area to go back to decon area with drillers. See MKD's notebook for details about today's activities at the TEE investigation at the TWFF.

1720 Drillers have left the decon area for the day. The site is secure.

1721 I am proceeding over to PWD to meet up ~~with~~ JCE with MKD ~~with~~ JCE with the box truck.

1734 MKD and I are leaving PWD. We

Monday September 15, 2003

are finished for the day. Offsite. The weather today was hot, humid, and sunny.

Jon C. Eldridge

Tuesday September 16, 2003

0630 Arrive on base through Gate 3.
0644 Arrive at PWD to pick up box truck.
0645 Proceeding to the TCE investigation area.
0651 ~~Damm~~ JLE MKD and I arrive at TCE investigation area.
0709 MKD and I arrive at 7TCETW201 to collect groundwater samples.
0730 Sample collected (7TCETW201).
0745 Arrive at 7TCETW203 to collect groundwater samples.
0810 Sampled well 7TCETW203 with its duplicate. An interface probe could not be used for the two temp. wells sampled above due JLE to the size of the well casing (1").
0822 Arrive at 7TCETW202 to collect groundwater samples.
0835 Sample well 7TCETW202. Mark Kimes called earlier to discuss status. See MKD's logbook for details dealing with the TWFF.
0845 Arrive back at box truck.
0848 MKD and I are going to try

Tuesday September 16, 2003

7TCETW201

TD = 20.00' from top PVC. Ø = 1" — Start pump 0719
SWL = 5.55' from top PVC — Bottom of tubing within well screen
1-volume = 0.63 gallons
↳ 1" multiplier used was 0.43 gallons
* Sampled well at 0730.
* Approx. 2 volumes were purged before sample collected.
* Sulfur odor in sample.

7TCETW203

TD = 20.00' from top PVC. Ø = 1" — Start pump 0739
SWL = 5.98' from top PVC. — Bottom of tubing within well screen.
1-volume = 0.60 gallons
↳ 1" multiplier used was 0.43
* Sample well at 0810.
* Approx. 2 volumes were purged before sample was collected.
* SL. sulfur smell in sample.
* Because interface probe could not be used, we lowered tubing to bottom and collected some water in a separate container and added Sudan IV. Tubing was raised to collect sample.

Tuesday September 16, 2003

>TCE TW 202

TD = 20.00' from top PVC
Ø = 1"
SWL = 5.86 from top PVC

Start pump 0825
Bottom of tubing within well screen.

1-volume = 0.61 gallons
in 1" multiplier used was .043 jcf

* Approx. 2 well volumes of water was purged prior to sampling.
* Sampled well at 0836.
* SL. sulfur odor observed in well.

* As like temporary well >TCE TW 203, the interface probe couldn't fit down well, so we lowered the tubing to the very bottom and collected initial purge water in a separate container and added Sudan IV. We then ~~[illegible]~~ jcf raised tubing approx. 2 feet to collect sample.
* All purge water from wells was placed in a drum over at decon area.

Tuesday September 16, 2003

to locate fuel line within the trench where Caleb gave me.

0904 Arrive back at box truck. Tracer meter doesn't seem to be working properly. Mark Kines called to request we go get the three surface soil samples over at the TWFF.

0912 Leaving the TCE area to go get more ice at the Marina.

0922 Arrive back at TCE area to meet up with MKO.

0925 Leaving TCE area to go surface soil sampling within TWFF.

0930 Arrive at fuels to call Carlos Brown that I will be in there.

0934 Arrive at first location to collect surface soil sample. All locations are down gradient from >MW17.

0943 Collected sample at the first location.

0944 Arrive at second location to collect surface soil.

0947 Sampled second location.

0956 Arrive at third location to collect surface soil sample including duplicate and MS/MSD.

0955 Sampled location 3. All samples (Locations 1 through 3) were

Tuesday September 16, 2003

Collected from a depth of 0 to 1' bags, and will be analyzed for zinc.

1003 Proceeding back to TCE Investigation area to meet up with MKD.

1012 Arrive back at TCE investigation area.

1015 Called Mark Kimes to get official Sample I.D's.

1027 Leaving TCE area to go to PWD to drop off meters.

1030 Arrive at PWD to drop off meters to Caleb Romero.

1045 Leaving PWD after speaking with Caleb and Madeline Rivera. I gave Madeline a Status update of our progress ~~down~~ completed TCE. She wants us to call her before we bore through location north of concrete pad.

1050 Arrive at landfill to tell Eric that we are finished with the exception of a full round of water levels.

1056 Arrive back at TCE investigation area to meet up with MKD.

1130 Trip blank Sample (7TCETB01) was

Tuesday September 16, 2003

labeled for todays shipment.

1144 MKD and I are breaking for lunch. Mark Kimes called and wants a small collected from 7MW07 and send out today.

1230 Arrive back at TCE investigation area.

1237 Arrive at 7MW07 to collect a groundwater sample.

1350 Collected groundwater sample from 7MW07.

1404 Called FedEx to schedule a pickup at BIDG. 2351. Pick up number is NRE206.

1408 Called Danny from FedEx to find out when he will be here. He said by 1430.

1440 Danny from FedEx came to pick up the cooler. Only 1 cooler was sent out today. Mesquite Air Waybill number was 8348 2976 7120.

1500 Helping MKD Soil Sample at the TCE investigative area. See MKD's logbook for the calibration of the multi-meter (556 MPS by YSI) for the sampling at 7MW07. See MKD's logbook for soil sampling activities at the TCE area.

1720 Left TCE area to go back to PWD to drop box truck off.

Tuesday September 16, 2003

7MW07

TD = 25'
Ø = 6"
SWL = 13.67' below top PVC

Start pump 1255
Bottom of tubing within well screen (2' above bottom of well)

Time	SWL	pH	Cond. (µS)	Temp.	Turb.	Eh	DO (mg/L)
1302	13.76	7.03	806	31.64°C	83.7	78.1	1.10
1308	13.82	7.03	778	31.28°C	64.9	72.7	1.07
1313	13.83	7.00	764	31.38°C	51.9	63.6	1.48
1318	13.86	7.06	757	31.11°C	45.4	63.7	1.68
1323	13.88	7.07	747	31.08°C	40.5	53.2	0.91
1328	13.88	7.13	741	31.09°C	36.7	51.0	0.95
1333	13.88	7.15	729	31.05°C	31.4	51.9	1.08
1338	13.89	7.19	723	31.07°C	30.6	48.4	1.10

Tuesday September 16, 2003

Time	SWL	pH	Cond.	Temp.	Turb.	Eh	D.O.
1343	13.89	7.19	715	30.91	25.9	47.5	1.11

* I collected this sample. Monitor well was 6".
* Sample time 1350.
* Final SWL was 13.76'.
* Chemets were used to get the final D.O. reading which was 2.0 mg/L.
* The monitor well is in good condition and locked.
* The initial SWL was collected with an interface probe, then a groundwater level meter was used during each round of purging.
* There was no indication of either LNAPL nor DNAPL.
* Flow rate was less than 500 mL/min.
* Peristaltic pump was used to purge and sample.
* TCL VOC analysis was requested.
  ↳ (3) 40 mL VOAs - HCl Preserved
* Weather was very hot, humid, and sunny.
* Stop purging at 1344.
* Sample appeared clear with some small floating debris. No apparent odor.
* Purge water placed in drum over at decon area.

Tuesday September 16, 2003

1720 MKD and I are leaving PWD for the day. Offsite. Weather was very hot, humid and sunny all day.

Jim E. Gall Jr.

Wednesday September 17, 2003

0625 MKD and I arrive at USER through Gate 3.

0640 Arrive at PWD to pick up the box truck.

0643 Heading to the TCE investigation area.

0645 Arrive at TCE investigation area.

0650 Leaving TCE area to go to decon area to make sure all drums with decon fluid or purge water are labeled up.

0655 Arrive at decon area to check on the drums.

0710 Arrive back at TCE area to meet up with MKD. Mark Kimes called to check on status at this site. See MKD's logbook for details. Also see MKD's logbook for details of the daily TCE investigation.

0740 Proceeding to Landfill to get final round of water levels. See the SWMU 3 logbook.

0900 Water levels at SWMU 3 are finished. Heading to marina to get more ice/Gatorade.

0914 Arrive back at TCE area to meet up with MKD. Mark Kimes called earlier to discuss more

Wednesday September 17, 2003

information about TWFF.

1000 MKD and I are going to go around to get a round of water levels out wells in and around the TCE investigation area.

	Well	SWL	Comments
1004	7GW20	12.00	Locking cap was loose
1007	7GW08	10.08 JCE	well cap on - doesn't lock.
		9.98	Depth to product
1022	UGW21	11.31	Depth to product
		11.39	" " water (Locking cap on)
1040	UGW19	10.46	Depth to product
		10.55	" " water (Locking cap was loose)
1047	UGW17	10.20	Depth to product
		10.60	" " water (")
× 1050	UGW13	9.98	Depth to product
		10.00	" " water (")
× 1102	UGW12	11.01	Depth to product
		12.02	" " water (")
1112	GW04	9.14	Depth to water (")
1115	UGW26	9.06	" " " (")

Wednesday September 17, 2003

	Well	SWL	Comments
1126	UGW09	7.58	Locking cap was loose
1130	UGW11	8.57	(")
1136	UGW18	12.40	(") Riser is loose from PVC casing, inside metal casing.
1145	UGW16	12.15	(") (")
1150	7MW07	13.75	Locking cap on tight.
1157	7MW10	5.90	Locking cap was loose. No bolts on flush mount lid.

(* See additional levels below) JCE

1200 Back at TCE area to meet up with MKD.

1226 MKD and I left to go get some lunch.

1300 MKD and I arrived back at the TCE investigation area of the TWFF.

1310 TCETW202 static water level is 5.77'.

1313 TCETW203 Static water level is 5.93'.

1315 TCETW201 static water level is 5.67'.

* All SWL's were taken from top of PVC. The interface was decon between wells which contained floating product.

1320 Helping MKD collect soil samples at the TCE investigation area. See his logbook for details.

1420 Gave Madeline Rivera a call to give

Wednesday September 17, 2003

her the heads up that we will be working with the boring north of the concrete pad tomorrow morning. I also said that I will be giving her a call before we start it. She said that was fine.

1640 MKD and I are getting ready to collect the three field blanks and the ~~first~~ second trip blank.

1701 MKD and I are heading over to PWD to drop off box truck.

1706 MKD and I are leaving PWD after dropping off the box truck. Offsite for the day. Weather today was hot, humid, and sunny, with strong afternoon thunderstorms. Drilling stopped for a short time. See MKD's logbook for all the details.

Jon C. Edell Jr

Thursday September 18, 2003

0620 Arrive at USCG through Gate 3.

0640 MKD and I arrive at PWD to pick up box truck. We will be proceeding to TCE investigation area.

0645 Arrive at TCE investigation area at TWFF.

0650 Arrive at TCETW204 to collect a groundwater sample.

0707 Sampled temporary well TCETW204.

0716 Arrive at TCETW205 to collect a groundwater sample.

0733 Sample collected TCETW205.

0800 Mark Kines called to check on status of everything.

0805 I am assisting MKD in soil collection with drillers. See his logbook for details.

0820 Called Madeline Rivera to tell her we will be proceeding over to TCESB07 north of pad. She said to continue on and they will be over.

0825 Arrive at TCESB07 to install soil boring. See MKD's logbook.

0850 Building Manager from the Harbor Patrol SIGG. Stopped over to find out if we hit anything. He said the

Thursday September 18, 2003

STEETW204

TD = 21.14' from top PVC
Ø = 2"
SWL = 9.93' from top PVC

Start pump 0659
Bottom of tubing within well screen.

1-volume = 1.9 gallons
↳ 2" multiplier used = 0.167

* No DNAPL/LNAPL present in well. Interface probe was used.
* Sample time is 0707.
* Sample appeared relatively clear with no apparent odor.
* Approx. 1.5 gallons was purged prior to sample.

Jon C. Edell Jr.

Thursday September 18, 2003

TEE TW205

TD = 25.18' from top PVC
Ø = 2"
SWL = 10.60' from top PVC

Start pump 0723
Bottom of tubing within well screen

1-volume = 2.4 gallons
↳ 2" multiplier used was 0.167.

* No LNAPL/DNAPL present in well. Interface probe was used.
* Sample time is 0733.
* Sample appeared relatively clear with no apparent odor.
* Approx. 1.5 gallons of water was purged prior to sample.

Jon C. Edell Jr.

Thursday September 18, 2003

Phone lines were just recently knocked out on this side of the base. I said we didn't hit anything that we only went down to 4' bgs all rock.

0900 Madeline Rivera (PWD-Env.) showed up and said she doesn't have any phone service over at PWD either. I explained to Madeline that we went down to 4' bgs but it is all rock. I explained that we didn't hit anything.

0905 Police show up along with other communications people to find out what is going on. I approach them and said that we have not hit anything. Madeline and I showed the Dig Permit to the police and the communications people. One of the communications people check the boring. No sign of any cable what so ever. They finally determined that it was not our problem.

Thursday September 18, 2003

0920 The police and communications people left the site.

0925 MKD and I took Madeline around the site to show her what has been going on. She wants us to park the box truck this weekend behind PWD B106. She also wants us to stop by tomorrow to be able to renew our passes for next week.

0930 Madeline Rivera left the site.

0945 Called Mark Kimes to let him know what is going on.

0955 Mark Kimes called back to say the initial screen on the ground water collected from >TEETW001 - >TEETW003 all came back clean for TCE. The lab should have final results in a couple of hours.

1012 I arrived at tecan area to dump purge water from >TEETW004 and >TEETW005 that were sampled today.

1031 Arrive back at TCE area after getting some more tea and gatorade.

1100 MKD and I are leaving TCE area to get lunch.

1204 Arrive back at TCE area with MKD. We stopped at PWD to get photocopy of TW-E from previous investigation.

Thursday September 18, 2003

Secured for the night. We went over instructions with Omar for Monday morning.

1205 MKO and I are heading back to PWD to drop off truck.

1212 MKO and I are leaving PWD. Offsite for the day. I called Angie Weimerskirk and left her a voicemail requesting more trip blanks be sent down here for Monday. Weather today was hot, humid, and mostly sunny.

Jon C. Earl Jr.

Friday September 19, 2003

0900 Arrive at NSER through Gate 3.

0913 Arrive at PWD to pick up box truck. Amy Beacon from STL called and said they would additional trip blanks as per my voicemail yesterday afternoon.

0915 Arrive at TCE area to collect groundwater samples from TCETW206 and TCETW207.

0927 Prepare TCETB03 with labels to be shipped out today.

0938 Sampled well TCETW207.

0940 Arrive at TCETW206 to collect groundwater samples.

1000 Sampled well TCETW206.

1010 Leaving TCE area to go dump purge water over at the decon area.

1015 Arrive at decon area.

1020 Leaving decon area. This area is secure for the weekend. Heading to get more ice.

1036 Arrive at PWD to park truck for the weekend and to pack up sample. The truck is parked behind PWD with salvaged vehicles.

