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FINAL CORRECTIVE MEASURES STUDY INVESTIGATIONS TOW WAY FUEL FARM NAVAL ACTIVITY PUERTO RICO

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FINAL

CORRECTIVE MEASURES STUDY INVESTIGATIONS
TOW WAY FUEL FARM

NAVAL STATION ROOSEVELT ROADS
CEBA, PUERTO RICO

CONTRACT TASK ORDER 0277

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LIST OF ACRONYMS AND ABBREVIATIONS

bgs	below ground surface
BTEX	benzene, toluene, ethylbenzene, and xylene
CMS	Corrective Measures Study
cm/sec	centimeters per second
DRO	diesel range organics
EPA	Environmental Protection Agency
ft	feet
ft/day	feet per day
g/cc	grams per cubic centimeter
g/ml	grams per milliliter
GRO	gasoline range organics
ICM	Interim Corrective Measure
K_m	mean coefficient of permeability
L	liters
MCLs	maximum contaminant levels
msl	mean sea level
PID	photo ionization detector
ppmV	parts per million by volume
PVC	polyvinyl chloride
QA/QC	quality assurance/quality control
RBCs	Risk Based Concentrations
redox	oxidation/reduction potential
TOC	total organic carbon
TPH	total petroleum hydrocarbons
TWFF	Tow Way Fuel Farm
µg/L	micrograms per liter
VOA	volatile organic analysis
VOC	volatile organic compounds

1.0 INTRODUCTION

The following sections present a description of work performed at the Tow Way Fuel Farm (TWFF) located at Naval Station Roosevelt Roads, Puerto Rico. The main purpose of the April 14 through April 22, 1998 field work was to gather additional data with respect to the fuel related contamination to assist in the development of the Corrective Measures Study (CMS) and selection of the most applicable remedial approach. This work included the collection of soil samples utilizing direct push technology, the performance of soil gas survey, vertical permeability testing, groundwater sampling, baildown tests, slug tests, groundwater levels, underground utility locations, and site survey. Also included is a description of the procedures used to accomplish the above tasks. All investigations performed were in accordance with the Environmental Protection Agency (EPA) approved Corrective Measure Study Work Plan (Baker, 1997a) and the additional requirements set forth in the February 11, 1998 comment letter from the EPA. The requirements for this additional work had been carefully selected so as to provide sufficient data for the performance of a CMS which includes a formal screening of remedial alternatives.

This report is designed to only transmit data. In essence, the data herein completes the site characterization effort. The work was done in the CMS stage rather than in the RFI stage in response to EPA=s contingent approval of the Draft RFI report for SWMU 7/8. No conclusions have been reached nor recommendations made in this report. The data obtained during the investigations will be used in screening remedial technologies and selecting the most site applicable as part of the Corrective Measures Study (CMS) process. Any conclusions and recommendations in the Task I and Tasks II, III, and IV CMS reports will reflect the results of the investigations discussed in the report sections which follow.

2.0 FIELD INVESTIGATION

Section 2 describes the field investigations undertaken at the Tow Way for the CMS. The text provides the framework while the tables and figures provide details.

Tables 2-1 through 2-4 present a listing of samples collected along with their associated analytical parameters. Figures 2-2 through 2-3 present a detailed view of the sampling locations at the TWFF. Figure 2-1 presents the area that was investigated under the approved Work plan. Figure 2-2 presents the subsurface soil sampling, soil gas sampling, and vertical permeability testing locations. Figure 2-3 presents the locations where groundwater samples were taken.

2.1 Direct Push Soil Borings

A total of 30 direct push soil borings were completed at the TWFF as shown on Figure 2-2. This section describes soil sample collection using direct push technology. Subsurface soil sampling was conducted to provide updated information regarding the extent and concentration of total petroleum hydrocarbons (TPH) in the subsurface soils and to obtain additional data to assist in the screening of possible corrective measure alternatives for the TWFF.

The soil borings were advanced using an Earthprobe™ 200 rig and one of three direct push methods; a double casing system, a Geoprobe™ Macro Core Sampler, or a Geoprobe™ Large Core Sampler. Regardless of the direct push method used soils were collected in virgin acetate liners. Subsurface conditions including the hardness of the material and the cohesiveness of the soil around the borehole dictated which direct push method was appropriate.

The outer casing of the double casing system was used to maintain an open boring. A smaller inner casing consisted of a two-foot long, split-casing sampler which was utilized to obtain the subsurface soil samples. Rods were used to advance and retrieve the split-casing sampler. Samples were collected at borings where the double casing system was used either continuously, or on four-foot centers. Often a boring was more easily advanced where samples were collected continuously. Four-foot centers were used rather than five-foot centers (as described in the work plan) because it as a more practical interval given the dimensions of the subcontractors tools. While this was a minor deviation from the workplan, it resulted in more samples being examined.

Soil samples were generally collected continuously using the Geoprobe™ Marco Core and Geoprobe™ Large Core Samplers. Up to four-foot long samples were obtained using the macro core sampler. Two-foot long samples were collected using the large core sampler.

Soil samples were screened, logged, and sampled by a Baker geologist. A HNu photoionization detector (PID) was used to screen for volatile organic vapors emanating from soil samples. After collecting the subsurface soil sample, the acetate liner was cut open lengthwise and the PID probe was placed close to the exposed soil. Several readings were noted over the length of the sample. The maximum reading was recorded in the logbook. Soil samples were then logged noting relative grain size distribution, color, moisture content, evidence of contamination, and any other relevant observations. Subsurface soil samples were collected where required for laboratory analysis. Analysis included benzene, toluene, ethylbenzene, and xylene (BTEX), TPH diesel range organics (DRO) and gasoline range organics (GRO), total organic carbon (TOC), bulk density, and particle size distribution.

A total of 68 soil samples were submitted for laboratory analysis as presented in Table 2-1. Sixty soil samples were collected and analyzed for BTEX, DRO and GRO using SW-846 modified Method 8015. Eight subsurface soil samples were collected from borings outside the suspected area of soil contamination for TOC analysis. The work plan called for ten TOC samples to be collected from just above the water table in areas outside of soil contamination. This was not possible due to many of the borings outside the area of contamination being terminated due to tool refusal before groundwater was encountered.

Five bulk density samples were collected as indicated in Table 2-1. Representative samples of the different stratigraphic units encountered at the site were collected. These stratigraphic units included; weathered bedrock, fine-grained fill material (silt and clay), coarse-grained fill material (sand and rock fragments), fine-grained natural sediments (silt and clay), and coarse-grained natural sediments (sand and coral fragments).

Nine samples were collected for particle size distribution analysis as presented in Table 2-1. One particle size sample was collected from every other boring outside the suspected area of contamination. One particle size sample was collected from each stratigraphic unit within the

suspected area of contamination. These stratigraphic units included; fine-grained fill material (silt and clay), coarse-grained fill material (sand and rock fragments), fine-grained natural sediments (silt and clay), and coarse-grained natural sediments (sand and coral fragments).

The soil sample locations and analytical parameters were carefully selected to address specific needs for performance of the CMS. TPH values are needed because the existing data is quite old and may not reflect present site conditions. Knowledge of TPH levels will assist in delineating areas requiring remediation. BTEX concentrations are needed to assess certain remedial alternatives (e.g. air sparging) that may applicable to site use. The present BTEX data is also old and new data will more nearly approximate present site conditions. TOC is required to assess natural attenuation as an alternative. The geotechnical parameters of grain size, moisture content, and bulk density will be used to estimate site permeability and to assess possible removal actions.

2.2 Soil Gas Survey

A total of ten soil gas samples were collected according to the EPA approved work plan. The sampling is summarized in Table 2-2 and the locations are shown on Figure 2-2. Soil gas sampling was conducted at the TWFF to provide additional data on the occurrence and concentration of soil vapors needed for the screening of possible corrective measures to be evaluated for the TWFF (e.g. in-situ biotreatment, bioventing, bioslurping).

All soil gas samples were collected from the vadose zone utilizing direct push technology. A disposable drive point was placed on the end of a rod. The drive point was held in the rod end by friction. The rod(s) and drive point were driven approximately three to four feet below ground surface (bgs) depending on subsurface conditions. The rods were pulled back a few inches, leaving the drive point in place and exposing the end of the rod. A manual vacuum system was then set up through the direct push rod. A five to six foot length of clear tubing was inserted through the push rod, and a syringe was connected to the tubing to establish a suction. A reusable metal fitting at the bottom end of the tubing was screwed onto the drive point sealing off air from the rods and the surface. The syringe was pumped several times to evacuate air from the tubing to obtain a representative gas sample from that particular depth. Once a sample was collected in the syringe, the contents were placed in a certified laboratory container under vacuum. The soil gas was placed in the container under slight

pressure to prevent leakage of air into the container. Soil gas samples were sent to the laboratory and analyzed for percent oxygen, percent carbon dioxide, and TPH (DRO and GRO).

2.3 Vertical Permeability Testing

A total of three vertical permeability tests were conducted to measure the infiltration rate of water through in-place surface soils at the TWFF. The locations of this testing is shown on Figure 2-2. This data is necessary to evaluate the vertical permeability of the site soils for proper screening of remedial alternatives including soil washing/flushing technology and potential reinfiltration of recovered groundwater as part of a larger free product recovery system.

A cylinder, open at both ends, was placed into a trench approximately three inches deep and grouted into place with bentonite and cement using approximately two inches of bentonite placed around the perimeter of the cylinder in the trench and two inches of cement placed on top of the bentonite. After the grout and cement had set, a known volume of water was poured inside the cylinder. A Hermit**7** pressure transducer was used to monitor the change in the water level within the cylinder. The top of the cylinder was covered to prevent rain infiltration into the cylinder and/or evaporation. Additional water of a known volume was added to the system as required by the site conditions.

The duration of the three vertical permeability tests consisted of the following: vertical permeability test one (VP-01) was run for approximately 50 hours, VP-02 was also run for approximately 50 hours, and VP-03 was run for approximately 39 hours.

2.4 Groundwater/ Product Level Measurements

Prior to collection of each groundwater sample, groundwater levels and product thickness measurements were recorded at each of the 41 monitoring wells shown on Figure 2-3 using an oil/water interface probe which was decontaminated between measurements. In addition, a complete round of groundwater/product level measurements were recorded from each of the 41 monitoring wells within approximately 2-1/2 hours on April 21, 1998. In wells where free product was detected on April 21, another set of groundwater/product level measurements were recorded on April 22, 1998 to allow for estimation of the time necessary for product to recharge in these wells. Each groundwater/product reading was measured to the nearest one-hundredth of a foot.

2.5 Groundwater Sampling

The groundwater investigation at the TWFF involved the sampling of 41 monitoring wells at the locations shown on Figure 2-3. All of the groundwater samples were submitted for laboratory analysis of BTEX using SW-846 Method 8240 including the trimethylbenzene isomers, TPH (DRO and GRO) using SW-846 modified Method 8015, methane, nitrate, sulfate, alkalinity, and chloride as presented on Table 2-3. The analysis for ferrous iron (Method 8146) was conducted in the field utilizing Hach Test Kits. Groundwater sampling was conducted to provide updated information regarding the extent of BTEX and hydrocarbon contamination in groundwater at the TWFF and to provide data for screening potential corrective measure alternatives.

In order to calculate the required well volumes to be purged, it was necessary to ascertain the total depth of each well. Well tags indicating the total depth were present on some of the monitoring wells. For those wells without well tags, a decontaminated stainless steel depth-of-well probe was used to record the well depth to the nearest tenth of a foot. As stated in section 2.4, groundwater and product levels were recorded at each monitoring well prior to purging. Following well depth determination and groundwater/product level measurements, the water column height was determined, as well as the gallons per well volume. The monitoring wells were then purged using disposable bailers and nylon roping. Care was taken not to contaminate the bailer or the roping after every bail. For monitoring wells 7MW09, 7MW08, 7MW07, and UGW-25, 3-inch diameter Teflon bailers were used to purge because the 4-inch wells had large volume requirements. These bailers were decontaminated according to the procedures described in the Data Collection Quality Assurance Plan of the Final RCRA Facility Investigation Work Plan (Baker, 1995). Temperature, pH, specific conductance, and oxidation/reduction (redox) potential were measured in the field during every volume. Dissolved oxygen was measured once, typically during the second volume. After three consecutive volumes were purged with measurements of temperature, pH, and specific conductance within ten percent of each other, samples were collected.

Immediately following purging, disposable bailers were used to collect samples and place them in the laboratory containers. These samples were introduced into laboratory-prepared/certified sample containers in the following order: BTEX, TPH (DRO and GRO), methane, nitrate, sulfate, alkalinity, and chloride. The analysis for ferrous iron was conducted in the field. The volatile organic analysis

(VOA) vials were supplied preserved with hydrochloric acid. Sampling personnel used new nitrile gloves at each monitoring well for purging/sampling activities. The purged water was placed in five gallon plastic buckets, and discarded in the on-site Interim Corrective Measure (ICM) storage tank as approved in the work plan. In monitoring wells where there was excessive product present, a different sampling technique was used to insure laboratory analysis of groundwater and not the free product. This technique consisted of filling the one liter glass amber laboratory containers first. The contents were allowed to overflow by keeping the sampling port under water at all times to flush the product out and leave the groundwater in. This technique was utilized to prevent volatization of the sample and provide a groundwater sample not one of free product. This groundwater was then used to fill the other sampling containers in the order already mentioned above.

2.6 Baildown Tests

Baildown tests were performed on monitoring wells UGW-19 and UGW-21 in order to allow for estimation of the rate of free product recovery. An attempt was made to perform a baildown test on monitoring well UGW-25; however, as this well measures 4-inches in diameter, it was not possible to bail at a rate sufficient to lower the product level within the well. This being the case, the baildown test at this monitoring well was aborted.

The baildown tests were performed by first taking an initial groundwater and product level measurements. Then a disposable, bottom filling, bailer was lowered into each well to collect any floating free product. The free product was removed from the well and poured into a calibrated cylinder to determine its volume. Efforts were made to minimize the volume of water removed from the well, and bailing ceased when the measurable thickness in the well could not be further significantly reduced (confirmed with the oil/water interface probe).

Baildown tests were monitored using the oil/water interface probe to determine the rate of free product recovery by measuring the free product thickness within the well. The baildown test for monitoring well UGW-19 proceeded hourly from 1600 hours to 1800 hours on April 21, with the last reading taken at 0740 on April 22. The baildown test for UGW-21 proceeded every hour from 1720 hours to 1920 hours on April 21, with the last reading taken at 0735 on April 22. Data was recorded on a baildown test record sheet.

2.7 Slug Tests

Six selected monitoring wells at the TWFF had in-situ hydraulic conductivity tests (Aslug tests@) performed following groundwater sampling at the locations shown on Figure 2-2. These tests allowed for the approximation of aquifer hydraulic conductivities in the vicinity immediately surrounding the wells. Each test was conducted by installing a pressure transducer, attached to an electronic recording device (Hermit™ data logger), into the well to record the water level data. The first part of the test (falling head) involved introducing a polyvinyl chloride (PVC) slug into the monitoring well while measurements were recorded as the water level returned to its original elevation. Once the static water level in the well stabilized, the slug was removed and the rising head test initiated. Data was recorded in the data logger and later downloaded in the field to a personal computer. Results of the slug tests are discussed in further detail in Section 3.2.4. These tests were conducted to provide additional information regarding in-situ soil permeability to assist in the screening of possible corrective measures, such as free product recovery by groundwater table depression.

2.8 Underground Utility Location

A file search was performed at NSRR offices to obtain as-built drawings of all underground utilities and product pipelines associated with the TWFF. These as built drawings were utilized to verify underground utilities and pipeline at the TWFF site. Where possible, the drawings were field checked by Aground truthing@ the locations using electromagnetic utility tracers. The underground utilities were horizontally located to get exact coordinates of the features so that their presence can be taken into proper account during remedial alternative screening, selection and subsequent design for future work performed. Figure 2-4 shows all the underground utility locations identified at the TWFF during the investigation.

2.9 Site Survey

All sampling locations, which included direct push subsurface soil locations, vertical permeability test locations, and on-site monitoring wells, were flagged in the field and were surveyed (both horizontally and vertically) using established control.

2.10 Quality Assurance/Quality Control Sampling Procedures

Extensive field quality assurance/quality control (QA/QC) samples were collected during this investigation. These samples were obtained to: (1) ensure that decontamination procedures were properly implemented (i.e., equipment rinsate blanks); (2) evaluate field methodology (i.e., duplicate samples); (3) establish field background conditions (i.e., field blanks); and, (4) evaluate whether cross-contamination occurred during sampling and/or shipping (i.e., trip blanks).

Several types of field QA/QC samples were collected and analyzed including duplicate samples, equipment rinsate samples, field blanks, and trip blanks. These QA/QC samples are defined below:

- Duplicate Sample (D): Two samples collected simultaneously into separate containers from the same source under identical conditions. One duplicate sample was collected for every 10 (10 percent) environmental samples collected for each media type.

- Equipment Rinsate Sample (ER): Sample obtained by running laboratory supplied deionized water over/through sample collection equipment after it was decontaminated. These samples were used to determine if decontamination procedures were adequate.

- Field Blank (FB): Sample obtained from each water source utilized during the field program. The water sources used during the field program included: laboratory supplied deionized water utilized to collect rinsate blanks; store bought distilled water utilized for decontamination; and, potable water utilized for decontamination.

- Trip Blank (TB): Trip blanks were prepared at the laboratory and shipped with the sample containers. The trip blanks were packaged for shipment with the other volatile organic compounds (VOC) samples and sent for analysis. At no time after their preparation were the trip blank sample containers opened before they reached the laboratory. At least one trip blank per shipping cooler was sent to the laboratory for VOC analysis.

A total of eight trip blanks were sent to the laboratory for analysis of BTEX and TPH GRO. There was also four equipment rinsates and three field blanks that were sent to the lab for analysis of BTEX and TPH GRO and DRO as shown in Table 2-4.

TABLES

TABLE 2-1 (continued)

SUBSURFACE SOIL SAMPLE MATRIX
CMS INVESTIGATION
TOW WAY FUEL FARM
NAVAL STATION ROOSEVELT ROADS

			Laboratory Analysis					
Sample ID	Date Collected	Sample Depth (ft bgs)	BTEX	DRO	GRO	TOC	Bulk Density	Particle Size
7DP01-05	14-Apr	8-10	X	X	X			
7DP01-08	14-Apr	14-16	X	X	X			
7DP01-11	14-Apr	20-22	X	X	X			
7DP01-13	14-Apr	24-26	X	X	X			
7DP01-14	14-Apr	27-28.5	X	X	X			
7DP01	14-Apr	0-29						X
7DP02-05	15-Apr	9-10	X	X	X			
7DP02/10	16-Apr						X	
7DP03-01	15-Apr	1-2	X	X	X			
7DP03-02	15-Apr	3-4	X	X	X	X	X	X
7DP04-01	15-Apr	1-3	X	X	X			
7DP04-03	15-Apr	5-7	X	X	X		X	
7DP05-01	15-Apr	2-3	X	X	X			
7DP05-02	15-Apr	3-5					X	
7DP05-05	15-Apr	9-11	X	X	X			
7DP06-01	15-Apr	0-4	X	X	X			
7DP06-05	15-Apr	8-12	X	X	X			
7DP07-01	15-Apr	0-4	X	X	X			X
7DP07-04	15-Apr	4-8	X	X	X			
7DP07-06	15-Apr	12-14	X	X	X			
7DP08-01	15-Apr	0-4	X	X	X	X	X	
7DP08-04	15-Apr	4-8	X	X	X			
7DP09-03	16-Apr	5-7	X	X	X			
7DP09	16-Apr	0-9						X
7DP10-01	16-Apr	1-2	X	X	X			
7DP10-03	16-Apr	5-7	X	X	X			
7DP10-05	16-Apr	10-12	X	X	X			
7DP11-02	16-Apr	4-6	X	X	X			
7DP11-05	16-Apr	10-12	X	X	X			
7DP12-01	16-Apr	1-3	X	X	X			
7DP13-02	16-Apr	4-5.5	X	X	X			
7DP14-01	16-Apr	1-3	X	X	X	X		
7DP15-02	17-Apr	3-5	X	X	X			
7DP15-04	17-Apr	6-8	X	X	X			

TABLE 2-1 (continued)

SUBSURFACE SOIL SAMPLE MATRIX
CMS INVESTIGATION
TOW WAY FUEL FARM
NAVAL STATION ROOSEVELT ROADS

			Laboratory Analysis					
Sample ID	Date Collected	Sample Depth (ft bgs)	BTEX	DRO	GRO	TOC	Bulk Density	Particle Size
7DP15-07	17-Apr	12-14	X	X	X			
7DP16-03	17-Apr	2-6	X	X	X			
7DP16-05	17-Apr	10-12	X	X	X			
7DP17-02	17-Apr	3-6	X	X	X			
7DP17-04	17-Apr	7-9	X	X	X	X		
7DP18-02	17-Apr	4-6	X	X	X			
7DP19-03	17-Apr	5-7	X	X	X			
7DP19-06	17-Apr	12-14	X	X	X			
7DP19-08	17-Apr	16-18	X	X	X			
7DP20-02	17-Apr	3-5	X	X	X			
7DP20-05	17-Apr	10-12	X	X	X			
7DP20	17-Apr	0-20						X
7DP21-01	18-Apr	1-3	X	X	X	X		
7DP22-01	18-Apr	0-4	X	X	X			
7DP23-02	18-Apr	3-4	X	X	X	X		
7DP24-01	18-Apr	3-5	X	X	X			
7DP24-02	18-Apr	3-5						X
7DP24-03	18-Apr	5-7	X	X	X			
7DP24-05	18-Apr	10-11	X	X	X			
7DP25-01	19-Apr	0-4	X	X	X			
7DP25-03	19-Apr	4-7	X	X	X			
7DP25-06	19-Apr	10-13	X	X	X			
7DP26-02	19-Apr	2-4	X	X	X			
7DP26-04	19-Apr	6-10	X	X	X			
7DP26-06	19-Apr	12-14	X	X	X			
7DP27-01	19-Apr	0-4	X	X	X			
7DP27-04	19-Apr	7-8	X	X	X	X		
7DP28-01	19-Apr	1-3	X	X	X	X		X
7DP29-01	19-Apr	1-3	X	X	X			X
7DP29-04	19-Apr	7-8	X	X	X			
7DP30-01	19-Apr	1-3	X	X	X			
7DP30-03	19-Apr	5-6	X	X	X			
7DP-TWFF-U1	21-Apr							X
7DP-TWFF-U	21-Apr							X

TABLE 2-2

SOIL GAS SAMPLE MATRIX
CMS INVESTIGATION
TOW WAY FUEL FARM
NAVAL STATION ROOSEVELT ROADS, PUERTO RICO

				Laboratory Analysis			
Sample ID	Boring Location	Sample Depth (ft bgs)	Date Collected/ Received by Lab	% Oxygen	% Carbon Dioxide	GRO	DRO
7SG01	7DP19	4	20-Apr	X	X	X	X
7SG02	7DP18	3	20-Apr	X	X	X	X
7SG03	7DP17	3	20-Apr	X	X	X	X
7SG04	7DP20	3	20-Apr	X	X	X	X
7SG05	7DP21	3	20-Apr	X	X	X	X
7SG06	7DP25	4	20-Apr	X	X	X	X
7SG07	7DP24	3	20-Apr	X	X	X	X
7SG08	7DP29	3	20-Apr	X	X	X	X
7SG09	7DP30	3	20-Apr	X	X	X	X
7SG10	7DP26	3	20-Apr	X	X	X	X

TABLE 2-3

GROUNDWATER SAMPLE MATRIX
CMS INVESTIGATION
TOW WAY FUEL FARM
NAVAL STATION ROOSEVELT ROADS, PUERTO RICO

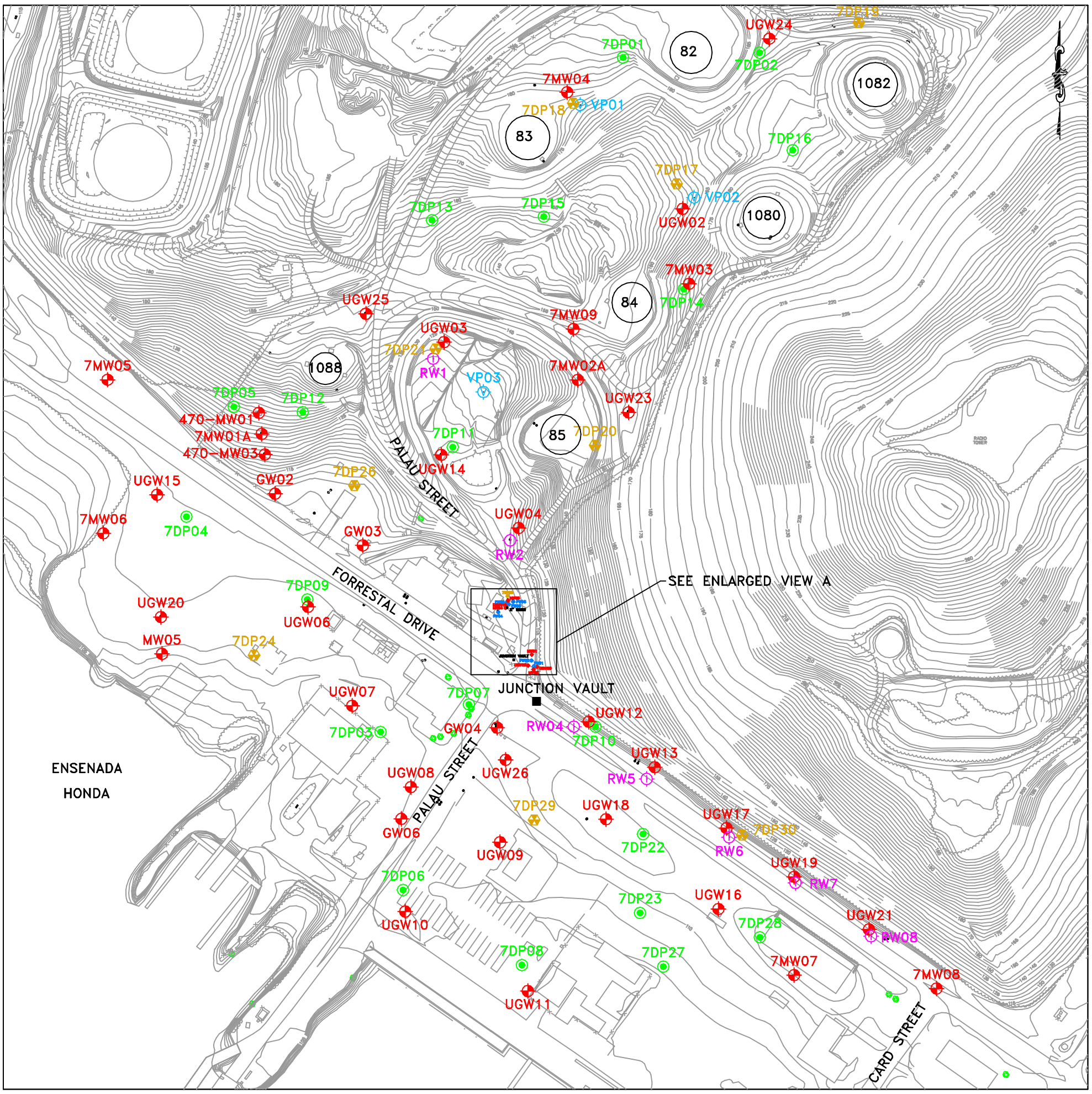
		Laboratory Analysis								
Sample ID	Date Collected	BTEX	GRO	DRO	Methane	Nitrate	Sulfate	Alkalinity	Chloride	Ferrous Iron
GW-02	21-Apr	X	X	X	X	X	X	X	X	X
GW-03	21-Apr	X	X	X	X	X	X	X	X	X
GW-04	16-Apr	X	X	X	X	X	X	X	X	X
GW-06	16-Apr	X	X	X	X	X	X	X	X	X
MW-2	17-Apr	X	X	X	X	X	X	X	X	X
MW-4	19-Apr	X	X	X	X	X	X	X	X	X
UGW-2	15-Apr	X	X	X	X	X	X	X	X	X
UGW-3	20-Apr	X	X	X	X	X	X	X	X	X
UGW-4	20-Apr	X	X	X	X	X	X	X	X	X
UGW-5	17-Apr	X	X	X	X	X	X	X	X	X
UGW-6	15-Apr	X	X	X	X	X	X	X	X	X
UGW-7	15-Apr	X	X	X	X	X	X	X	X	X
UGW-8	16-Apr	X	X	X	X	X	X	X	X	X
UGW-9	16-Apr	X	X	X	X	X	X	X	X	X
UGW-10	16-Apr	X	X	X	X	X	X	X	X	X
UGW-11	17-Apr	X	X	X	X	X	X	X	X	X
UGW-12	20-Apr	X	X	X	X	X	X	X	X	X
UGW-13	21-Apr	X	X	X	X	X	X	X	X	X
UGW-14	19-Apr	X	X	X	X	X	X	X	X	X
UGW-15	15-Apr	X	X	X	X	X	X	X	X	X
UGW-16	16-Apr	X	X	X	X	X	X	X	X	X
UGW-17	21-Apr	X	X	X	X	X	X	X	X	X
UGW-18	16-Apr	X	X	X	X	X	X	X	X	X
UGW-19	17-Apr	X	X	X	X	X	X	X	X	X
UGW-20	14-Apr	X	X	X	X	X	X	X	X	X
UGW-21	17-Apr	X	X	X	X	X	X	X	X	X
UGW-23	18-Apr	X	X	X	X	X	X	X	X	X
UGW-24	19-Apr	X	X	X	X	X	X	X	X	X
UGW-25	19-Apr	X	X	X	X	X	X	X	X	X
UGW-26	20-Apr	X	X	X	X	X	X	X	X	X
7MW01A	20-Apr	X	X	X	X	X	X	X	X	X
7MW02	19-Apr	X	X	X	X	X	X	X	X	X
7MW03	15-Apr	X	X	X	X	X	X	X	X	X
7MW04	15-Apr	X	X	X	X	X	X	X	X	X
7MW05	19-Apr	X	X	X	X	X	X	X	X	X
7MW06	19-Apr	X	X	X	X	X	X	X	X	X
7MW07	19-Apr	X	X	X	X	X	X	X	X	X
7MW08	18-Apr	X	X	X	X	X	X	X	X	X
7MW09	18-Apr	X	X	X	X	X	X	X	X	X
470-MW1	18-Apr	X	X	X	X	X	X	X	X	X
470-MW3	17-Apr	X	X	X	X	X	X	X	X	X

TABLE 2-4

QA/QC SAMPLE MATRIX
CMS INVESTIGION
TOW WAY FUEL FARM
NAVAL STATION ROOSEVELT ROADS, PUERTO RICO

		Laboratory Analysis		
Sample ID	Date Collected	BTEX	GRO	DRO
Trip Blanks				
TB-01	NA	X	X	
TB-02	NA	X	X	
TB-03	NA	X	X	
TB-04	NA	X	X	
TB-05	NA	X	X	
TB-06	NA	X	X	
TB-07	NA	X	X	
TB-08	NA	X	X	
Equipment Rinsates				
ER-01	16-Apr	X	X	X
ER-02	16-Apr	X	X	X
ER-03	16-Apr	X	X	X
ER-04	21-Apr	X	X	X
Field Blanks				
FB-01	21-Apr	X	X	X
FB-02	21-Apr	X	X	X
FB-03	21-Apr	X	X	X

FIGURES



VIEW A

277223WP

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

Baker

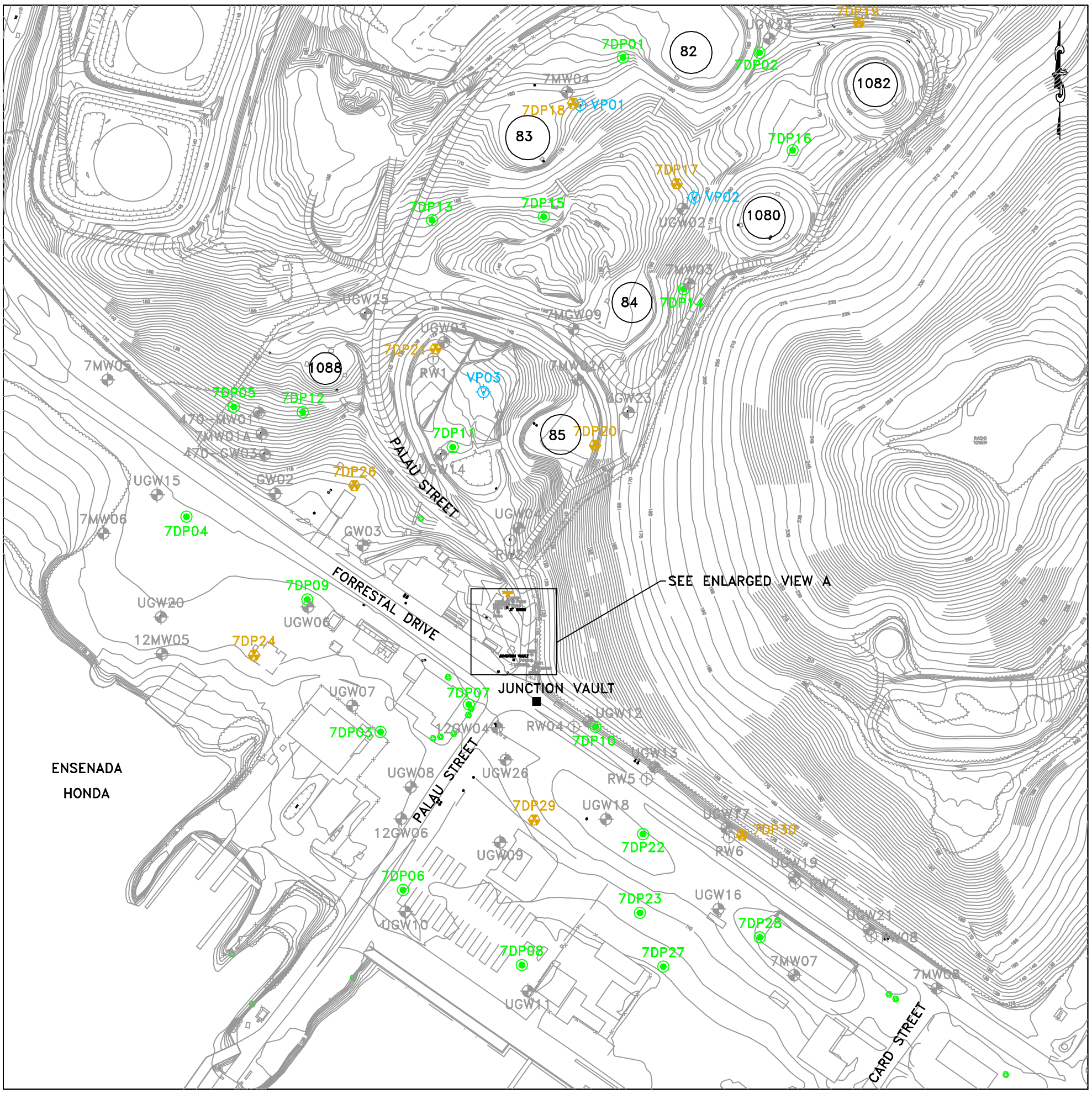
LEGEND

- MONITORING WELL LOCATION
- VERTICAL PERMEABILITY SAMPLE LOCATION
- SOIL BORING LOCATION
- SOIL BORING AND SOIL GAS SAMPLE LOCATION
- TERRAVAC PRODUCT RECOVERY WELL LOCATION
- ICHOR PRODUCT RECOVERY WELL LOCATION

SOURCE: LANTDIV, FEB. 1992/1997

FIGURE 2-1
SITE PLAN
TOW WAY FUEL FARM

NAVAL STATION ROOSEVELT ROADS
PUERTO RICO



VIEW A

277805WP

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

Baker

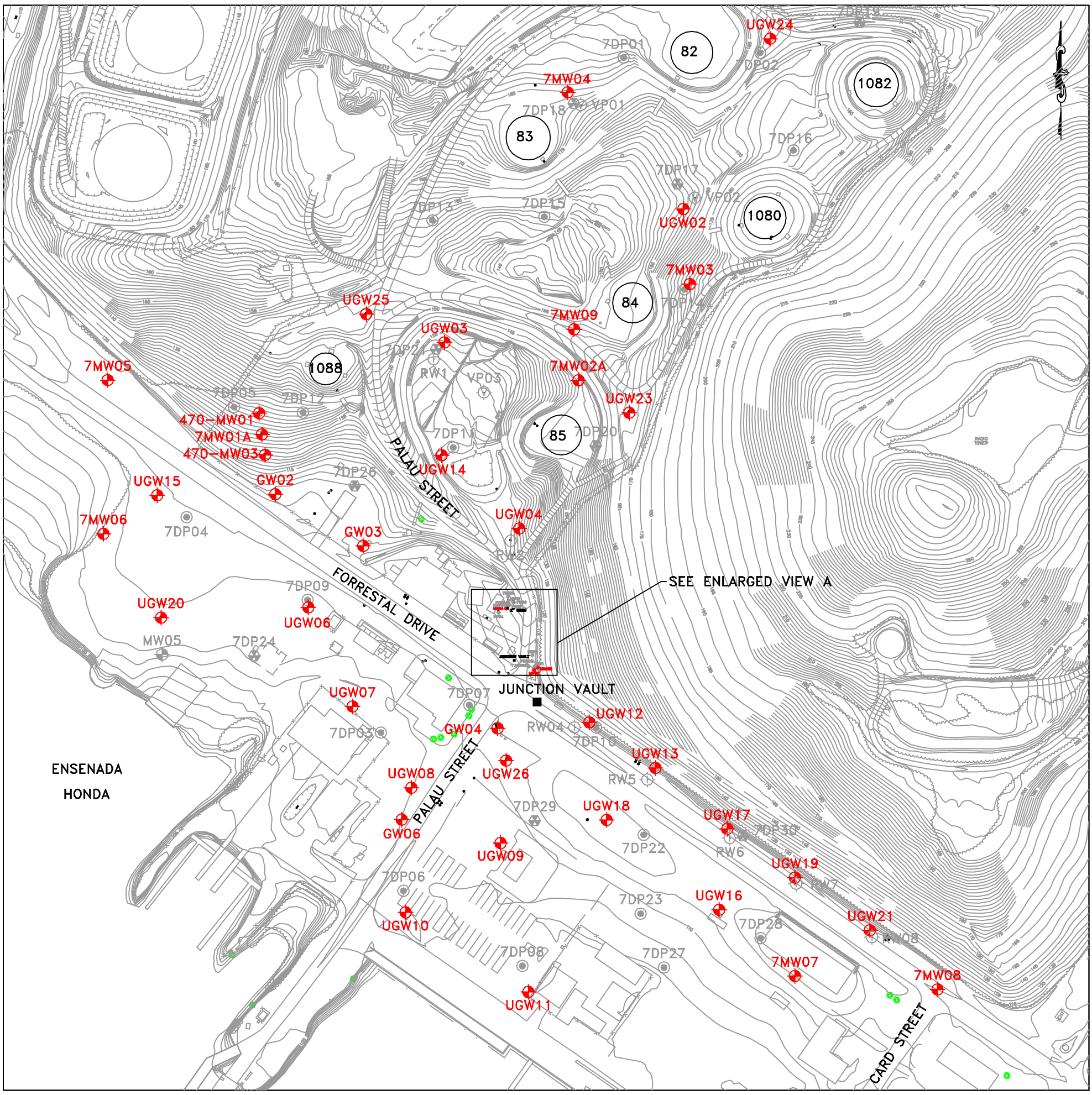
LEGEND

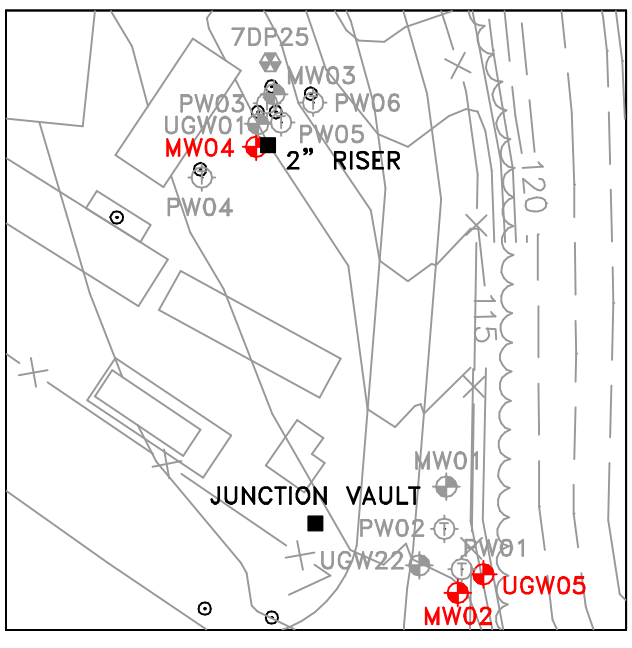
- MONITORING WELL LOCATION
- VERTICAL PERMEABILITY SAMPLE LOCATION
- SOIL BORING LOCATION
- SOIL BORING AND SOIL GAS SAMPLE LOCATION
- TERRAVAC PRODUCT RECOVERY WELL LOCATION
- ICHOR PRODUCT RECOVERY WELL LOCATION

SOURCE: LANTDIV, FEB. 1992/1997

FIGURE 2-2
SUBSURFACE SOIL, SOIL GAS, AND VERTICAL PERMEABILITY SAMPLING LOCATIONS
TOW WAY FUEL FARM

NAVAL STATION ROOSEVELT ROADS
PUERTO RICO





VIEW A

200 0 100 200
1 inch = 200 ft.

50 0 25 50
1 inch = 50 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

277809WP

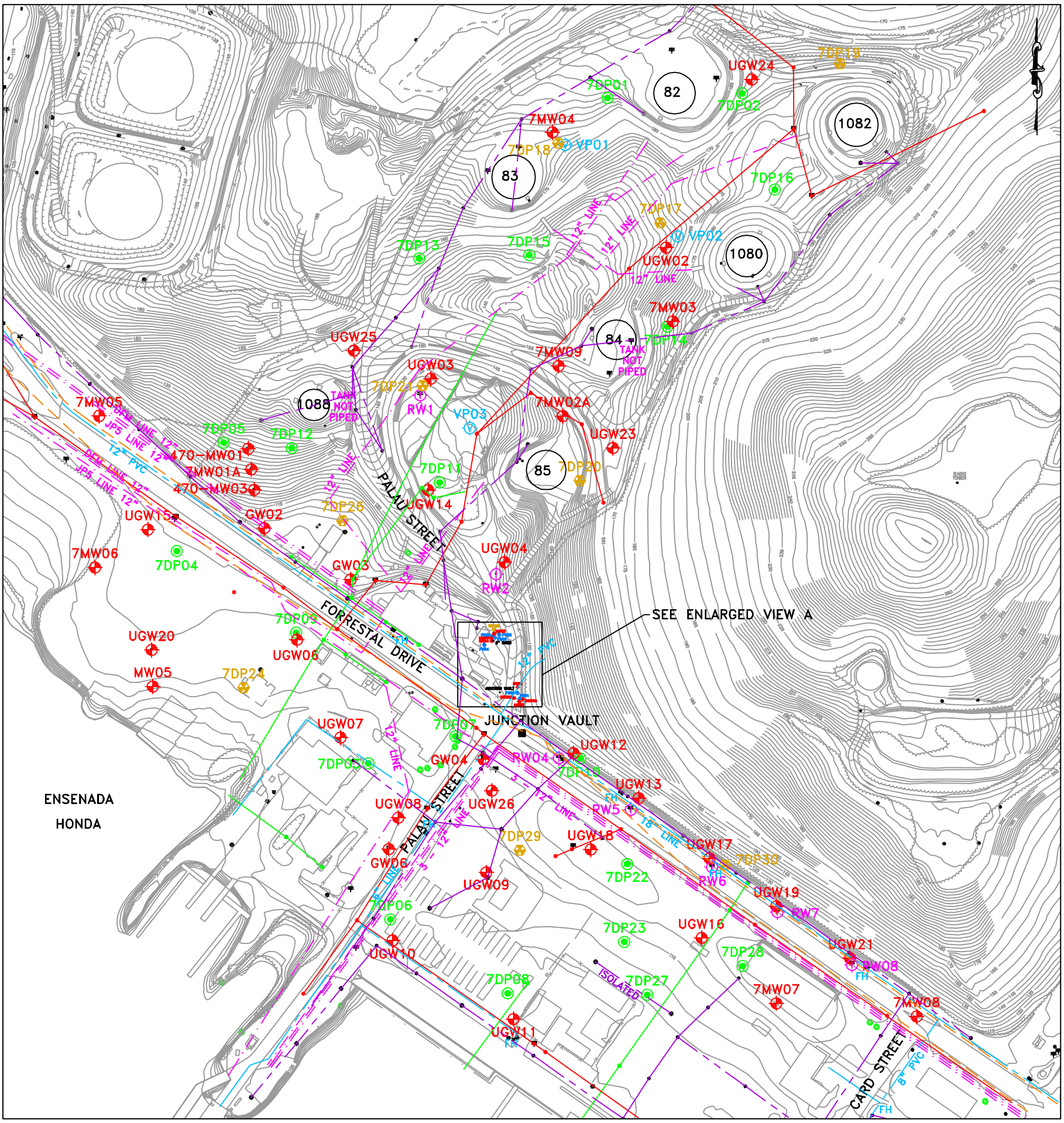
LEGEND

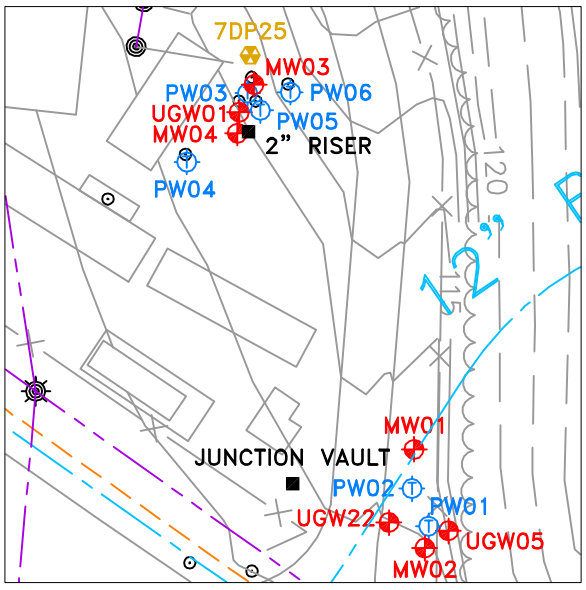
- MONITORING WELL LOCATION
- VERTICAL PERMEABILITY SAMPLE LOCATION
- SOIL BORING LOCATION
- SOIL BORING AND SOIL GAS SAMPLE LOCATION
- TERRAVAC PRODUCT RECOVERY WELL LOCATION
- ICHOR PRODUCT RECOVERY WELL LOCATION

SOURCE: LANTDIV, FEB. 1992/1997

FIGURE 2-3
GROUNDWATER SAMPLING LOCATIONS
TOW WAY FUEL FARM

NAVAL STATION ROOSEVELT ROADS
PUERTO RICO





200 0 100 200
1 inch = 200 ft.

50 0 25 50
1 inch = 50 ft.

VIEW A

- SANITARY SEWER
- STORM SEWER
- WATER LINE
- FUEL LINE
- OVERHEAD ELECTRICAL POWER AND/OR COMMUNICATIONS
- UNDERGROUND FIBER OPTICS

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

2034802G

SOURCE: LANTDIV, FEB. 1992/1997

Baker

LEGEND

- MONITORING WELL LOCATION
- VERTICAL PERMEABILITY SAMPLE LOCATION
- SOIL BORING LOCATION
- SOIL BORING AND SOIL GAS SAMPLE LOCATION
- TERRAVAC PRODUCT RECOVERY WELL LOCATION
- ICHOR PRODUCT RECOVERY WELL LOCATION

FIGURE 2–4
UNDERGROUND UTILITY LOCATIONS
TOW WAY FUEL FARM

NAVAL STATION ROOSEVELT ROADS
PUERTO RICO

3.0 RESULTS

This section presents an overview of the results obtained during the TWFF CMS field investigation. The objective of the investigation was to provide additional and time equivalent data regarding site contamination sufficient to evaluate corrective measures for the TWFF. Data was obtained through analysis of groundwater and subsurface soil and through water and product level readings, slug tests, baildown tests, and vertical permeability tests. Field and laboratory data is provided in appendices. Appendix A presents the chain-of-custody records for the samples shipped. Appendix B provides the test boring records. The particle size analysis of soils is contained in Appendix C. Appendix D presents the analytical laboratory results while Appendix E presents the wellhead test data (Slug Tests). The Quality Assurance/Quality Control Results are provided in Appendix F.

3.1 Soils Investigation

This section presents the results associated with the soils at the TWFF including site geology, subsurface soil analytical results, soil gas analytical results, and vertical permeability test results.

3.1.1 Site Geology

Subsurface conditions at the TWFF have been illustrated on two hydrogeologic cross-sections, as well as on 30 test boring records (Appendix B). Figure 3-1 shows the locations of the hydrogeologic cross-sections A-A' and B-B'. Figures 3-2 and 3-3 graphically present subsurface conditions along the hydrogeologic cross-sections.

As a part of the corrective measures study, soil samples were collected for grain size and bulk density analysis. These analytical results are presented in Table 3-1 with the particle size analysis provided in Appendix C. This data is intended for use in the selection of corrective measures. Particle size analysis samples were collected from soils representative of conditions outside the zone of contamination. Bulk density analysis samples were collected from soils representative of stratigraphic units located inside the zone of contamination.

The stratigraphic units encountered at the TWFF can be classified into two groups; consolidated bedrock and unconsolidated material. Both of these groups are discussed in the paragraphs which follow.

The consolidated bedrock is gabbro and is igneous in origin. The top of bedrock was encountered between 0 and 20 ft bgs. Bedrock was encountered at the ground surface at monitoring well 7MW08 (Cross-section B-B:), and approximately 20 ft bgs at monitoring well UGW-10 (Cross-section A-A:). The top of bedrock generally follows the contours of the ground surface (note the hillside on Cross-section A-A: for example). In the lower portions of the TWFF the bedrock surface undulates from 7 to 20 feet bgs in a southwest direction while the ground surface slopes gently towards the southwest. This undulation is not observed in the northwest-southeast direction (Cross-section B-B:). The gabbro bedrock contains significant zones of weathering. Both cross-sections indicate that much of the bedrock encountered is weathered. The particle size sample from 7DP01 is an example of the particle size distribution in the weathered bedrock. It is also apparent from the test boring records that petroleum constituents have migrated through the weathered zones in places (Cross-section B-B:, between wells MW02 and UGW-17 for example).

The unconsolidated material can be divided into four primary groups; topsoil, saprolite, fill, and marine deposits. Topsoil is found as a relatively thin veneer on the hillsides of the TWFF (Cross-section A-A:), between monitoring wells UGW24 and UGW04. The topsoil at the TWFF was observed to be 4 to 6 feet thick and consists primarily of silt. A saprolite was observed immediately below the topsoil on the TWFF hillsides. A saprolite is a highly decomposed bedrock zone that is considered to be a transition zone between bedrock and topsoil. The particle size samples 7DPTWFFU and 7DPTWFFU1 provide examples of the particle size distribution of the unconsolidated material (topsoil and saprolite) on the hillside of the TWFF. The saprolite primarily consists of silt, clay, and sand with rock fragments. The particle size sample from 7DP20 is an example of the particle size distribution of the saprolite. This saprolite was observed to be approximately 5 to 10 feet thick. Fill material was encountered in the lower portions of the TWFF, where the ground surface is relatively flat (Cross-section B-B: and Cross-section A-A:, between well UGW04 and boring 7DP06). The fill material consists of fine to coarse sand generally with lesser amounts gravel, silt, and clay. The particle size samples from 7DP07, 7DP09, 7DP24, 7DP28, and 7DP29 all provide examples of the particle size distribution of the fill material. Several borings

located close to Ensenada Honda indicate the presence of naturally deposited sediments. These sediments were encountered at monitoring well UGW10 (on the southwestern end of Cross-section A-A:) and are primarily silt with lesser amounts of sand and clay. In other borings close to Ensenada Honda, but not on the cross-section, the sediments were observed to contain coral and shell fragments, which are indicative of a marine origin. The particle size sample from 7DP03 is an example of the particle size distribution of the marine sediments.

The information used to develop the cross-sections came from this investigation and from RCRA Facility Investigation Report (Baker, June 1996). Information was also taken from the Additional Well Installation Interim Corrective Measure Report (Baker, March 1998).

3.1.2 Subsurface Soil Analytical Results

A total of 68 subsurface soil samples were submitted for laboratory analysis from the TWFF during the CMS investigation.

At least one of the four constituents in the BTEX analysis were detected in 34 of the 60 samples as presented in Table 3-1. None of the detected levels exceeded the residential or industrial RBCs. Sample 7DP15-02 contained the maximum detections for three of the four BTEX constituents, including benzene (150 J µg/kg), toluene (680 µg/kg), and xylene (2,300 µg/kg). The location of the maximum detection of ethylbenzene was 7DP07-04, with a concentration of 12,000 µg/kg.

TPH (DRO and GRO) were detected in 43 of the 60 samples as shown in Table 3-1. There were a total of 14 samples which exceeded the EPA Region III RBCs for TPH DRO (100 mg/kg) with concentrations ranging from 270J mg/kg (7DP07-06) to 22,000 mg/kg (7DP15-04). A total of ten samples exceeded the screening criteria for TPH GRO (100,000 µg/kg) with concentrations ranging from 180,000 µg/kg (7DP10-05) to 1,100,000 J µg/kg (7DP25-06).

Isopleth maps of the BTEX and TPH (DRO and GRO) concentrations were developed on five foot intervals to a total depth of 15 feet bgs. A minimum of three positive detections were required in each interval for the respective constituent to generate the isopleth maps. This yielded a BTEX, TPH (DRO and GRO) isopleth from the three five foot intervals for a total of nine isopleth maps.

Figures 3-4, 3-5, and 3-6 provide the BTEX, TPH GRO, and TPH DRO isopleth maps for the 0-5 ft bgs interval. Figure 3-7, 3-8, and 3-9 correspond to the 5-10 ft bgs interval while Figures 3-10, 3-11, and 3-12 provide the BTEX, TPH GRO, and TPH DRO isopleths. An estimated volume of contaminated soil was determined utilizing the isopleth maps. This volume was calculated for those soils which exceeded 100 mg/kg (Commonwealth of Puerto Rico's generally applied soil standard for TPH in soil). It was estimated that 146,000 cubic yards of soil is in excess of 100 mg/kg TPH.

TOC was detected in eight of the 68 samples submitted for analysis as presented in Table 3-1. The concentrations ranged from 0.046 µg/kg (7DP23-02) to 0.77 µg/kg (7DP03-02).

A total of five samples (7DP02/10, 7DP03-02, 7DP04-03, 7DP05-02, and 7DP08-01) were submitted for analysis of bulk density. The density of the samples ranged from one gram per milliliter (g/ml) in sample 7DP08-01 to 1.4 g/ml (7DP03-02).

3.1.3 Soil Gas Analytical Results

A total of ten soil gas samples were submitted for laboratory analysis as summarized on Table 3-2. These samples were submitted for analysis of TPH (DRO and GRO), percent carbon dioxide, and percent oxygen.

TPH GRO was detected in four of the ten samples with a minimum detection of 5.6 parts per million by volume (ppmV) in sample 7SG10, and a maximum detection of 45 ppmV in sample 7SG06. TPH DRO was not detected in any of the ten samples. Carbon dioxide was detected in nine samples with a minimum concentration of 0.9% from sample 7SG02, and a maximum concentration of 20.8% from sample 7SG01. The concentration of oxygen detected in the subsurface soils ranged from 7.6% (7SD01) to 25.4% (7SG06) as indicated in Table 3-2.

3.1.4 Vertical Permeability Test Results

A total of three vertical permeability tests were performed at the TWFF at the locations shown on Figure 2-2. The results of the tests are presented in Tables 3-3 through 3-5. The tests were conducted according to the EPA approved work plan, and utilized the Aflush bottom in uniform soil with variable head@ calculation to determine the mean coefficient of permeability (Winterkorn and Fang, 1975). The formula used consists of the following:

Where:

K_m = mean coefficient of permeability, cm/sec.

D = cylinder diameter, cm

t = time, seconds

In = $\log_e = 2.3 \log_{10}$

H_1 = piezometer head for $t = t_1$, cm

H_2 = piezometer head for $t = t_2$, cm

VP-01, located just northeast of tank 83, had a mean coefficient of permeability (K_m) of 8.5 x 10^{-4} centimeters per second (cm/sec) as shown in Table 3-3 in the beginning of the test. The infiltration of water into the surface soils commenced after the soils became saturated. One gallon of water was added to the permeability container 432 minutes into the testing procedure to increase the head on the surface soils. The test was conducted for approximately fifty hours. The Hermit data logger and pressure transducer were not used at this test location due to the low permeability of the surface soils.

VP-02, located just west of tank 1080, had an average K_m of 4.4 x 10^{-4} cm/sec and a maximum coefficient of 1.3 x 10^{-2} cm/sec as presented on Table 3-4. The maximum coefficient was measured two minutes into the testing procedure. One gallon of water was added to the permeability container at 2 minutes into the procedure. Water was then added in two gallon volumes at 54 minutes and then again at 420 minutes. At 671 minutes, 4 gallons of water were added and the Hermit data logger and pressure transducer was introduced into the cylinder to record water levels at 15 minute intervals. At 1467 minutes into the test, rain water was determined to have infiltrated the container due to the increase in water levels as shown in Table 3-4. Therefore the data obtained after this interval is subject and should not be used. This test was also conducted for approximately 50 hours.

VP-03, which was located northwest of tank 85, had a minimum K_m of 5.0 x 10^{-4} cm/sec, and a maximum K_m of 8.1 x 10^{-4} cm/sec as presented in Table 3-5. The average K_m was 6.2 x 10^{-4} cm/sec. The Hermit data logger and pressure transducer were not used at this test location due to the low permeability of the surface soils.

3.2 Groundwater Investigation

This section provides the results of the groundwater investigations at the TWFF including groundwater/product levels, groundwater analyses, baildown tests, and slug tests.

3.2.1 Groundwater Level Measurements

A complete round of groundwater/product level measurements were taken from each monitoring well sampled during the CMS investigation on April 21,1998.

Ten of the forty-one wells measured on April 21, contained some measurable thickness of product including GW-03, UGW-3, UGW-4, UGW-12, UGW-13, UGW-17, UGW-19, UGW-21, UGW-25, and 470-MW1. The thickness of product ranged from 0.01 feet (ft) at monitoring well GW-03, to 6.27 ft at well UGW-13. It should be noted that the monitoring wells were sampled prior to the complete round of water levels were recorded. The purging which took place prior to groundwater sampling removed substantial quantities of free product from within the wells. A more in depth discussion of the product thickness is provided in Section 3.2.3.

A groundwater correction factor was utilized to obtain the corrected groundwater elevation when free product was present in the well. The following formula was used:

True Elevation = (Apparent Product Thickness) x (Density of Product) + (Apparent Groundwater Elevation)

The apparent thickness is measured from top of detected product to top of detected groundwater. The density of the product at the majority of the wells at the TWFF is 0.811 grams per cubic centimeter (g/cc). The apparent elevation of groundwater was obtained by measuring depth to groundwater from the top of the PVC casing with a known elevation.

The corrected groundwater elevations are provided in Table 3-6. A corrected groundwater surface contour map was developed as shown on Figure 3-13. The groundwater at the site generally follows the topographic surface down the TWFF hillside in a southwest direction toward Ensenada Honda.

3.2.2 Groundwater Analytical Results

A total of 41 groundwater samples were collected from the TWFF during the CMS investigation.

Twenty one VOCs were detected in the groundwater samples collected. Only fourteen of the detected VOCs were in excess of either or both of the screening criteria as shown in Table 3-7. 1,1-Dichloroethene, chloroform, bromodichloromethane, and 1,1,2-Trichloroethane exceed the EPA Region III Tap Water RBCs in one sample each. 1,3,5-Trimethylbenzene, 1,2,4-Trimethylbenzene, n-Propylbenzene, Sec-butylbenzene, and n-butylbenzene all exceeded their respective tap water RBCs. A total of five constituents exceeded both of the listed criteria. Trichloroethene with a MCL of 5 Fg/l was detected in three samples ranging in concentration of 2-2,000J Fg/l. An isopleth map providing the BTEX concentrations in the groundwater at the TWFF is shown on Figure 3-14.

TPH GRO was detected in 26 out of 41 samples ranging from 29 J to 420,000 J µg/L. An isopleth map of the TPH GRO concentrations in groundwater at the TWFF is provided on Figure 3-15. TPH DRO was detected in 33 of 41 samples with concentrations from 65 J to 960,000 µg/L. An isopleth map of the TPH DRO concentrations in groundwater at the TWFF is provided on Figure 3-16.

Methane was detected in 33 of the 41 samples with concentrations ranging from 0.05 to 55 µg/L as provided in Table 3-7. The alkalinity of the groundwater samples ranged from 156,000 to 1,400,000 µg/L. Nitrate was detected in 17 out of 41 samples ranging in concentration from 110 to 3,200 µg/L. Sulfate detections ranged from 260 to 681,000 µg/L in 38 of the 41 groundwater samples. Chloride which was detected in all of the groundwater samples ranged from 14,100 to 8,340,000 µg/L, while ferrous iron was detected in 39 of the 41 samples ranging from 80 to 28,000 µg/L as shown in Table 3-7.