1050 MKO and I are leaving PWD.

Friday September 19, 2003

STCETW207

TD = 23.11' from top PVC
Ø = 2"
SWL = 12.68' from top PVC

Start pump 0925
Bottom of tubing within well screen.

1-volume = 1.74 gallons

* NO DNAPL OR LNAPL present within well.
* Sample time is 0938. Sample appeared relatively clear with no apparent odor.
* Approx. 1 volume of water was purged prior to sampling.

Jon C Edell Jr.

Friday September 19, 2003

STCETW206

TD = 22.98' from top PVC.
Ø = 2"
SWL = 13.29' from top PVC.

Start pump 0948
Bottom of tubing within well screen

1-volume = 1.6 gallons

* No DNAPL/LNAPL present in well.
* Sample time is 1000. Sampled appeared relatively clear with no odor apparent.
* Approx. 1 gallon of water as purged prior to sampling.

Jon C Edell Jr.

Friday September 19, 2003

The TCE investigation area, the decon area, and the box break are all secured for the weekend. Madeline Rivera has already been informed about us going home this weekend.

1130 MKB and I are leaving the base after grabbing some lunch. We are heading to San Juan to drop off samples to FedEx off of the Campo Rico exit on 26 West.

1230 Arrive at FedEx off of Campo Rico Ave. to drop off samples.

1250 Arrive at Avis Rental Car at airport.

1300 Arrive at San Juan Intl. Airport.

1310 I called Mark Kimes to brief him on the status of everything up till our break. He said he wants a round of water levels first thing Monday morning. Doesn't necessarily have to include the ones with free product. He said we should have results for the samples ~~[illegible]~~ we shipped yesterday and today (groundwater samples) on Monday Am. He

Friday September 19, 2003

said to get existing wells sampled and send them out Tuesday if possible. Then hold off sampling until rest of wells are installed and developed. Then sample and ship.

1510 Leave San Juan in route to Philadelphia.

1900 Arrive in Philadelphia.

2010 Leaving Philadelphia in route to Pittsburgh.

2100 Arrive in Pittsburgh.

Jon C. Edel Jr.

Sunday — September 21, 2003

1345 Arrive at Pittsburgh Intl. Airport.

1550 Leaving Pittsburgh in Route to Philadelphia.

1710 Arrived in Philadelphia.

1745 Leaving Philadelphia to go to San Juan.

2110 Arrive in San Juan. Heading to Avis Rental Car. We will then proceed to the condo.

Jon C. Dell J.

Monday — September 22, 2003

0630 Arrived at USEPA through Gate 1. MKD and I stopped to get new passes because of new vehicle.

0650 Proceeding through Gate 1 with new passes.

0700 Arrive at PWD to pick up box truck.

0704 Leaving PWD to go to decon area to check on drillers.

0705 Arrive at decon area and drillers are not onsite yet.

0712 OMNR from Geoworks arrived at decon area. The other two guys are not here yet.

0718 The rest of OMNR's guys arrived at decon area. They are preparing for the days activities.

0800 Leaving decon area with drillers to go to TCE area at TWFF.

0805 Arrive at TCE area. MKD and drillers are ready to install MW21. I got a SWL from MW-20 before MKD has the drillers install MW21 in its place. SWL was 6.24' below ground surface. PVC is at ground surface.

0817 Left Mark Kines a message about

Monday September 22, 2003

our status as well as checking on shipment from Friday for Saturday delivery.

~~[illegible]~~ (JEE)

0830 Mark Kimes called to say that the cooler got to STL on Saturday as planned.

0835 A slight issue with the drillers has developed. See MKD's logbook.

0840 Mark Kimes called again to address voicemail left by MKD. Drillers are leaving to go get needed supplies for drilling.

0919 MKD and I are going to get SWLs.

	Well	SWL	Comments
0922	7MW20	7.86	well cap locked.
0926	6W04	8.09	"
0928	UGW26	7.88	"
0931	UGW8	5.62	"
0932	GW6	8.68	* Cap Unlocked
0936	UGW10	9.22	* Cap Unlocked
0938	7MW11	7.34	* Cap unlocked, no flushmount bolts.
0943	UGW11	8.01	well cap locked.

Monday September 22, 2003

	Well	SWL	Comments
0947	UGW18	12.00	Riser is cracked off at concrete base within steel casing.
0955	UGW16	11.54	"
0957	7TCETW202	11.91	(Temporary well)
0958	7MW07	12.22	well cap locked.
1000	7TCETW206	11.42	(Temporary well)
1001	7TCETW204	9.53	(")
1003	7TCETW205	10.19	(")
1007	7MW20	5.38	Locking cap on and locked. no bolts for flushmount lid.
1009	7TCETW203	5.61	(Temporary well)
1010	7TCETW202	~~5.59~~ JEE 5.44	(")
1029	UGW09	7.38	well cap locked. We had to remove water in steel casing.

1041 Called and left a message with Madeline Rivera to let her know we are back on base working.

1045 MKD and I are taking an early lunch to be back when the drillers get back from picking up their supplies.

1121 Arrive back at box truck at the TCE investigation area. We are going to start

Monday September 22, 2003

groundwater sampling.

1195 Omar and crew driven back to TCE area.

1290 Sampled well 2MW10.

1245. Leaving 2MW10 to go to UGW11 to collect a groundwater sample.

1319 Arrive at UGW11 after getting permission from Fred's.

1438 JCE Sampled UGW11.

1435 Arrived at Fred's office to tell them that I am out of the truck rack.

1450 Arrive at TCE area to dump purge water in drums.

1445 Leaving TCE area to go more in from the marina.

1504 Arrive back at TCE area.

1520 Spoke with Mark Kimes about the status of the work being performed.

1546 Arrived at 2MW08 to collect a groundwater sample.

1720 Sampled 2MW08.

1730 Arrive back at TCE area to get box truck.

1740 Arrive at PWS to drop truck off.

Monday September 22, 2003

2MW10

TD = 12.34' below top PVC.
Ø = 2"
SWL = 5.39' below top PVC.

Start pump 1147
Bottom of tubing within well screen. (2' above bottom)

Time	SWL	pH	Cond. (µS)	Temp. (°C)	Turb.	Eh	D.O. (mg/L)
1152	5.39	7.10	7,476	30.08	37.7	-96.8	0.87
1159	5.40	7.22	5,544	29.83	5.90	-133.8	0.68
1205	5.40	7.25	5,212	30.04	1.67	-138.6	0.70
1210	5.40	7.26	4,997	29.89	0.76	-148.6	0.69
1216	5.40	7.23	5,020	29.86	0.39	-152.3	0.86
1222	5.40	7.22	4,939	29.98	0.27	-165.4	0.86
1228	5.40	7.25	4,915	30.01	0.22	-174.2	0.89
1234	5.40	7.25	4,880	30.01	0.12	-170.9	0.90

* Stop purging 1235.
* Sample time 1240.
* The DO reading using chemets was 0.9 mg/L.
* I collected this sample.
* Final SWL was 5.40' below top of PVC
* The monitor well is in good condition and

Monday September 22, 2003

and locked.

* The initial SWL was collected with an interface probe, then a groundwater level meter was used during each round of purging.
* There was no indication of either LNAPL/DNAPL.
* Flow rate was less than 500 mL/min.
* Peristaltic pump was used to purge and sample.
* TCL VOC analysis was requested, (3) 40 mL VOAs - HCL Preserved.
* Weather is very hot, humid, and sunny.
* Sample appeared clear with a slight sulfur odor.
* Purged water was containerized in drums on the site.

Monday September 22, 2003

UGW11

TD = 18.65' from top PVC
Ø = 2"
SWL = 8.05' from top PVC

Start pump 1334
Bottom of tubing within well screen. (Approx. 2' above bottom)

Time	SWL	pH	Cond. (µS)	Temp. (°C)	Turb.	Eh	D.O. (mg/L)
1339	8.01	7.13	12,728	30.27	166	-19.8	0.71
1344	8.01	7.87	1,324	30.12	18.2	-21.8	2.85
1349	8.02	7.73	875	30.13	3.65	0.8	2.98
1355	8.02	7.69	775	30.09	1.51	10.1	2.99
1400	8.02	7.67	700	30.20	0.89	18.4	3.03
1405	8.02	7.64	665	30.19	0.47	21.5	3.03
1410	8.02	7.66	634	29.98	0.19	20.7	3.03
1415	8.04	7.66	608	30.10	0.21	20.7	2.93
1421	8.07	7.66	582	30.14	0.15	22.8	3.02

* Stop purging well at 1422.
* Sample time 1428.
* The DO reading using the chemets was 3.5 mg/L.
* I collected this sample.

Monday September 22, 2003

* The final SWL was 8.04' below top of PVC.
* The monitor well is in good condition and locked.
* The initial SWL was collected with an interface probe, then a groundwater level meter was used during each round of purging.
* There was no indication of either LNAPL/DNAPL.
* Flow rate was less than 500 mL/min.
* Peristaltic pump was used to purge and sample.
* TCL VOC analysis was requested (3) 40 mL VOAs - HCl preserved.
* Weather is very hot, humid, and sunny.
* Sampled appeared clear with no apparent odor.
* Purged water was containerized in drums.

Jm C Edel Jr

Monday September 22, 2003

DMWW08

TD = 28.42' from top PVC.
Ø = 6" JCE
SWL = 8.25' (JCE) from top PVC.

Stand pump 1623
Bottom of tubing within well screen.

Time	SWL	pH	Cond. (µS)	Temp. (°C)	Turb.	Eh	D.O. (mg/L)
1630	8.20	6.63	5,913	31.45	82.2	-57.8	0.83
1637	8.20	6.61	5,213	31.37	47.9	-72.8	0.42
1642	8.20	6.66	3,886	31.44	29.1	-65.9	0.47
1647	8.21	6.68	2,285	31.46	14.8	-59.3	0.53
1653	8.21	6.70	1,238	31.38	11.3	-51.1	0.59
1659	8.21	6.64	951	31.14	9.68	-36.3	0.61
1705	8.21	6.64	857	31.07	8.25	-17.2	0.65 (JCE)

(* Product (LNAPL) was JCE observed at 8.28' from top of PVC. Notes from the stand of the well.)

1711	8.21	6.61	862	31.03	6.81	-14.9	0.67
1716	8.21	6.61	878	30.90	7.32	-8.7	0.67

* Stop purging 1719.
* Sample time is 1720.

Monday September 22, 2003

* DO using the chemets was 0.6 mg/L.
* MRD collected this sample.
* Final SWL is 8.15' below top of PVC.
* The monitor well was a 6" well (flushmount) and the locking cap would not lock.
* The initial SWL was collected with an interface probe, then a groundwater level meter was used during each round of purging.
* LNAPL was present, but DNAPL was not. To sample well with LNAPL, I used a 1" PVC pipe with aluminum foil on the end. I lowered that down past the LNAPL so the peristaltic tubing doesn't go through it. I took a representative sample from the screen area. All water levels during purging were adjusted from the 1" stick up to the 6" stick up. (Approx. 0.9' difference.)
* Flow rate was less than 500 mL/min.
* Peristaltic pump was used to purge and sample.

Monday September 22, 2003

* TCL VOC analysis was requested.
  (3) 40 mL Vials. HCL Preserved
* Weather today was hot, humid, and sunny.
* Sample contained some small floating black debris, with no apparent odor.
* Purged water was containerized in drums.
* There were no bolts on the flushmount, and the locking cap will not lock.

Jon C. Edwards

Monday September 22, 2003

1756 MKD and I are leaving PWD. offsite for the day. The weather today was hot, humid, and sunny. The meters for field parameters were calibrated by MKD earlier today. See his logbook.

Jon E. Eddy Jr.

Tuesday September 23, 2003

0630 MKD and I arrive on base through Gate 3.

0645 We arrived at PWD to pick up box truck.

0650 We arrived at TCE area of TWEF to prepare for the day.

0658 Drillers arrive onsite.

0700 All parameters in multi-meter were calibrated including pH (7,4,10), specific conductance (1,000 uS), redox (231 mV), %D.O., and the turbidity meter was also calibrated.

0722 Proceeding to 7MW20 to collect groundwater samples including duplicate, MS, and MSD.

0727 Arrive at 7MW20 to collect groundwater samples.

0840 Sampled well 7MW20 including its duplicate, MS, and MSD.

0910 Arrive back at TCE area to dump purge water. Mark Kimes called to discuss status of TCE area.

0936 Leaving to go get more ice from Marina.

0946 Arrive back at TCE area with

Tuesday September 23, 2003

MW20

T.D. = 12.86' from top PVC
Ø = 4"
SWL = 6.91' from top of PVC

start pump 0746
Bottom of tubing within well screen (Approx. 2' above bottom)

Time	SWL	pH	Cond. (us)	Temp. (oC)	Turb.	Eh	D.O. (mg/L)
0751	6.97	6.73	844	29.04	462	108.0	2.17
0757	7.35	6.91	843	29.10	444	95.5	2.16
0803	7.63	6.96	841	29.05	333	89.2	2.22
0809	7.89	6.98	843	29.16	39.7	79.7	2.25
0815	8.17	6.97	837	29.15	14.7	75.5	2.22
0820	8.18	6.99	833	29.17	10.46	71.2	2.36
0826	8.18	7.06	825	29.27	11.1	65.4	2.46
0832	8.18	7.06	828	29.16	10.30	67.6	2.53

Tuesday September 23, 2003

* D.O. using the chemets was 3.0 mg/L
* Stop purging 0835.
* Sample time 0840.
* I collected this sample.
* Final SWL was 8.18' below top of PVC.
* This monitor well is in good condition. It is a 4" well.
* The initial SWL was collected with an interface probe, then a groundwater level meter was used during each round of sampling.
* There was no indication of either LNAPL/DNAPL.
* Flow rate was at the minimum of the pump.
* Peristaltic pump was used to purge and sample.
* The VOC analysis requested (3) 40 mL VOAs - HCl preserved
* Weather today is very hot, humid, and sunny.
* Sample appeared relatively clear with no apparent odor.
* Purge water was containerized in drums.

the ice.

1005 Leaving TEE area to go to PWD to talk with Madeline Rivera.

1010 Arrive at PWD. I gave her a status update of the progress thus far. I also picked up the shipment from the lab of additional trip blank samples. During our conversation, I was able to get the surveying equipment to get the elevations for the temporary wells. We also discussed Del Brown coming down to survey all the points. I will stop back on Friday to pick up his pass for Saturday if need be.

1050 Arrive back at TEE area to prep cooler for todays shipment.

1100 Labeling 7TEETB04 for todays shipment.

1125 Mark Kimes called again to discuss the installation of 3 more temporary wells. See MKD's logbook for details. These additional temporary wells will have quick turn analysis. He also wants

another round of water levels once the additional 3 temporary wells are installed.