The on-site water quality characteristics of specific conductivity, temperature, pH, redox potential, and dissolved oxygen are shown on Table 3-8. The specific conductivity ranged from 50 to 27,500 Fmhos, the pH values were in the range of 6.31 to 7.76. The redox potential ranged from 354.5 to 164.1 mV. Dissolved oxygen concentrations were 0.68 to 4.03 mg/L.

3.2.3 Baildown Test Results And Product Level Measurements

Two baildown tests were conducted on monitoring wells UGW-19 and UGW-21 on April 21, 1998. The baildown tests were performed to estimate the rate of free product recovery. These two particular wells were tested due to the quantity of free product available within the monitoring wells at the time of the tests.

Before the actual baildown test was performed, pre-test conditions were established. In monitoring well UGW-19, the initial product thickness was 1.24 ft, with an initial corrected groundwater elevation of 101.68 ft mean sea level (msl) as shown in Table 3-9 (Datum plan used is mean low water = 100.00 ft. as established by U.S. Navy Survey Section as of November 1941). Multiple bailers of liquid were then purged out of the monitoring well and placed in a five gallon bucket. The purpose of this procedure was to remove as much product as possible from the monitoring well. The product volume was then measured from the volume of liquid bailed. This well contained 0.8 liters (L) of product. Once the amount of product was determined, the post test conditions were established. This consisted of taking measurements hourly for the next two hours. The product thickness increased from 0.10 ft at 1600 hours, to 0.17 ft at 1700 and 1800 hours on April 21, 1998. The next measurement was taken at 0740 hours on April 22, 1998 yielding a product thickness of 0.18 ft and a corrected groundwater elevation of 102.19 ft msl. This level could have been influenced by the overnight heavy rain.

In monitoring well UGW-21, the initial product thickness was 1.63 ft, with an initial corrected groundwater elevation of 101.2 ft msl as shown in Table 3-9. Multiple bailers of liquid were then purged out of the monitoring well and placed in a five gallon bucket. The purpose of this procedure was to remove as much product as possible in the monitoring well. The product volume was then measured from the volume of liquid bailed. This well contained 3.79 L of product. Once the amount of product was determined, the post test conditions were established. Measurements were taken hourly for two hours. The product thickness increased from 0.52 ft at 1720 hours, to 0.58 ft at 1820 and 1920 hours on April 21, 1998. The next measurement was taken at 0735 hours on April 22, 1998 with a product thickness of 0.68 ft and a corrected groundwater elevation of 101.84 ft

msl. This level could have also been influenced by the heavy rain the night before.

During groundwater sampling from April 14 to April 21, 1998, 15 wells contained measurable product. This is five more wells than seen during the complete round of groundwater/product level measurements obtained on April 21 when only10 wells had measurable product thickness as shown on Table 3-10. This indicated that the product did not have enough time to totally recover from the time the wells were sampled (April 14) to the time their groundwater/product levels were measured (April 21). Due to this development, another round of groundwater/product level measurements were taken on April 22, 1998 from the monitoring wells that had a measurable product thickness during the April 21, 1998 water level round to obtain additional information on the free product recharging within the aquifer. Because of the slow recharge of free product within the monitoring wells, free product thickness measurements collected during the groundwater sampling event were utilized to develop the free product thickness and extent map as shown on Figure 3-17.

3.2.4 Slug Test Results

The slug test analysis results are summarized on Table 3-11, the slug test data plots are provided in Appendix E. The results indicate heterogeneity in hydraulic conductivity in the bedrock aquifer.

The bedrock aquifer heterogeneity is exhibited in the data in two ways. First, Table 3-10 shows that the hydraulic conductivity values range by an order of magnitude. Examining the rising head data, the hydraulic conductivity results range from 1.52×10^{-4} (cm/sec) (UGW-24) to 3.49×10^{-3} (7MW01A) cm/sec. Also, there does not appear to be any distinct pattern to the areal distribution of the data. Second, several of the data plots presented in Appendix E show this heterogeneity. The plots for wells 7MW02A, 7MW03 (falling head), and UGW-24 exhibit disturbances in the data distribution over time. This is an indication of changes in the rate of recovery of these wells (i.e., zone of varying hydraulic conductivity near those wells). In fact, two plots are presented in Appendix E for UGW-24 because the data showed two distinct slopes.

The falling head test analysis at 7MW01A estimated the hydraulic conductivity to be approximately 1.06×10^{-2} cm/sec. This value appears to be anomalously high. The rising head test, as well as previous pumping test data (Baker, 1997b), indicates a lower hydraulic conductivity value. The rising head test analysis estimated the hydraulic conductivity value to be 3.49×10^{-3} cm/sec. Recovery test data from a pumping test conducted at the TWFF estimated the hydraulic conductivity to be

approximately 1.4 x 10^{-3}. Since the rising head test and the recovery test data appear more comparable, the falling head test data is considered to be unrepresentative of aquifer conditions.

The UGW-11 slug test analysis estimated the hydraulic conductivity to be approximately 139 ft/day. This value appears anomalously high for fine to coarse unconsolidated sands. According to Fetter (Fetter, 1988) well-sorted sand or gravel typically exhibit hydraulic conductivity values of over 100 ft/day. Poorly sorted sand like that observed at UGW-11 typically exhibit hydraulic conductivity values of 0.3 to 30 ft/day. Additionally, based on the data plot of UGW-11, full recovery occurred in less than 15 seconds. Such a quick recovery rate is considered to be attributable to sand pack drainage rather than aquifer response.

3.3 Quality Assurance/ Quality Control

A portion of the QA/QC sampling efforts consisted of equipment rinsate samples, field blanks, and trip blanks. The complete set of the analytical results from the QA/QC sampling is presented in Appendix F.

3.3.1 Equipment Rinsate Samples

A total of four equipment rinsate samples (ER-01 through ER-04) were collected at the TWFF as presented in Table 3-12. The equipment rinsate samples were collected while pouring lab grade deionized water over the sampling equipment. Sample ER-01 was associated with a disposable bailer, sample ER-02 an acetate liner, sample ER-03 a stainless steel spoon, and sample ER-04 a three inch Teflon bailer.

Only one VOC, (methylene chloride which is a common laboratory artifact), was detected in all of the equipment rinsate samples with concentrations ranging from 0.9 micrograms per liter (µg/L) in ER-01 to 1.0 µg/L in ER-02 through ER-04 as shown on Table 3-12. TPH GRO was detected in two of the four equipment rinsate samples. TPH GRO was detected in ER-02 with a level of 57 µg/L and in ER-03 with a level of 460 µg/L.

3.3.2 Field Blanks

Three field blanks (FB-01 through FB-03) were collected during the investigation at the TWFF as

presented in Tables 3-13. The water analyzed included lab grade deionized water (FB-01), store bought distilled water (FB-02) , and NSRR potable water supply (spigot located outside of Building 31)(FB-03).

FB-01 had positive VOC detections of both methylene chloride and trichloethene, each with a result of 1.0 µg/L. FB-02 had a positive detection of 1,4-dichlorobenzene with a level of 5.0 µg/L. FB-03 had positive detections of chloroform (11 µg/L), bromodichloromethane (14 µg/L), dibromochloromethane (2 µg/L), and TPH GRO (34 µg/L).

3.3.3 Trip Blanks

A total of eight trip blanks (TB-01 through TB-08) were analyzed during the investigation at the TWFF as presented in Table 3-14. Only TPH GRO was positively detected in two (TB-06 and TB-07) of the eight samples, at concentrations of 30 J µg/L and 26 J µg/L, respectively.

TABLES

TABLE 3-1

SUMMARY OF SUBSURFACE SOIL ANALYTICAL RESULTS
CMS INVESTIGATION
TOW WAY FUEL FARM
NAVAL STATION ROOSEVELT ROADS, PUERTO RICO

Sample ID	EPA Region III	**EPA Region III**	7DP-TWFF-U	7DP-TWFF-U1	7DP01	7DP01-05	7DP01-08	7DP01-11	7DP01-13	7DP01-14	7DP02-05	7DP02/10
Sample Date	Industrial	**Residential**	04/21/98	04/21/98	04/14/98	04/14/98	04/14/98	04/14/98	04/14/98	04/14/98	04/15/98	04/16/98
Depth Range (ft.)	RBC	**RBC**			0.00-29.00	8.00-10.00	14.00-16.00	20.00-22.00	24.00-26.00	27.00-28.50	9.00-10.00	
BTEX (ug/kg)												
Benzene	200,000	22,000	NA	NA	NA	1.2 U	1.2 U	1.1 U	1.1 U	1.1 U	1.1 U	NA
Ethylbenzene	200,000,000	7,800,000	NA	NA	NA	1.2 U	1.2 U	1.1 U	1.1 U	1.1 U	1.1 U	NA
Toluene	410,000,000	16,000,000	NA	NA	NA	1.2 U	1.2 U	1.1 U	1.1 U	1.1 U	1.1 U	NA
Xylenes	4,100,000,000	160,000,000	NA	NA	NA	1.2 U	1.2 U	3.4	1.1 U	0.82 J	0.6 J	NA
TPH												
Diesel Range Organics (mg/kg)	100	100	NA	NA	NA	12	11	5.3 J	6.9 U	15	26	NA
Gasoline Range Organics (ug/kg)	100,000	100,000	NA	NA	NA	58 U	32 J	79	55 U	65	54 U	NA
Grain-size												
% Clay	NE	NE	12.2	63	23.8	NA	NA	NA	NA	NA	NA	NA
% Silt	NE	NE	25.9	24.7	25.9	NA	NA	NA	NA	NA	NA	NA
% Gravel	NE	NE	8.4	2.1	4.1	NA	NA	NA	NA	NA	NA	NA
% Sand	NE	NE	53.5	10.2	46.2	NA	NA	NA	NA	NA	NA	NA
Engineering Properties												
Total organic carbon (ug/kg)	NE	NE	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Density												
Density (g/ml)	NE	NE	NA	NA	NA	NA	NA	NA	NA	NA	NA	1.05

Data Qualifiers:
J - Analyte present. Reported value may not be accurate or precise.
U - Not detected. The associate number indicates the approximate sample concentration necessary to be detected.
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NE - Not established.
NA - Not analyzed.

TABLE 3-1

SUMMARY OF SUBSURFACE SOIL ANALYTICAL RESULTS
CMS INVESTIGATION
TOW WAY FUEL FARM
NAVAL STATION ROOSEVELT ROADS, PUERTO RICO

Sample ID	EPA Region III	**EPA Region III**	7DP03-01	7DP03-02	7DP04-01	7DP04-03	7DP05-02	7DP05-01	7DP05-05	7DP06-01	7DP06-05	7DP07-01	7DP07-04	7DP07-06
Sample Date	Industrial	**Residential**	04/15/98	04/15/98	04/15/98	04/15/98	04/15/98	04/15/98	04/15/98	04/15/98	04/15/98	04/15/98	04/15/98	04/15/98
Depth Range (ft.)	RBC	**RBC**	1.00-2.00	3.00-4.00	1.00-3.00	5.00-7.00	3.00-5.00	2.00-3.00	9.00-11.00	0.00-4.00	8.00-12.00	0.00-4.00	4.00-8.00	12.00-14.00
BTEX (ug/kg)														
Benzene	200,000	22,000	1.2 U	1.3 U	1.2 U	1.2 U	NA	1.1 U	1.1 U	1.2 U	4.5	1.2 U	28 J	6.2 U
Ethylbenzene	200,000,000	7,800,000	1.2 U	1.3 U	1.2 U	10	NA	1.1 U	1.1 U	1.2 U	3.8	1.2 U	12,000	31 J
Toluene	410,000,000	16,000,000	1.2 J	0.68 J	1.2 U	2.3	NA	1.1 U	1.1 U	1.2 U	0.92 J	1.2 U	37 J	24 J
Xylenes	4,100,000,000	160,000,000	2.7	1.2 J	1.2 U	10	NA	1.1 U	1.1 U	1.2 U	9	1.9	560	53 J
TPH														
Diesel Range Organics (mg/kg)	100	100	7.3 U	8.1 U	7.3 U	6.9 U	NA	6.6 U	6.9 U	7.6 U	13 J	35	**5,700**	**270** J
Gasoline Range Organics (ug/kg)	100,000	100,000	59 U	66 U	61 U	1,100 J	NA	29 J	57 U	61 U	2,100	110	**730,000**	60,000
Grain-size														
% Clay	NE	NE	NA	31.3	NA	NA	NA	NA	NA	NA	NA	15.6	NA	NA
% Silt	NE	NE	NA	32.7	NA	NA	NA	NA	NA	NA	NA	56.8	NA	NA
% Gravel	NE	NE	NA	0.7	NA	NA	NA	NA	NA	NA	NA	0.3	NA	NA
% Sand	NE	NE	NA	35.3	NA	NA	NA	NA	NA	NA	NA	27.3	NA	NA
Engineering Properties														
Total organic carbon (ug/kg)	NE	NE	NA	0.77	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Density														
Density (g/ml)	NE	NE	NA	1.4	NA	1.37	1.1	NA	NA	NA	NA	NA	NA	NA

Data Qualifiers:
J - Analyte present. Reported value may not be accurate or precise.
U - Not detected. The associate number indicates the approximate sample concentration necessary to be detected.
UJ - Not detected, quantitation limit may be inaccurate or imprecise.
NE - Not established.
NA - Not analyzed.

TABLE 3-1

SUMMARY OF SUBSURFACE SOIL ANALYTICAL RESULTS
CMS INVESTIGATION
TOW WAY FUEL FARM
NAVAL STATION ROOSEVELT ROADS, PUERTO RICO

Sample ID	EPA Region III	**EPA Region III**	7DP08-01	7DP08-04	7DP09	7DP09-03	7DP10-01	7DP10-03	7DP10-05	7DP11-02	7DP11-05	7DP12-01	7DP13-02
Sample Date	Industrial	**Residential**	04/15/98	04/15/98	04/16/98	04/16/98	04/16/98	04/16/98	04/16/98	04/16/98	04/16/98	04/16/98	04/16/98
Depth Range (ft.)	RBC	**RBC**	0.00-4.00	4.00-8.00	0.00-9.00	5.00-7.00	1.00-2.00	5.00-7.00	10.00-12.00	4.00-6.00	10.00-12.00	1.00-3.00	4.00-5.50
BTEX (ug/kg)													
Benzene	200,000	22,000	1.1 U	1.1 U	NA	2.5 U	1.2 U	12 U	6 U	1.2 U	10 J	1.1 U	1.2 U
Ethylbenzene	200,000,000	7,800,000	1.1 U	1.1 U	NA	2.5 U	1.2 U	180 J	41	1.2 U	140 J	1.1 U	1.2 U
Toluene	410,000,000	16,000,000	1.1 U	1.1 U	NA	2.5 U	1.2 U	190 J	8.4	1.2 U	15 J	1.1 U	1.2 U
Xylenes	4,100,000,000	160,000,000	0.75 J	1.1 U	NA	1.7 J	1.2	450 J	54	1.2 U	170 J	1.1 U	0.7 J
TPH													
Diesel Range Organics (mg/kg)	100	100	6.7 UJ	6.7 U	NA	7.9 U	7.1 U	**8,400**	**2,300**	93	**1,100**	19	5.8 J
Gasoline Range Organics (ug/kg)	100,000	100,000	54 U	56 U	NA	640	51 J	**220,000**	**180,000**	62 U	**280,000**	56 U	58 U
Grain-size													
% Clay	NE	NE	NA	NA	15.3	NA	NA	NA	NA	NA	NA	NA	NA
% Silt	NE	NE	NA	NA	38	NA	NA	NA	NA	NA	NA	NA	NA
% Gravel	NE	NE	NA	NA	7.6	NA	NA	NA	NA	NA	NA	NA	NA
% Sand	NE	NE	NA	NA	39.1	NA	NA	NA	NA	NA	NA	NA	NA
Engineering Properties													
Total organic carbon (ug/kg)	NE	NE	0.34	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Density													
Density (g/ml)	NE	NE	1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Data Qualifiers:
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NE - Not established.
NA - Not analyzed.

TABLE 3-1

SUMMARY OF SUBSURFACE SOIL ANALYTICAL RESULTS
CMS INVESTIGATION
TOW WAY FUEL FARM
NAVAL STATION ROOSEVELT ROADS, PUERTO RICO

Sample ID	EPA Region III	**EPA Region III**	7DP14-01	7DP15-02	7DP15-04	7DP15-07	7DP16-03	7DP16-05	7DP17-02	7DP17-04	7DP18-02	7DP19-03	7DP19-06	7DP19-08
Sample Date	Industrial	**Residential**	04/16/98	04/17/98	04/17/98	04/17/98	04/17/98	04/17/98	04/17/98	04/17/98	04/17/98	04/17/98	04/17/98	04/17/98
Depth Range (ft.)	RBC	**RBC**	1.00-3.00	3.00-5.00	6.00-8.00	12.00-14.00	2.00-6.00	10.00-12.00	3.00-6.00	7.00-9.00	4.00-6.00	5.00-7.00	12.00-14.00	16.00-18.00
BTEX (ug/kg)														
Benzene	200,000	22,000	1.2 U	150 J	340 U	140 U	2.8 U	1.1 U	1.3 U	1.2 U	1.2 U	6.2 U	1.2 J	1.3 U
Ethylbenzene	200,000,000	7,800,000	1.2 U	2,300	3,400	140 U	2.8 U	1.1 U	1.3 U	1.2 U	1.2 U	6.2 U	7.4	0.79 J
Toluene	410,000,000	16,000,000	1.2 U	680	340 U	140 U	2.8 U	1.1 U	1.3 U	1.2 U	1.2 U	6.2 U	2.8	0.81 J
Xylenes	4,100,000,000	160,000,000	0.17 J	2,300	2,000	910 J	9.5	0.82 J	1.8	1.2 U	0.82 J	12	35	3.9
TPH														
Diesel Range Organics (mg/kg)	100	100	7.5 U	**7,900** J	**22,000**	**9,400**	**9,500**	3.8 J	5.5 J	5.5 J	7.4 U	**3,200**	15	8.1 U
Gasoline Range Organics (ug/kg)	100,000	100,000	60 U	**540,000**	**660,000**	**340,000**	1,200	46 J	95	60 U	61 U	3,600	3,800	71
Grain-size														
% Clay	NE	NE	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
% Silt	NE	NE	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
% Gravel	NE	NE	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
% Sand	NE	NE	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Engineering Properties														
Total organic carbon (ug/kg)	NE	NE	0.09	NA	NA	NA	NA	NA	NA	0.053	NA	NA	NA	NA
Density														
Density (g/ml)	NE	NE	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Data Qualifiers:
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UJ - Not detected, quantitation limit may be inaccurate or imprecise.
NE - Not established.
NA - Not analyzed.

TABLE 3-1

SUMMARY OF SUBSURFACE SOIL ANALYTICAL RESULTS
CMS INVESTIGATION
TOW WAY FUEL FARM
NAVAL STATION ROOSEVELT ROADS, PUERTO RICO

Sample ID	EPA Region III	**EPA Region III**	7DP20	7DP20-02	7DP20-05	7DP21-01	7DP22-01	7DP23-02	7DP24-02	7DP24-01	7DP24-03	7DP24-05	7DP25-01
Sample Date	Industrial	**Residential**	04/17/98	04/17/98	04/17/98	04/18/98	04/18/98	04/18/98	04/18/98	04/18/98	04/18/98	04/18/98	04/19/98
Depth Range (ft.)	RBC	**RBC**	0.00-9.00	3.00-5.00	10.00-12.00	1.00-3.00	0.00-4.00	3.00-4.00	3.00-5.00	3.00-5.00	5.00-7.00	10.00-11.00	0.00-4.00
BTEX (ug/kg)													
Benzene	200,000	22,000	NA	1.2 U	1.2 U	1.3 U	1.1 U	1.1 U	NA	1.1 U	1.2 R	1.4 U	160 U
Ethylbenzene	200,000,000	7,800,000	NA	1.2 U	1.2 U	1.3 U	1.1 U	1.1 U	NA	1.1 U	1.2 R	1.4 U	1,300 J
Toluene	410,000,000	16,000,000	NA	1.2 U	1.2 U	1.3 U	1.1 U	1.1 U	NA	1.1 U	1.2 R	1.4 U	160 U
Xylenes	4,100,000,000	160,000,000	NA	1.2 U	1.2 U	0.71 J	1.1 U	1.1 U	NA	1.1 U	1.2 R	1.4 U	820 J
TPH													
Diesel Range Organics (mg/kg)	100	100	NA	7.1 U	5.3 J	8 U	6 J	6.5 U	NA	5.8 J	7.6 U	8.5 U	**3,600**
Gasoline Range Organics (ug/kg)	100,000	100,000	NA	59 U	58 U	49 J	54 U	53 U	NA	57 U	62 R	160	**1,000,000** J
Grain-size													
% Clay	NE	NE	34.6	NA	NA	NA	NA	NA	24.4	NA	NA	NA	NA
% Silt	NE	NE	32.3	NA	NA	NA	NA	NA	32.8	NA	NA	NA	NA
% Gravel	NE	NE	1.5	NA	NA	NA	NA	NA	10.6	NA	NA	NA	NA
% Sand	NE	NE	31.6	NA	NA	NA	NA	NA	32.2	NA	NA	NA	NA
Engineering Properties													
Total organic carbon (ug/kg)	NE	NE	NA	NA	NA	0.17	NA	0.046	NA	NA	NA	NA	NA
Density													
Density (g/ml)	NE	NE	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Data Qualifiers:
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UJ - Not detected, quantitation limit may be inaccurate or imprecise.
NE - Not established.
NA - Not analyzed.

TABLE 3-1

SUMMARY OF SUBSURFACE SOIL ANALYTICAL RESULTS
CMS INVESTIGATION
TOW WAY FUEL FARM
NAVAL STATION ROOSEVELT ROADS, PUERTO RICO

Sample ID	EPA Region III	**EPA Region III**	7DP25-03	7DP25-06	7DP26-02	7DP26-04	7DP26-06	7DP27-01	7DP27-04	7DP28-01	7DP29-01	7DP29-04	7DP30-01	7DP30-03
Sample Date	Industrial	**Residential**	04/19/98	04/19/98	04/19/98	04/19/98	04/19/98	04/19/98	04/19/98	04/19/98	04/19/98	04/19/98	04/19/98	04/19/98
Depth Range (ft.)	RBC	**RBC**	4.00-7.00	10.00-13.00	2.00-4.00	6.00-10.00	12.00-14.00	0.00-4.00	7.00-8.00	1.00-3.00	1.00-3.00	7.00-8.00	1.00-3.00	5.00-6.00
BTEX (ug/kg)														
Benzene	200,000	22,000	5.3 U	140 U	1.2 U	24 J	1.3 U	1.2 U	1.5 U	1.1 U	1.3 U	1.3 U	1.1 U	1.1 U
Ethylbenzene	200,000,000	7,800,000	17	1,700 J	1.2 U	87 J	1.3 U	1.2 U	1.5 U	1.1 U	1.3 U	1.3 U	1.1 U	1.1 U
Toluene	410,000,000	16,000,000	2.7 J	140 U	1.2 U	29 J	1.3 U	1.2 U	1.5 U	1.1 U	1.3 U	1.3 U	1.1 U	1.1 U
Xylenes	4,100,000,000	160,000,000	43	1,200 J	2.4	370 J	1.3 U	1.2 U	1.5 U	1.1 U	1.3 U	1.3 U	1.1 U	1.1 U
TPH														
Diesel Range Organics (mg/kg)	100	100	**280** J	**4,000**	7.6 U	**2,500** J	20 U	7.2 U	9.1 U	15	14	8.2 U	6.8 U	7.1 UJ
Gasoline Range Organics (ug/kg)	100,000	100,000	64,000	**1,100,000** J	720 J	**310,000**	290	58 U	73 U	54 U	65 U	67 U	55 U	36 J
Grain-size														
% Clay	NE	NE	NA	NA	NA	NA	NA	NA	NA	29.2	28.2	NA	NA	NA
% Silt	NE	NE	NA	NA	NA	NA	NA	NA	NA	35.9	54.7	NA	NA	NA
% Gravel	NE	NE	NA	NA	NA	NA	NA	NA	NA	2.2	2.7	NA	NA	NA
% Sand	NE	NE	NA	NA	NA	NA	NA	NA	NA	32.7	14.4	NA	NA	NA
Engineering Properties														
Total organic carbon (ug/kg)	NE	NE	NA	NA	NA	NA	NA	NA	0.39	0.051	NA	NA	NA	NA
Density														
Density (g/ml)	NE	NE	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Data Qualifiers:
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U - Not detected. The associate number indicates the approximate sample concentration necessary to be detected.
UJ - Not detected, quantitation limit may be inaccurate or imprecise.
NE - Not established.
NA - Not analyzed.

TABLE 3-1

SUMMARY OF SUBSURFACE SOIL ANALYTICAL RESULTS
CMS INVESTIGATION
TOW WAY FUEL FARM
NAVAL STATION ROOSEVELT ROADS, PUERTO RICO

Sample ID Sample Date Depth Range (ft.)	EPA Region III Industrial RBC	**EPA Region III Residential RBC**	Number Exceeding EPA Region III Industrial RBC	Range Exceeding EPA Region III Industrial RBC	**Number Exceeding EPA Region III Residential RBC**	**Range Exceeding EPA Region III Residential RBC**	Location Maximum Detect
BTEX (ug/kg)							
Benzene	200,000	22,000	0/60		0/60		7DP15-02
Ethylbenzene	200,000,000	7,800,000	0/60		0/60		7DP07-04
Toluene	410,000,000	16,000,000	0/60		0/60		7DP15-02
Xylenes	4,100,000,000	160,000,000	0/60		0/60		7DP15-02
TPH							
Diesel Range Organics (mg/kg)	100	100	14/60	270J-22,000	14/60	270J-22,000	7DP15-04
Gasoline Range Organics (ug/kg)	100,000	100,000	10/60	180,000-1,100,000J	1060	180,000-1,100,000J	7DP25-06
Grain-size							
% Clay	NE	NE	NE		NE		7DP-TWFF-U1
% Silt	NE	NE	NE		NE		7DP07-01
% Gravel	NE	NE	NE		NE		7DP24-02
% Sand	NE	NE	NE		NE		7DP-TWFF-U
Engineering Properties							
Total organic carbon (ug/kg)	NE	NE	NE		NE		7DP03-02
Density							
Density (g/ml)	NE	NE	NE		NE		7DP03-02

Data Qualifiers:
J - Analyte present. Reported value may not be accurate or precise.
U - Not detected. The associate number indicates the approximate sample concentration necessary to be detected.
UJ - Not detected, quantitation limit may be inaccurate or imprecise.
NE - Not established.
NA - Not analyzed.

TABLE 3-2

SUMMARY OF SOIL GAS ANALYTICAL RESULTS
CMS INVESTIGATION
TOW WAY FUEL FARM
NAVAL STATION ROOSEVELT ROADS, PUERTO RICO

LOCATION	7SG01	7SG02	7SG03	7SG04	7SG05	7SG06	7SG07	7SG08	7SG09	7SG10	LOCATION
SAMPLE ID	7SG01	7SG02	7SG03	7SG04	7SG05	7SG06	7SG07	7SG08	7SG09	7SG10	MAXIMUM
SAMPLE DATE	04/21/98	04/21/98	04/21/98	04/21/98	04/21/98	04/21/98	04/21/98	04/21/98	04/21/98	04/21/98	DETECT
TPH											
Gasoline Range Organics (ppmv)	15	3.6 U	3.6 U	3.6 U	23	45	3.6 U	3.6 U	3.6 U	5.6	7SG06
Soil Gas											
Carbon Dioxide (%)	20.8	0.9	3	1.6	4.7	0	2.1	1.8	1.1	4.8	7SG01
Oxygen (%)	7.6	23.8	21.7	24.1	17.5	25.4	22.7	23.4	24	16	7SG06

Data Qualifiers:
U - Not detected. The assiciate number indicated the approximate sample concentration necessary to be detected.

TABLE 3-3

VERTICAL PERMEABILITY TEST (VP-01) RESULTS
CMS INVESTIGATION
TOW WAY FUEL FARM
NAVAL STATION ROOSEVELT ROADS, PUERTO RICO

Cumulative Time (minutes)	Cumulative Time (seconds)	Water Level (cm)	Mean Coeff. of Perm. (cm/sec) (k_m)	Diameter of Column (cm) (D)	$Time_1$ (seconds) (t_1)	$Time_2$ (seconds) (t_2)	Piez. Head for $t = t_1$ (cm) (H_1)	Piez. Head for $t = t_2$ (cm) (H_2)	Comments
0	0	5.08							Start of Test
19	1140	4.445	0.00085	25.4	0	1140	5.08	4.445	
66	3960	4.445	0	25.4	1140	3960	4.445	4.445	
115	6900	4.445	0	25.4	3960	6900	4.445	4.445	
198	11880	4.445	0	25.4	6900	11880	4.445	4.445	
432	25920	4.445	0	25.4	11880	25920	4.445	4.445	
									Added 1 gallon of H_2O
432	25920	10.795							
620	37200	10.4775	1.92E-05	25.4	25920	37200	10.795	10.4775	
671	40260	10.4775	0	25.4	37200	40260	10.4775	10.4775	
1377	82620	10.4775	0	25.4	40260	82620	10.4775	10.4775	
3002	180120	10.4775	0	25.4	82620	180120	10.4775	10.4775	End of Test

TABLE 3-4

VERTICAL PERMEABILITY TEST (VP-02) RESULTS
CMS INVESTIGATION
TOW WAY FUEL FARM
NAVAL STATION ROOSEVELT ROADS, PUERTO RICO

Cumulative Time (minutes)	Cumulative Time (seconds)	Water Level (cm)	Mean Coeff. of Perm. (cm/sec) (k_m)	Diameter of Column (cm) (D)	$Time_1$ (seconds) (t_1)	$Time_2$ (seconds) (t_2)	Piez. Head for $t = t_1$ (cm) (H_1)	Piez. Head for $t = t_2$ (cm) (H_2)	Comments
0	0	6.35							Start of Test
2	120	5.08	0.0134894	25.4	0	120	6.35	5.08	
									Added 1 gallon of H_2O
2	120	11.43							
8	480	9.525	0.0036739	25.4	120	480	11.43	9.525	
54	3240	2.54	0.003474	25.4	480	3240	9.525	2.54	
									Added 2 gallons of H_2O
54	3240	15.875							
103	6180	12.7	0.0005506	25.4	3240	6180	15.875	12.7	
182	10920	10.16	0.0003415	25.4	6180	10920	12.7	10.16	
420	25200	3.81	0.0004983	25.4	10920	25200	10.16	3.81	
									Added 2 gallons of H_2O
420	25200	17.145							
612	36720	10.4775	0.0003101	25.4	25200	36720	17.145	10.4775	
671	40260	8.89	0.0003367	25.4	36720	40260	10.4775	8.89	
									Added 4 gallons of H_2O
671	40260	34.29							Start of Hermit Recording
702	42120	33.2029	0.0001257	25.4	40260	42120	34.29	33.20288	
717	43020	32.8371	8.928E-05	25.4	42120	43020	33.20288	32.83712	
732	43920	32.4714	9.028E-05	25.4	43020	43920	32.83712	32.47136	
747	44820	31.8922	0.0001451	25.4	43920	44820	32.47136	31.89224	
762	45720	31.496	0.0001008	25.4	44820	45720	31.89224	31.496	
777	46620	31.0998	0.000102	25.4	45720	46620	31.496	31.09976	
792	47520	30.9169	4.754E-05	25.4	46620	47520	31.09976	30.91688	
807	48420	30.3378	0.0001524	25.4	47520	48420	30.91688	30.33776	
822	49320	29.9415	0.000106	25.4	48420	49320	30.33776	29.94152	
837	50220	29.5758	9.907E-05	25.4	49320	50220	29.94152	29.57576	
852	51120	29.1795	0.0001087	25.4	50220	51120	29.57576	29.17952	
867	52020	28.8138	0.0001017	25.4	51120	52020	29.17952	28.81376	

TABLE 3-4

VERTICAL PERMEABILITY TEST (VP-02) RESULTS
CMS INVESTIGATION
TOW WAY FUEL FARM
NAVAL STATION ROOSEVELT ROADS, PUERTO RICO

Cumulative Time (minutes)	Cumulative Time (seconds)	Water Level (cm)	Mean Coeff. of Perm. (cm/sec) (k_m)	Diameter of Column (cm) (D)	$Time_1$ (seconds) (t_1)	$Time_2$ (seconds) (t_2)	Piez. Head for $t = t_1$ (cm) (H_1)	Piez. Head for $t = t_2$ (cm) (H_2)	Comments
882	52920	28.4175	0.0001116	25.4	52020	52920	28.81376	28.41752	
897	53820	28.2346	5.204E-05	25.4	52920	53820	28.41752	28.23464	
912	54720	28.0213	6.114E-05	25.4	53820	54720	28.23464	28.02128	
927	55620	27.6555	0.0001059	25.4	54720	55620	28.02128	27.65552	
942	56520	27.4422	6.243E-05	25.4	55620	56520	27.65552	27.44216	
957	57420	27.0764	0.0001082	25.4	56520	57420	27.44216	27.0764	
972	58320	26.863	6.377E-05	25.4	57420	58320	27.0764	26.86304	
987	59220	26.6802	5.506E-05	25.4	58320	59220	26.86304	26.68016	
1002	60120	26.4973	5.544E-05	25.4	59220	60120	26.68016	26.49728	
1017	61020	26.2839	6.517E-05	25.4	60120	61020	26.49728	26.28392	
1032	61920	26.101	5.628E-05	25.4	61020	61920	26.28392	26.10104	
1047	62820	25.9182	5.667E-05	25.4	61920	62820	26.10104	25.91816	
1062	63720	25.7048	6.663E-05	25.4	62820	63720	25.91816	25.7048	
1077	64620	25.5219	5.755E-05	25.4	63720	64620	25.7048	25.52192	
1092	65520	25.339	5.796E-05	25.4	64620	65520	25.52192	25.33904	
1107	66420	25.1562	5.838E-05	25.4	65520	66420	25.33904	25.15616	
1122	67320	25.1562	0	25.4	66420	67320	25.15616	25.15616	
1137	68220	24.9428	6.865E-05	25.4	67320	68220	25.15616	24.9428	
1152	69120	24.7599	5.932E-05	25.4	68220	69120	24.9428	24.75992	
1167	70020	24.7599	0	25.4	69120	70020	24.75992	24.75992	
1182	70920	24.577	5.975E-05	25.4	70020	70920	24.75992	24.57704	
1197	71820	24.3637	7.028E-05	25.4	70920	71820	24.57704	24.36368	
1212	72720	24.3637	0	25.4	71820	72720	24.36368	24.36368	
1227	73620	24.1808	6.073E-05	25.4	72720	73620	24.36368	24.1808	
1242	74520	24.1808	0	25.4	73620	74520	24.1808	24.1808	
1257	75420	23.9979	6.119E-05	25.4	74520	75420	24.1808	23.99792	
1272	76320	23.9979	0	25.4	75420	76320	23.99792	23.99792	
1287	77220	23.7846	7.198E-05	25.4	76320	77220	23.99792	23.78456	
1302	78120	23.6017	6.221E-05	25.4	77220	78120	23.78456	23.60168	

TABLE 3-4

VERTICAL PERMEABILITY TEST (VP-02) RESULTS
CMS INVESTIGATION
TOW WAY FUEL FARM
NAVAL STATION ROOSEVELT ROADS, PUERTO RICO

Cumulative Time (minutes)	Cumulative Time (seconds)	Water Level (cm)	Mean Coeff. of Perm. (cm/sec) (k_m)	Diameter of Column (cm) (D)	$Time_1$ (seconds) (t_1)	$Time_2$ (seconds) (t_2)	Piez. Head for $t = t_1$ (cm) (H_1)	Piez. Head for $t = t_2$ (cm) (H_2)	Comments
1317	79020	23.6017	0	25.4	78120	79020	23.60168	23.60168	
1332	79920	23.4188	6.27E-05	25.4	79020	79920	23.60168	23.4188	
1347	80820	23.4188	0	25.4	79920	80820	23.4188	23.4188	
1362	81720	23.2054	7.377E-05	25.4	80820	81720	23.4188	23.20544	
1377	82620	23.2054	0	25.4	81720	82620	23.20544	23.20544	
1392	83520	23.0226	6.377E-05	25.4	82620	83520	23.20544	23.02256	
1407	84420	23.0226	0	25.4	83520	84420	23.02256	23.02256	
1422	85320	22.8397	6.428E-05	25.4	84420	85320	23.02256	22.83968	
1437	86220	22.8397	0	25.4	85320	86220	22.83968	22.83968	
1452	87120	22.8397	0	25.4	86220	87120	22.83968	22.83968	
1467	88020	23.0226	-6.43E-05	25.4	87120	88020	22.83968	23.02256	Rain Water Infiltrating Test
1482	88920	23.0226	0	25.4	88020	88920	23.02256	23.02256	
1497	89820	23.0226	0	25.4	88920	89820	23.02256	23.02256	
1512	90720	23.0226	0	25.4	89820	90720	23.02256	23.02256	
1527	91620	23.4188	-0.000138	25.4	90720	91620	23.02256	23.4188	
1542	92520	23.2054	7.377E-05	25.4	91620	92520	23.4188	23.20544	
1557	93420	23.4188	-7.38E-05	25.4	92520	93420	23.20544	23.4188	
1572	94320	23.4188	0	25.4	93420	94320	23.4188	23.4188	
1587	95220	23.6017	-6.27E-05	25.4	94320	95220	23.4188	23.60168	
1602	96120	23.6017	0	25.4	95220	96120	23.60168	23.60168	
1617	97020	23.6017	0	25.4	96120	97020	23.60168	23.60168	
1632	97920	23.9979	-0.000134	25.4	97020	97920	23.60168	23.99792	
1647	98820	23.6017	0.0001342	25.4	97920	98820	23.99792	23.60168	
1662	99720	23.9979	-0.000134	25.4	98820	99720	23.60168	23.99792	
1677	100620	23.9979	0	25.4	99720	100620	23.99792	23.99792	
1692	101520	23.7846	7.198E-05	25.4	100620	101520	23.99792	23.78456	
1707	102420	23.9979	-7.2E-05	25.4	101520	102420	23.78456	23.99792	
2995	179700	1.27	0.0002759	25.4	102420	179700	23.99792	1.27	End of Test

TABLE 3-5

VERTICAL PERMEABILITY TEST (VP-03) RESULTS
CMS INVESTIGATION
TOW WAY FUEL FARM
NAVAL STATION ROOSEVELT ROADS, PUERTO RICO

Cumulative Time (minutes)	Cumulative Time (seconds)	Water Level (cm)	Mean Coeff. of Perm. (cm/sec) (k_m)	Diameter of Column (cm) (D)	$Time_1$ (seconds) (t_1)	$Time_2$ (seconds) (t_2)	Piez. Head for $t = t_1$ (cm) (H_1)	Piez. Head for $t = t_2$ (cm) (H_2)	Comments
0	0	30.63875							Start of Test
604	36240	2.54	0.0004984	25.4	0	36240	30.63875	2.54	
									Added 2 gallons of H_2O
0	0	5.715							
91	5460	3.81	0.0005387	25.4	0	5460	5.715	3.81	
171	10260	2.2225	0.0008146	25.4	5460	10260	3.81	2.2225	
									Added 1 gallon of H_2O
171	10260	9.525							
977	58620	0.15875	0.0006142	25.4	10260	58620	9.525	0.15875	End of Test

TABLE 3-6

CORRECTED GROUNDWATER ELEVATIONS AND PRODUCT THICKNESS MEASUREMENTS
CMS INVESTIGATION
TOW WAY FUEL FARM
NAVAL STATION ROOSEVELT ROADS, PUERTO RICO

	April 21, 1998	
Well ID	**Corrected Groundwater Elevation (ft msl)**	**Product Thickness (ft)**
GW-02	102.65	ND
GW-03	102.35	0.01
GW-04	104.88	ND
GW-06	101.27	ND
MW-2	105.21	ND
MW-4	107.58	ND
UGW-2	105.51	ND
UGW-3	104.35	1.45
UGW-4	103.43	0.09
UGW-5	103.10	ND
UGW-6	101.57	ND
UGW-7	101.84	ND
UGW-8	101.54	ND
UGW-9	101.36	ND
UGW-10	99.77	ND
UGW-11	100.66	ND
UGW-12	102.42	4.54
UGW-13	101.25	6.27
UGW-14	103.27	ND
UGW-15	100.75	ND
UGW-16	101.29	ND

Notes:
ND - Not Detected
Datum plan used is mean low water = 100.00 ft. as established
by U.S. Navy Survey Section as of Nov. 1941

TABLE 3-6

CORRECTED GROUNDWATER ELEVATIONS AND PRODUCT THICKNESS MEASUREMENTS
CMS INVESTIGATION
TOW WAY FUEL FARM
NAVAL STATION ROOSEVELT ROADS, PUERTO RICO

	April 21, 1998	
Well ID	**Corrected Groundwater Elevation (ft msl)**	**Product Thickness (ft)**
UGW-17	101.36	5.99
UGW-18	101.50	ND
UGW-19	101.59	1.19
UGW-20	100.47	ND
UGW-21	101.19	1.53
UGW-23	104.37	ND
UGW-24	104.78	ND
UGW-25	104.35	1.70
UGW-26	102.04	ND
7MW01A	102.48	ND
7MW02	104.15	ND
7MW03	106.57	ND
7MW04	104.33	ND
7MW05	102.67	ND
7MW06	100.49	ND
7MW07	101.60	ND
7MW08	100.68	ND
7MW09	104.07	ND
470-MW1	101.44	0.21
470-MW3	102.47	ND

Notes:
ND - Not Detected
Datum plan used is mean low water = 100.00 ft. as established
by U.S. Navy Survey Section as of Nov. 1941

TABLE 3-7

SUMMARY OF GROUNDWATER ANALYTICAL RESULTS
CMS INVESTIGATION
TOW WAY FUEL FARM
NAVAL STATION ROOSEVELT ROADS, PUERTO RICO

Sample ID Sample Date	Federal MCL (ug/l)	EPA Region III Tap Water RB (ug/l)	470-MW1 04/18/98	470-MW3 04/17/98	7MW01A 04/20/98	7MW02 04/19/98	7MW03 04/15/98	7MW04 04/15/98	7MW05 04/19/98
Volatiles (ug/l)									
1,1-Dichloroethene	7	0.044	50 U	250 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Methylene chloride	5	4.1	50 U	250 U	0.6 U	0.5 U	0.5 U	0.5 U	0.5 U
cis-1,2-Dichloroethene	70	61	50 U	250 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Chloroform	100	0.15	50 U	250 U	34 U	0.5 U	0.5 U	0.5 U	0.5 U
Benzene	5	0.36	**26,000**	**18,000**	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Trichloroethene	5	1.6	50 U	250 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Bromodichloromethane	100	0.17	50 U	250 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Toluene	1,000	750	**7,800**	**4,400**	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1,2-Trichloroethane	5	0.19	50 U	250 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Ethylbenzene	700	1,300	**2,100**	**2,900**	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
m/p-xylene	NE	NE	9,400	13,000	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
o-Xylene	NE	12,000	4,600	5,900	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Isopropylbenzene	NE	3,700	130	250 U	0.5 U	2	0.5 U	0.5 U	0.5 U
n-Propylbenzene	NE	61	**340**	250 U	0.5 U	3	0.5 U	0.5 U	0.5 U
1,3,5-Trimethylbenzene	NE	12	**1,100**	250 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
tert-Butylbenzene	NE	61	50 U	250 U	0.5 U	1	0.5 U	0.5 U	0.5 U
1,2,4-Trimethylbenzene	NE	12	**3,900**	**4,600**	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
sec-Butylbenzene	NE	61	50 U	250 U	0.5 U	6	0.5 U	0.5 U	0.5 U
p-Isopropyltoluene	NE	NE	50 U	250 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
n-Butylbenzene	NE	61	50 U	250 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Naphthalene	NE	1,500	970	250 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Methane	NE	NE	17	1.2	0.15	55	0.02	1.4	0.05

Data Qualifiers:

J - Analyte present. Reported value may not be accurate or precise.
U - Not detected. The associate number indicates the approximate sample concentration necessary to be detected.
UJ - Not detected, quantitation limit may be inaccurate or imprecise.
NE - Not established.

TABLE 3-7 (continued)

SUMMARY OF GROUNDWATER ANALYTICAL RESULTS
CMS INVESTIGATION
TOW WAY FUEL FARM
NAVAL STATION ROOSEVELT ROADS, PUERTO RICO

Sample ID Sample Date	Federal MCL (ug/l)	EPA Region III Tap Water RB (ug/l)	470-MW1 04/18/98	470-MW3 04/17/98	7MW01A 04/20/98	7MW02 04/19/98	7MW03 04/15/98	7MW04 04/15/98	7MW05 04/19/98
TPH (ug/l)									
Diesel Range Organics	NE	NE	21,000	33,000	120 J	1,400	130 U	150	130 U
Gasoline Range Organics	NE	NE	100,000	89,000	76 U	540	50 U	50 U	50 U
Engineering Properties (ug/l)									
Alkalinity	NE	NE	1,400,000	728,000	998,000	681,000	354,000	582,000	650,000
Nitrate-N by IC	10,000	58,000	100 U	1,300	10,000 U	100 U	10,000 U	10,000 U	870
Sulfate by IC	500,000	NE	200 U	200 U	1,200	580	244,000	508,000	112,000
Chloride	NE	NE	130,000	1,320,000	1,040,000	80,700	5,280,000	3,000,000	314,000
Ferrous Iron	NE	NE	1,830	9,750	80	3,540	1,320	740	900

Data Qualifiers:
J - Analyte present. Reported value may not be accurate or precise.
U - Not detected. The associate number indicates the approximate sample concentration necessary to be detected.
UJ - Not detected, quantitation limit may be inaccurate or imprecise.
NE - Not established.

TABLE 3-7 (continued)

SUMMARY OF GROUNDWATER ANALYTICAL RESULTS
CMS INVESTIGATION
TOW WAY FUEL FARM
NAVAL STATION ROOSEVELT ROADS, PUERTO RICO

Sample ID Sample Date	Federal MCL (ug/l)	EPA Region III Tap Water RB (ug/l)	7MW06 04/19/98	7MW07 04/19/98	7MW08 04/18/98	7MW09 04/18/98	GW-02 04/21/98	GW-03 04/21/98	GW-04 04/16/98
Volatiles (ug/l)									
1,1-Dichloroethene	7	0.044	0.5 U	0.5 U	0.5 U	0.5 U	5 UJ	0.5 UJ	12 U
Methylene chloride	5	4.1	0.5 U	0.5 U	0.5 U	0.5 U	5 UJ	0.5 UJ	12 U
cis-1,2-Dichloroethene	70	61	0.5 U	6	0.5 U	0.5 U	5 UJ	0.5 UJ	12 U
Chloroform	100	0.15	0.5 U	0.5 U	0.5 U	0.5 U	5 UJ	0.5 UJ	12 U
Benzene	5	0.36	0.5 U	0.5 U	0.5 U	0.5 U	**3,000**	0.5 UJ	12 U
Trichloroethene	5	1.6	0.5 U	**2,000** J	**3**	0.5 U	5 UJ	0.5 UJ	12 U
Bromodichloromethane	100	0.17	0.5 U	0.5 U	0.5 U	0.5 U	5 UJ	0.5 UJ	12 U
Toluene	1,000	750	0.5 U	0.5 U	0.5 U	0.5 U	85 J	0.5 UJ	12 U
1,1,2-Trichloroethane	5	0.19	0.5 U	**0.5**	0.5 U	0.5 U	5 UJ	0.5 UJ	12 U
Ethylbenzene	700	1,300	0.5 U	0.5 U	0.5 U	0.5 U	**820**	0.5 UJ	12 U
m/p-xylene	NE	NE	0.5 U	0.5 U	0.5 U	0.5 U	760 J	0.5 UJ	12 U
o-Xylene	NE	12,000	0.5 U	0.5 U	0.5 U	0.5 U	270 J	0.5 UJ	12 U
Isopropylbenzene	NE	3,700	0.5 U	0.5 U	0.5 U	0.5 U	69 J	0.5 J	12 U
n-Propylbenzene	NE	61	0.5 U	0.5 U	0.5 U	0.5 U	**220** J	0.8 J	12 U
1,3,5-Trimethylbenzene	NE	12	0.5 U	0.5 U	0.5 U	0.5 U	**300** J	1 J	12 U
tert-Butylbenzene	NE	61	0.5 U	0.5 U	0.5 U	0.5 U	5 UJ	0.5 UJ	12 U
1,2,4-Trimethylbenzene	NE	12	0.5 U	0.5 U	0.5 U	0.5 U	**740** J	5 J	12 U
sec-Butylbenzene	NE	61	0.5 U	0.5 U	0.5 U	0.5 U	5 UJ	1 J	35
p-Isopropyltoluene	NE	NE	0.5 U	0.5 U	0.5 U	0.5 U	11 J	0.6 J	12 U
n-Butylbenzene	NE	61	0.5 U	0.5 U	0.5 U	0.5 U	59 J	2 J	12 U
Naphthalene	NE	1,500	0.5 U	0.5 U	18	0.5 U	89 J	7 J	12 U
Methane	NE	NE	0.38	0.75	0.058	0	6	1	43

Data Qualifiers:
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U - Not detected. The associate number indicates the a sample concentration necessary to be detected.
UJ - Not detected, quantitation limit may be inaccurate
NE - Not established.

TABLE 3-7 (continued)

SUMMARY OF GROUNDWATER ANALYTICAL RESULTS
CMS INVESTIGATION
TOW WAY FUEL FARM
NAVAL STATION ROOSEVELT ROADS, PUERTO RICO

Sample ID Sample Date	Federal MCL (ug/l)	EPA Region III Tap Water RB (ug/l)	7MW06 04/19/98	7MW07 04/19/98	7MW08 04/18/98	7MW09 04/18/98	GW-02 04/21/98	GW-03 04/21/98	GW-04 04/16/98
TPH (ug/l)									
Diesel Range Organics	NE	NE	140 U	130 U	360	100 J	4,700	3,100 J	270,000
Gasoline Range Organics	NE	NE	50 U	560	34 J	50 U	23,000	140 U	24,000
Engineering Properties (ug/l)									
Alkalinity	NE	NE	900,000	234,000	473,000	936,000	894,000	676,000	515,000
Nitrate-N by IC	10,000	58,000	10,000 U	770	1,300	640	190	10,000 U	100 U
Sulfate by IC	500,000	NE	382,000	23,100	223,000	188,000	6,500	445,000	440
Chloride	NE	NE	8,340,000	57,500	1,630,000	831,000	463,000	2,710,000	14,500
Ferrous Iron	NE	NE	2,900	320	190	0	140	1,020	290

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U - Not detected. The associate number indicates the a sample concentration necessary to be detected.
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NE - Not established.

TABLE 3-7 (continued)

SUMMARY OF GROUNDWATER ANALYTICAL RESULTS
CMS INVESTIGATION
TOW WAY FUEL FARM
NAVAL STATION ROOSEVELT ROADS, PUERTO RICO

Sample ID Sample Date	Federal MCL (ug/l)	EPA Region III Tap Water RB (ug/l)	GW-06 04/16/98	MW-2 04/17/98	MW-4 04/19/98	UGW-10 04/16/98	UGW-11 04/17/98	UGW-12 04/20/98	UGW-13 04/21/98
Volatiles (ug/l)									
1,1-Dichloroethene	7	0.044	0.5 U	0.5 U	2 U	0.5 U	0.5 UJ	25 U	12 UJ
Methylene chloride	5	4.1	0.5 U	0.5 U	2 U	0.5 U	0.5 UJ	25 U	12 UJ
cis-1,2-Dichloroethene	70	61	0.5 U	0.5 U	2 U	0.5 U	0.5 UJ	25 U	12 UJ
Chloroform	100	0.15	0.5 U	0.5 U	2 U	0.5 U	0.5 UJ	25 U	12 UJ
Benzene	5	0.36	0.5 U	**0.8** J	**2**	0.5 U	**0.8** J	25 U	12 UJ
Trichloroethene	5	1.6	0.5 U	0.5 U	2 U	0.5 U	0.5 UJ	25 U	12 UJ
Bromodichloromethane	100	0.17	0.5 U	0.5 U	2 U	**0.8**	0.5 UJ	25 U	12 UJ
Toluene	1,000	750	0.5 U	0.5 U	2 U	0.5 U	0.5 UJ	25 U	12 UJ
1,1,2-Trichloroethane	5	0.19	0.5 U	0.5 U	2 U	0.5 U	0.5 UJ	25 U	12 UJ
Ethylbenzene	700	1,300	0.5 U	2 J	40	0.5 U	2 J	120	86 J
m/p-xylene	NE	NE	0.5 U	0.5 U	28	0.5 U	0.5 UJ	170	86 J
o-Xylene	NE	12,000	0.5 U	0.5 U	2 U	0.5 U	0.5 UJ	25 U	12 UJ
Isopropylbenzene	NE	3,700	0.5 U	15 J	34	3	12 J	44	69 J
n-Propylbenzene	NE	61	0.5 U	25 J	**68**	3	20 J	**92**	**150** J
1,3,5-Trimethylbenzene	NE	12	0.5 U	2 J	**54**	0.5 U	3 J	**180**	**250** J
tert-Butylbenzene	NE	61	0.5 U	0.5 U	2 U	0.5 U	0.5 UJ	25 U	12 UJ
1,2,4-Trimethylbenzene	NE	12	0.5 U	8 J	**120**	0.5 U	9 J	**780**	**530** J
sec-Butylbenzene	NE	61	0.5 U	13 J	**70**	2	13 J	**81**	**160** J
p-Isopropyltoluene	NE	NE	0.5 U	3 J	46	0.5 U	0.5 UJ	93	170 J
n-Butylbenzene	NE	61	0.5 U	12 J	2 U	2	14 J	**210**	**360** J
Naphthalene	NE	1,500	0.5 U	110 J	430 J	0.5 U	260 J	690	760 J
Methane	NE	NE	0	22	41	27	6	37	26

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UJ - Not detected, quantitation limit may be inaccurate
NE - Not established.

TABLE 3-7 (continued)

SUMMARY OF GROUNDWATER ANALYTICAL RESULTS
CMS INVESTIGATION
TOW WAY FUEL FARM
NAVAL STATION ROOSEVELT ROADS, PUERTO RICO

Sample ID Sample Date	Federal MCL (ug/l)	EPA Region III Tap Water RB (ug/l)	GW-06 04/16/98	MW-2 04/17/98	MW-4 04/19/98	UGW-10 04/16/98	UGW-11 04/17/98	UGW-12 04/20/98	UGW-13 04/21/98
TPH (ug/l)									
Diesel Range Organics	NE	NE	320	29,000	250,000	1,600	24,000	390,000	120,000
Gasoline Range Organics	NE	NE	50 U	1,000 U	28,000	280 U	3,600	9,800	15,000 J
Engineering Properties (ug/l)									
Alkalinity	NE	NE	478,000	494,000	832,000	796,000	510,000	629,000	281,000
Nitrate-N by IC	10,000	58,000	20,000 U	100 U	290	100 U	440	5,000 U	100 U
Sulfate by IC	500,000	NE	681,000	400	200 U	930	255,000	610	1,200
Chloride	NE	NE	3,920,000	44,300	86,400	77,100	804,000	123,000	357,000
Ferrous Iron	NE	NE	2,340	440	5,000	550	1,630	3,000	2,030

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U - Not detected. The associate number indicates the a sample concentration necessary to be detected.
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TABLE 3-7 (continued)

SUMMARY OF GROUNDWATER ANALYTICAL RESULTS
CMS INVESTIGATION
TOW WAY FUEL FARM
NAVAL STATION ROOSEVELT ROADS, PUERTO RICO

Sample ID Sample Date	Federal MCL (ug/l)	EPA Region III Tap Water RB (ug/l)	UGW-14 04/19/98	UGW-15 04/15/98	UGW-16 04/16/98	UGW-17 04/21/98	UGW-18 04/16/98	UGW-19 04/17/98	UGW-2 04/15/98
Volatiles (ug/l)									
1,1-Dichloroethene	7	0.044	0.5 U	0.5 U	**2**	50 UJ	0.5 U	5 UJ	50 U
Methylene chloride	5	4.1	0.5 U	0.5 U	0.5 U	50 UJ	0.5 U	5 UJ	**54**
cis-1,2-Dichloroethene	70	61	0.5 U	0.5 U	0.5 U	50 UJ	0.5 U	5 UJ	50 U
Chloroform	100	0.15	0.5 U	0.5 U	0.5 U	50 UJ	**2**	5 UJ	50 U
Benzene	5	0.36	0.5 U	0.5 U	0.5 U	50 UJ	0.5 U	5 UJ	50 U
Trichloroethene	5	1.6	0.5 U	0.5 U	0.5 U	50 UJ	0.5 U	5 UJ	50 U
Bromodichloromethane	100	0.17	0.5 U	0.5 U	0.5 U	50 UJ	0.5 U	5 UJ	50 U
Toluene	1,000	750	0.5 U	0.5 U	0.5 U	50 UJ	0.5 U	5 UJ	50 U
1,1,2-Trichloroethane	5	0.19	0.5 U	0.5 U	0.5 U	50 UJ	0.5 U	5 UJ	50 U
Ethylbenzene	700	1,300	2	0.5 U	0.5 U	50 UJ	0.5 U	5 UJ	78
m/p-xylene	NE	NE	0.5 U	0.5 U	0.5 U	50 UJ	0.5 U	11 J	50 U
o-Xylene	NE	12,000	0.5 U	0.5 U	0.5 U	50 UJ	0.5 U	5 UJ	50 U
Isopropylbenzene	NE	3,700	8	0.6	0.5 U	50 UJ	0.5 U	15 J	50 U
n-Propylbenzene	NE	61	15	0.5 U	0.5 U	50 UJ	0.5 U	18 J	50 U
1,3,5-Trimethylbenzene	NE	12	0.5 U	0.5 U	0.5 U	50 UJ	0.5 U	**72** J	50 U
tert-Butylbenzene	NE	61	0.5 U	0.5 U	0.5 U	50 UJ	0.5 U	5 UJ	50 U
1,2,4-Trimethylbenzene	NE	12	0.5 U	0.5 U	0.5 U	**150** J	0.5 U	**310** J	50 U
sec-Butylbenzene	NE	61	18	0.5 U	0.5 U	**62** J	0.5 U	21 J	50 U
p-Isopropyltoluene	NE	NE	0.5 U	0.5 U	0.5 U	50 UJ	0.5 U	27 UJ	50 U
n-Butylbenzene	NE	61	0.5 U	0.5 U	0.5 U	**92** J	0.5 U	5 UJ	50 U
Naphthalene	NE	1,500	22	0.5 U	0.5 U	250 J	0.5 U	290 J	50 U
Methane	NE	NE	17	1	0	17	0	18	20

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TABLE 3-7 (continued)

SUMMARY OF GROUNDWATER ANALYTICAL RESULTS
CMS INVESTIGATION
TOW WAY FUEL FARM
NAVAL STATION ROOSEVELT ROADS, PUERTO RICO

Sample ID Sample Date	Federal MCL (ug/l)	EPA Region III Tap Water RB (ug/l)	UGW-14 04/19/98	UGW-15 04/15/98	UGW-16 04/16/98	UGW-17 04/21/98	UGW-18 04/16/98	UGW-19 04/17/98	UGW-2 04/15/98
TPH (ug/l)									
Diesel Range Organics	NE	NE	3,600	180	130 U	180,000	120 U	22,000	270,000
Gasoline Range Organics	NE	NE	2,500	110	48 U	3,400	31 U	7,200	360,000
Engineering Properties (ug/l)									
Alkalinity	NE	NE	1,030,000	936,000	317,000	598,000	156,000	458,000	463,000
Nitrate-N by IC	10,000	58,000	2,100	20,000 U	420	100 U	760	100 U	1,000 U
Sulfate by IC	500,000	NE	17,700	497,000	60,700	9,500	110,000	260	4,500
Chloride	NE	NE	1,500,000	6,150,000	125,000	81,000	543,000	14,100	5,220,000
Ferrous Iron	NE	NE	2,110	700	90	460	510	2,320	28,000

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TABLE 3-7 (continued)

SUMMARY OF GROUNDWATER ANALYTICAL RESULTS
CMS INVESTIGATION
TOW WAY FUEL FARM
NAVAL STATION ROOSEVELT ROADS, PUERTO RICO

Sample ID Sample Date	Federal MCL (ug/l)	EPA Region III Tap Water RB (ug/l)	UGW-20 04/14/98	UGW-21 04/17/98	UGW-23 04/18/98	UGW-24 04/19/98	UGW-25 04/19/98	UGW-26 04/20/98	UGW-3 04/20/98
Volatiles (ug/l)									
1,1-Dichloroethene	7	0.044	0.5 U	250 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Methylene chloride	5	4.1	0.5 U	250 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
cis-1,2-Dichloroethene	70	61	0.5 U	250 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Chloroform	100	0.15	0.5 U	250 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Benzene	5	0.36	0.5 U	250 U	0.5 U	0.5 U	**13**	0.5 U	**9**
Trichloroethene	5	1.6	0.5 U	250 U	0.5 U	**2**	0.5 U	0.5 U	0.5 U
Bromodichloromethane	100	0.17	0.5 U	250 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Toluene	1,000	750	0.5 U	250 U	0.5 U	0.5 U	1	0.5 U	3
1,1,2-Trichloroethane	5	0.19	0.5 U	250 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Ethylbenzene	700	1,300	0.5 U	250 U	0.5 U	0.5 U	7	0.5 U	22
m/p-xylene	NE	NE	0.5 U	250 U	0.5 U	0.5 U	33	0.5 U	17
o-Xylene	NE	12,000	0.5 U	250 U	0.5 U	0.5 U	7	0.5 U	11
Isopropylbenzene	NE	3,700	0.5 U	250 U	0.5 U	0.5 U	19	0.5 U	10
n-Propylbenzene	NE	61	0.5 U	250 U	0.5 U	0.5 U	20	0.5 U	16
1,3,5-Trimethylbenzene	NE	12	0.5 U	250 U	0.5 U	0.5 U	**54** J	0.5 U	**22**
tert-Butylbenzene	NE	61	0.5 U	250 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2,4-Trimethylbenzene	NE	12	0.5 U	**260**	0.5 U	0.5 U	**160** J	0.5 U	**150**
sec-Butylbenzene	NE	61	0.5 U	250 U	0.5 U	0.5 U	27	0.5 U	10
p-Isopropyltoluene	NE	NE	0.5 U	250 U	0.5 U	0.5 U	19	0.5 U	10
n-Butylbenzene	NE	61	0.5 U	250 U	0.5 U	0.5 U	0.5 U	0.5 U	18
Naphthalene	NE	1,500	0.5 U	250 U	0.5 U	0.5 U	200 J	0.5 U	220
Methane	NE	NE	27	42	0	0	36	1	3

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TABLE 3-7 (continued)

SUMMARY OF GROUNDWATER ANALYTICAL RESULTS
CMS INVESTIGATION
TOW WAY FUEL FARM
NAVAL STATION ROOSEVELT ROADS, PUERTO RICO

Sample ID Sample Date	Federal MCL (ug/l)	EPA Region III Tap Water RB (ug/l)	UGW-20 04/14/98	UGW-21 04/17/98	UGW-23 04/18/98	UGW-24 04/19/98	UGW-25 04/19/98	UGW-26 04/20/98	UGW-3 04/20/98
TPH (ug/l)									
Diesel Range Organics	NE	NE	65 J	79,000	180	91 J	960,000	130 U	32,000
Gasoline Range Organics	NE	NE	50 U	420,000 J	41 J	29 J	420,000 J	50 U	2,800
Engineering Properties (ug/l)									
Alkalinity	NE	NE	962,000	494,000	832,000	749,000	1,010,000	614,000	801,000
Nitrate-N by IC	10,000	58,000	10,000 U	100 U	3,200	800	670	1,200	10,000 U
Sulfate by IC	500,000	NE	20,200	610	46,600	252,000	37,700	361,000	194,000
Chloride	NE	NE	7,770,000	40,100	105,000	554,000	241,000	1,150,000	2,340,000
Ferrous Iron	NE	NE	9,280	6,960	180	0	3,210	80	1,030

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U - Not detected. The associate number indicates the a sample concentration necessary to be detected.
UJ - Not detected, quantitation limit may be inaccurate
NE - Not established.