1223 MKD and I are breaking for lunch along with the drillers.

1333 Called FedEx to schedule a pickup here at B1D6. 2351. Our pickup number is WER207.

1335 Called Danny from FedEx to find out when he will be here. He said he will come now.

1342 FedEx came to pick up our cooler.

1351 Collecting 7TEEER01 of a stainless steel spoon using lab grade DI.

1406 Collecting 7TEEER03 of the silicon tubing using lab grade DI and the peristaltic pump.

1422 Collecting 7TEEER02 of a split-spoon using lab grade DI water. The sample will be collected from running the water down the inside of the split-spoon.

1450 Mark Kimes called to check on status of the TEE investigation. He went over the method he wants us to use to

Tuesday September 23, 2003

obtain the elevations for the temporary wells. He wants the red on the black line on PVC.

1455 Leaving to go get more ice at the marina.

1502 Arrive back at TCE area. Assisting MKD with the drillers. See MKD's logbook for details.

1640 Mark Kimes called for a status update. He wants me to sample 7CETW208 that is in, and any permanent wells that have been installed and developed. This sampling will take place in the morning.

1730 MKD and I are leaving TCE area to head to PWD to drop truck off. Drillers are offsite.

1735 Arrive at PWD to drop truck off.

1740 MKD and I are leaving PWD. Offsite for the day. Weather all day was hot, humid, and sunny.

Jon C. Edell Jr.

Wednesday September 24, 2003

0630 Arrive at USER through Gate 3.

0642 Arrive at PWD with MKD to pick up box truck.

0648 Arrive at TCE area and getting equipment ready for the day.

0700 All parameters in multi-meter were calibrated including pH (4, 7, 10), specific conductance (1,000 µS), redox (231 mV), D.O., and the turbidity meter.

0725 Arrive at 7CETW209 to collect a groundwater sample.

0756 Sampled 7CETW209.

0806 Arrive at 7MW24 to collect a groundwater sample.

0815 Mark Kimes called to check on status of the investigation. He wants me to send out samples today that are collected. He also wants me to go over an talk with Madeline Rivera about 7MW07R at Landfill. The temporary well sampled today will have a 24 hour turn on it.

0938 Sampled well 7MW24.

0947 Proceeding to marina to get gatorade.

0955 Arrive back at TCE area.

Wednesday September 24, 2003

TCETW209

TD = 20.05' from top PVC
Ø = 1"
SWL = 8.24' from top PVC

Start pump 0741
Bottom of tubing within well screen

1-volume = 0.49 gallons
↳ 1" multiplier used was 0.048.

* Sample time is 0756. Sample appeared slightly cloudy, with no apparent odor.
* Approx. two volumes were purged prior to sampling.

Jon E. Ellis Jr.

Wednesday September 24, 2003

7MW24

TD = 25.27' from top PVC
Ø = 2"
SWL = 11.26' from top PVC

Start pump 0842
Bottom of tubing within well screen (Approx. 2' above bottom)

Time	SWL	pH	Cond. (us)	Temp. (°C)	Turb.	Eh	D.O. (mg/L)
0848	11.36	6.92	3,513	31.08	2.09	75.5	0.93
0854	11.35	6.80	3,789	30.90	6.40	68.6	0.66
0900	11.35	6.74	4,345	30.83	4.10	66.7	0.75
0905	11.35	6.75	4,530	30.85	2.39	62.2	0.70
0911	11.36	6.77	4,578	30.70	2.26	63.6	0.71
0917	11.36	6.79	4,573	30.84	1.68	59.0	0.63
0923	11.38	6.76	4,544	30.57	1.64	59.1	0.56
0928	11.38	6.78	4,528	30.81	1.63	57.0	0.65

* Stop purging 0931
* DO using chemets was 0.5 mg/L.
* Sample time 0938.
* Final SWL was 11.24' below top of PVC.
* I collected this sample.
* This monitor well currently has a stick up

Wednesday September 24, 2003

but will be a flushmount when the drillers are finished installing it. We will get the current level of PVC. It is a 2" well.

* The initial SWL was collected with an interface probe, then a groundwater level meter was used during each round of purging.
* There was no indication of either LNAPL/DNAPL.
* Flow rate was less than 500 ml/min.
* Peristaltic pump was used to purge and sample.
* TCL VOC analysis was requested:
  (3) 40 ml VOAs - HCL preserved
* Weather today is hot, humid, and sunny.
* Sampled appeared clear with no apparent odor.
* Purged water was containerized in a drum.

Jon C. Edel Jr.

Wednesday September 24, 2003

0959	Arrive at 7MW23 to collect groundwater samples.
1020	Mark Kimes called and said do NOT ship any samples out today.
1050	Mark Kimes called and said he was in town with Madelino Rivera. She does not have a problem with installing a well in replace of 7MW07R. He wants me to go over tomorrow morning to check status of dig permit. 7MW07R is over at landfill.
1125	Sampled well 7MW23.
1157	MKD and I are heading for lunch.
1256	MKD and I arrive back at TCE area to prepare for this afternoon. We stopped on the way here to get more ice and Gatorade.
1345	Called Mark Kimes to discuss the status and the remaining work at the TCE area. He wants the sample to go out tomorrow to the lab. The round of water levels can be done in the afternoon.
1420	Called and left a message for Angie Weinerskirk at STL. I had a couple of questions dealing with IDW sample containers.
1430	Labeling up trip blank sample

Wednesday September 24, 2003

7MW23

TD = 19.96' from top PVC
Ø = 2"
SWL = 8.52' from top PVC

Start pump 1018
Bottom of tubing within well screen (Approx. 2' above bottom)

Time	SWL	pH	Cond. (µS)	Temp. (°C)	Turb.	Eh	D.O. (mg/L)
1025	8.58	7.27	5,791	30.59	405	45.0	1.04
1031	8.60	7.20	5,741	30.24	271	45.1	1.08
1038	8.60	7.23	5,815	30.39	146	48.1	1.08
1044	8.61	7.21	5,811	30.40	94.0	41.6	1.05
1050	8.60	7.20	5,704	30.51	47.5	44.7	1.01
1056	8.60	7.17	5,602	30.42	23.3	47.5	0.97
1104	8.60	7.21	5,572	30.34	20.1	41.7	0.99
1110	8.60	7.25	5,461	30.49	19.5	43.2	0.96
1117	8.60	7.23	5,318	30.60	16.9	43.1	0.93
1123	8.60	7.21	5,282	30.61	15.0	46.1	0.91

* Stop purging 1125
* DO using chemets was 0.5 mg/L.
* Sample time was ~~[illegible]~~ 1125.
* Final SWL was 8.56' below top of PVC.
* I collected this sample.

Wednesday September 24, 2003

* This monitor well currently has a stick but will be finished as a flushmount when the drillers are finished installing it. We will get the current level of the PVC.
* The initial SWL was collected using an interface probe, then a groundwater level meter was used during each round of purging.
* There was no indication of either LNAPL/DNAPL.
* Flow rate was less than 500 mL/min.
* Peristaltic pump was used to purge and sample.
* TCL VOC analysis was requested.
  (3) 40 mL VOAs - HCL preserved
* Weather today is very hot and humid.
* Sample appeared relatively clear with no apparent odor.
* Purged water was containerized in a drum.

Jon C. Edl Jr.

>TCETBOS. MKD and the drillers are developing wells. See MKD's logbook for details.

1530 MKD and I spoke to OMAR about the rest of the day today and tomorrow. They will just be cleaning up the rest of the day today. Tomorrow they will install landfill well and finish installation of that well and the permanent wells here at the TCE area. They will then yank the temporary wells at the TCE once we get a full round of water levels. They should either finish everything tomorrow afternoon or Friday morning.

1544 MKD and I are getting the elevations of all temporary wells and the two permanent wells. See the measurements below.

1635 MKD and I are heading over to decon area to collect the soil IDW sample.

1640 Arrive at decon area to collect soil

IDW sample (>TCEIDW01).

1650 Collecting sample >TCEIDW01. (4 Drums)

1717 MKD and I are heading back to PWD to drop off truck. >TCEIDW01 was collected by homogenizing soil from 4 drums of soil cuttings.

1721 Arrive back at PWD to drop off box truck.

1726 MKD and I are leaving PWD. offsite for the day. Weather today was very hot, humid, and sunny.

Surveying Information

PT	Elev.	Rod	H.I.
Setup			5.52'
>MW07	115.35	1.09'	
>TCETW202		9.55'	
>TCETW203		9.57'	
>TCETW206		1.62'	
>TCETW207		2.28'	
>TCETW208		2.66'	
>TCETW209		2.09'	
>TCETW210	JCE	[redacted]	7.55'
>MW23		6.31' (Top of PVC)	
		7.29' (Ground Surface)	

JLE Wednesday

September 24, 2003 JLE

Pt.	Elev.	ROD	H.I.
7mw24		3.10	
7mw22		3.87 (Top of PVC)	
		6.71 (Ground Surface)	
7mw21		9.53 (Top of PVC)	
		9.53 (Ground Surface)	

* 7mw21 replaced 7TCETW201
* 7mw22 replaced 7TCETW205 JLE
* 7mw23 replaced 7TCETW04

Jon C. Gall Jr.

JLE

Thursday September 25, 2003

0635	Arrive at NSRR through Gate 3.
0645	MKD and I arrived at 7MW07R at location in which will be replaced. We are staking out a new location.
0650	Called Mark Kimes to find out about soil cuttings from the well. He wants us to containerize soil cuttings from new well.
0655	Arrive at PWO to pick up box truck.
0657	Leaving PWO to go to TCE area at TWF.
0700	Arrive at 7TCETW208 to collect a groundwater sample.
0730	Sampled temporary well 7TCETW208.
0739	Arrive at 7TCETW210 to collect groundwater sample.
0750	Sampled 7TCETW210.
0755	Arrive at 7MW22 to collect groundwater sample. The multimeter was calibrated this morning by MKD.
0905	JLE Sampled well 7MW22.
0927	Arrive at 7MW21 to collect groundwater sample.
1045	Sampled 7MW21.
1110	Proceeding to get Gatorade.
1120	Arrive at 7MW07R to meet up with

Thursday September 25, 2003

7TCBTW208

TD = 24.48' from top PVC
Ø = 1"
SWL = 11.31' from top PVC

Start pump 0716
Bottom of tubing within well screen

1-volume = 0.52 gallons
↳ 1" multiplier used was 0.043.

* Sample time is 0730. Sample was slightly cloudy with no apparent odor.
* Approx. two volumes were purged prior to sampling.

Jon C. Ebell Jr.

Thursday September 25, 2003

7TCBTW210

TD = 10.00' from top PVC
Ø = 1"
SWL = 6.08' from top PVC

Start pump 0744
Bottom of tubing within well screen

1-volume = 0.17 gallons
↳ 1" multiplier was used (0.043).

* Sample time is 0750. Sample appeared very cloudy with no apparent odor.
* Approx. two volumes were purged prior to sampling.

Jon C. Ebell Jr.

Thursday September 25, 2003

7MW22

TD = 25.10' from top PVC
Ø = 2"
SWL = 10.84' from top PVC

Start pump at 0803
Bottom of tubing
within well screen.
(Approx. 2' above
bottom)

Time	SWL	pH	Cond. (uS)	Temp. (°C)	Turb.	Eh	DO. (mg/L)
0810	10.85	6.56	7,606	30.33	8.99	104.4	1.12
0817	10.86	6.63	7,556	30.20	7.45	87.3	1.04
0823	10.87	6.68	7,554	30.49	8.47	82.3	1.11
0829	10.87	6.73	7,592	30.39	7.02	78.8	1.38
0834	10.88	6.69	7,484	30.38	6.57	80.1	1.19
0841	10.88	6.70	7,413	30.38	4.54	74.5	1.13
0847	10.88	6.72	7,458	30.38	4.16	75.2	1.16
0852	10.88	6.73	7,494	30.38	4.12	72.5	1.07
0858	10.88	6.73	7,412	30.38	4.17	75.8	1.09

* Stop purging 0900.
* DO using Chemets was 1.0 mg/L.
* Sample time is 0905.
* Final SWL was 10.87' from top of PVC.
* I collected this sample.
* The monitor well currently has a stick up

but will be completed as a flushmount. MKD and I already surveyed in the elevation of this well with stick up.

* The initial SWL was collected using an interface probe, then a groundwater level meter was used during each round of purging.
* There was no indication of either LNAPL/DNAPL.
* Flow rate was less than 500 mL/min.
* Peristaltic pump was used to purge and sample.
* TCL VOC analysis was requested
  (3) 40 mL VOAs - HCl preserved
* Weather today is hot, humid, and sunny.
* Sample appeared relatively clear with no apparent odor.
* Purge water was containerized in a drum.

Jon C. Edel Jr.

Thursday September 25, 2003

7mw28 WE

TD = 20.26' from top PVC
Ø = 2"
SWL = 5.60' from top PVC

Start pump 0939
Bottom of tubing within well screen (approx. 2' above bottom)

Time	SWL	pH	(uS) Cond.	(°C) Temp.	Turb.	Eh	(mg/L) D.O.
0945	5.62	7.07	7,555	29.33	60.6	-242.9	0.77
0951	5.68	7.09	7,412	29.44	48.1	-273.3	0.77
0958	5.67	7.06	7,284	29.69	13.3	-267.8	0.75
1003	5.67	7.07	7,275	29.52	7.60	-269.1	0.95
1010	5.67	7.08	7,330	29.62	4.87	-285.5	0.85
1016	5.67	7.03	7,365	29.58	2.79	-284.6	0.65
1023	5.68	7.06	7,374	29.67	2.08	-279.6	0.71
1030	5.68	7.06	7,370	29.70	1.64	-284.3	0.69
1037	5.69	7.04	7,308	29.58	1.25	-286.6	0.68

* Stop purging 1040.
* DO using the chemets was 0.4 mg/L.
* Sample time 1045.
* Final SWL was 5.60' below top of PVC.
* I collected this sample.
* The PVC at this well is currently at

Thursday September 25, 2003

ground surface.

* The initial SWL was collected using an interface probe, then the groundwater level meter was used during each round of purging.
* There was no indication of either LNAPL or DNAPL.
* Flow rate was less than 500 mL/min.
* Peristaltic pump was used to purge and sample.
* TCL VOC analysis was requested.
  (3) 40 mL VOAs - HCl preserved
* Weather today is hot, humid, and sunny.
* Sample appeared relatively clear with a definite sulfur odor.
* Purge water was containerized in a drum.

Jon C. Cole Jr.

Thursday September 25, 2003

MKD.

1126 Leaving >MW02R to go collect >TCEIDW02.

1135 Collecting >TCEIDW02.

1205 Arrive over at TCE area to get remaining >TCEIDW02 sample from last drum over at this area. Seven drums total.

1218 MKD and I are going to lunch.

1300 MKD and I are back at TCE area to pick up samples and to get a round of water levels.

1345 Called FedEx to schedule a pickup here at BLDG. 2351. There is two shipments going to SIC today. Shipment 1 is one cooler with the remaining environmental samples. Shipment two is seven cooler, either empty or have empty containers in them. These are going Intl. economy, while shipment 1 is going Intl. priority. Pick up #NBE 224

1350 Called Danny from FedEx to see when he would be here. He

Thursday September 25, 2003

Said about 1430.