TABLE 3-7 (continued)

SUMMARY OF GROUNDWATER ANALYTICAL RESULTS
CMS INVESTIGATION
TOW WAY FUEL FARM
NAVAL STATION ROOSEVELT ROADS, PUERTO RICO

Sample ID Sample Date	Federal MCL (ug/l)	EPA Region III Tap Water RB (ug/l)	UGW-4 04/20/98	UGW-5 04/17/98	UGW-6 04/15/98	UGW-7 04/15/98	UGW-8 04/16/98	UGW-9 04/16/98
Volatiles (ug/l)								
1,1-Dichloroethene	7	0.044	12 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Methylene chloride	5	4.1	12 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
cis-1,2-Dichloroethene	70	61	12 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Chloroform	100	0.15	12 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Benzene	5	0.36	12 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Trichloroethene	5	1.6	12 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Bromodichloromethane	100	0.17	12 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Toluene	1,000	750	12 U	0.5	0.5 U	0.5 U	0.5 U	0.5 U
1,1,2-Trichloroethane	5	0.19	12 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Ethylbenzene	700	1,300	27	3	0.5 U	0.5 U	0.5 U	0.5 U
m/p-xylene	NE	NE	42	0.6	0.5 U	0.5 U	0.5 U	0.5 U
o-Xylene	NE	12,000	12 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Isopropylbenzene	NE	3,700	16	33	0.5 U	0.5 U	1	0.5 U
n-Propylbenzene	NE	61	31	**360** J	0.5 U	0.5 U	0.5 U	0.5 U
1,3,5-Trimethylbenzene	NE	12	**57**	**18**	0.5 U	0.5 U	0.5 U	0.5 U
tert-Butylbenzene	NE	61	12 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2,4-Trimethylbenzene	NE	12	**230**	**37**	0.5 U	0.5 U	0.5 U	0.5 U
sec-Butylbenzene	NE	61	21	24	0.5 U	0.5 U	0.5 U	0.5 U
p-Isopropyltoluene	NE	NE	23	15	0.5 U	0.5 U	0.5 U	0.5 U
n-Butylbenzene	NE	61	12 U	27	0.5 U	0.5 U	0.5 U	0.5 U
Naphthalene	NE	1,500	300	430 J	0.5 U	0.5 U	0.5 U	0.5 U
Methane	NE	NE	10	34	0	3	9	0

Data Qualifiers:
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NE - Not established.

TABLE 3-7 (continued)

SUMMARY OF GROUNDWATER ANALYTICAL RESULTS
CMS INVESTIGATION
TOW WAY FUEL FARM
NAVAL STATION ROOSEVELT ROADS, PUERTO RICO

Sample ID Sample Date	Federal MCL (ug/l)	EPA Region III Tap Water RB (ug/l)	UGW-4 04/20/98	UGW-5 04/17/98	UGW-6 04/15/98	UGW-7 04/15/98	UGW-8 04/16/98	UGW-9 04/16/98
TPH (ug/l)								
Diesel Range Organics	NE	NE	700,000	82,000	88 J	120 U	310	180
Gasoline Range Organics	NE	NE	2,400	5,000	36 J	35 J	500	29 U
Engineering Properties (ug/l)								
Alkalinity	NE	NE	1,080,000	624,000	338,000	988,000	832,000	411,000
Nitrate-N by IC	10,000	58,000	5,000 U	100 U	100 U	2,200	100 U	110
Sulfate by IC	500,000	NE	2,700	1,100	9,800	402,000	3,400	86,100
Chloride	NE	NE	145,000	117,000	67,900	2,220,000	133,000	183,000
Ferrous Iron	NE	NE	850	840	250	810	1,750	320

Data Qualifiers:
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U - Not detected. The associate number indicates the a sample concentration necessary to be detected.
UJ - Not detected, quantitation limit may be inaccurate
NE - Not established.

TABLE 3-7 (continued)

SUMMARY OF GROUNDWATER ANALYTICAL RESULTS
CMS INVESTIGATION
TOW WAY FUEL FARM
NAVAL STATION ROOSEVELT ROADS, PUERTO RICO

Sample ID Sample Date	Federal MCL (ug/l)	EPA Region III Tap Water RB (ug/l)	Number Exceeding Federal MCL	Range Exceeding Federal MCL	Number Exceeding EPA Region III Tap Water RBC	Range Exceeding EPA Region III Tap Water RBC	Location of Maximum Detect
Volatiles (ug/l)							
1,1-Dichloroethene	7	0.044	0/41		1/41	2	UGW-16
Methylene chloride	5	4.1	1/41	54	1/41	54	UGW-2
cis-1,2-Dichloroethene	70	61	0/41		0/41		7MW07
Chloroform	100	0.15	0/41		1/41	2-2	UGW-18
Benzene	5	0.36	5/41	9-26,000	8/41	0.8 J-26,000	470-MW1
Trichloroethene	5	1.6	1/41	2,000 J	3/41	2-2,000 J	7MW07
Bromodichloromethane	100	0.17	0/41		1/41	8	UGW-10
Toluene	1,000	750	2/41	4,400-7,800	2/41	4,400-7,800	470-MW1
1,1,2-Trichloroethane	5	0.19	0/41		1/41	0.5	7MW07
Ethylbenzene	700	1,300	3/41	820-2,900	2/41	2,100-2,900	470-MW3
m/p-xylene	NE	NE	NE		NE		470-MW3
o-Xylene	NE	12,000	NE		0/41		470-MW3
Isopropylbenzene	NE	3,700	NE		0/41		470-MW1
n-Propylbenzene	NE	61	NE		6/41	68-360 J	UGW-5
1,3,5-Trimethylbenzene	NE	12	NE		10/41	18-1,100	470-MW1
tert-Butylbenzene	NE	61	NE		0/41		7MW02
1,2,4-Trimethylbenzene	NE	12	NE		13/41	37-4,600	470-MW3
sec-Butylbenzene	NE	61	NE		4/41	62 J-160 J	UGW-13
p-Isopropyltoluene	NE	NE	NE		NE		UGW-13
n-Butylbenzene	NE	61	NE		3/41	92 J-360 J	UGW-13
Naphthalene	NE	1,500	NE		0/41		470-MW1
Methane	NE	NE	NE		NE		7MW02

Data Qualifiers:
J - Analyte present. Reported value may not be accurat
U - Not detected. The associate number indicates the a sample concentration necessary to be detected.
UJ - Not detected, quantitation limit may be inaccurate
NE - Not established.

TABLE 3-7 (continued)

SUMMARY OF GROUNDWATER ANALYTICAL RESULTS
CMS INVESTIGATION
TOW WAY FUEL FARM
NAVAL STATION ROOSEVELT ROADS, PUERTO RICO

Sample ID Sample Date	Federal MCL (ug/l)	EPA Region III Tap Water RB (ug/l)	Number Exceeding Federal MCL	Range Exceeding Federal MCL	Number Exceeding EPA Region III Tap Water RBC	Range Exceeding EPA Region III Tap Water RBC	Location of Maximum Detect
TPH (ug/l)							
Diesel Range Organics	NE	NE	NE		NE		UGW-25
Gasoline Range Organics	NE	NE	NE		NE		UGW-21, UGW-25
Engineering Properties (ug/l)							
Alkalinity	NE	NE	NE		NE		470-MW1
Nitrate-N by IC	10,000	58,000	0/41		0/41		UGW-23
Sulfate by IC	500,000	NE	2/41	508,000-681,000	NE		GW-06
Chloride	NE	NE	NE		NE		7MW06
Ferrous Iron	NE	NE	NE		NE		UGW-2

Data Qualifiers:
J - Analyte present. Reported value may not be accurat
U - Not detected. The associate number indicates the a sample concentration necessary to be detected.
UJ - Not detected, quantitation limit may be inaccurate
NE - Not established.

TABLE 3-8 (continued)

SUMMARY OF ON-SITE WATER QUALITY PARAMETERS
CMS INVESTIGATION
TOW WAY FUEL FARM
NAVAL STATION ROOSEVELT ROADS, PUERTO RICO

Well ID	Date	Time	Number of Well Volumes	Well Volume (Gallons)	Specific Conductivity (umhos)	Temperature (C)	pH	Redox Potential (mV)	Dissolved Oxygen (mg/l)	COMMENTS
GW-02	4/21/98	0755	0	--	--	--	--	--	--	Light gray, slightly turbid
		0800	1	1.9	3,000	29.0	7.76	-221.7	--	Black with wood/organic debris
			2							Bailed dry during 2nd volume
GW-03	4/21/98	0650	0	--	--	--	--	--	--	Relatively clear, slight fuel odor.
		0700	1	3.7	10,000	28.0	6.60	-297.7	--	Relatively clear with some floating debris.
		0710	2	7.4	10,000	28.5	6.69	-276.2	1.42	Slightly turbid
		0715	3	11.1	10,000	28.5	6.66	-281.8	--	Slightly turbid
GW-04	4/16/98	1650	0	--	--	--	--	--	--	Brown product on top of sample, strong fuel odor.
		1655	1	1.8	9,500	29.0	7.11	-79.8	--	Brown product on top of relatively clear sample.
			2							Bailed dry during 2nd volume.
GW-06	4/16/98	0805	0	--	--	--	--	--	--	Bailer getting caught up on edges of monitoring well.
		0815	1	2.6	16,000	28.5	6.39	-3.1	--	Light brown, slightly turbid, with a slight sheen
		0825	2	5.2	15,000	29.0	6.47	-6.2	2.19	Dark brown staining inside bailer.
		0835	3	7.8	14,500	29.0	6.53	-13.5	--	Dark brown staining inside bailer.
MW-2	4/17/98	0850	0	--	--	--	--	--	--	Relatively clear, brown product on top, good strong odor.
		0855	1	2.6	1,350	29.0	6.78	-159.3	--	Relatively clear with a heavy sheen
		0900	2	5.2	1,300	29.0	6.73	-174.8	1.68	Light gray, medium turbidity with sheen
		0910	3	7.8	1,350	29.0	6.83	-188.6	--	Dark brown, very turbid, bailed to within 1 foot of bottom

TABLE 3-8 (continued)

SUMMARY OF ON-SITE WATER QUALITY PARAMETERS
CMS INVESTIGATION
TOW WAY FUEL FARM
NAVAL STATION ROOSEVELT ROADS, PUERTO RICO

Well ID	Date	Time	Number of Well Volumes	Well Volume (Gallons)	Specific Conductivity (umhos)	Temperature (C)	pH	Redox Potential (mV)	Dissolved Oxygen (mg/l)	COMMENTS
MW-4	4/19/98	1345	0	--	--	--	--	--	--	Dark brown product on top 3/4 of bailer
		1400	1	2.6	1,600	29.5	6.64	-173.9	--	Light gray, slightly turbid, heavy sheen on top
		1405	2	5.2	1,650	29.0	6.66	-158.3	4.03	Light gray, slightly turbid, heavy sheen on top
			3							Bailed dry during 3rd volume, dark greenish gray, very turbid. Bailed dry within 6 inches of bottom.
UGW-2	4/15/98	0920	0	--	--	--	--	--	--	Very turbid, dark greenish water with brown product on top.
		0935	1	0.5	20,900	27.0	6.34	164.1	Not enough volume	Very turbid, dark greenish water. Bailed dry, less than 6 inches water remaining in well.
UGW-3	4/20/98	1645	0	--	--	--	--	--	--	Pure product, golden brown
		1650	1	2.5	9,500	28.0	6.51	-277.8	--	Relatively clear, slightly turbid
		1655	2	5.0	10,000	28.0	6.52	-295.7	2.72	Relatively clear, slightly turbid
		1700	3	7.5	10,000	28.0	6.55	-220.8	--	Relatively clear, slightly turbid
UGW-4	4/20/98	1740	0	--	--	--	--	--	--	Pure product, golden brown
		1745	1	3.3	2,800	28.5	6.98	-275.9	--	Relatively clear, slightly turbid. Heavy sheen
		1750	2	6.6	2,800	28.0	6.92	-247.8	1.78	Relatively clear, medium turbid. Heavy sheen
		1755	3	9.9	2,600	28.0	6.93	-214.1	--	Slight turbid gray. Heavy sheen
UGW-5	4/17/98	0945	0	--	--	--	--	--	--	Relatively clear, brown product on top, good strong odor.
		0950	1	2.9	1,500	29.5	6.67	-97.6	--	Relatively clear, slightly turbid with a sheen
		1000	2	5.8	1,600	29.0	6.58	-95.9	2.02	Light brown, medium turbid
			3							Bailed dry to within 3 inches of bottom, allowing well to recharge

TABLE 3-8 (continued)

SUMMARY OF ON-SITE WATER QUALITY PARAMETERS
CMS INVESTIGATION
TOW WAY FUEL FARM
NAVAL STATION ROOSEVELT ROADS, PUERTO RICO

Well ID	Date	Time	Number of Well Volumes	Well Volume (Gallons)	Specific Conductivity (umhos)	Temperature (C)	pH	Redox Potential (mV)	Dissolved Oxygen (mg/l)	COMMENTS
UGW-6	4/15/98	1630	0	--	--	--	--	--	--	Relatively clear, hydrogen sulfide odor
		1640	1	1.7	23,000	28.0	6.74	-354.5	--	Brown to gray, medium turbid
		1650	2	3.4	22,000	28.0	6.78	-342.5	0.94	Brown to gray, medium turbid, slight product stain (black on bailer)
		1655	3	5.1	22,000	28.5	6.72	-344.6	--	Brown to gray, medium turbid, slight product stain (black on bailer)
UGW-7	4/15/98	1750	0	--	--	--	--	--	--	Dark gray
		1752	1	1.7	3,900	27.0	6.99	-136.1	--	Relatively clear, no odor
		1755	2	3.4	14,500	25.0	6.87	-316.8	--	Dark brown to black, medium turbid
		1800	3	5.1	8,000	27.5	7.02	-322.6	0.68	Dark brown to black, medium turbid
		1803	4	6.8	12,500	27.5	6.87	-350.8	--	Dark brown to black, medium turbid
			5							Well bailed dry after the 5th volume.
UGW-8	4/16/98	1040	0	--	--	--	--	--	--	Relatively clear, slight orange stain in bailer.
		1045	1	1.7	1,750	28.5	7.15	-94.5	--	Light brown, medium turbidity, orange particles floating.
		1052	2	3.4	1,800	28.0	7.09	-98.9	3.14	Gray, medium turbid
		1058	3	5.1	1,850	28.5	7.12	-109.1	--	Gray, medium turbid
UGW-9	4/16/98	1815	0	--	--	--	--	--	--	Light greenish, gray slightly turbid
		1820	1	1.9	1,250	29.0	7.05	-4.0	--	Light gray, slightly turbid
		1825	2	3.8	1,500	29.0	7.02	-6.2	2.12	Light gray, slightly turbid
		1832	3	5.7	1,500	29.0	7.04	-25.5	--	Light gray, slightly turbid
		1838	4	7.6	1,550	26.5	7.07	2.8	--	Light gray, slightly turbid
UGW-10	4/16/98	1725	0	--	--	--	--	--	--	Greenish gray, medium turbid, slight fuel odor.
		1729	1	1.5	1,250	29.0	7.27	-82.6	--	Light gray, medium turbid.
		1732	2	3.0	1,350	29.0	7.28	-81.1	2.13	Light gray, medium turbid.
		1740	3	4.5	1,350	30.0	7.32	-137.1	--	Light gray, medium turbid.

TABLE 3-8 (continued)

SUMMARY OF ON-SITE WATER QUALITY PARAMETERS
CMS INVESTIGATION
TOW WAY FUEL FARM
NAVAL STATION ROOSEVELT ROADS, PUERTO RICO

Well ID	Date	Time	Number of Well Volumes	Well Volume (Gallons)	Specific Conductivity (umhos)	Temperature (C)	pH	Redox Potential (mV)	Dissolved Oxygen (mg/l)	COMMENTS
UGW-11	4/17/98	0735	0	--	--	--	--	--	--	Relatively clear
		0740	1	1.7	4,300	29.0	7.02	-189.8	--	Light gray, slightly turbid
		0745	2	3.4	4,000	29.0	7.11	-178.3	1.47	Light gray, medium turbidity
		0750	3	5.1	3,850	29.0	7.13	-124.5	--	Light gray, medium turbidity
UGW-12	4/20/98	1805	0	--	--	--	--	--	--	Pure product - gold
		1810	1	2.4	1,750	28.0	6.67	-124.1	--	LT. Gray, slightly turbid. Heavy sheen, strong odor. Bailer is 3/4 product
		1820	2	4.8	1,600	29.0	6.80	-125.3	1.9	LT. Gray, slightly turbid. Heavy sheen, strong odor. 6 inches product on top.
		1828	3	7.2	1,500	29.0	6.95	-139.8	--	LT. Gray, slightly turbid. Heavy sheen, strong odor. 1/4 inch product on top.
UGW-13	4/21/98	0915	0	--	--	--	--	--	--	Pure product, golden brown
		0920	1	2.4	1,500	29.0	6.87	-123.4	--	LT. Gray, slightly turbid. 1inch of product
		0925	2	4.8	1,500	29.0	7.02	-139.3	2.53	LT. Gray, slightly turbid. 1inch of product
		0930	3	7.2	1,500	29.0	6.97	-147.5	--	LT. Gray, slightly turbid. 1inch of product
UGW-14	4/19/98	1750	0	--	--	--	--	--	--	Relatively clear, slight fuel odor.
		1800	1	3.6	7,900	28.0	6.81	-288.6	--	Light gray, slightly turbid
		1810	2	7.2	7,500	27.5	6.78	-250.0	1.09	Dark gray, medium turbid
		1815	3	10.8	7,500	28.0	6.79	-164.2	--	Dark gray, very turbid
UGW-15	4/15/98	1525	0	--	--	--	--	--	--	Relatively clear
		1530	1	1.3	18,500	29.5	6.84	-174.2	--	Relatively clear with a hydrogen sulfide odor. Light gray, slightly turbid.
		1540	2	2.6	18,500	29.5	6.94	-116.9	1.3	Light brown, medium turbid
		1555	3	3.9	18,500	29.5	6.98	-157.6	--	Light brown, medium turbid. Hydrogen sulfide smell still noted. Suspended particles present (possible wood fragments)

TABLE 3-8 (continued)

SUMMARY OF ON-SITE WATER QUALITY PARAMETERS
CMS INVESTIGATION
TOW WAY FUEL FARM
NAVAL STATION ROOSEVELT ROADS, PUERTO RICO

Well ID	Date	Time	Number of Well Volumes	Well Volume (Gallons)	Specific Conductivity (umhos)	Temperature (C)	pH	Redox Potential (mV)	Dissolved Oxygen (mg/l)	COMMENTS
UGW-16	4/16/98	1420	0	--	--	--	--	--	--	Relatively clear, no odor
		1425	1	1.5	1,050	28.0	7.46	110.9	--	Light brown, slightly turbid
		1430	2	3.0	1,150	29.5	7.42	117.8	2.31	Light brown, slightly turbid
		1434	3	4.5	1,150	29.0	7.41	89.2	--	Light brown, medium turbid
UGW-17	4/21/98	0825	0	--	--	--	--	--	--	Pure product, golden brown
		0830	1	2.5	1,500	29.0	6.89	-62.3	--	Slightly turbid with 1 inch of product on top
		0835	2	5.0	1,400	29.0	6.83	-114.0	2.80	Medium turbid
		0840	3	7.5	1,300	29.0	6.99	-118.8	--	Medium turbid, less than 1/4 inch product on top.
UGW-18	4/16/98	1510	0	--	--	--	--	--	--	Relatively clear
		1515	1	1.5	1,950	30.0	7.29	141.8	--	Brown, very turbid
		1520	2	3.0	2,150	30.0	7.26	106.0	2.49	Brown, very turbid
		1525	3	4.5	2,350	29.5	7.20	92.6	--	Brown, very turbid
UGW-19	4/17/98	1705	0	--	--	--	--	--	--	Half of bailer was full of golden brown product.
		1712	1	1.5	9,500	30.0	6.93	-183.6	--	Dark gray, very turbid
			2							Bailed dry during the second volume, within 4 inches of bottom - allowing for recharge
UGW-20	4/14/98	1515	0	--	--	--	--	--	--	Initial volume was relatively clear.
		1517	1	1.5	25,500	28.5	6.45	-98.7	1.38	Light brown. Relatively turbid Probe was lacking reference solution.
		1530	2	3.0	25,000	29.2	6.50	-93.8	1.52	Light brown. Relatively turbid
		1540	3	4.5	24,000	30.0	6.50	-106.1	1.52	Light brown. Relatively turbid Note: Groundwater slightly foamy. Hydrogen Sulfide odor.

TABLE 3-8 (continued)

SUMMARY OF ON-SITE WATER QUALITY PARAMETERS
CMS INVESTIGATION
TOW WAY FUEL FARM
NAVAL STATION ROOSEVELT ROADS, PUERTO RICO

Well ID	Date	Time	Number of Well Volumes	Well Volume (Gallons)	Specific Conductivity (umhos)	Temperature (C)	pH	Redox Potential (mV)	Dissolved Oxygen (mg/l)	COMMENTS
UGW-21	4/17/98	1422	0	--	--	--	--	--	--	Top 18 inches was product, and the last 6 inches was very turbid gray
		1425	1	0.6	50	30.5	6.31	-170.3	--	Golden brown, pure product
		1430	2	1.2	50	30.5	6.70	-204.1	2.70	Golden brown, pure product
		1440	3	1.8	50	30.0	6.34	-168.2	--	Golden brown, pure product
UGW-23	4/18/98	0750	0	--	--	--	--	--	--	Light gray, slightly turbid
		0810	1	2.4	1,900	27.0	7.00	-25.1	--	Dark gray, turbid
		0900	2	4.8	1,850	27.0	7.14	-17.5	1.60	Dark gray, turbid
		1005	3	7.2	1,950	28.0	7.24	-11.7	--	Light gray slightly turbid
UGW-24	4/19/98	0915	0	--	--	--	--	--	--	Relatively clear
		0935	1	4.8	7,200	28.0	6.83	-33.7	--	Brown, medium turbid
		1000	2	9.6	7,000	28.0	6.96	-14.3	1.92	Brown, very turbid
		1015	3	14.4	7,000	28.0	7.04	-5.7	--	Brown, very turbid
UGW-25	4/19/98	1120	0	--	--	--	--	--	--	Relatively clear, golden brown product on top, strong fuel odor
		1125	1	5.4	3,400	28.5	6.98	-182.7	--	LT. Gray, slightly turbid, heavy sheen
		1135	2	10.8	3,500	28.0	7.06	-100.3	1.59	LT. Gray, slightly turbid, product on top, heavy sheen
		1145	3	16.2	3,550	28.0	7.03	-154.7	--	LT. Gray, slightly turbid, 2 inches of product on top, heavy sheen
UGW-26	4/20/98	0715	0	--	--	--	--	--	--	Relatively clear
		0745	1	25.0	6,000	29.0	7.10	-35.2	--	Relatively clear
		0815	2	50.0	5,800	29.0	7.02	-24.2	1.57	Relatively clear
		0843	3	75.0	5,900	29.0	7.15	-18.9	--	Relatively clear
7MW01A	4/20/98	1520	0	--	--	--	--	--	--	Relatively clear, slight fuel odor.
		1525	1	7.5	4,950	29.0	6.89	-12.2	--	Relatively clear, slight fuel odor.
		1550	2	15.0	6,000	28.5	6.91	4.1	1.99	Relatively clear, slight fuel odor.
		1600	3	22.5	6,000	28.5	6.81	-8.7	--	Relatively clear, slight fuel odor.
		1610	4	30.0	6,000	28.5	6.87	-6.5	--	Relatively clear, slight fuel odor.

TABLE 3-8 (continued)

SUMMARY OF ON-SITE WATER QUALITY PARAMETERS
CMS INVESTIGATION
TOW WAY FUEL FARM
NAVAL STATION ROOSEVELT ROADS, PUERTO RICO

Well ID	Date	Time	Number of Well Volumes	Well Volume (Gallons)	Specific Conductivity (umhos)	Temperature (C)	pH	Redox Potential (mV)	Dissolved Oxygen (mg/l)	COMMENTS
7MW02	4/19/98	1630	0	--	--	--	--	--	--	Relatively clear
		1641	1	3.1	1,510	28.0	7.10	-190.3	--	Light gray, slightly turbid
		1652	2	6.2	1,400	28.0	7.10	-162.1	0.90	Light gray, slightly turbid
		1705	3	9.3	1,400	28.0	7.04	-146.9	--	Light gray, slightly turbid
7MW03	4/15/98	1005	0	--	--	--	--	--	--	Relatively clear
		1050	1	10.5	15,000	26.0	6.31	37.8	--	Light gray, slightly turbid
		1150	2	21.0	15,500	27.5	6.39	37.5	1.73	Light gray, slightly turbid
		1330	3	31.5	16,500	27.0	6.44	100.6	--	Light gray, slightly turbid
7MW04	4/15/98	0725	0	0.0	--	--	--	--	--	Started 0725
		0742	1	5.0	12,500	26.5	6.45	-53.2	--	Light gray slightly turbid, probe was lacking reference solution.
		0803	2	10.0	12,200	27.0	6.55	46.8	2.18	Light gray slightly turbid
		0825	3	15.0	12,500	27.0	6.61	79.4	--	Light gray slightly turbid
7MW05	4/19/98	1425	0	--	--	--	--	--	--	Relatively clear
		1430	1	2.5	4,760	28.0	7.57	-58.3	--	Light brown, medium turbidity
		1440	2	5.0	4,550	28.0	7.33	-158.3	1.21	Light brown, medium turbidity
		1445	3	7.5	4,400	28.0	7.47	-30.7	--	Light brown, medium turbidity
7MW06	4/19/98	1530	0	--	--	--	--	--	--	Water is relatively clear with heavy brown slime/ bacterial growth
		1535	1	2.8	24,200	28.0	6.56	-130.7	--	Light brown, medium turbidity
		1540	2	5.6	25,000	28.0	6.63	-191.2	1.15	Light brown, medium turbidity
		1544	3	8.4	27,500	28.0	6.63	-174.4	--	Light brown, medium turbidity
7MW07	4/19/98	0710	0	--	--	--	--	--	--	Relatively clear
		0725	1	20	600	28.0	7.64	45.4	--	Light brown, medium turbidity
		0745	2	40	550	29.0	7.67	109.3	3.1	Light brown, medium turbidity
		0800	3	60	600	29.0	7.67	110.5	--	Light brown, medium turbidity
7MW08	4/18/98	1315	0	--	--	--	--	--	--	Relatively clear
		1330	1	26	9,500	29.0	6.61	1.1	--	Light gray slightly turbid
		1345	2	52	10,100	29.0	6.73	-0.4	2.1	Light gray slightly turbid
		1408	3	78	10,500	29.0	6.72	12.4	--	Light gray slightly turbid

TABLE 3-8 (continued)

SUMMARY OF ON-SITE WATER QUALITY PARAMETERS
CMS INVESTIGATION
TOW WAY FUEL FARM
NAVAL STATION ROOSEVELT ROADS, PUERTO RICO

Well ID	Date	Time	Number of Well Volumes	Well Volume (Gallons)	Specific Conductivity (umhos)	Temperature (C)	pH	Redox Potential (mV)	Dissolved Oxygen (mg/l)	COMMENTS
7MW09	4/18/98	0930	0	--	--	--	--	--	--	Brown, turbid
		0940	1	5.9	3,900	28.0	6.73	-53.6	--	Brown, turbid
			2							Bailed dry during 2nd volume, within 4 inches of bottom
470-MW1	4/18/98	1625	0	--	--	--	--	--	--	Water is relatively clear, 3 inches of golden brown product on top, strong fuel odor
		1630	1	1.5	2,700	29.0	7.28	-160.8	--	LT. Gray, slightly turbid, heavy sheen, strong fuel odor (1/2 inch product on top golden brown)
		1635	2	3.0	2,750	29.5	7.24	-159.5	1.25	LT. Gray, slightly turbid, heavy sheen, strong fuel odor (1/2 inch product on top golden brown)
		1650	3	4.5	2,700	29.5	7.22	-157.5	--	LT. Gray, slightly turbid, heavy sheen, strong fuel odor (1/2 inch product on top golden brown)
470-MW3	4/17/98	1810	0	--	--	--	--	--	--	Relatively clear, strong fuel odor
		1815	1	1.6	6,000	29.0	6.70	-138.7	--	LT. Gray, medium turbid, sheen present
		1820	2	3.2	5,500	29.0	6.69	-185.6	2.68	LT. Gray, medium turbid, sheen present
		1830	3	4.8	5,500	29.0	6.70	-179.0	--	Dark gray, turbid with a sheen

Note: -- Not tested

TABLE 3-9

Baildown Test Record Sheet

Site: TWFF

Well Identification: UGW-19

Well Diameter (OD/ID): 2 inches (OD)

Date at Start of Test: 4/21/98 Sampler=s Initials: MGT/JCE

Time at Start of Test: 1545

Initial Readings

Depth to Groundwater (ft)	Depth to Free Product (ft)	Free Product Thickness (ft)	Total Volume Bailed (L)
11.80	10.56	1.24	1.1 L (0.3 L H_2O, 0.8 L product)

Test Data

Sample Collection Time	Depth to Groundwater (ft)	Depth to Free Product (ft)	Free Product Thickness (ft)
1600	11.22	11.12	0.1
1700	10.94	10.77	0.17
1800	10.94	10.77	0.17
0740	10.43	10.25	0.18

TABLE 3-9 (continued)

Baildown Test Record Sheet

Site: TWFF

Well Identification: UGW-21

Well Diameter (OD/ID): 2 inches (OD)

Date at Start of Test: 4/21/98 Sampler's Initials: MGT/JCE

Time at Start of Test: 1710

Initial Readings

Depth to Groundwater (ft)	Depth to Free Product (ft)	Free Product Thickness (ft)	Total Volume Bailed (L)
13.53	11.90	1.63	4.93 L (1.14 L H_2O, 3.79 L product)

Test Data

Sample Collection Time	Depth to Groundwater (ft)	Depth to Free Product (ft)	Free Product Thickness (ft)
1720	13.30	12.78	0.52
1820	12.74	12.16	0.58
1920	12.74	12.16	0.58
0735	12.12	11.44	0.68

TABLE 3-10

FREE PRODUCT THICKNESS
CMS INVESTIGATION
TOW WAY FUEL FARM
NAVAL STATION ROOSEVELT ROADS, PUERTO RICO

	Groundwater Sampling Round		April 21, 1998	April 22, 1998
Well ID	**Date**	**Free Product Thickness (ft)**	**Free Product Thickness (ft)**	**Free Product Thickness (ft)**
GW-02	4/21/98	ND	ND	NM
GW-03	4/21/98	0.00811	0.01	<0.01
GW-04	4/16/98	0.19464	ND	NM
GW-06	4/16/98	0	ND	NM
MW-2	4/17/98	0.03244	ND	NM
MW-4	4/19/98	1.57334	ND	NM
UGW-2	4/15/98	0.28385	ND	NM
UGW-3	4/20/98	2.74929	1.45	1.94
UGW-4	4/20/98	8.18299	0.09	0.04
UGW-5	4/17/98	0.28385	ND	NM
UGW-6	4/15/98	0	ND	NM
UGW-7	4/15/98	ND	ND	NM
UGW-8	4/16/98	ND	ND	NM
UGW-9	4/16/98	<0.01	ND	NM
UGW-10	4/16/98	<0.01	ND	NM
UGW-11	4/17/98	ND	ND	NM
UGW-12	4/17/98	7.92	4.54	6.37
UGW-13	4/21/98	6.27	6.27	2.31
UGW-14	4/19/98	ND	ND	NM
UGW-15	4/15/98	<0.01	ND	NM

Notes:
ND - Not Detected
NM - Not Measured
Datum plan is mean low water = 100.00 ft. as established by U.S. Survey Section as of Nov. 1941

TABLE 3-10

FREE PRODUCT THICKNESS
CMS INVESTIGATION
TOW WAY FUEL FARM
NAVAL STATION ROOSEVELT ROADS, PUERTO RICO

	Groundwater Sampling Round		April 21, 1998	April 22, 1998
Well ID	**Date**	**Free Product Thickness (ft)**	**Free Product Thickness (ft)**	**Free Product Thickness (ft)**
UGW-16	4/16/98	<0.01	ND	NM
UGW-17	4/21/98	5.99	5.99	1.25
UGW-18	4/16/98	ND	ND	NM
UGW-19	4/17/98	1.73	1.19	0.18
UGW-20	4/14/98	ND	ND	NM
UGW-21	4/17/98	2.3	1.53	0.68
UGW-23	4/18/98	ND	ND	NM
UGW-24	4/19/98	ND	ND	NM
UGW-25	4/19/98	1.78	1.70	1.65
UGW-26	4/20/98	ND	ND	NM
7MW01A	4/20/98	ND	ND	NM
7MW02	4/19/98	ND	ND	NM
7MW03	4/15/98	ND	ND	NM
7MW04	4/15/98	ND	ND	NM
7MW05	4/19/98	ND	ND	NM
7MW06	4/19/98	ND	ND	NM
7MW07	4/19/98	ND	ND	NM
7MW08	4/18/98	ND	ND	NM
7MW09	4/18/98	ND	ND	NM
470-MW1	4/18/98	0.37	0.21	0.16
470-MW3	4/17/98	ND	ND	NM

Notes:
ND - Not Detected
NM - Not Measured
Datum plan is mean low water = 100.00 ft. as established by U.S. Survey Section as of Nov. 1941

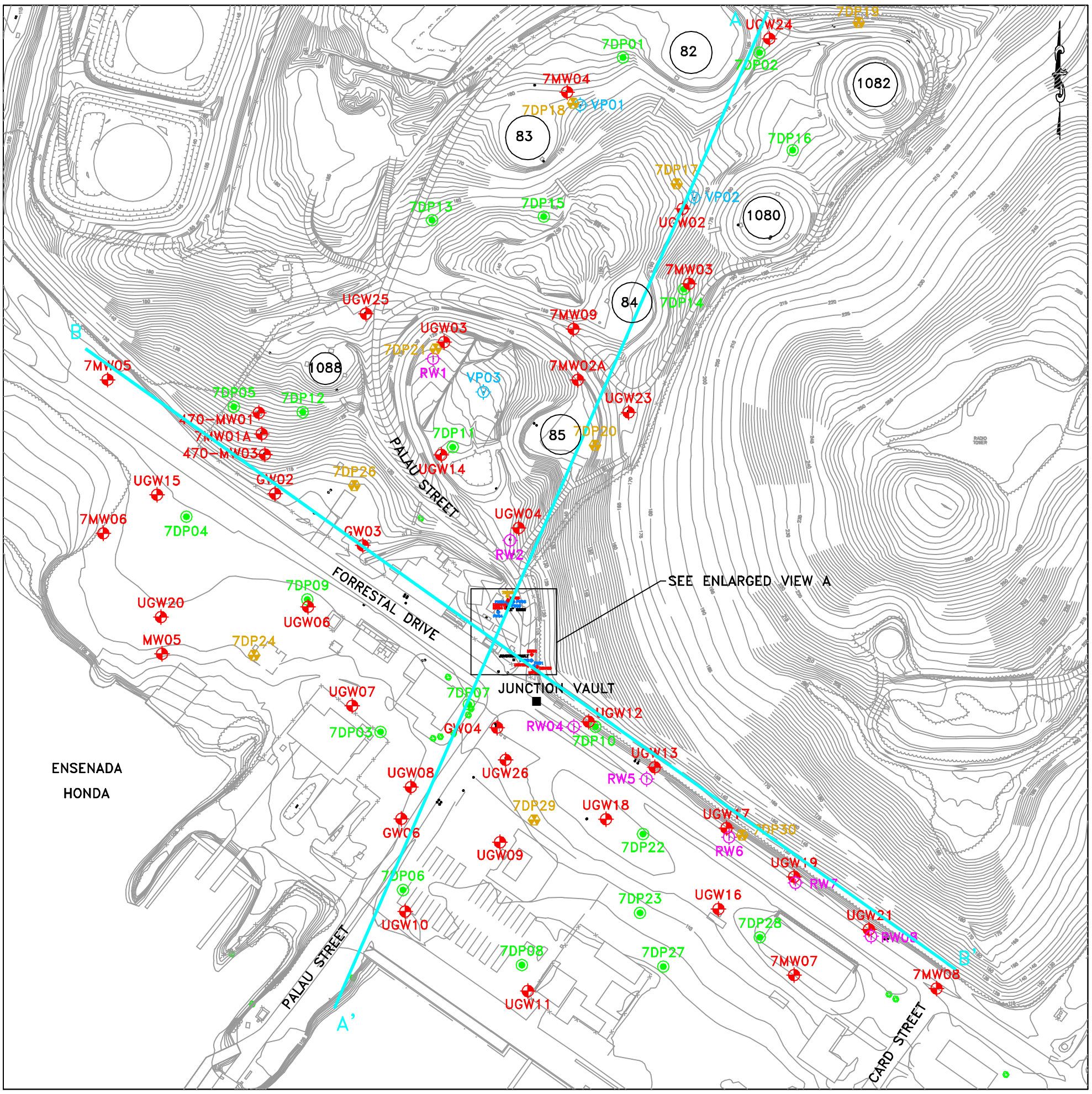
TABLE 3-11

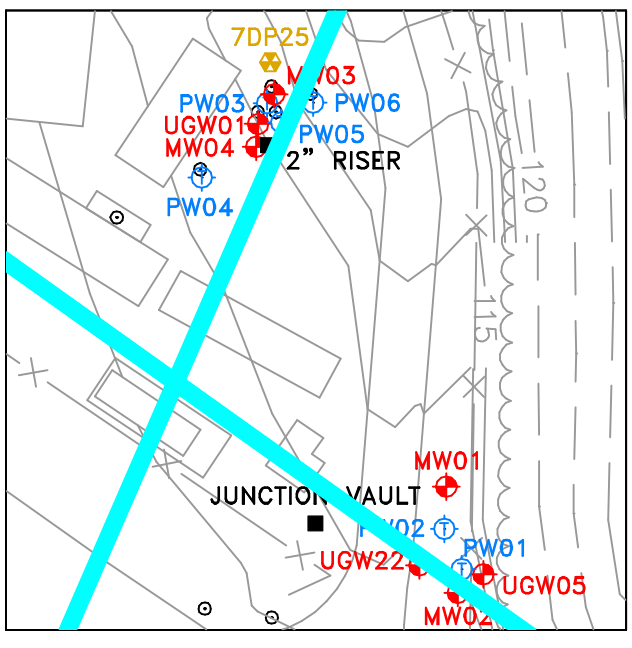
SUMMARY OF HYDRAULIC CONDUCTIVITY ESTIMATES
CMS INVESTIGATION
TOW WAY FUEL FARM
NAVAL STATION ROOSEVELT ROADS, PUERTO RICO

Well ID	Hydraulic Conductivity (ft/day)			Comments
	Falling Head	Rising Head	Average	
Bedrock Aquifer				
7MW01A[1]	30	9.9	--	Well screened in bedrock
7MW02A	[2]	1.2	--	Well screened in bedrock
7MW03	0.73	5.3	3.02	Well screened in bedrock
7MW04	2.6	2.6	2.60	Well screened in bedrock
UGW-24	[2]	0.92	--	Well screened in bedrock
UGW-24	[2]	0.43	--	Well screened in bedrock
Average	--	4.98	2.81	
Unconsolidated Aquifer				
UGW-11	[2]	138.5	--	Well screened in very loose F/C sand

NOTES: [1] Falling head test result not representative of aquifer conditions
[2] Falling head test data not recorded because water level was within the screened interval.

FIGURES





VIEW A

200 0 100 200
1 inch = 200 ft.

50 0 25 50
1 inch = 50 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

277800WP

LEGEND

- MONITORING WELL LOCATION
- VERTICAL PERMEABILITY SAMPLE LOCATION
- SOIL BORING LOCATION
- SOIL BORING AND SOIL GAS SAMPLE LOCATION
- TERRAVAC PRODUCT RECOVERY WELL LOCATION
- ICHOR PRODUCT RECOVERY WELL LOCATION

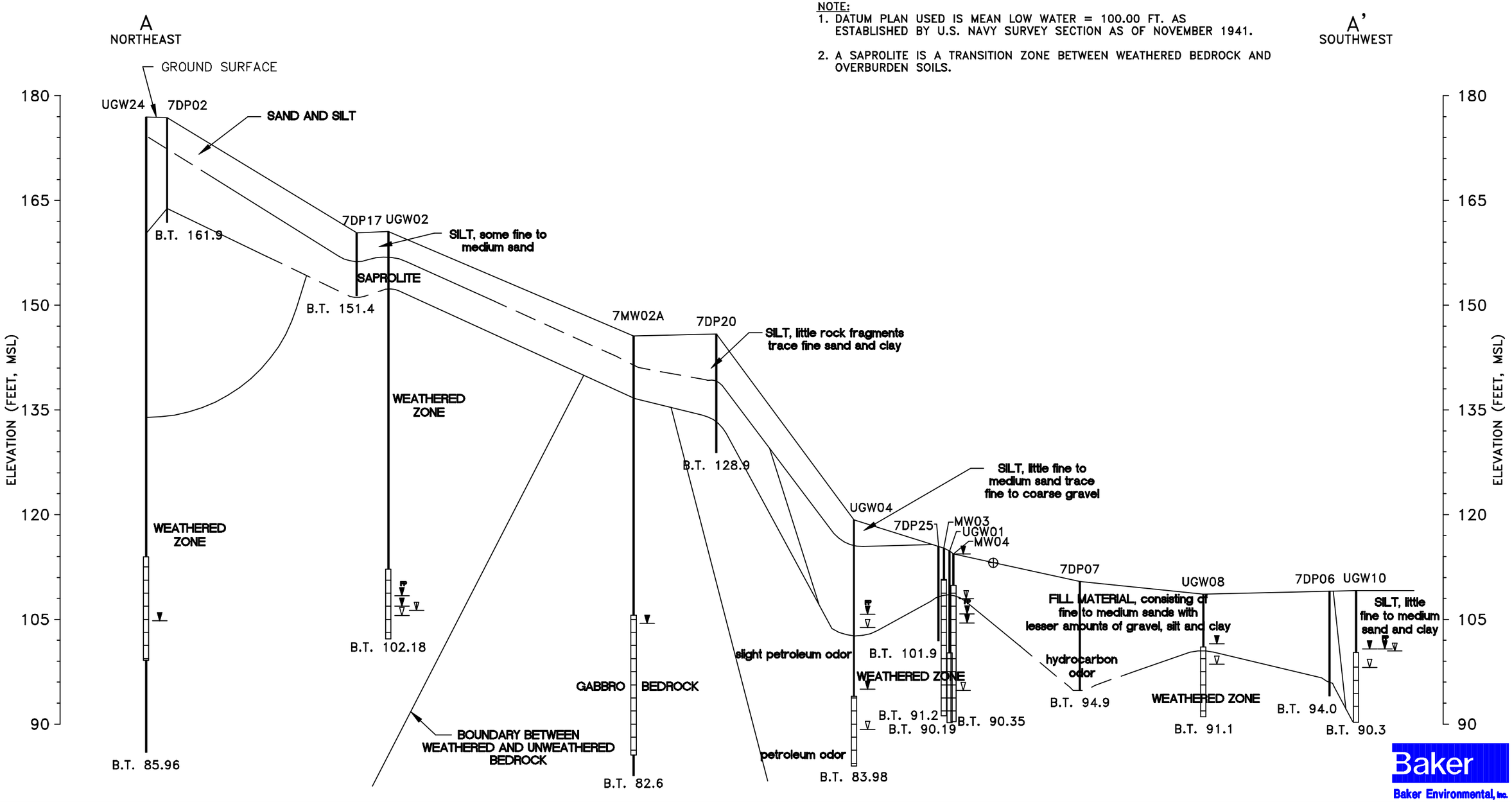
SOURCE: LANTDIV, FEB. 1992/1997

FIGURE 3-1
CROSS SECTION TRAVERSE LOCATIONS FOR
A-A' AND B-B'
TOW WAY FUEL FARM

NAVAL STATION ROOSEVELT ROADS
PUERTO RICO

277807WP

NOTE:
1. DATUM PLAN USED IS MEAN LOW WATER = 100.00 FT. AS ESTABLISHED BY U.S. NAVY SURVEY SECTION AS OF NOVEMBER 1941.
2. A SAPROLITE IS A TRANSITION ZONE BETWEEN WEATHERED BEDROCK AND OVERBURDEN SOILS.



Baker
Baker Environmental, Inc.

LEGEND

- GROUNDWATER ELEVATION (4/15/98 THROUGH 4/21/98)
- CORRECTED GROUNDWATER ELEVATION (4/21/98)
- GROUNDWATER ENCOUNTERED DURING DRILLING
- FREE PRODUCT ELEVATION (4/15/98 THROUGH 4/21/98)
- B.T. X' — BORING TERMINATED, ELEVATION MSL
- WELL SCREEN INTERVAL
- INTERSECTION OF CROSS-SECTION B-B'
- ESTIMATED — — — PROJECTED

150 0 75 150 300
Horizontal Scale: 1 inch = 150 ft.

15 0 7.5 15 30
Vertical Scale: 1 inch = 15 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
HYDROGEOLOGIC CROSS-SECTION A-A'
TOW WAY FUEL FARM

NAVAL STATION ROOSEVELT ROADS
PUERTO RICO

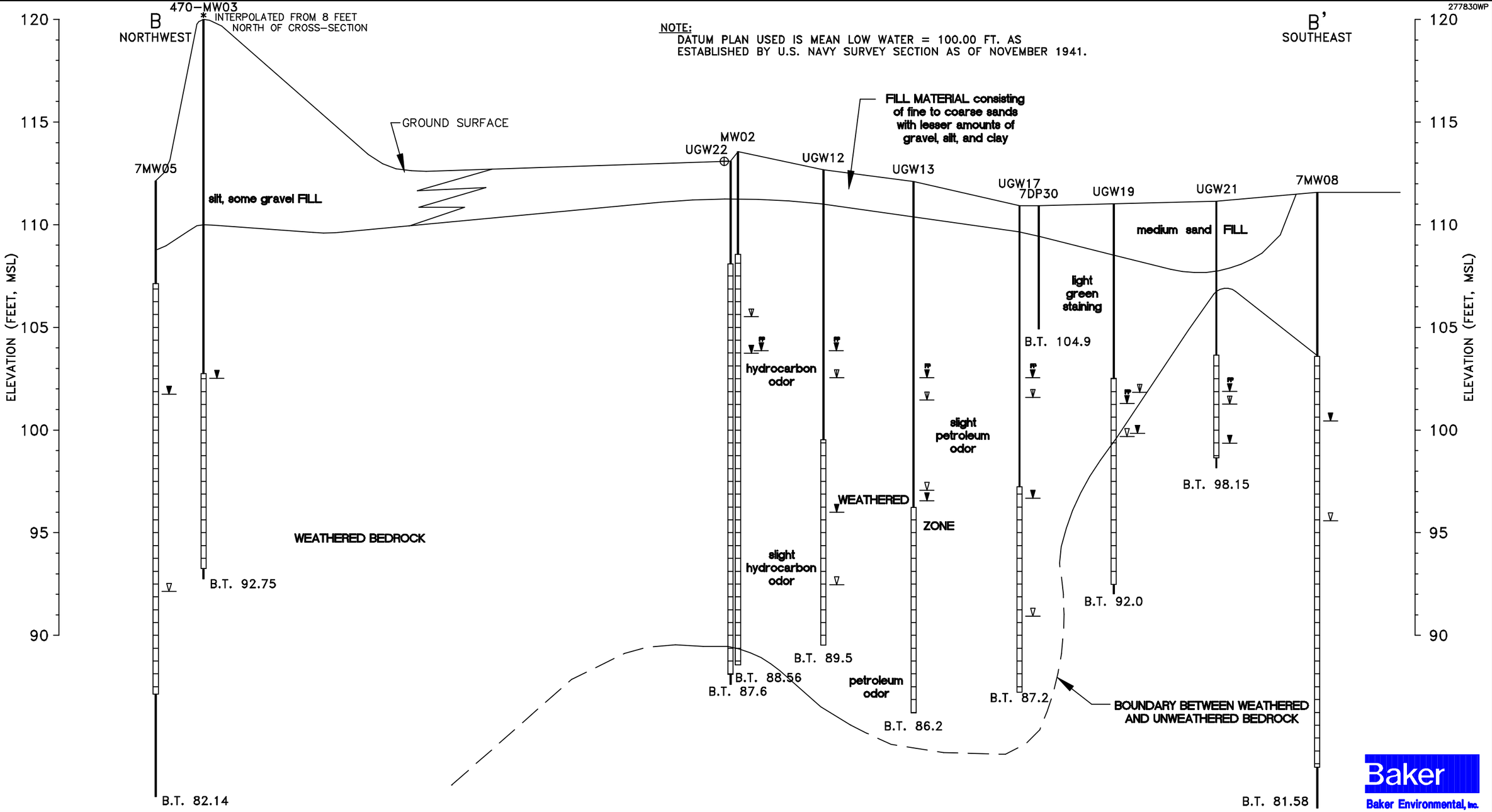
277830WP

B NORTHWEST

B' SOUTHEAST

470-MW03 INTERPOLATED FROM 8 FEET NORTH OF CROSS-SECTION

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



Baker
Baker Environmental, Inc.

LEGEND

- GROUNDWATER ELEVATION (4/15/98 THROUGH 4/21/98)
- CORRECTED GROUNDWATER ELEVATION (4/21/98)
- GROUNDWATER ENCOUNTERED DURING DRILLING
- FREE PRODUCT ELEVATION (4/15/98 THROUGH 4/21/98)
- B.T. X' — BORING TERMINATED, ELEVATION MSL
- WELL SCREEN INTERVAL
- INTERSECTION OF CROSS-SECTION A-A'
- ESTIMATED — — — PROJECTED

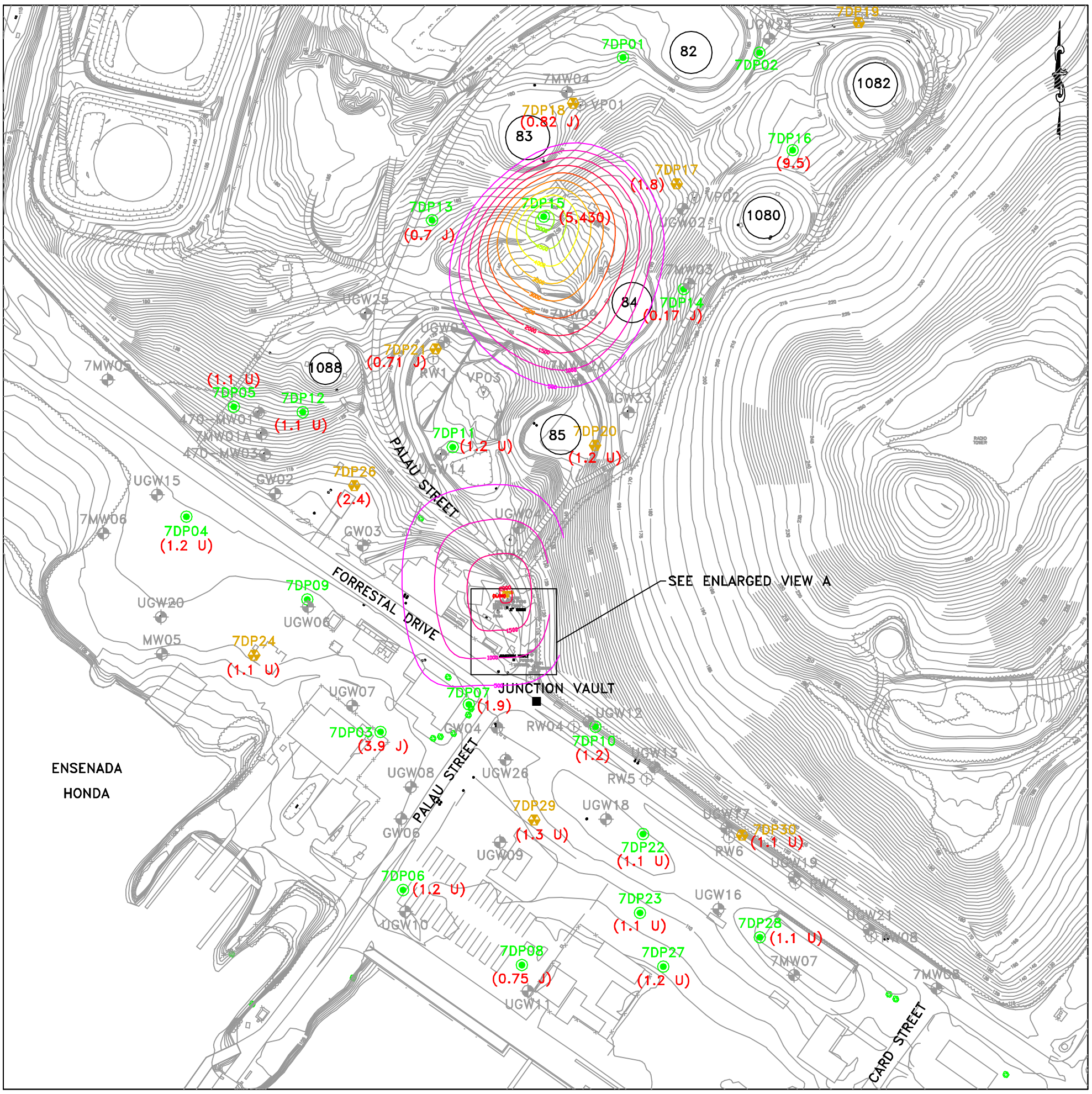
160 0 80 160 320
Horizontal Scale: 1 inch = 160 ft.

5 0 2.5 5 10
Vertical Scale: 1 inch = 5 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 3-3
HYDROGEOLOGIC CROSS-SECTION B-B'
TOW WAY FUEL FARM

NAVAL STATION ROOSEVELT ROADS
PUERTO RICO



VIEW A

277821WP

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

Baker

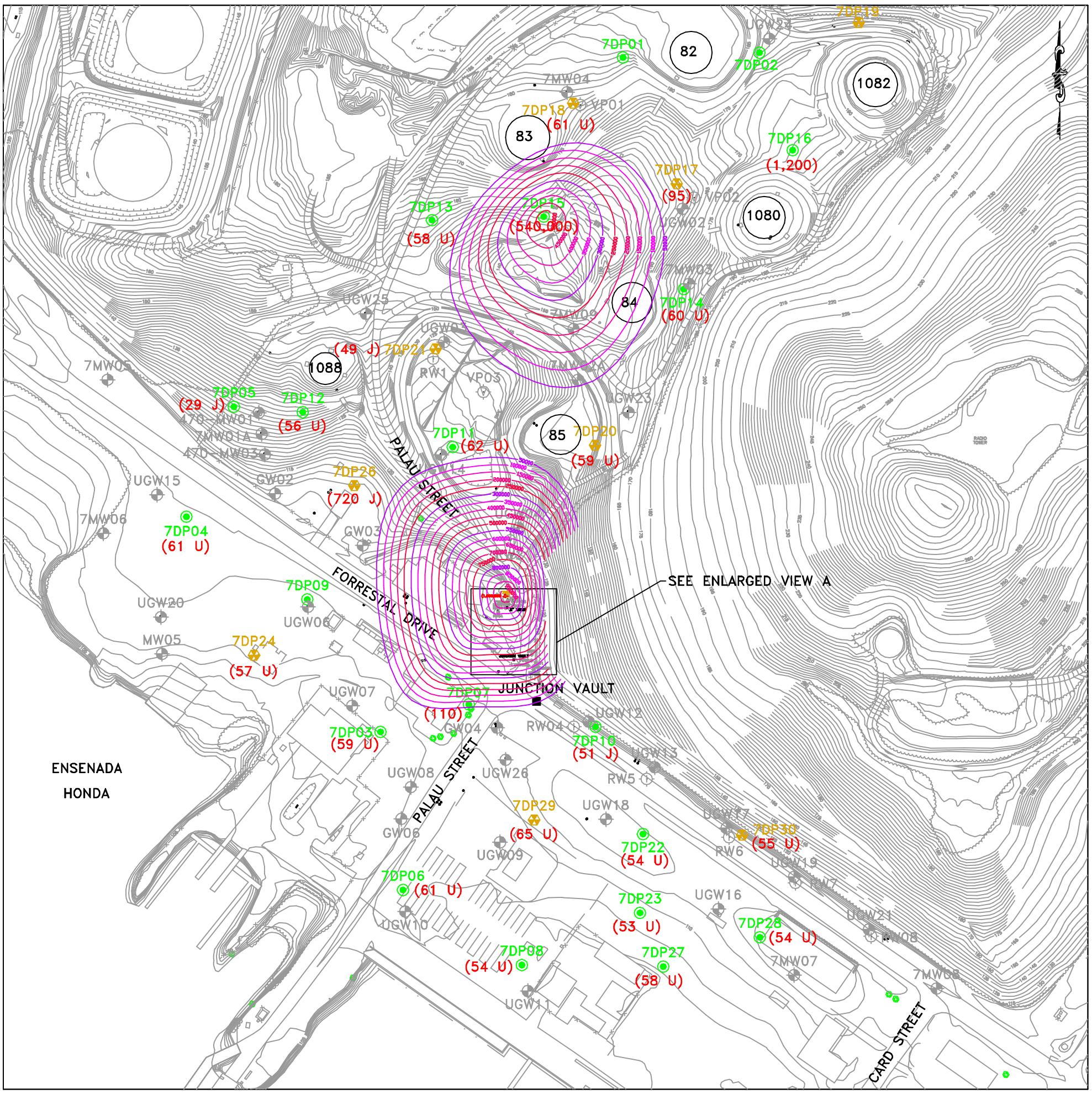
LEGEND

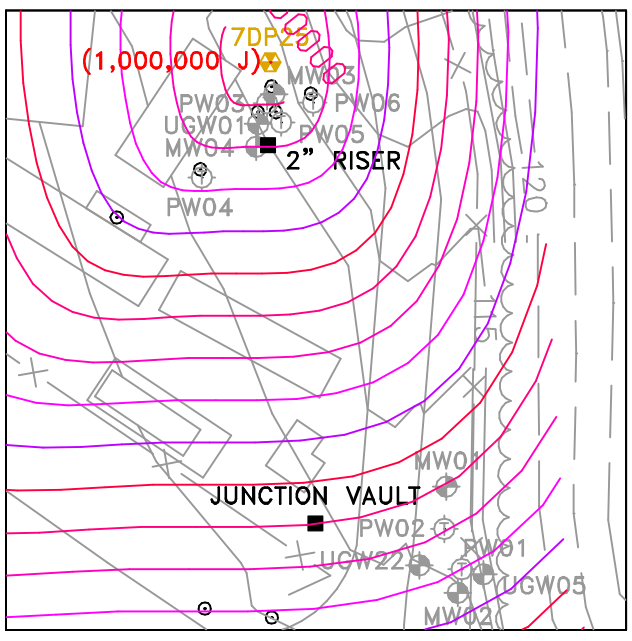
- MONITORING WELL LOCATION
- VERTICAL PERMEABILITY SAMPLE LOCATION
- SOIL BORING LOCATION
- SOIL BORING AND SOIL GAS SAMPLE LOCATION
- TERRAVAC PRODUCT RECOVERY WELL LOCATION
- ICHOR PRODUCT RECOVERY WELL LOCATION
- (2.120) – BTEX CONCENTRATION (ug/kg) IN SOILS
- 1.5 – ISOCONCENTRATION LINE (ug/kg)

SOURCE: LANTDIV, FEB. 1992/1997

FIGURE 3-4
BTEX IN SOIL ISOPLETH MAP 0-5' BGS
TOW WAY FUEL FARM

NAVAL STATION ROOSEVELT ROADS
PUERTO RICO





VIEW A

200 0 100 200
1 inch = 200 ft.