1435 Danny from FedEx came to pick up both shipments.

1503 Arrived at PWD to drop off survey equipment to Madeline. I gave her a status report on where everything stands. She asked for our help dealing with dredging that will take place at YFU 2317 Ramp by the facilities group at LANTDIV. She thinks there will be an issue with the sediments that will need to be addressed prior to the commencement of the dredging. She introduced me to a Pete Wright of LANTDIV who is arranging this down here. I told her that I will discuss this with Mark Kimes.

1558 Heading back to TCE area.

1605 Arrive back at TCE area. Called Mark Kimes to brief him on the dredging situation. He said he will call Madeline to discuss situation. He will let me know. Madeline would also want a well construction log of the replaced well (>GW02R2) at the

Thursday September 25, 2003

landfill.

1630 MKD and I are leaving Site to go get a water level from R76W07R2 at the landfill.

1640 MKD and I arrive at the YFU2217 ramp to scope out location for possible sampling.

1645 Arrive back at TEE area.

1705 MKD and I are heading back over to decon area to drop off a drum.

1710 Arrive at decon area.

1716 Leaving decon area to go to PWD.

1720 Arrive at PWD to drop truck off.

1730 Leaving PWD for the day offsite.

1805 Mark Kimes called and said not to worry about the sediment sampling issue at the YFU2217 ramp. MKD will not come during this trip.

* During the conversation I had with Madeline Rivera this afternoon, she also said they found information from Weston Inc. dealing with the suspected asbestos samples from SWMU 11. She will get that to us.

Friday September 26, 2003

0635 Arrive on base through Gate 3 with MKD.

0645 Arrive at PWD to pick up box truck.

0650 Arrive at decon area to wait for the drillers.

0700 Called Mark Kimes to find out what he wants us to do with the used PVC. He said to have the drillers steam it and throw it away.

0710 Proceeding to TEE area to see if drillers are there.

0725 Drillers arrive at TEE area. They had to stop for some supplies. For drilling activities please MKD's logbook. They are finishing up grouting holes and cleaning up the site.

0819 Arrive back at decon area with drillers.

0825 Spoke with our travel department about switching flight from Monday to Sunday. They did it for me.

0842 Called ~~[illegible]~~ SSL (Jeff) to have them keep and eye out for our cooler we sent them yesterday. I asked for them to call us as soon as it comes in.

1010 Amy from SSL called and said cooler

get there safe and sound with no breakage. Everything was within temperature.

1015 Leaving decon area to go get some gaborade.

1024 Arrive at RIGWORRA at landfill to meet up with MKD.

1116 Leaving RMWORRA to go back to decon area.

1119 Arrive back at decon area.

1140 MKD and I are leaving to go to lunch.

1234 Arrive back at decon area with MKD.

1240 Called FedEx to schedule a pickup. Pickup number NREK175.

1323 Called Danny from FedEx. He said he is not working today. If guy doesn't come to be over at the exchange by 4 (1600). There is a postal service over there that he will be picking up from today (the new guy will be). Vanessa at the postal service is the contact.

1415 Leaving decon area to go debrief

Madeline Rivera.

1420 Arrive at PWD to talk to Madeline Rivera. She said that we need to paint the new well (casing and stick up). I got a key to unlock their (PWD's) lock to secure the fence area. I told her I will bring it back.

1440 (1438) Arrive back at decon area.

1500 Fedex showed up to pick up all six coolers.

1520 Left decon area to go back to PWD to drop off tubing, flags, etc. and key for cage at decon area.

1525 Arrive at ~~decon~~ TCE PWD area to talk to Madeline Rivera again.

1530 Leaving ~~decon~~ TCE PWD to go with MKD to drop truck off at Leasway.

1630 Arrive back at NSCR through Gate 1 with MKD. We saw Del Brown our surveyor at the Gate. I gave the pass office the original paperwork to get him a pass. He is sub for the weekend.

1640 Del Brown is on base. All three of us are going to the TCE area.

1648 Arrive at TCE area to show Del around.

Friday — September 26, 2003

1656 We are all leaving TCE area for the day. OFFsite.

* There is a total of 11 drums at the decon area from the investigations performed during this September 2003 field effort. There are four drums of soil cuttings, and 7 drums of decon water / purge water. All drums are properly labeled and locked up in the fenced in area at SIDG. 38. The drillers removed all of their equipment from the fenced area. They left their B-61 drill rig, their trailer mounted drill rig, and their compressor. They will pick those up Monday morning early.

Saturday — September 27, 2003

0630 Arrived at NSRR through Gate 3. Del Brown and I are together. Mike went home this morning.

0645 Arrive at RIGWORR at the landfill to survey it in. I will also be painting it.

0916 Arrive at TCE area at TWSF to survey the sampling locations. Del Brown and I are working together.

1124 Del and I are breaking for lunch.

1224 Finished with lunch. We are setting up control points for Del's survey grade GPS unit.

1630 Del Brown and I are leaving TCE area at the TWSF. We are going to go back to RIGWORR to label since I painted it this morning.

1640 Arrive at RIGWORR to label new well.

1650 Leaving RIGWORR to go around and pick up Del's other GPS units. Offsite finished with all investigations.

Sunday September 28, 2003

0650 Arrive at Sam Juan Int. Airport.
0880 Left Puerto Rico to head to Philadelphia.
1215 Arrive in Philadelphia Airport.
1530 Leaving Philadelphia in route to Pittsburgh.
1640 Arrive in Pittsburgh.

Jon E. Edel Jr

APPENDIX C
IDW Analytical Results

APPENDIX C

IDW SAMPLE RESULTS
TCE PLUME DELINEATION AND SOURCE INVESTIGATION, CTO-253
NAVAL STATION ROOSEVELT ROADS, CEIBA, PUERTO RICO
JANUARY 2004

Site ID	7TCEIDW01	7TCEIDW02
Sample ID	7TCEIDW01	7TCEIDW02
Sample Date	09/24/03	09/25/03
Matrix	Solid	Aqueous
Volatile Organic Compounds	**ug/kg dw**	**ug/L**
1,1,1-Trichloroethane	6.3 U	1 U
1,1,2-Trichloroethane	6.3 U	1 U
1,1-Dichloroethane	6.3 U	1 U
1,1-Dichloroethene	6.3 U	1 U
1,2-Dichloroethane	6.3 U	1 U
Chloroform	6.3 U	0.44 J
Chloromethane (Methyl Chloride)	6.3 U	1 U
cis-1,2-Dichloroethene	6.3 U	1.8
Methylene chloride (Dichloromethane)	6.3 U	5 U
Pentachloroethane	32 U	5 U
Tetrachloroethene	6.3 U	1 U
trans-1,2-Dichloroethene	6.3 U	1 U
Trichloroethene	6.3 U	16
Vinyl chloride	6.3 U	1 U

APPENDIX D
Chain-of-Custody Records

Serial Number 06699

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

SEVERN TRENT **STL**

Mosbee Air Waybill # 8348 2976 2120

STL Savannah
5102 LaRoche Avenue
Savannah, GA 31404
Website: www.stl-inc.com
Phone: (912) 354-7858
Fax: (912) 352-0165

7-1

Alternate Laboratory Name/Location
Phone:
Fax:

PROJECT REFERENCE	PROJECT NO.	PROJECT LOCATION (STATE)	PAGE
SWMU 7	CTO-268	PR	1 OF 2
STL (LAB) PROJECT MANAGER: Angie Weimerskirk	P.O. NUMBER	CONTRACT NO.: CLEAN II	STANDARD REPORT DELIVERY ○
CLIENT (SITE) PM: Jon Edel	CLIENT PHONE: (787) 485-1097	CLIENT FAX: (412) 375-3995	DATE DUE 28 Day TAT
CLIENT NAME: Baker	CLIENT E-MAIL: mkimes@mbakercorp.com		EXPEDITED REPORT DELIVERY (SURCHARGE) ○
CLIENT ADDRESS: 100 Airside Drive, Moon Twp., PA 15108			DATE DUE _____
COMPANY CONTRACTING THIS WORK (if applicable): CH2M Hill			NUMBER OF COOLERS SUBMITTED PER SHIPMENT:

REQUIRED ANALYSIS

SAMPLE DATE	SAMPLE TIME	SAMPLE IDENTIFICATION	COMPOSITE (C) OR GRAB (G) INDICATE	AQUEOUS (WATER)	SOLID OR SEMISOLID	AIR	NONAQUEOUS LIQUID (OIL, SOLVENT,...)	APP. IX VOCs 5035/8260B (Methanol Dasol)	Solvent Screen EPA 8260	Interfacial Tension ASTM 1331A	Viscosity SOC ASTM D445	Ignitability SW846 1010/1030	Reactive Cyanide 7.3.3.2/7.3.4.2	Corrosivity 9040/9045	APP IX VOCs EPA 8260B	Zinc	Percent Moisture	REMARKS
								PRESERVATIVE								—	—	
								NUMBER OF CONTAINERS SUBMITTED										
9-16-03	0943	75501	G		X											1		
9-16-03	0947	75502	G		X											1		
9-16-03	0955	75503	G		X											1		
9-16-03	0955	75503D	G		X											1		
9-16-03	0955	75503MS/MSD	G		X											1		
9-13-03	0944	7TCESB05-05	G		X			1/2									1	
9-13-03	1453	7TCESB08-05	G		X			1/2									1	
9-15-03	1543	7TCESB03-04	G		X			1/2									1	
9-13-03	0822	7TCESB08-02	G		X			1/2									1	
9-15-03	1533	7TCESB03-03	G		X			1/2									1	
9-16-03	0730	7TCETW201	G	X											3			*24 hour turn around*
9-16-03	0810	7TCETW203	G	X											3			*24 hour turn around*

RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RELINQUISHED BY: (SIGNATURE)	DATE	TIME
EMPTY CONTAINERS			Jon C. Edel Jr.	9-16-03	1423			
RECEIVED BY: (SIGNATURE)	**DATE**	**TIME**	**RECEIVED BY: (SIGNATURE)**	**DATE**	**TIME**	**RECEIVED BY: (SIGNATURE)**	**DATE**	**TIME**
EMPTY CONTAINERS Jon C. Edel Jr.	9/8/03	1000						

LABORATORY USE ONLY

RECEIVED FOR LABORATORY BY: (SIGNATURE)	DATE	TIME	CUSTODY INTACT YES ○ NO ○	CUSTODY SEAL NO.	STL SAVANNAH LOG NO.	LABORATORY REMARKS

STL8240-680 (12/02)

Serial Number 06700

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

Master Air Waybill #
8318 2976 7170

SEVERN TRENT **STL**

STL Savannah
5102 LaRoche Avenue
Savannah, GA 31404
Website: www.stl-inc.com
Phone: (912) 354-7858
Fax: (912) 352-0165

7-1

Alternate Laboratory Name/Location
Phone:
Fax:

PROJECT REFERENCE	PROJECT NO.	PROJECT LOCATION (STATE)	PAGE
SWMU 7	CTO-268	PR	2 OF 2

STL (LAB) PROJECT MANAGER	P.O. NUMBER	CONTRACT NO.
Angie Weimerskirk		CLEAN II

CLIENT (SITE) PM	CLIENT PHONE	CLIENT FAX
Jon Edel	(787) 485-1097	(412) 375-3995

CLIENT NAME	CLIENT E-MAIL
Baker	mkimes@mbakercorp.com

CLIENT ADDRESS: 100 Airside Drive, Moon Twp., PA 15108

COMPANY CONTRACTING THIS WORK (if applicable): CH2M Hill

STANDARD REPORT DELIVERY ◯
DATE DUE 28 Day TAT
EXPEDITED REPORT DELIVERY (SURCHARGE) ◯
DATE DUE _____
NUMBER OF COOLERS SUBMITTED PER SHIPMENT:

REQUIRED ANALYSIS / NUMBER OF CONTAINERS SUBMITTED

SAMPLE DATE	SAMPLE TIME	SAMPLE IDENTIFICATION	COMPOSITE (C) OR GRAB (G) INDICATE	AQUEOUS (WATER)	SOLID OR SEMISOLID	AIR	NONAQUEOUS LIQUID (OIL, SOLVENT,...)	APP. IX VOCs 5035/8260B	Solvent Screen EPA 8260	Interfacial Tension ASTM 1331A	Viscosity 50C ASTM D445	Ignitability SW846 1010/1030	Reactive Cyanide 7.3.3.2/7.3.4.2	Corrosivity 9040/9045	TCLP VOCs App. IX JCE	EPA 8260B JCE		REMARKS
9-16-03	0810	TCETW2030	G	X											3			*24 hour turn around*
9-16-03	0835	TCETW202	G	X											3			*24 hour turn around*
9-16-03	1130	TCETB01	G	X											3		JCE	
9-16-03	1350	TMW07	G	X											3			*24 hour turn around*

PRESERVATIVE

RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RELINQUISHED BY: (SIGNATURE)	DATE	TIME
EMPTY CONTAINERS			Jon C. Edel Jr.	9-16-03	1423			

RECEIVED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)	DATE	TIME
Jon C. Edel Jr. EMPTY CONTAINERS	9/8/03	1000						

LABORATORY USE ONLY

RECEIVED FOR LABORATORY BY: (SIGNATURE)	DATE	TIME	CUSTODY INTACT YES ◯ NO ◯	CUSTODY SEAL NO.	STL SAVANNAH LOG NO.	LABORATORY REMARKS

STL 8240-680 (12/02)

Serial Number 08501

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

SEVERN TRENT **STL**

Master Air Waybill # 8348 2976 7180

STL Savannah
5102 LaRoche Avenue
Savannah, GA 31404
Website: www.stl-inc.com
Phone: (912) 354-7858
Fax: (912) 352-0165

7-2

Alternate Laboratory Name/Location

Phone:
Fax:

PROJECT REFERENCE	PROJECT NO.	PROJECT LOCATION (STATE)
SWMU 7	CTO-268	PR
STL (LAB) PROJECT MANAGER	P.O. NUMBER	CONTRACT NO.
Angie Weimerskirk		CLEAN II
CLIENT (SITE) PM	CLIENT PHONE	CLIENT FAX
Jon Edel	(787) 485-1097	375-3995 (412)
CLIENT NAME	CLIENT E-MAIL	
Baker	mkimes@mbakercorp.com	
CLIENT ADDRESS		
100 Airside Drive, Mcon Twp., PA 15108		
COMPANY CONTRACTING THIS WORK (if applicable)		
CH2M HILL		

PAGE 1 OF 1

STANDARD REPORT DELIVERY ◯

DATE DUE 28 Day TAT

EXPEDITED REPORT DELIVERY (SURCHARGE) ◯

DATE DUE _____

NUMBER OF COOLERS SUBMITTED PER SHIPMENT:

PRESERVATIVE —

SAMPLE DATE	SAMPLE TIME	SAMPLE IDENTIFICATION	COMPOSITE (C) OR GRAB (G) INDICATE	AQUEOUS (WATER)	SOLID OR SEMISOLID	AIR	NONAQUEOUS LIQUID (OIL, SOLVENT,...)	APP. IX VOCs 5035/8260B	Solvent Screen EPA 8260	Interfacial Tension ASTM 1331A	Viscosity 50C ASTM D445	Ignitability SW846 1010/1030	Reactive Cyanide 7.3.3.2/7.3.4.2	Corrosivity 9040/9045	APP IX VOCs EPA 8260B	Percent Moisture		REMARKS
								NUMBER OF CONTAINERS SUBMITTED										
9-18-03	0707	JTCETW204	G	X					(RUSH)					3			*	RUSH-24 hr TURN
9-18-03	0733	JTCETW205	G	X					(RUSH)					3			*	RUSH-24 hr TURN
9-17-03	1700	JTCEFB01	G	X										3				
9-17-03	1650	JTCEFB02	G	X										3				
9-17-03	1645	JTCEFB03	G	X										3				
9-17-03	1635 JCE	JTCETB02	G	X										3				
9-17-03	1406	JTCESB01-01	G		X			1/2							1			
9-17-03	1421	JTCESB01-03	G		X			1/2							1			
9-18-03	0758	JTCESB09-01	G		X			1/2							1			
9-18-03	0838	JTCESB07-01	G		X			1/2							1			
9-18-03	0838	JTCESB07-01MS/MSD	G		X			1/2							1			

RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RELINQUISHED BY: (SIGNATURE)	DATE	TIME
EMPTY CONTAINERS			Jon C. Edel Jr.	9/18/03	1400			
RECEIVED BY: (SIGNATURE)	**DATE**	**TIME**	**RECEIVED BY: (SIGNATURE)**	**DATE**	**TIME**	**RECEIVED BY: (SIGNATURE)**	**DATE**	**TIME**
EMPTY CONTAINERS Jon C. Edel Jr.	9/18/03	1000						

LABORATORY USE ONLY

RECEIVED FOR LABORATORY BY: (SIGNATURE)	DATE	TIME	CUSTODY INTACT YES ◯ NO ◯	CUSTODY SEAL NO	STL SAVANNAH LOG NO.	LABORATORY REMARKS

Serial Number 08504

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

SEVERN TRENT **STL**

Mostre Air Waybill # 83118 2976 7191

STL Savannah
5102 LaRoche Avenue
Savannah, GA 31404

Website: www.stl-inc.com
Phone: (912) 354-7858
Fax: (912) 352-0165

7-3

Alternate Laboratory Name/Location

Phone:
Fax:

PROJECT REFERENCE	PROJECT NO.	PROJECT LOCATION (STATE)	PAGE 1 OF 1
SWMU 7	CTO-268	PR	
STL (LAB) PROJECT MANAGER: Angie Weimerskirk	P.O. NUMBER	CONTRACT NO. CLEAN II	STANDARD REPORT DELIVERY ○
CLIENT (SITE) PM: Jon Edel	CLIENT PHONE: (787) 485-1097	CLIENT FAX: 375-3995 (412)	DATE DUE 28 Day TAT
CLIENT NAME: Baker	CLIENT E-MAIL: Mkimes@mbakercorp.com		EXPEDITED REPORT DELIVERY (SURCHARGE) ○
CLIENT ADDRESS: 100 Airside Drive, Moon, Twp., PA 15108			DATE DUE _____
COMPANY CONTRACTING THIS WORK (if applicable): CH2M Hill			NUMBER OF COOLERS SUBMITTED PER SHIPMENT:

MATRIX TYPE: COMPOSITE (C) OR GRAB (G) INDICATE; AQUEOUS (WATER); SOLID OR SEMISOLID; AIR; NONAQUEOUS LIQUID (OIL, SOLVENT,...)

REQUIRED ANALYSIS: APP. IX VOCs 5035/8260B; Solvent Screen EPA 8260; Interfacial Tension ASTM 1331A; Viscosity 50C ASTM D445; Ignitability SW846 1010/1030; Reactive Cyanide 7.3.3.2/7.3.4.2; Corrosivity 9040/9045; ~~TCLP~~ VOCs EPA ~~[illegible]~~ 8260B

PRESERVATIVE

NUMBER OF CONTAINERS SUBMITTED

SAMPLE DATE	SAMPLE TIME	SAMPLE IDENTIFICATION	COMPOSITE (C) OR GRAB (G)	AQUEOUS (WATER)	SOLID OR SEMISOLID	AIR	NONAQUEOUS LIQUID	APP. IX VOCs 5035/8260B	Solvent Screen EPA 8260	Interfacial Tension ASTM 1331A	Viscosity 50C ASTM D445	Ignitability SW846 1010/1030	Reactive Cyanide 7.3.3.2/7.3.4.2	Corrosivity 9040/9045	VOCs EPA 8260B		REMARKS
9/10/03	1000	TCETW206	G	X						(RUSH)					3		* 24 HR TURN *
9/10/03	0938	TCETW207	G	X						(RUSH)					3		* 24 HR TURN *
9/10/03	0927	TCETB03	G	X											3		

RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RELINQUISHED BY: (SIGNATURE)	DATE	TIME
EMPTY CONTAINERS			Jon C. Edel Jr.	9/10/03	1300			
RECEIVED BY: (SIGNATURE)	**DATE**	**TIME**	**RECEIVED BY: (SIGNATURE)**	**DATE**	**TIME**	**RECEIVED BY: (SIGNATURE)**	**DATE**	**TIME**
EMPTY CONTAINERS Jon C. Edel Jr.	9/12/03	1000						

LABORATORY USE ONLY

RECEIVED FOR LABORATORY BY: (SIGNATURE)	DATE	TIME	CUSTODY INTACT YES ○ NO ○	CUSTODY SEAL NO.	STL SAVANNAH LOG NO.	LABORATORY REMARKS

STL 8240 680 (12/02)

Serial Number 08503

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

SEVERN TRENT **STL**

Master Air Waybill # 8348 2976 7217

STL Savannah
5102 LaRoche Avenue
Savannah, GA 31404

Website: www.stl-inc.com
Phone: (912) 354-7858
Fax: (912) 352-0165

7-4

Alternate Laboratory Name/Location

Phone:
Fax:

PROJECT REFERENCE	PROJECT NO.	PROJECT LOCATION (STATE)	PAGE
SWMU 7	CTO-268	PR	1 OF 1
STL (LAB) PROJECT MANAGER: Angie Weimerskirk	P.O. NUMBER	CONTRACT NO. CLEAN II	STANDARD REPORT DELIVERY ○
CLIENT (SITE) PM: Jon Edel	CLIENT PHONE (787) 485-1097	CLIENT FAX (412) 375-3995	DATE DUE 28 Day TAT
CLIENT NAME: Baker	CLIENT E-MAIL: mkimes@mbakercorp.com		EXPEDITED REPORT DELIVERY (SURCHARGE) ○
CLIENT ADDRESS: 100 Airside Drive, Moon Twp., PA 15108			DATE DUE
COMPANY CONTRACTING THIS WORK (if applicable): CH2M Hill			NUMBER OF COOLERS SUBMITTED PER SHIPMENT:

MATRIX TYPE — COMPOSITE (C) OR GRAB (G) INDICATE; AQUEOUS (WATER); SOLID OR SEMISOLID; AIR; NONAQUEOUS LIQUID (OIL, SOLVENT,...)

REQUIRED ANALYSIS — PRESERVATIVE

SAMPLE DATE	SAMPLE TIME	SAMPLE IDENTIFICATION	COMPOSITE (C) OR GRAB (G)	AQUEOUS (WATER)	SOLID OR SEMISOLID	AIR	NONAQUEOUS LIQUID (OIL, SOLVENT,...)	APP. IX VOCs 5035/8260B	Solvent Screen EPA 8260	Interfacial Tension ASTM 1331A	Viscosity 50C ASTM D445	Ignitability SW846 1010/1030	Reactive Cyanide 7.3.3.2/7.3.4.2	Corrosivity 9040/9045	~~TCLP VOCs EPA 1311/8260B~~ App. IX (JCE)			REMARKS
9/22/03	1720	7MW08	G	X											3			
9/22/03	1240	7MW10	G	X											3			
9/22/03	1428	U6W11	G	X											3			
9/23/03	0840	7MW20	G	X											3			
9/23/03	0840	7MW20D	G	X											3			
9/23/03	0840	7MW20MS	G	X											3			
9/23/03	0840	7MW20MSD	G	X											3			
9/23/03	1100	7TCET304	G	X											3			

NUMBER OF CONTAINERS SUBMITTED

RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RELINQUISHED BY: (SIGNATURE)	DATE	TIME
EMPTY CONTAINERS			Jon C. Edel Jr.	9/23/03				
RECEIVED BY: (SIGNATURE)	**DATE**	**TIME**	**RECEIVED BY: (SIGNATURE)**	**DATE**	**TIME**	**RECEIVED BY: (SIGNATURE)**	**DATE**	**TIME**
EMPTY CONTAINERS Jon C. Edel Jr.	9/8/03	1000						

LABORATORY USE ONLY

RECEIVED FOR LABORATORY BY: (SIGNATURE)	DATE	TIME	CUSTODY INTACT YES ○ NO ○	CUSTODY SEAL NO.	STL SAVANNAH LOG NO.	LABORATORY REMARKS

STL 8240.680 (12/02)

Serial Number 08505

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

SEVERN TRENT **STL**

Master Air Waybill # 8348 2976 7776

STL Savannah
5102 LaRoche Avenue
Savannah, GA 31404

Website: www.stl-inc.com
Phone: (912) 354-7858
Fax: (912) 352-0165

7-5

◯ Alternate Laboratory Name/Location

Phone:
Fax:

PROJECT REFERENCE	PROJECT NO.	PROJECT LOCATION (STATE)	PAGE 1 OF 2
SWMU 7	CTO-268	PR	
STL (LAB) PROJECT MANAGER: Angie Weimerskirk	P.O. NUMBER	CONTRACT NO. CLEAN II	
CLIENT (SITE) PM: Jon Edel	CLIENT PHONE (787) 485-1097	CLIENT FAX (412) 375-3995	STANDARD REPORT DELIVERY ◯
CLIENT NAME: Baker	CLIENT E-MAIL: mkimes@mbakercorp.com		DATE DUE 28 Day TAT
CLIENT ADDRESS: 100 Airside Drive, Moon Twp., PA 15108			EXPEDITED REPORT DELIVERY (SURCHARGE) ◯
COMPANY CONTRACTING THIS WORK (if applicable): CH2M Hill			DATE DUE _____

MATRIX TYPE: COMPOSITE (C) OR GRAB (G) INDICATE; AQUEOUS (WATER); SOLID OR SEMISOLID; AIR; NONAQUEOUS LIQUID (OIL, SOLVENT,...)

REQUIRED ANALYSIS / NUMBER OF CONTAINERS SUBMITTED

SAMPLE DATE	SAMPLE TIME	SAMPLE IDENTIFICATION	COMPOSITE (C) OR GRAB (G)	AQUEOUS (WATER)	SOLID OR SEMISOLID	AIR	NONAQUEOUS LIQUID (OIL, SOLVENT,...)	APP. IX VOCs 5035/8260B	Solvent Screen EPA 8260	Interfacial Tension ASTM 1331A	Viscosity 50C ASTM D445	Ignitability SW846 1010/1030	Reactive Cyanide 7.3.3.2/7.3.4.2	Corrosivity 9040/9045	App IX VOCs EPA 8260B (JCE)	TCLP VOCs EPA 1311/8260		REMARKS
		PRESERVATIVE						—							— ICE —			
9/23/03	1351	TCEER01	G	X											3			
9/23/03	1422	TCEER02	G	X											3			
9/23/03	1405	TCEER03	G	X											3			
9/21/03	0756	TCETW209	G	X							(RUSH) →				3			*24 HR TURN*
9/24/03	0938	TMW24	G	X											3			
9/24/03	1125	TMW23	G	X											3			
9/21/03	1430	TCETB05	G	X											3			
9/24/03	1650	TCEIDW01	C		X			1				(1 Container)				1		
9/25/03	0905	TMW22	G	X											3			
9/25/03	1045	TMW21	G	X											3			
9/25/03	0730	TCETW208	G	X						(RUSH) →					3			*24 HR TURN*
9/25/03	0750	TCETW210	G	X						(RUSH) →					3			*24 HR TURN*

RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RELINQUISHED BY: (SIGNATURE)	DATE	TIME
EMPTY CONTAINERS			for C. Edel	9/25/03				
RECEIVED BY: (SIGNATURE)	**DATE**	**TIME**	**RECEIVED BY: (SIGNATURE)**	**DATE**	**TIME**	**RECEIVED BY: (SIGNATURE)**	**DATE**	**TIME**
for C. Edel EMPTY CONTAINERS	9/8/03	1000						

LABORATORY USE ONLY

RECEIVED FOR LABORATORY BY: (SIGNATURE)	DATE	TIME	CUSTODY INTACT YES ◯ NO ◯	CUSTODY SEAL NO.	STL SAVANNAH LOG NO.	LABORATORY REMARKS

STL 8240 680 (12/02)

Serial Number 08507

SEVERN TRENT

STL

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

Master Air Waybill # 8318 2976 7776

STL Savannah
5102 LaRoche Avenue
Savannah, GA 31404

Website: www.stl-inc.com
Phone: (912) 354-7858
Fax: (912) 352-0165

7-5

Alternate Laboratory Name/Location

Phone:
Fax:

PROJECT REFERENCE	PROJECT NO.	PROJECT LOCATION (STATE)	PAGE
SWMU 7	CTO-268	PR	2 OF 2

STL (LAB) PROJECT MANAGER	P.O. NUMBER	CONTRACT NO.
Angie Weimerskirk		CLEAN II

CLIENT (SITE) PM	CLIENT PHONE	CLIENT FAX
Jon Edel	(787) 485-1097	(412) 375-3995

CLIENT NAME	CLIENT E-MAIL
Baker	mkimes@mbakercorp.com

CLIENT ADDRESS: 100 Airside Drive, Moon Twp., PA 15108

COMPANY CONTRACTING THIS WORK (if applicable): CH2M Hill

STANDARD REPORT DELIVERY ◯

DATE DUE ~~28 Day TAT~~

EXPEDITED REPORT DELIVERY (SURCHARGE) ◯

DATE DUE _____

NUMBER OF COOLERS SUBMITTED PER SHIPMENT:

REQUIRED ANALYSIS

SAMPLE DATE	SAMPLE TIME	SAMPLE IDENTIFICATION	COMPOSITE (C) OR GRAB (G) INDICATE	AQUEOUS (WATER)	SOLID OR SEMISOLID	AIR	NONAQUEOUS LIQUID (OIL, SOLVENT,...)	APP. IX VOCs 8260B	Solvent Screen EPA 8260	Interfacial Tension ASTM 1331A	Viscosity 50C ASTM D445	Ignitability SW846 1010/1030	Reactive Cyanide 7.3.3.2/7.3.4.2	Corrosivity 9040/9045	TCLP VOCs EPA 1311/8260	REMARKS
								HCL	PRESERVATIVE							
9/25/03	1135	7TCE-DW02	C	X				3				(1-Container)				

RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RELINQUISHED BY: (SIGNATURE)	DATE	TIME
EMPTY CONTAINERS			Jon C. Edel Jr.	9/25/03				

RECEIVED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)	DATE	TIME
EMPTY CONTAINERS Jon C. Edel Jr.	9/8/03	1000						

LABORATORY USE ONLY

RECEIVED FOR LABORATORY BY: (SIGNATURE)	DATE	TIME	CUSTODY INTACT YES ◯ NO ◯	CUSTODY SEAL NO.	STL SAVANNAH LOG NO.	LABORATORY REMARKS

STL 8240-680 (12/02)

APPENDIX E
Analytical Laboratory Results

APPENDIX E

SUBSURFACE SOIL SAMPLE RESULTS
TCE INVESTIGATION
NAVAL STATION ROOSEVELT ROADS, CEIBA, PUERTO RICO
JANUARY 2004

Site ID	7TCESB01-01	7TCESB01-03	7TCESB03-03	7TCESB03-04	7TCESB04-02	7TCESB04-04
Sample ID	7TCESB01-01	7TCESB01-03	7TCESB03-03	7TCESB03-04	7TCESB04-02	7TCESB04-04
Sample Date	09/17/03	09/17/03	09/15/03	09/15/03	09/17/03	09/17/03
Volatile Organic Compounds (ug/kg dw)						
1,1,1-Trichloroethane	3.6 U	4 U	5.4 U	4.2 U	3.6 U	3.5 U
1,1,2-Trichloroethane	3.6 U	4 U	5.4 U	4.2 U	3.6 U	3.5 U
1,1-Dichloroethane	3.6 U	4 U	5.4 U	4.2 U	3.6 U	3.5 U
1,1-Dichloroethene	3.6 U	4 U	5.4 U	4.2 U	3.6 U	3.5 U
1,2-Dichloroethane	3.6 U	4 U	5.4 U	4.2 U	3.6 U	3.5 U
Chloroform	3.6 U	4 U	5.4 U	4.2 U	3.6 U	3.5 U
Chloromethane (Methyl Chloride)	3.6 U	4 U	5.4 U	4.2 U	3.6 U	3.5 U
cis-1,2-Dichloroethene	3.6 U	4 U	5.4 U	4.2 U	3.6 U	3.5 U
Methylene chloride (Dichloromethane)	3.6 U	4 U	5.4 U	4.2 U	3.6 U	3.5 U
Pentachloroethane	18 U	20 U	27 U	21 U	18 U	18 U
Tetrachloroethene	3.6 U	4 U	5.4 U	4.2 U	3.6 U	3.5 U
trans-1,2-Dichloroethene	3.6 U	4 U	5.4 U	4.2 U	3.6 U	3.5 U
Trichloroethene	3.6 U	4 U	5.4 U	4.2 U	3.6 U	3.5 U
Vinyl chloride	3.6 U	4 U	5.4 U	4.2 U	3.6 U	3.5 U

APPENDIX E

SUBSURFACE SOIL SAMPLE RESULTS
TCE INVESTIGATION
NAVAL STATION ROOSEVELT ROADS, CEIBA, PUERTO RICO
JANUARY 2004

Site ID	7TCESB05-05	7TCESB06-01	7TCESB06-03	7TCESB06-03	7TCESB07-01
Sample ID	7TCESB05-05	7TCESB06-01	7TCESB06-03	7TCESB06-03D	7TCESB07-01
Sample Date	09/13/03	09/17/03	09/17/03	09/17/03	09/17/03
Volatile Organic Compounds (ug/kg dw)					
1,1,1-Trichloroethane	3.4 U	5.4 U	4.3 U	3.6 U	5.8 U
1,1,2-Trichloroethane	3.4 U	5.4 U	4.3 U	3.6 U	5.8 U
1,1-Dichloroethane	3.4 U	5.4 U	4.3 U	3.6 U	5.8 U
1,1-Dichloroethene	3.4 U	5.4 U	4.3 U	3.6 U	5.8 U
1,2-Dichloroethane	3.4 U	5.4 U	4.3 U	3.6 U	5.8 U
Chloroform	3.4 U	5.4 U	4.3 U	3.6 U	5.8 U
Chloromethane (Methyl Chloride)	3.4 U	5.4 U	4.3 U	3.6 U	5.8 U
cis-1,2-Dichloroethene	3.4 U	5.4 U	4.3 U	3.6 U	5.8 U
Methylene chloride (Dichloromethane)	3.4 U	5.4 U	4.3 U	3.6 U	5.8 U
Pentachloroethane	17 U	27 U	22 U	3.6 U	29 U
Tetrachloroethene	3.4 U	5.4 U	4.3 U	3.6 U	5.8 U
trans-1,2-Dichloroethene	3.4 U	5.4 U	4.3 U	3.6 U	5.8 U
Trichloroethene	110	5.4 U	4.3 U	3.6 U	5.8 U
Vinyl chloride	3.4 U	5.4 U	4.3 U	3.6 U	5.8 U

APPENDIX E

SUBSURFACE SOIL SAMPLE RESULTS
TCE INVESTIGATION
NAVAL STATION ROOSEVELT ROADS, CEIBA, PUERTO RICO
JANUARY 2004

Site ID	7TCESB08-02	7TCESB08-05	7TCESB09-01
Sample ID	7TCESB08-02	7TCESB08-05	7TCESB09-01
Sample Date	09/13/03	09/13/03	09/17/03
Volatile Organic Compounds (ug/kg dw)			
1,1,1-Trichloroethane	4.8 U	2.8 U	4.5 U
1,1,2-Trichloroethane	4.8 U	2.8 U	4.5 U
1,1-Dichloroethane	4.8 U	2.8 U	4.5 U
1,1-Dichloroethene	4.8 U	2.8 U	4.5 U
1,2-Dichloroethane	4.8 U	2.8 U	4.5 U
Chloroform	4.8 U	2.8 U	4.5 U
Chloromethane (Methyl Chloride)	4.8 U	2.8 U	4.5 U
cis-1,2-Dichloroethene	4.8 U	2.8 U	4.5 U
Methylene chloride (Dichloromethane)	4.8 U	2.8 U	4.5 U
Pentachloroethane	24 U	14 U	23 U
Tetrachloroethene	4.8 U	2.8 U	4.5 U
trans-1,2-Dichloroethene	4.8 U	2.8 U	4.5 U
Trichloroethene	4.8 U	2.8 U	4.5 U
Vinyl chloride	4.8 U	2.8 U	4.5 U

APPENDIX E

GROUNDWATER SAMPLE RESULTS
TCE INVESTIGATION
NAVAL STATION ROOSEVELT ROADS, CEIBA, PUERTO RICO
JANUARY 2004

Site ID	7TCETW201	7TCETW202	7TCETW203	7TCETW203	7TCETW204
Sample ID	7TCETW201	7TCETW202	7TCETW203	7TCETW203D	7TCETW204
Sample Date	09/16/03	09/16/03	09/16/03	09/16/03	09/18/03
Volatile Organic Compounds (ug/L)					
1,1,1-Trichloroethane	1 U	1 U	1 U	1 U	1 U
1,1,2-Trichloroethane	1 U	0.42 J	1 U	0.89 J	1 U
1,1-Dichloroethane	1 U	1 U	1 U	1 U	1 U
1,1-Dichloroethene	1 U	1 U	1 U	1 U	0.56 J
1,2-Dichloroethane	1 U	0.51 J	1 U	0.89 J	1 U
Chloroform	1 U	1 U	1 U	1 U	1 U
Chloromethane (Methyl Chloride)	1 U	1.3 U	1 U	1 U	1 U
cis-1,2-Dichloroethene	1 U	1 U	1 U	1 U	83
Methylene chloride (Dichloromethane)	5 U	5 U	5 U	5 U	5 U
Pentachloroethane	5 U	5 U	5 U	5 U	5 U
Tetrachloroethene	1 U	0.5 J	1 U	1 U	1 U
trans-1,2-Dichloroethene	1 U	1 U	1 U	1 U	1.1
Trichloroethene	1 U	0.26 J	1 U	0.21 J	14
Vinyl chloride	1 U	1 U	1 U	1 U	1 U

ug/L--micrograms per liter
U--non-detect concentration
J--estimated concentration

APPENDIX E

GROUNDWATER SAMPLE RESULTS
TCE INVESTIGATION
NAVAL STATION ROOSEVELT ROADS, CEIBA, PUERTO RICO
JANUARY 2004

Site ID	7TCETW205	7TCETW206	7TCETW207	7TCETW208	7TCETW209
Sample ID	7TCETW205	7TCETW206	7TCETW207	7TCETW208	7TCETW209
Sample Date	09/18/03	09/19/03	09/19/03	09/25/03	09/24/03
Volatile Organic Compounds (ug/L)					
1,1,1-Trichloroethane	1 U	0.18 J	1 U	1 U	1 U
1,1,2-Trichloroethane	1 U	1 U	1 U	1 U	1 U
1,1-Dichloroethane	1 U	1 U	1 U	1 U	1 U
1,1-Dichloroethene	3.8	1 U	1 U	1 U	0.87 J
1,2-Dichloroethane	1 U	1 U	1 U	1 U	1 U
Chloroform	1 U	0.14 U	0.14 U	1 U	1 U
Chloromethane (Methyl Chloride)	1 U	0.4 J	1 U	1 U	1 U
cis-1,2-Dichloroethene	1 U	0.36 J	1 U	1 U	1 U
Methylene chloride (Dichloromethane)	5 U	5 U	5 U	5 U	5 U
Pentachloroethane	5 U	5 U	5 U	5 U	5 U
Tetrachloroethene	1 U	4.5	0.51 J	1 U	1 U
trans-1,2-Dichloroethene	1 U	1 U	1 U	1 U	1 U
Trichloroethene	0.32 J	66	0.2 J	0.68 U	1 U
Vinyl chloride	1 U	1 U	1 U	1 U	1 U

ug/L--micrograms per liter
U--non-detect concentration
J--estimated concentration

APPENDIX E

GROUNDWATER SAMPLE RESULTS
TCE INVESTIGATION
NAVAL STATION ROOSEVELT ROADS, CEIBA, PUERTO RICO
JANUARY 2004

Site ID	7TCETW210	7MW07	7MW08	7MW10	7MW20
Sample ID	7TCETW210	7MW07	7MW08	7MW10	7MW20
Sample Date	09/25/03	09/16/03	09/22/03	09/22/03	09/23/03
Volatile Organic Compounds (ug/L)					
1,1,1-Trichloroethane	1 U	100 U	1 U	1 U	1 U
1,1,2-Trichloroethane	1 U	100 U	1 U	1 U	1 U
1,1-Dichloroethane	1 U	100 U	1 U	1 U	1 U
1,1-Dichloroethene	1 U	100 U	1 U	1 U	1 U
1,2-Dichloroethane	1 U	100 U	1 U	1 U	1 U
Chloroform	1 U	100 U	1 U	1 U	0.13 U
Chloromethane (Methyl Chloride)	1 U	100 U	1 U	1 U	1 U
cis-1,2-Dichloroethene	1 U	41 J	1 U	1 U	1 U
Methylene chloride (Dichloromethane)	5 U	500 U	5 U	5 U	5 U
Pentachloroethane	5 U	500 U	5 U	5 U	5 U
Tetrachloroethene	1 U	100 U	1 U	1 U	1 U
trans-1,2-Dichloroethene	1 U	100 U	1 U	1 U	1 U
Trichloroethene	1 U	1800	0.15 J	1 U	1 U
Vinyl chloride	1 U	100 U	1 U	1 U	1 U

ug/L--micrograms per liter
U--non-detect concentration
J--estimated concentration

APPENDIX E

GROUNDWATER SAMPLE RESULTS
TCE INVESTIGATION
NAVAL STATION ROOSEVELT ROADS, CEIBA, PUERTO RICO
JANUARY 2004

Site ID	7MW20	7MW21	7MW22	7MW23	7MW24
Sample ID	7MW20D	7MW21	7MW22	7MW23	7MW24
Sample Date	09/23/03	09/25/03	09/25/03	09/24/03	09/24/03
Volatile Organic Compounds (ug/L)					
1,1,1-Trichloroethane	1 U	1 U	1 U	1 U	1 U
1,1,2-Trichloroethane	1 U	1 U	1 U	1 U	0.22 J
1,1-Dichloroethane	1 U	1 U	1 U	1 U	1 U
1,1-Dichloroethene	1 U	1 U	5	1 U	2.5
1,2-Dichloroethane	1 U	1 U	1 U	1 U	1 U
Chloroform	0.12 U	1 U	1 U	1 U	0.55 U
Chloromethane (Methyl Chloride)	1 U	1 U	1 U	1 U	1 U
cis-1,2-Dichloroethene	1 U	1 U	1 U	1 U	1.5
Methylene chloride (Dichloromethane)	5 U	5 U	5 U	5 U	5 U
Pentachloroethane	5 U	5 U	5 U	5 U	5 U
Tetrachloroethene	1 U	1 U	1 U	1 U	1 U
trans-1,2-Dichloroethene	1 U	1 U	1 U	1 U	1 U
Trichloroethene	1 U	1.4 U	0.44 U	87	1600
Vinyl chloride	1 U	1 U	1 U	1 U	1 U

ug/L--micrograms per liter
U--non-detect concentration
J--estimated concentration

APPENDIX E

GROUNDWATER SAMPLE RESULTS
TCE INVESTIGATION
NAVAL STATION ROOSEVELT ROADS, CEIBA, PUERTO RICO
JANUARY 2004

Site ID	UGW11
Sample ID	UGW11
Sample Date	09/22/03
Volatile Organic Compounds (ug/L)	
1,1,1-Trichloroethane	1 U
1,1,2-Trichloroethane	1 U
1,1-Dichloroethane	1 U
1,1-Dichloroethene	1 U
1,2-Dichloroethane	1 U
Chloroform	20 U
Chloromethane (Methyl Chloride)	1 U
cis-1,2-Dichloroethene	1 U
Methylene chloride (Dichloromethane)	5 U
Pentachloroethane	5 U
Tetrachloroethene	1 U
trans-1,2-Dichloroethene	1 U
Trichloroethene	1 U
Vinyl chloride	1 U

ug/L--micrograms per liter
U--non-detect concentration
J--estimated concentration