50 0 25 50
1 inch = 50 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

277818WP

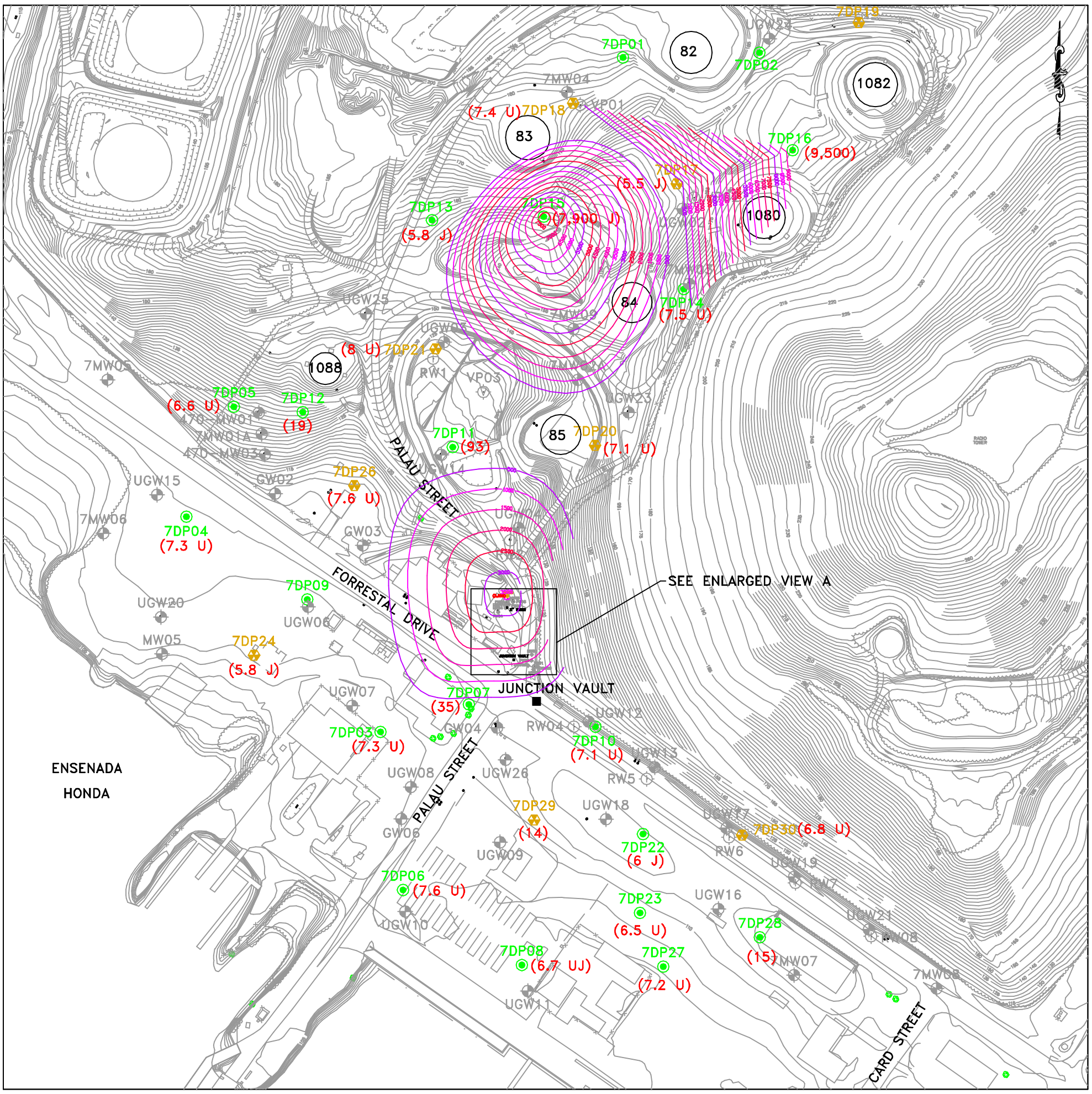
LEGEND

- MONITORING WELL LOCATION
- VERTICAL PERMEABILITY SAMPLE LOCATION
- SOIL BORING LOCATION
- SOIL BORING AND SOIL GAS SAMPLE LOCATION
- TERRAVAC PRODUCT RECOVERY WELL LOCATION
- ICHOR PRODUCT RECOVERY WELL LOCATION
- (29 J) – TPH GRO CONCENTRATION (ug/kg) IN SOILS
- 50000 – ISOCONCENTRATION LINE (ug/kg)

SOURCE: LANTDIV, FEB. 1992/1997

FIGURE 3-5
TPH GRO IN SOIL ISOPLETH MAP 0-5' BGS
TOW WAY FUEL FARM

NAVAL STATION ROOSEVELT ROADS
PUERTO RICO



VIEW A

277813WP

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

Baker

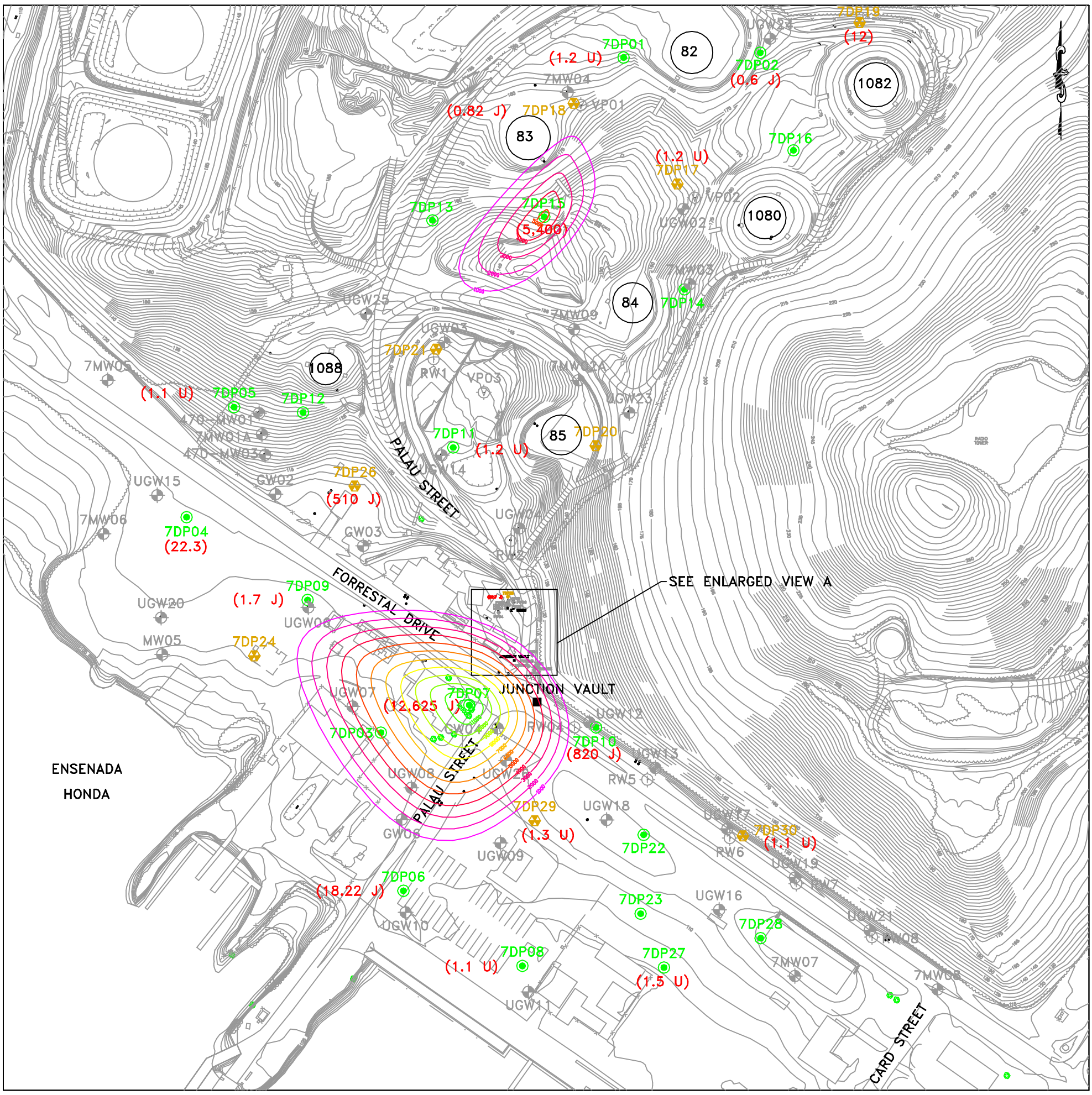
LEGEND

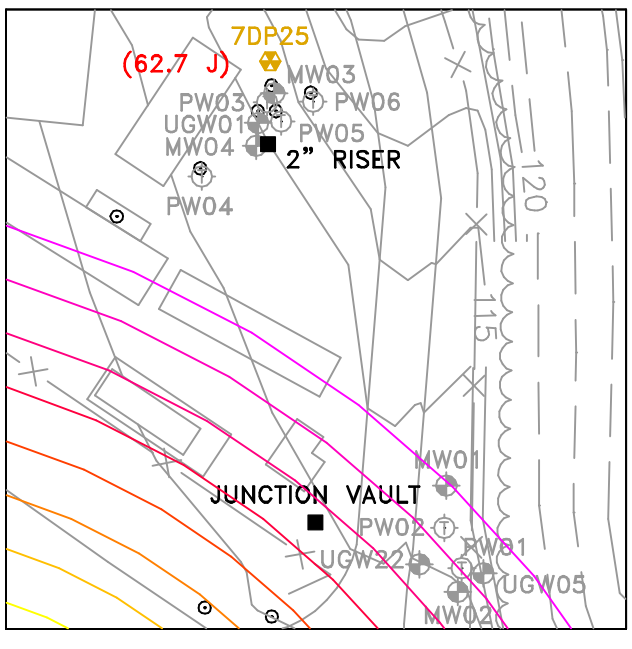
- MONITORING WELL LOCATION
- VERTICAL PERMEABILITY SAMPLE LOCATION
- SOIL BORING LOCATION
- SOIL BORING AND SOIL GAS SAMPLE LOCATION
- TERRAVAC PRODUCT RECOVERY WELL LOCATION
- ICHOR PRODUCT RECOVERY WELL LOCATION
- (3,600) – TPH DRO CONCENTRATION (mg/kg) IN SOILS
- 500 – ISOCONCENTRATION LINE (mg/kg)

SOURCE: LANTDIV, FEB. 1992/1997

FIGURE 3-6
TPH DRO IN SOIL ISOPLETH MAP 0-5' BGS
TOW WAY FUEL FARM

NAVAL STATION ROOSEVELT ROADS
PUERTO RICO





VIEW A

50 0 25 50
1 inch = 50 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

277820WP

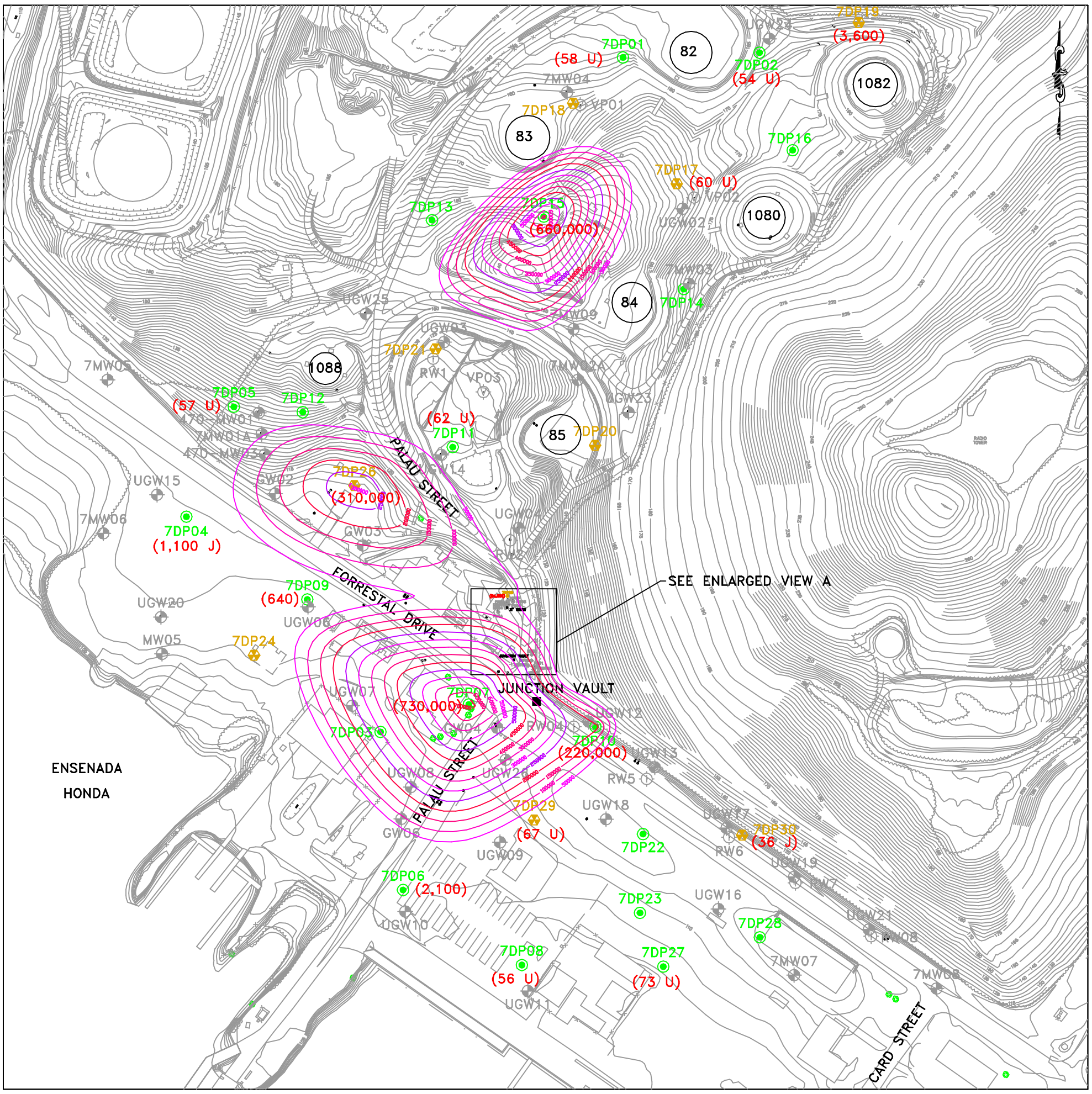
LEGEND

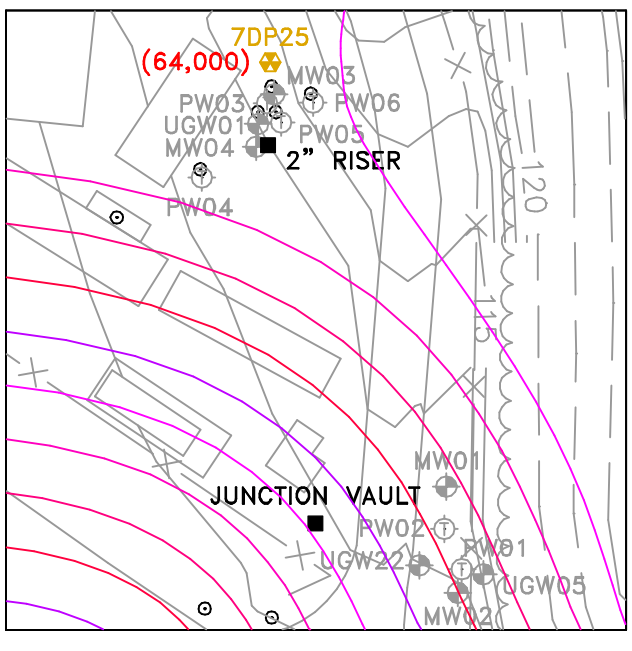
- MONITORING WELL LOCATION
- VERTICAL PERMEABILITY SAMPLE LOCATION
- SOIL BORING LOCATION
- SOIL BORING AND SOIL GAS SAMPLE LOCATION
- TERRAVAC PRODUCT RECOVERY WELL LOCATION
- ICHOR PRODUCT RECOVERY WELL LOCATION
- (12) – BTEX CONCENTRATION (ug/kg) IN SOILS
- 10,000 – ISOCONCENTRATION LINE (ug/kg)

SOURCE: LANTDIV, FEB. 1992/1997

FIGURE 3-7
BTEX IN SOIL ISOPLETH MAP 5-10' BGS
TOW WAY FUEL FARM

NAVAL STATION ROOSEVELT ROADS
PUERTO RICO





VIEW A

200 0 100 200
1 inch = 200 ft.

50 0 25 50
1 inch = 50 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

277817WP

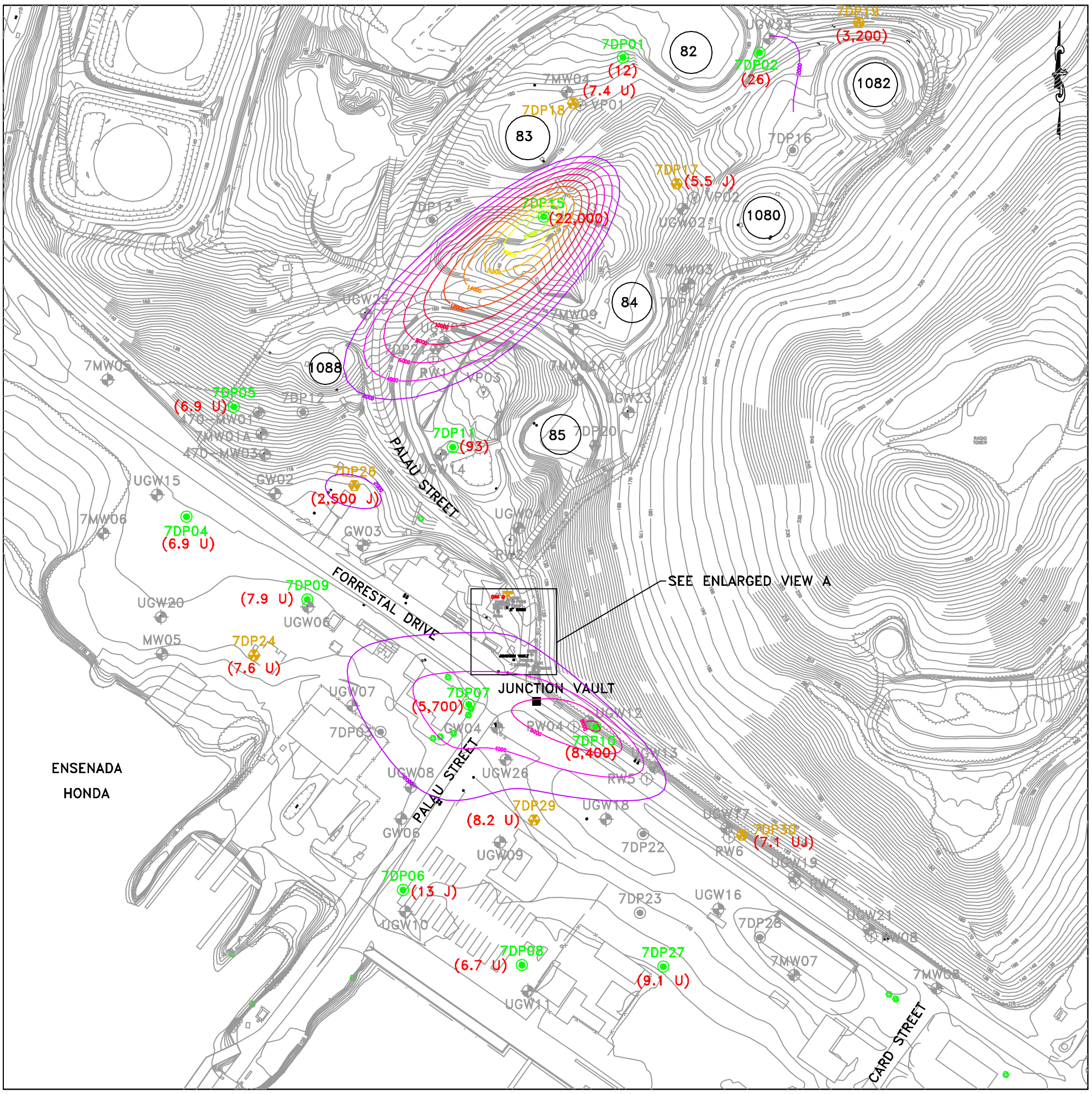
LEGEND

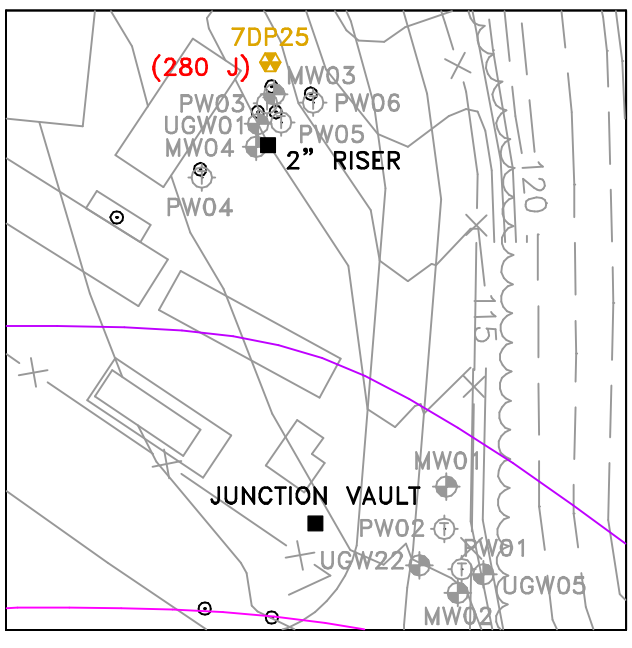
- MONITORING WELL LOCATION
- VERTICAL PERMEABILITY SAMPLE LOCATION
- SOIL BORING LOCATION
- SOIL BORING AND SOIL GAS SAMPLE LOCATION
- TERRAVAC PRODUCT RECOVERY WELL LOCATION
- ICHOR PRODUCT RECOVERY WELL LOCATION
- (64,000) – TPH GRO CONCENTRATION (ug/kg) IN SOILS
- 550 – ISOCONCENTRATION LINE (ug/kg)

SOURCE: LANTDIV, FEB. 1992/1997

FIGURE 3-8
TPH GRO IN SOIL ISOPLETH MAP 5-10' BGS
TOW WAY FUEL FARM

NAVAL STATION ROOSEVELT ROADS
PUERTO RICO





VIEW A

200 0 100 200
1 inch = 200 ft.

50 0 25 50
1 inch = 50 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

277819WP

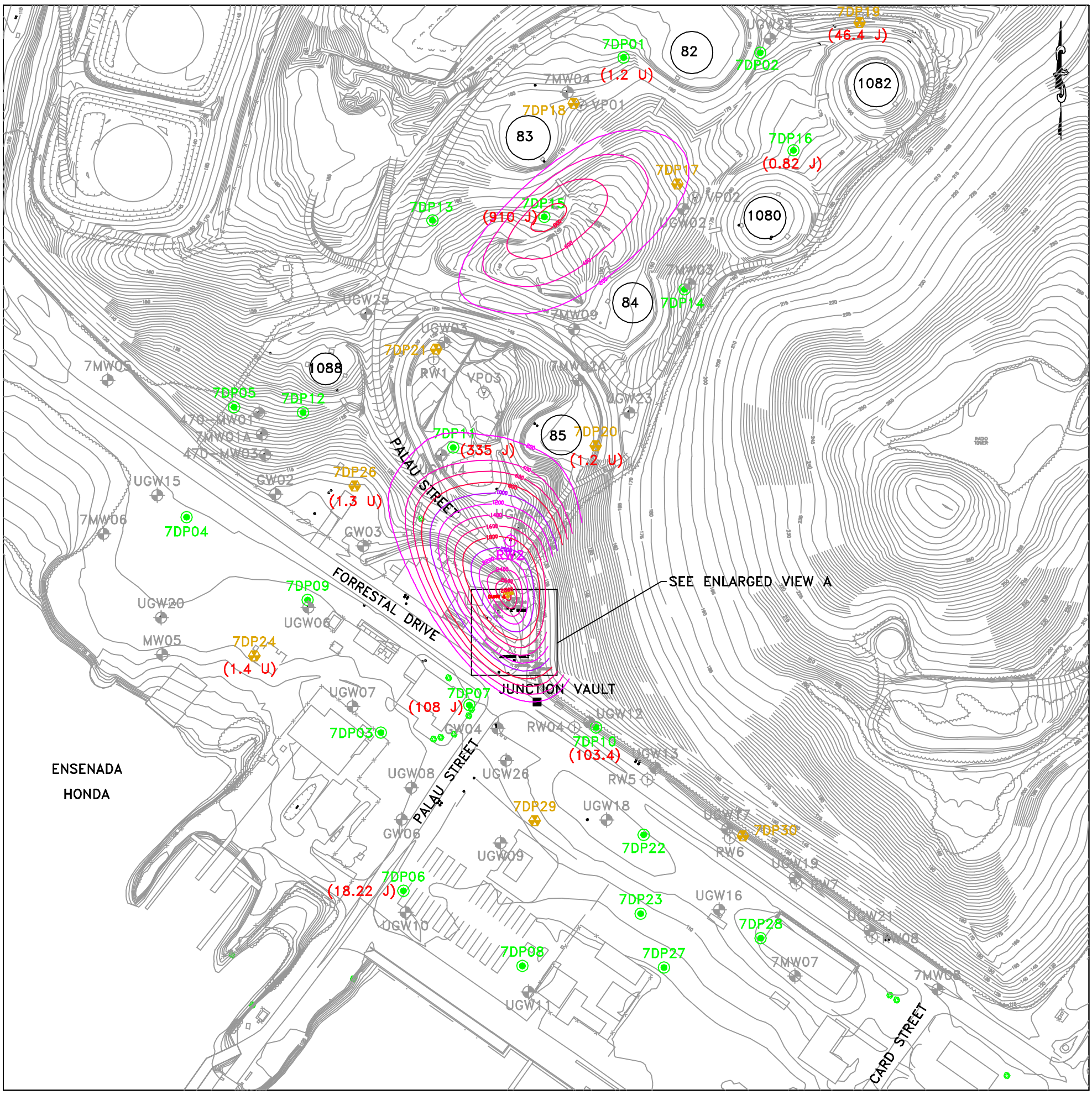
LEGEND

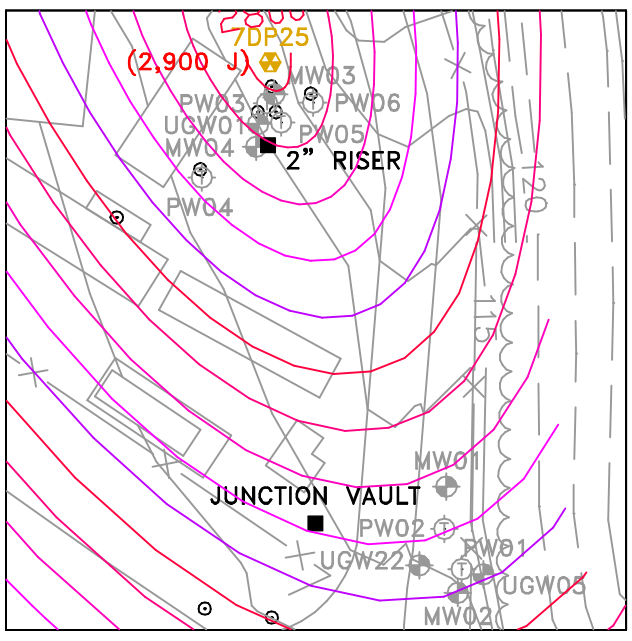
- MONITORING WELL LOCATION
- VERTICAL PERMEABILITY SAMPLE LOCATION
- SOIL BORING LOCATION
- SOIL BORING AND SOIL GAS SAMPLE LOCATION
- TERRAVAC PRODUCT RECOVERY WELL LOCATION
- ICHOR PRODUCT RECOVERY WELL LOCATION
- (12) – TPH DRO CONCENTRATION (mg/kg) IN SOILS
- 4000 – ISOCONCENTRATION LINE (mg/kg)

SOURCE: LANTDIV, FEB. 1992/1997

FIGURE 3–9
TPH DRO IN SOIL ISOPLETH MAP 5–10' BGS
TOW WAY FUEL FARM

NAVAL STATION ROOSEVELT ROADS
PUERTO RICO





VIEW A

200 0 100 200
1 inch = 200 ft.