APPENDIX F
QA/QC Laboratory Results

APPENDIX F

QUALITY ASSURANCE/QUALITY CONTROL RESULTS
TCE INVESTIGATION
NAVAL STATION ROOSEVELT ROADS, CEIBA, PUERTO RICO
JANUARY 2004

Site ID	7TCEFB01	7TCEFB02	7TCEFB03	7TCETB01	7TCETB02	7TCETB03
Sample ID	7TCEFB01	7TCEFB02	7TCEFB03	7TCETB01	7TCETB02	7TCETB03
Sample Date	09/17/03	09/17/03	09/17/03	09/16/03	09/17/03	09/19/03
Identifier	Field Blank	Field Blank	Field Blank	Trip Blank	Trip Blank	Trip Blank
Volatile Organic Compounds (ug/L)						
1,1,1-Trichloroethane	5 U	5 U	5 U	1 U	5 U	1 U
1,1,2-Trichloroethane	5 U	5 U	5 U	1 U	5 U	1 U
1,1-Dichloroethane	5 U	5 U	5 U	1 U	5 U	1 U
1,1-Dichloroethene	5 U	5 U	5 U	1 U	5 U	1 U
1,2-Dichloroethane	5 U	5 U	5 U	1 U	5 U	1 U
Chloroform	5 U	5 U	160	1 U	5 U	1 U
Chloromethane (Methyl Chloride)	5 U	5 U	5 U	0.7 J	5 U	1 U
cis-1,2-Dichloroethene	5 U	5 U	5 U	1 U	5 U	1 U
Methylene chloride (Dichloromethane)	5 U	0.86 J	5 U	4.2 J	5 U	5 U
Pentachloroethane	25 U	25 U	25 U	5 U	25 U	5 U
Tetrachloroethene	5 U	5 U	5 U	1 U	5 U	1 U
trans-1,2-Dichloroethene	5 U	5 U	5 U	1 U	5 U	1 U
Trichloroethene	5 U	5 U	5 U	1 U	5 U	1 U
Vinyl chloride	5 U	5 U	5 U	1 U	5 U	1 U

APPENDIX F

QUALITY ASSURANCE/QUALITY CONTROL RESULTS
TCE INVESTIGATION
NAVAL STATION ROOSEVELT ROADS, CEIBA, PUERTO RICO
JANUARY 2004

Site ID	7TCETB04	7TCETB05	7TCEER01	7TCEER02
Sample ID	7TCETB04	7TCETB05	7TCEER01	7TCEER02
Sample Date	09/23/03	09/24/03	09/23/03	09/23/03
Identifier	Trip Blank	Trip Blank	Equipment Rinsate Blank	Equipment Rinsate Blank
Volatile Organic Compounds (ug/L)				
1,1,1-Trichloroethane	1 U	1 U	1 U	1 U
1,1,2-Trichloroethane	1 U	1 U	1 U	1 U
1,1-Dichloroethane	1 U	1 U	1 U	1 U
1,1-Dichloroethene	1 U	1 U	1 U	1 U
1,2-Dichloroethane	1 U	1 U	1 U	1 U
Chloroform	1 U	1 U	1 U	1 U
Chloromethane (Methyl Chloride)	1 U	1 U	1 U	1 U
cis-1,2-Dichloroethene	1 U	1 U	1 U	1 U
Methylene chloride (Dichloromethane)	5 U	5 U	5 U	5 U
Pentachloroethane	5 U	5 U	5 U	5 U
Tetrachloroethene	1 U	1 U	1 U	1 U
trans-1,2-Dichloroethene	1 U	1 U	1 U	1 U
Trichloroethene	1 U	0.34 J	1 U	1 U
Vinyl chloride	1 U	1 U	1 U	1 U

APPENDIX F

QUALITY ASSURANCE/QUALITY CONTROL RESULTS
TCE INVESTIGATION
NAVAL STATION ROOSEVELT ROADS, CEIBA, PUERTO RICO
JANUARY 2004

Site ID	7TCEER03
Sample ID	7TCEER03
Sample Date	09/23/03
Identifier	Equipment Rinsate Blank
Volatile Organic Compounds (ug/L)	
1,1,1-Trichloroethane	1 U
1,1,2-Trichloroethane	1 U
1,1-Dichloroethane	1 U
1,1-Dichloroethene	1 U
1,2-Dichloroethane	1 U
Chloroform	1 U
Chloromethane (Methyl Chloride)	1 U
cis-1,2-Dichloroethene	1 U
Methylene chloride (Dichloromethane)	5 U
Pentachloroethane	5 U
Tetrachloroethene	1 U
trans-1,2-Dichloroethene	1 U
Trichloroethene	1 U
Vinyl chloride	1 U

APPENDIX G
Data Validation Report Narratives

HEARTLAND
ENVIRONMENTAL SERVICES, INC.

Data Validation Report

SDG#:	PRNS78
Date:	Nov. 14, 2003
Client Name:	Michael Baker Jr., Inc..
Project/Site Name:	Puerto Rico CTO-271
Date Sampled:	Sept.16, 2003
Number of Samples:	6 Aqueous Sample(s) with 1 MS(s)/MSD(s)
Laboratory:	STL Savannah
Validation Guidance:	National Functional Guidelines for Organic Data Review, Region II
QA/QC Level:	DQO Level IV
Method(s) Utilized:	SW846 Third Edition
Analytical Fractions:	Volatiles Only

Analytical data in this report were screened to determine usability of results and also to determine contractual compliance relative to these requirements and deliverables. This screening assumes analytical results are correct as reported and merely provides an interpretation of the reported quality control results. A minimum of 10% of all laboratory calculations have been verified as part of this validation. All instrument output, i.e. spectra, chromatograms, etc., for each sample have been carefully reviewed. The end-user is urged to review the Specific Findings and associated Data Qualifications presented in this report. Annotated Form 1s or spreadsheets for all samples reviewed are included after the Data Assessment Narratives. Form 1s for MS/MSD samples or spreadsheets are not annotated.

The release of this Data Validation Report is authorized by the following signature:

Paul B. Humburg, President

11/14/03
Date

39 Windcastle Dr. • St. Charles, MO 63304
(636) 936-1332 • Fax (636) 936-1335

SDG# PRNS78

Samples and Fractions Reviewed

Sample Identifications | Analytical Fractions

BAKER ID	MATRIX	VOA	
7TCETW201	WATER	X	
7TCETW203	WATER	X	
7TCETW203D	WATER	X	
7TCET202	WATER	X	
7MW07	WATER	X	
7TCETB01	WATER	X	
Total Billable Samples (Water/Soil)		6	0

DATA ASSESSMENT NARRATIVE

GC/MS VOLATILES

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC/MS performance, tuning results, calibration results and internal standard areas. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the SW 846 8260 volatile method; the Region II Modifications to the National Functional Guidelines for Organic Data Review, 9/94, and DQO Level IV requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDG # PRNS78

A validation was performed on the volatile Data from SDG PRNS78. The data was evaluated based on the following parameters:

*	•	Data Completeness
*	•	Holding Times
*	•	Calibration
	•	Blanks
*	•	Surrogate Recoveries
*	•	Matrix Spike/Matrix Spike Duplicates
*	•	Field Duplicates
*	•	Laboratory Control Standard
*	•	Compound Identification
*	•	Compound Quantitation

* - All criteria were met for this parameter.

Blank Results

The preparation blank exhibited contamination for Methyl Chloride. Sample 7TCETW202 was the only sample affected. It's positive value was changed to non-detect "U".

System Performance and Overall Assessment

The data, as reported, required qualifications.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported Quantitation limit is qualified as estimated

R = Result is rejected and unusable

D = Result value is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

U = The sample result for the blank contaminant is less than the sample CRQL and is less than 5X (10X for common laboratory contaminants) the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that compound is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 5X (10X for common laboratory contaminants) the method blank value. The sample result for the blank contaminant is qualified as non detected at the compound value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 5X (10X for common laboratory contaminants) the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	COMPOUND ID	DL	QL
7TCETW202	methyl chloride	B	U

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non detect result

HEARTLAND
ENVIRONMENTAL SERVICES, INC.

Data Validation Report

SDG#:	PRNS80
Date:	Nov. 14, 2003
Client Name:	Michael Baker Jr., Inc..
Project/Site Name:	Puerto Rico CTO-271
Date Sampled:	Sept.13, 2003
Number of Samples:	5 Non- Aqueous Sample(s) with 1 MS(s)/MSD(s)
Laboratory:	STL Savannah
Validation Guidance:	National Functional Guidelines for Inorganic Data Review, Region II
QA/QC Level:	DQO Level IV
Method(s) Utilized:	SW846 Third Edition
Analytical Fractions:	Volatiles Only

Analytical data in this report were screened to determine usability of results and also to determine contractual compliance relative to these requirements and deliverables. This screening assumes analytical results are correct as reported and merely provides an interpretation of the reported quality control results. A minimum of 10% of all laboratory calculations have been verified as part of this validation. All instrument output, i.e. spectra, chromatograms, etc., for each sample have been carefully reviewed. The end-user is urged to review the Specific Findings and associated Data Qualifications presented in this report. Annotated Form 1s or spreadsheets for all samples reviewed are included after the Data Assessment Narratives. Form 1s for MS/MSD samples or spreadsheets are not annotated.

The release of this Data Validation Report is authorized by the following signature:

Paul B. Humburg, President

Date 11/14/03

39 Windcastle Dr. • St. Charles, MO 63304
(636) 936-1332 • Fax (636) 936-1335

SDG# PRNS80

Samples and Fractions Reviewed

Sample Identifications | Analytical Fractions

BAKER ID	MATRIX	VOA	
7TCESB05-05	SOIL	X	
7TCESB08-05	SOIL	X	
7TCESB03-04	SOIL	X	
7TCESB08-02	SOIL	X	
7TCESB09-03	SOIL	X	
Total Billable Samples (Water/Soil)		5	0

DATA ASSESSMENT NARRATIVE

GC/MS VOLATILES

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC/MS performance, tuning results, calibration results and internal standard areas. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the SW 846 8260 volatile method; the Region II Modifications to the National Functional Guidelines for Organic Data Review, 9/94, and DQO Level IV requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDG # PRNS80

A validation was performed on the volatile Data from SDG PRNS80. The data was evaluated based on the following parameters:

*	•	Data Completeness
*	•	Holding Times
*	•	Calibration
*	•	Blanks
*	•	Surrogate Recoveries
*	•	Matrix Spike/Matrix Spike Duplicates
*	•	Field Duplicates
*	•	Laboratory Control Standard
*	•	Compound Identification
*	•	Compound Quantitation

* - All criteria were met for this parameter.

System Performance and Overall Assessment

The data, as reported, required no qualifications.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported Quantitation limit is qualified as estimated

R = Result is rejected and unusable

D = Result value is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

U = The sample result for the blank contaminant is less than the sample CRQL and is less than 5X (10X for common laboratory contaminants) the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that compound is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 5X (10X for common laboratory contaminants) the method blank value. The sample result for the blank contaminant is qualified as non detected at the compound value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 5X (10X for common laboratory contaminants) the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	COMPOUND ID	DL	QL

Data stands as reported without qualification.

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non detect result

HEARTLAND
ENVIRONMENTAL SERVICES, INC.

Data Validation Report

SDG#:	PRNS81
Date:	Nov. 14, 2003
Client Name:	Michael Baker Jr., Inc..
Project/Site Name:	Puerto Rico CTO-271
Date Sampled:	Sept.18, 2003
Number of Samples:	2 Aqueous Sample(s) with 1 MS(s)/MSD(s)
Laboratory:	STL Savannah
Validation Guidance:	National Functional Guidelines for Organic Data Review, Region II
QA/QC Level:	DQO Level IV
Method(s) Utilized:	SW846 Third Edition
Analytical Fractions:	Volatiles Only

Analytical data in this report were screened to determine usability of results and also to determine contractual compliance relative to these requirements and deliverables. This screening assumes analytical results are correct as reported and merely provides an interpretation of the reported quality control results. A minimum of 10% of all laboratory calculations have been verified as part of this validation. All instrument output, i.e. spectra, chromatograms, etc., for each sample have been carefully reviewed. The end-user is urged to review the Specific Findings and associated Data Qualifications presented in this report. Annotated Form 1s or spreadsheets for all samples reviewed are included after the Data Assessment Narratives. Form 1s for MS/MSD samples or spreadsheets are not annotated.

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Paul B. Humburg, President

Date 11/14/03

39 Windcastle Dr. • St. Charles, MO 63304
(636) 936-1332 • Fax (636) 936-1335

SDG# PRNS81

Samples and Fractions Reviewed

Sample Identifications | Analytical Fractions

BAKER ID	MATRIX	VOA	
7TCETW204	WATER	X	
7TCETW205	WATER	X	
Total Billable Samples (Water/Soil)		2	0

DATA ASSESSMENT NARRATIVE

GC/MS VOLATILES

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC/MS performance, tuning results, calibration results and internal standard areas. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the SW 846 8260 volatile method; the Region II Modifications to the National Functional Guidelines for Organic Data Review, 9/94, and DQO Level IV requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDG # PRNS81

A validation was performed on the volatile Data from SDG PRNS81. The data was evaluated based on the following parameters:

* • Data Completeness
* • Holding Times
* • Calibration
* • Blanks
* • Surrogate Recoveries
* • Matrix Spike/Matrix Spike Duplicates
* • Field Duplicates
* • Laboratory Control Standard
* • Compound Identification
* • Compound Quantitation

* - All criteria were met for this parameter.

System Performance and Overall Assessment

The data, as reported, required no qualifications.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported Quantitation limit is qualified as estimated

R = Result is rejected and unusable

D = Result value is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

U = The sample result for the blank contaminant is less than the sample CRQL and is less than 5X (10X for common laboratory contaminants) the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that compound is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 5X (10X for common laboratory contaminants) the method blank value. The sample result for the blank contaminant is qualified as non detected at the compound value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 5X (10X for common laboratory contaminants) the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	COMPOUND ID	DL	QL

Data stands as reported without qualification.

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non detect result

HEARTLAND
ENVIRONMENTAL SERVICES, INC.

Data Validation Report

SDG#:	PRNS82
Date:	Nov. 14, 2003
Client Name:	Michael Baker Jr., Inc..
Project/Site Name:	Puerto Rico CTO-271
Date Sampled:	Sept.17, 2003
Number of Samples:	13 Aqueous Sample(s) with 1 MS(s)/MSD(s)
Laboratory:	STL Savannah
Validation Guidance:	National Functional Guidelines for Organic Data Review, Region II
QA/QC Level:	DQO Level IV
Method(s) Utilized:	SW846 Third Edition
Analytical Fractions:	Volatiles Only

Analytical data in this report were screened to determine usability of results and also to determine contractual compliance relative to these requirements and deliverables. This screening assumes analytical results are correct as reported and merely provides an interpretation of the reported quality control results. A minimum of 10% of all laboratory calculations have been verified as part of this validation. All instrument output, i.e. spectra, chromatograms, etc., for each sample have been carefully reviewed. The end-user is urged to review the Specific Findings and associated Data Qualifications presented in this report. Annotated Form 1s or spreadsheets for all samples reviewed are included after the Data Assessment Narratives. Form 1s for MS/MSD samples or spreadsheets are not annotated.

The release of this Data Validation Report is authorized by the following signature:

Paul B. Humburg, President

11/14/03
Date

39 Windcastle Dr. • St. Charles, MO 63304
(636) 936-1332 • Fax (636) 936-1335

SDG# PRNS82

Samples and Fractions Reviewed

Sample Identifications | Analytical Fractions

BAKER ID	MATRIX	VOA	
7TCEFB01	WATER	X	
7TCEFB02	WATER	X	
7TCEFB03	WATER	X	
7TCETB02	WATER	X	
7TCESB01-01	WATER	X	
7TCESB01-03	WATER	X	
7TCESB09-01	WATER	X	
7TCESB07-01	WATER	X	
7TCESB07-01MS	WATER	X	
7TCESB07-01MSD	WATER	X	
7TCESB04-04	WATER	X	
7TCESB06-03	WATER	X	
7TCESB04-02	WATER	X	
7TCESB06-01	WATER	X	
7TCESB06-03D	WATER	X	
Total Billable Samples (Water/Soil)		15	0

Soil samples, not water

CLH

DATA ASSESSMENT NARRATIVE

GC/MS VOLATILES

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC/MS performance, tuning results, calibration results and internal standard areas. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the SW 846 8260 volatile method; the Region II Modifications to the National Functional Guidelines for Organic Data Review, 9/94, and DQO Level IV requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDG # PRNS82

A validation was performed on the volatile Data from SDG PRNS82. The data was evaluated based on the following parameters:

*	•	Data Completeness
*	•	Holding Times
*	•	Calibration
*	•	Blanks
*	•	Surrogate Recoveries
*	•	Matrix Spike/Matrix Spike Duplicates
*	•	Field Duplicates
*	•	Laboratory Control Standard
*	•	Compound Identification
*	•	Compound Quantitation

* - All criteria were met for this parameter.

System Performance and Overall Assessment

The data, as reported, required no qualifications.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported Quantitation limit is qualified as estimated

R = Result is rejected and unusable

D = Result value is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

U = The sample result for the blank contaminant is less than the sample CRQL and is less than 5X (10X for common laboratory contaminants) the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that compound is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 5X (10X for common laboratory contaminants) the method blank value. The sample result for the blank contaminant is qualified as non detected at the compound value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 5X (10X for common laboratory contaminants) the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	COMPOUND ID	DL	QL

Data stands as reported without qualification.

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non detect result

HEARTLAND
ENVIRONMENTAL SERVICES, INC.

Data Validation Report

SDG#:	PRNS83
Date:	Nov. 14, 2003
Client Name:	Michael Baker Jr., Inc..
Project/Site Name:	Puerto Rico CTO-271
Date Sampled:	Sept.19, 2003
Number of Samples:	3 Aqueous Sample(s) with 1 MS(s)/MSD(s)
Laboratory:	STL Savannah
Validation Guidance:	National Functional Guidelines for Organic Data Review, Region II
QA/QC Level:	DQO Level IV
Method(s) Utilized:	SW846 Third Edition
Analytical Fractions:	Volatiles Only

Analytical data in this report were screened to determine usability of results and also to determine contractual compliance relative to these requirements and deliverables. This screening assumes analytical results are correct as reported and merely provides an interpretation of the reported quality control results. A minimum of 10% of all laboratory calculations have been verified as part of this validation. All instrument output, i.e. spectra, chromatograms, etc., for each sample have been carefully reviewed. The end-user is urged to review the Specific Findings and associated Data Qualifications presented in this report. Annotated Form 1s or spreadsheets for all samples reviewed are included after the Data Assessment Narratives. Form 1s for MS/MSD samples or spreadsheets are not annotated.

The release of this Data Validation Report is authorized by the following signature:

Paul B. Humburg, President

Date 11/14/03

39 Windcastle Dr. • St. Charles, MO 63304
(636) 936-1332 • Fax (636) 936-1335

SDG# PRNS83

Samples and Fractions Reviewed

Sample Identifications | Analytical Fractions

BAKER ID	MATRIX	VOA	
7TCETW206	WATER	X	
7TCETW207	WATER	X	
7TCETB03	WATER	X	
Total Billable Samples (Water/Soil)		3	0

DATA ASSESSMENT NARRATIVE

GC/MS VOLATILES

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC/MS performance, tuning results, calibration results and internal standard areas. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the SW 846 8260 volatile method; the Region II Modifications to the National Functional Guidelines for Organic Data Review, 9/94, and DQO Level IV requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDG # PRNS83

A validation was performed on the volatile Data from SDG PRNS83. The data was evaluated based on the following parameters:

*	•	Data Completeness
*	•	Holding Times
*	•	Calibration
*	•	Blanks
*	•	Surrogate Recoveries
*	•	Matrix Spike/Matrix Spike Duplicates
*	•	Field Duplicates
*	•	Laboratory Control Standard
*	•	Compound Identification
*	•	Compound Quantitation

* - All criteria were met for this parameter.

System Performance and Overall Assessment

The data, as reported, required no qualifications.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported Quantitation limit is qualified as estimated

R = Result is rejected and unusable

D = Result value is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

U = The sample result for the blank contaminant is less than the sample CRQL and is less than 5X (10X for common laboratory contaminants) the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that compound is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 5X (10X for common laboratory contaminants) the method blank value. The sample result for the blank contaminant is qualified as non detected at the compound value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 5X (10X for common laboratory contaminants) the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	COMPOUND ID	DL	QL

Data stands as reported without qualification.

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non detect result

HEARTLAND
ENVIRONMENTAL SERVICES, INC.

Data Validation Report

SDG#:	PRNS84
Date:	Nov. 14, 2003
Client Name:	Michael Baker Jr., Inc..
Project/Site Name:	Puerto Rico CTO-271
Date Sampled:	Sept.22, 2003
Number of Samples:	6 Aqueous Sample(s) with 1 MS(s)/MSD(s)
Laboratory:	STL Savannah
Validation Guidance:	National Functional Guidelines for Organic Data Review, Region II
QA/QC Level:	DQO Level IV
Method(s) Utilized:	SW846 Third Edition
Analytical Fractions:	Volatiles Only

Analytical data in this report were screened to determine usability of results and also to determine contractual compliance relative to these requirements and deliverables. This screening assumes analytical results are correct as reported and merely provides an interpretation of the reported quality control results. A minimum of 10% of all laboratory calculations have been verified as part of this validation. All instrument output, i.e. spectra, chromatograms, etc., for each sample have been carefully reviewed. The end-user is urged to review the Specific Findings and associated Data Qualifications presented in this report. Annotated Form 1s or spreadsheets for all samples reviewed are included after the Data Assessment Narratives. Form 1s for MS/MSD samples or spreadsheets are not annotated.

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11/14/03
Date

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(636) 936-1332 • Fax (636) 936-1335

SDG# PRNS84

Samples and Fractions Reviewed

Sample Identifications | Analytical Fractions

BAKER ID	MATRIX	VOA	
7MW08	WATER	X	
7MW10	WATER	X	
UGW11	WATER	X	
7MW20	WATER	X	
7MW20MS	WATER	X	
7MW20MSD	WATER	X	
7MW20D	WATER	X	
7TCETB04	WATER	X	
Total Billable Samples (Water/Soil)		8	0

DATA ASSESSMENT NARRATIVE

GC/MS VOLATILES

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC/MS performance, tuning results, calibration results and internal standard areas. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the SW 846 8260 volatile method; the Region II Modifications to the National Functional Guidelines for Organic Data Review, 9/94, and DQO Level IV requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDG # PRNS84

A validation was performed on the volatile Data from SDG PRNS84. The data was evaluated based on the following parameters:

*	•	Data Completeness
*	•	Holding Times
*	•	Calibration
*	•	Blanks
*	•	Surrogate Recoveries
*	•	Matrix Spike/Matrix Spike Duplicates
*	•	Field Duplicates
*	•	Laboratory Control Standard
*	•	Compound Identification
*	•	Compound Quantitation

* - All criteria were met for this parameter.

System Performance and Overall Assessment

The data, as reported, required no qualifications.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported Quantitation limit is qualified as estimated

R = Result is rejected and unusable

D = Result value is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

U = The sample result for the blank contaminant is less than the sample CRQL and is less than 5X (10X for common laboratory contaminants) the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that compound is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 5X (10X for common laboratory contaminants) the method blank value. The sample result for the blank contaminant is qualified as non detected at the compound value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 5X (10X for common laboratory contaminants) the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	COMPOUND ID	DL	QL

Data stands as reported without qualification.

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non detect result

HEARTLAND
ENVIRONMENTAL SERVICES, INC.

Data Validation Report

SDG#:	PRNS85
Date:	Nov. 14, 2003
Client Name:	Michael Baker Jr., Inc..
Project/Site Name:	Puerto Rico CTO-271
Date Sampled:	Sept.24, 2003
Number of Samples:	3 Aqueous Sample(s) with 1 MS(s)/MSD(s)
Laboratory:	STL Savannah
Validation Guidance:	National Functional Guidelines for Organic Data Review, Region II
QA/QC Level:	DQO Level IV
Method(s) Utilized:	SW846 Third Edition
Analytical Fractions:	Volatiles Only

Analytical data in this report were screened to determine usability of results and also to determine contractual compliance relative to these requirements and deliverables. This screening assumes analytical results are correct as reported and merely provides an interpretation of the reported quality control results. A minimum of 10% of all laboratory calculations have been verified as part of this validation. All instrument output, i.e. spectra, chromatograms, etc., for each sample have been carefully reviewed. The end-user is urged to review the Specific Findings and associated Data Qualifications presented in this report. Annotated Form 1s or spreadsheets for all samples reviewed are included after the Data Assessment Narratives. Form 1s for MS/MSD samples or spreadsheets are not annotated.

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Date 11/14/03

39 Windcastle Dr. • St. Charles, MO 63304
(636) 936-1332 • Fax (636) 936-1335

SDG# PRNS85

Samples and Fractions Reviewed

Sample Identifications | Analytical Fractions

BAKER ID	MATRIX	VOA	
7TCETW209	WATER	X	
7TCETW208	WATER	X	
7TCETW210	WATER	X	
Total Billable Samples (Water/Soil)		3	0

DATA ASSESSMENT NARRATIVE

GC/MS VOLATILES

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC/MS performance, tuning results, calibration results and internal standard areas. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the SW 846 8260 volatile method; the Region II Modifications to the National Functional Guidelines for Organic Data Review, 9/94, and DQO Level IV requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDG # PRNS85

A validation was performed on the volatile Data from SDG PRNS85. The data was evaluated based on the following parameters:

*	•	Data Completeness
*	•	Holding Times
*	•	Calibration
*	•	Blanks
*	•	Surrogate Recoveries
*	•	Matrix Spike/Matrix Spike Duplicates
*	•	Field Duplicates
*	•	Laboratory Control Standard
*	•	Compound Identification
*	•	Compound Quantitation

* - All criteria were met for this parameter.

System Performance and Overall Assessment

The data, as reported, required no qualifications.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported Quantitation limit is qualified as estimated

R = Result is rejected and unusable

D = Result value is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

U = The sample result for the blank contaminant is less than the sample CRQL and is less than 5X (10X for common laboratory contaminants) the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that compound is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 5X (10X for common laboratory contaminants) the method blank value. The sample result for the blank contaminant is qualified as non detected at the compound value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 5X (10X for common laboratory contaminants) the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	COMPOUND ID	DL	QL

Data stands as reported without qualification.

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non detect result

HEARTLAND
ENVIRONMENTAL SERVICES, INC.

Data Validation Report

SDG#:	PRNS86
Date:	Nov. 14, 2003
Client Name:	Michael Baker Jr., Inc..
Project/Site Name:	Puerto Rico CTO-271
Date Sampled:	Sept.23, 2003
Number of Samples:	11 Aqueous Sample(s) with 1 MS(s)/MSD(s)
Laboratory:	STL Savannah
Validation Guidance:	National Functional Guidelines for Organic Data Review, Region II
QA/QC Level:	DQO Level IV
Method(s) Utilized:	SW846 Third Edition
Analytical Fractions:	Volatiles Only

Analytical data in this report were screened to determine usability of results and also to determine contractual compliance relative to these requirements and deliverables. This screening assumes analytical results are correct as reported and merely provides an interpretation of the reported quality control results. A minimum of 10% of all laboratory calculations have been verified as part of this validation. All instrument output, i.e. spectra, chromatograms, etc., for each sample have been carefully reviewed. The end-user is urged to review the Specific Findings and associated Data Qualifications presented in this report. Annotated Form 1s or spreadsheets for all samples reviewed are included after the Data Assessment Narratives. Form 1s for MS/MSD samples or spreadsheets are not annotated.

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Paul B. Humburg, President

11/14/03
Date

39 Windcastle Dr. • St. Charles, MO 63304
(636) 936-1332 • Fax (636) 936-1335

SDG# PRNS86

Samples and Fractions Reviewed

Sample Identifications | Analytical Fractions

BAKER ID	MATRIX	VOA	
7TCEER01	WATER	X	
7TCEER02	WATER	X	
7TCEER03	WATER	X	
7MW24	WATER	X	
7MW23	WATER	X	
7MW22	WATER	X	
7MW21	WATER	X	
7TCEIDW02	WATER	X	
7TCETB05	WATER	X	
7TCEIDW01	WATER	X	
7TCEIDW01	WATER	X	
Total Billable Samples (Water/Soil)		11	0

DATA ASSESSMENT NARRATIVE

GC/MS VOLATILES

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC/MS performance, tuning results, calibration results and internal standard areas. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the SW 846 8260 volatile method; the Region II Modifications to the National Functional Guidelines for Organic Data Review, 9/94, and DQO Level IV requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDG # PRNS86

A validation was performed on the volatile Data from SDG PRNS86. The data was evaluated based on the following parameters:

*	•	Data Completeness
*	•	Holding Times
*	•	Calibration
*	•	Blanks
*	•	Surrogate Recoveries
*	•	Matrix Spike/Matrix Spike Duplicates
*	•	Field Duplicates
*	•	Laboratory Control Standard
*	•	Compound Identification
*	•	Compound Quantitation

* - All criteria were met for this parameter.

System Performance and Overall Assessment

The data, as reported, required no qualifications.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported Quantitation limit is qualified as estimated

R = Result is rejected and unusable

D = Result value is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

U = The sample result for the blank contaminant is less than the sample CRQL and is less than 5X (10X for common laboratory contaminants) the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that compound is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 5X (10X for common laboratory contaminants) the method blank value. The sample result for the blank contaminant is qualified as non detected at the compound value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 5X (10X for common laboratory contaminants) the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	COMPOUND ID	DL	QL

Data stands as reported without qualification.

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non detect result