50 0 25 50
1 inch = 50 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

277816WP

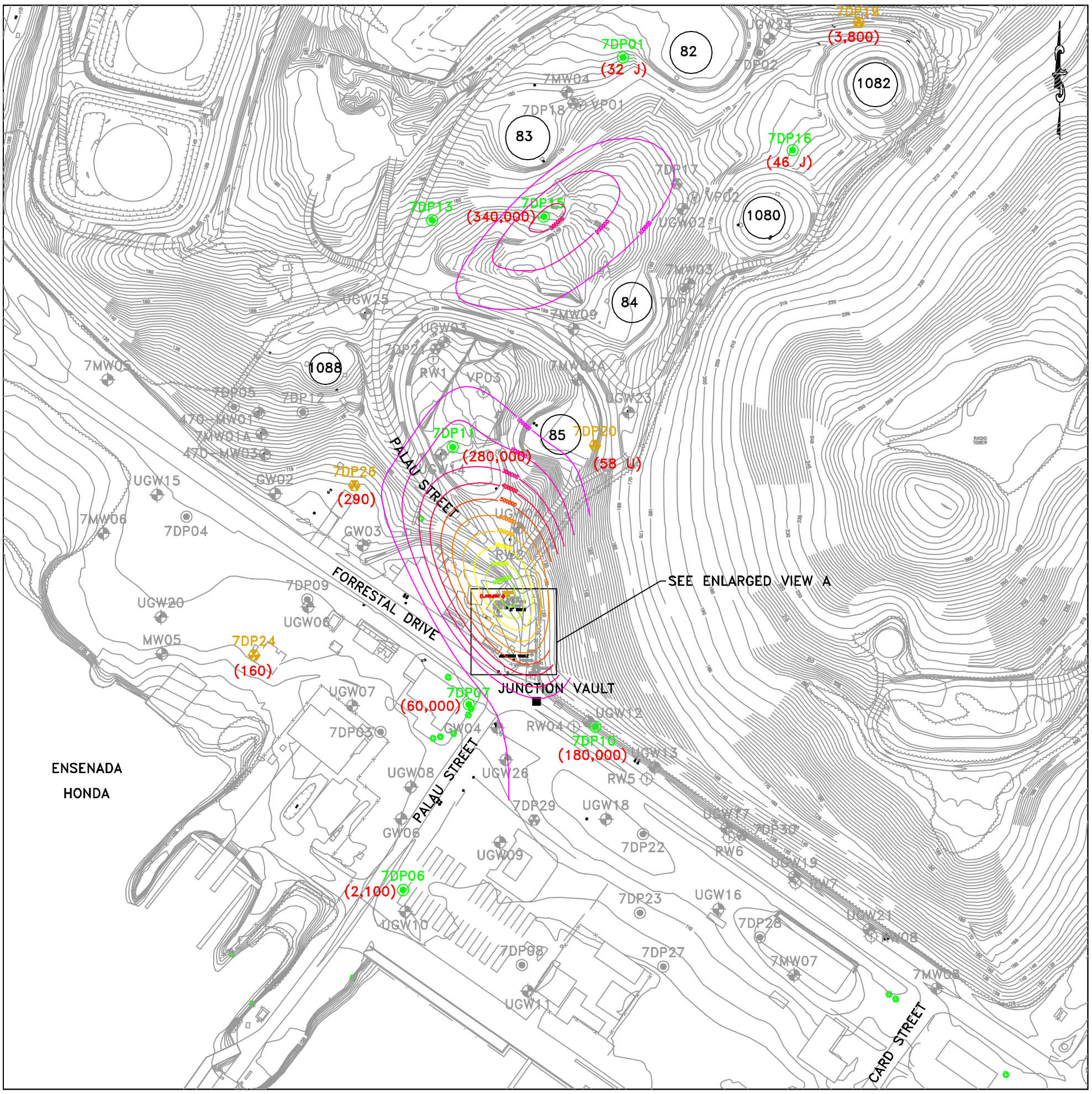
LEGEND

- MONITORING WELL LOCATION
- VERTICAL PERMEABILITY SAMPLE LOCATION
- SOIL BORING LOCATION
- SOIL BORING AND SOIL GAS SAMPLE LOCATION
- TERRAVAC PRODUCT RECOVERY WELL LOCATION
- ICHOR PRODUCT RECOVERY WELL LOCATION
- (910) – BTEX CONCENTRATION (ug/kg) IN SOILS
- 2400 – ISOCONCENTRATION LINE (ug/kg)

SOURCE: LANTDIV, FEB. 1992/1997

FIGURE 3-10
BTEX IN SOIL ISOPLETH MAP 10-15' BGS
TOW WAY FUEL FARM

NAVAL STATION ROOSEVELT ROADS
PUERTO RICO



VIEW A

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

Baker

277814WP

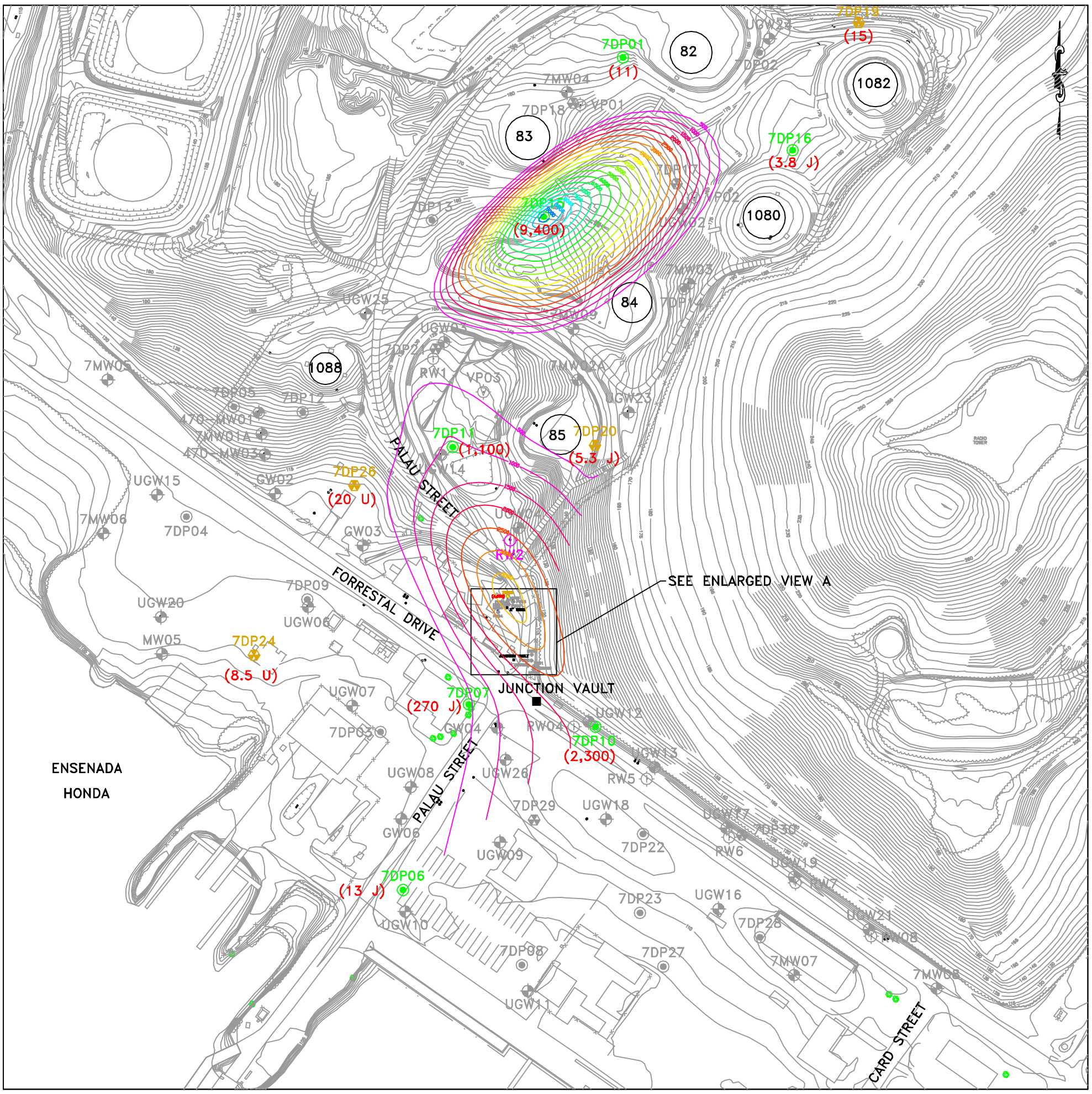
LEGEND

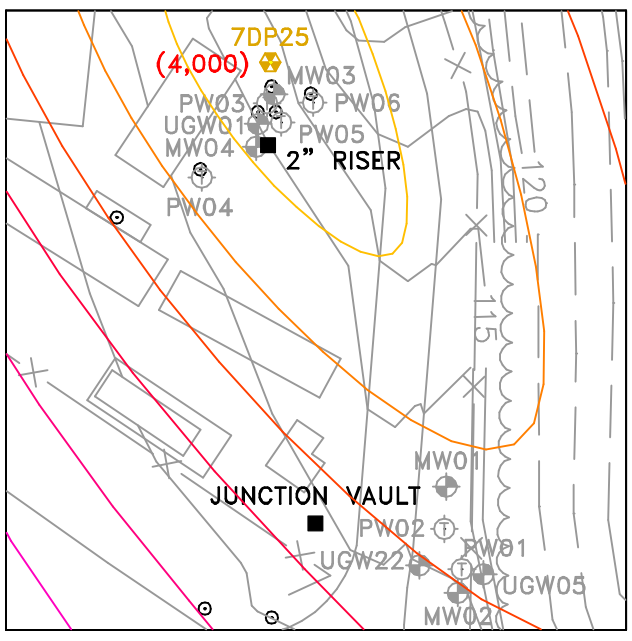
- MONITORING WELL LOCATION
- VERTICAL PERMEABILITY SAMPLE LOCATION
- SOIL BORING LOCATION
- SOIL BORING AND SOIL GAS SAMPLE LOCATION
- TERRAVAC PRODUCT RECOVERY WELL LOCATION
- ICHOR PRODUCT RECOVERY WELL LOCATION
- (1,100,000 J) – TPH GRO CONCENTRATION (ug/kg) IN SOILS
- 1000000 – ISOCONCENTRATION LINE (ug/kg)

SOURCE: LANTDIV, FEB. 1992/1997

FIGURE 3–11
TPH GRO IN SOIL ISOPLETH MAP 10–15' BGS
TOW WAY FUEL FARM

NAVAL STATION ROOSEVELT ROADS
PUERTO RICO





VIEW A

200 0 100 200
1 inch = 200 ft.

50 0 25 50
1 inch = 50 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

277815WP

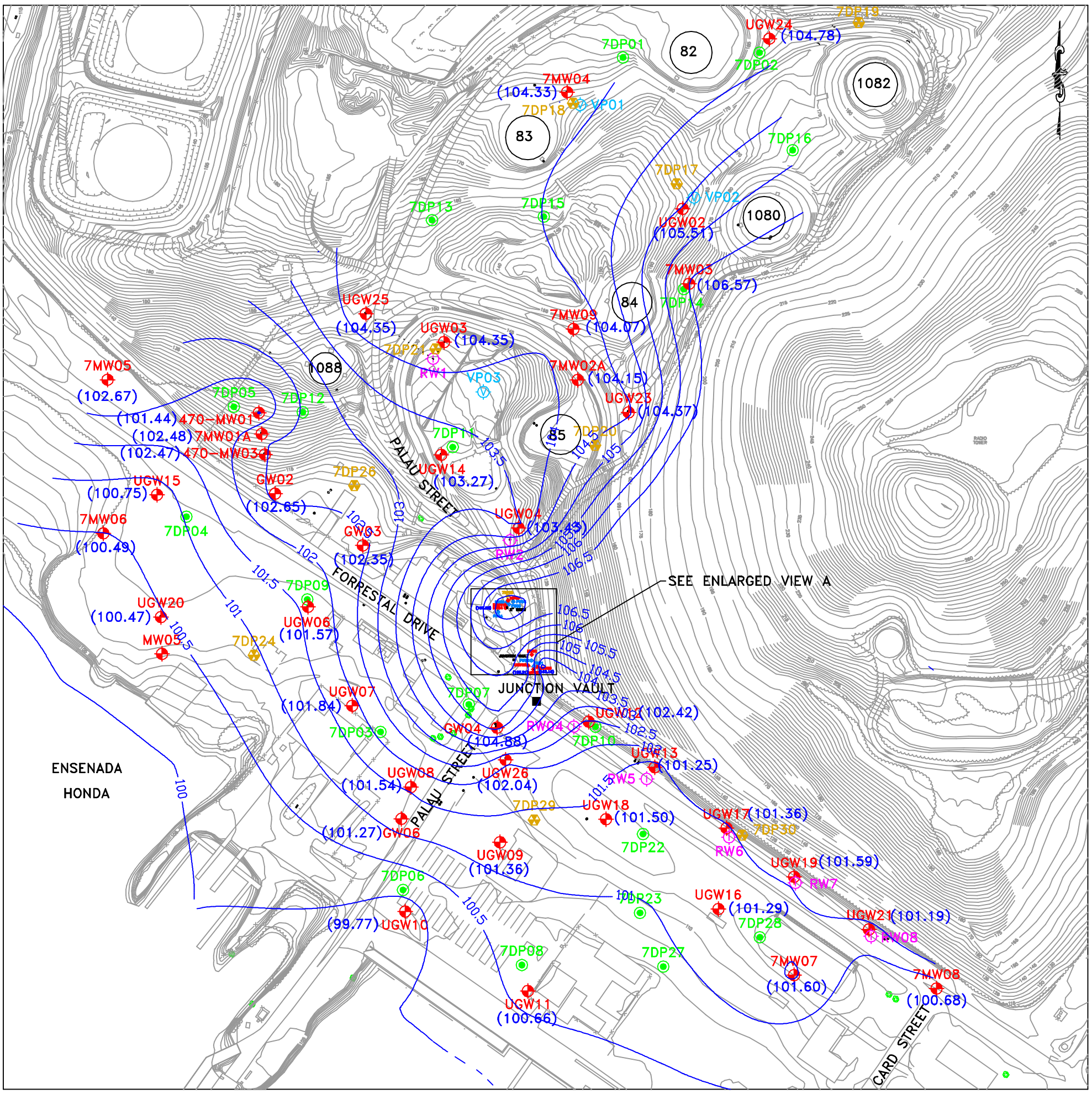
LEGEND

- MONITORING WELL LOCATION
- VERTICAL PERMEABILITY SAMPLE LOCATION
- SOIL BORING LOCATION
- SOIL BORING AND SOIL GAS SAMPLE LOCATION
- TERRAVAC PRODUCT RECOVERY WELL LOCATION
- ICHOR PRODUCT RECOVERY WELL LOCATION
- (4,000) – TPH DRO CONCENTRATION (mg/kg) IN SOILS
- 1500 – ISOCONCENTRATION LINE (mg/kg)

SOURCE: LANTDIV, FEB. 1992/1997

FIGURE 3–12
TPH DRO IN SOIL ISOPLETH MAP 10–15' BGS
TOW WAY FUEL FARM

NAVAL STATION ROOSEVELT ROADS
PUERTO RICO



VIEW A

277823WP

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

Baker

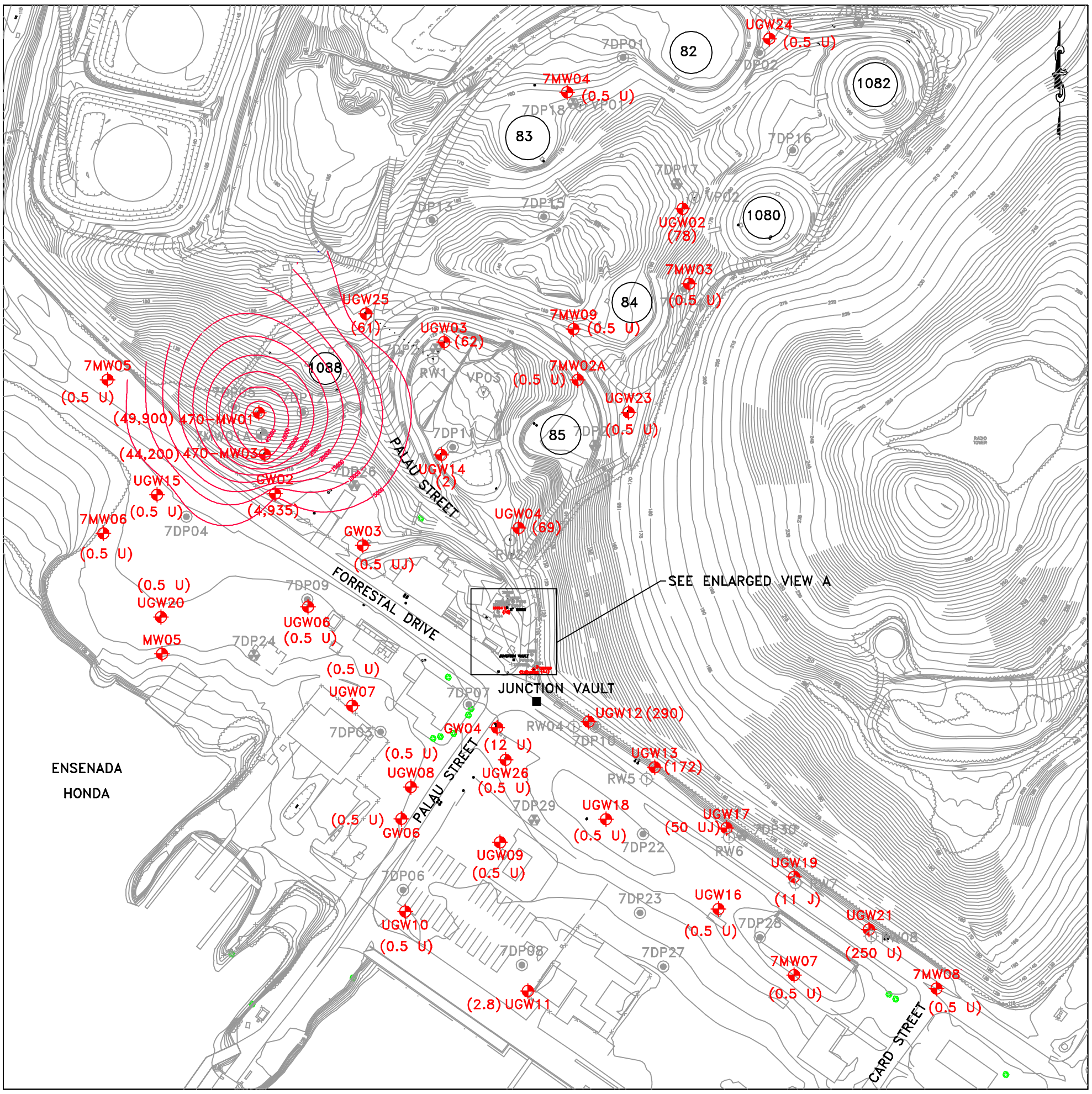
LEGEND

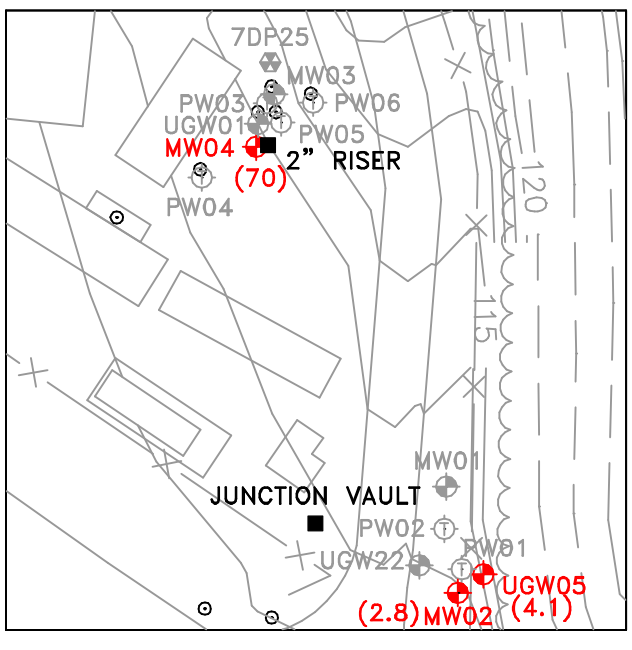
- MONITORING WELL LOCATION
- VERTICAL PERMEABILITY SAMPLE LOCATION
- SOIL BORING LOCATION
- SOIL BORING AND SOIL GAS SAMPLE LOCATION
- TERRAVAC PRODUCT RECOVERY WELL LOCATION
- ICHOR PRODUCT RECOVERY WELL LOCATION
- —103— CORRECTED GROUNDWATER SURFACE CONTOUR

SOURCE: LANTDIV, FEB. 1992/1997

FIGURE 3-13
CORRECTED GROUNDWATER SURFACE CONTOUR MAP
APRIL 21, 1998
TOW WAY FUEL FARM

NAVAL STATION ROOSEVELT ROADS
PUERTO RICO





VIEW A

200 0 100 200
1 inch = 200 ft.

50 0 25 50
1 inch = 50 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

277810WP

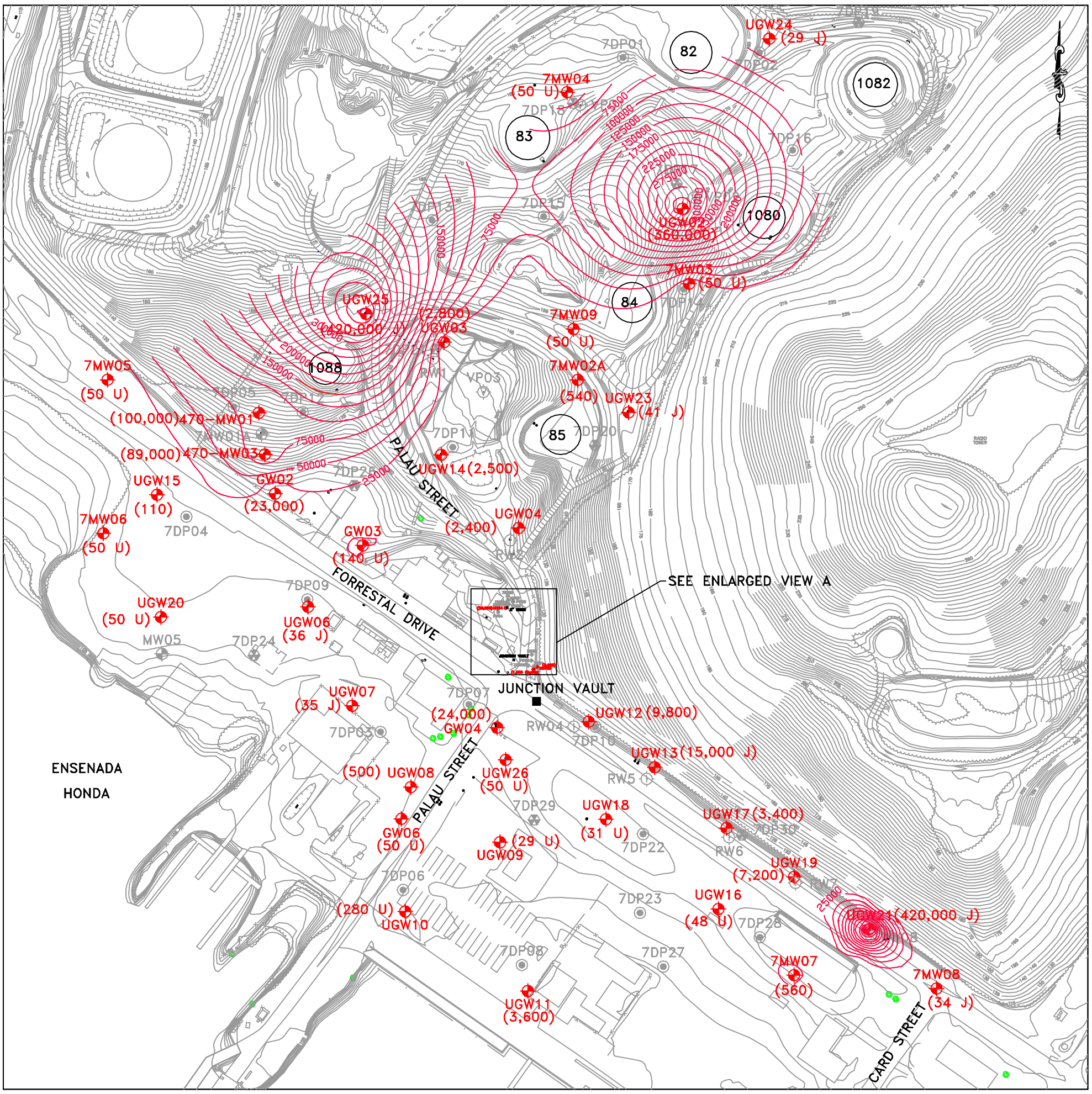
LEGEND

- MONITORING WELL LOCATION
- VERTICAL PERMEABILITY SAMPLE LOCATION
- SOIL BORING LOCATION
- SOIL BORING AND SOIL GAS SAMPLE LOCATION
- TERRAVAC PRODUCT RECOVERY WELL LOCATION
- ICHOR PRODUCT RECOVERY WELL LOCATION
- (2.8) – BTEX CONCENTRATION (ug/L) IN GROUNDWATER
- 2500 – ISOCONCENTRATION LINE (ug/L)

SOURCE: LANTDIV, FEB. 1992/1997

FIGURE 3-14
BTEX IN GROUNDWATER ISOPLETH MAP
TOW WAY FUEL FARM

NAVAL STATION ROOSEVELT ROADS
PUERTO RICO



VIEW A

277812WP

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

Baker

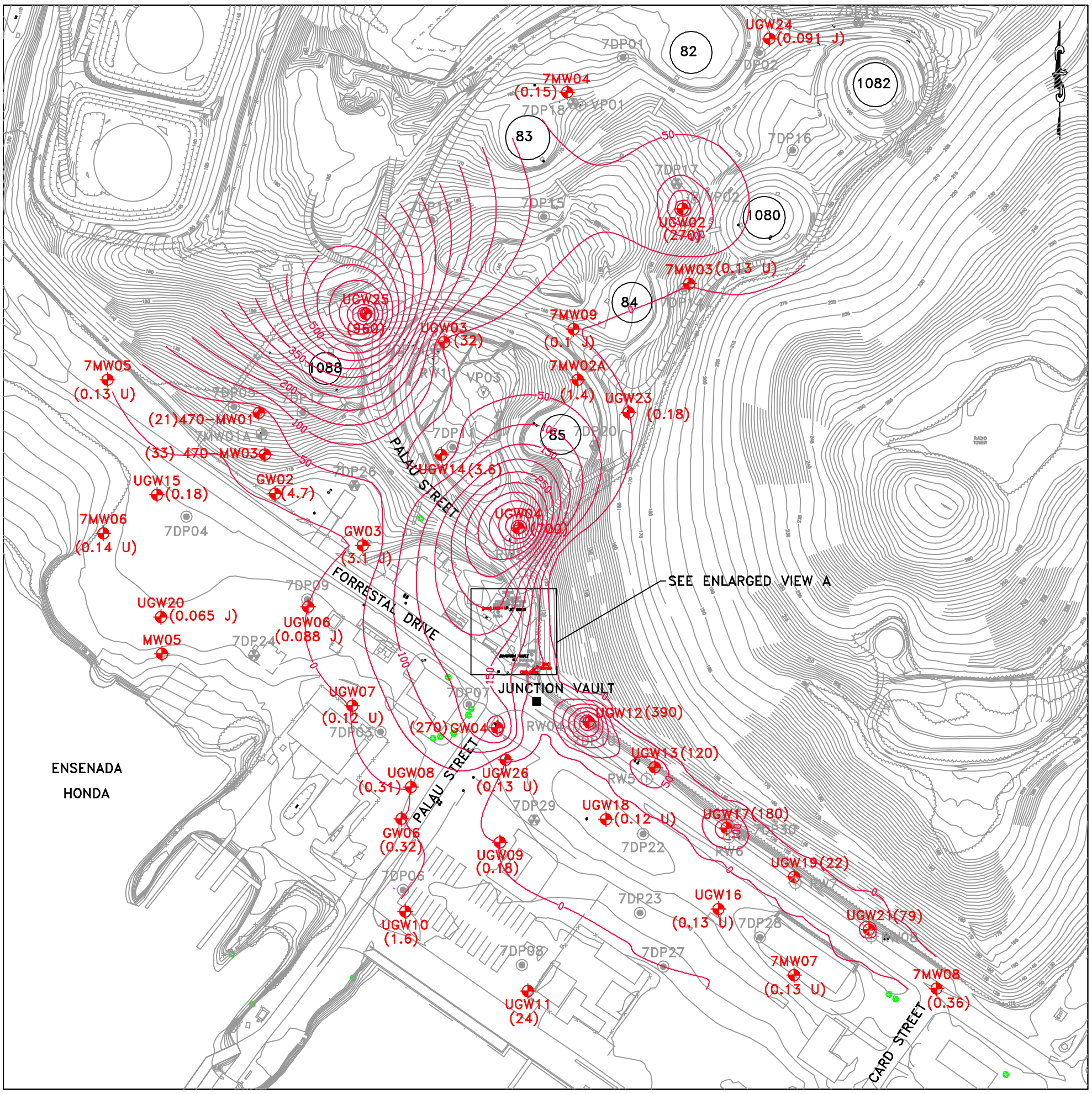
LEGEND

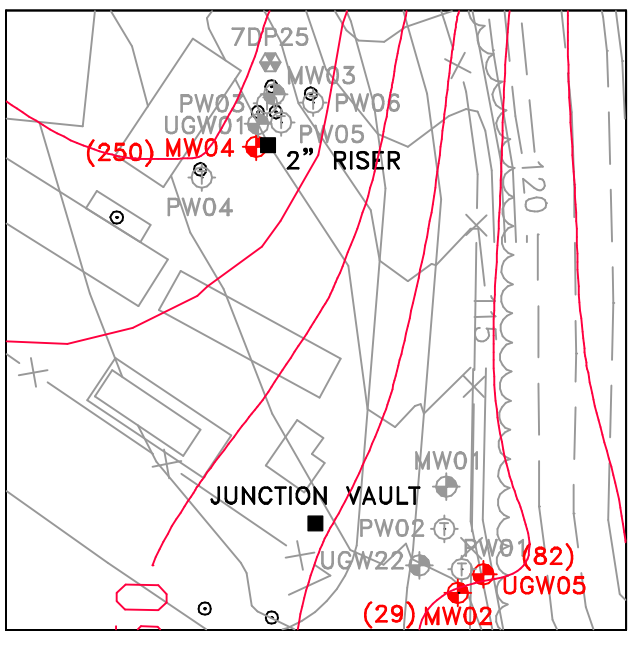
- MONITORING WELL LOCATION
- VERTICAL PERMEABILITY SAMPLE LOCATION
- SOIL BORING LOCATION
- SOIL BORING AND SOIL GAS SAMPLE LOCATION
- TERRAVAC PRODUCT RECOVERY WELL LOCATION
- ICHOR PRODUCT RECOVERY WELL LOCATION
- (28,000) – TPH GRO CONCENTRATION (ug/L) IN GROUNDWATER
- 50 – ISOCONCENTRATION LINE (ug/L)

SOURCE: LANTDIV, FEB. 1992/1997

FIGURE 3-15
TPH GRO IN GROUNDWATER ISOPLETH MAP
TOW WAY FUEL FARM

NAVAL STATION ROOSEVELT ROADS
PUERTO RICO





VIEW A

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

Baker

277811WP

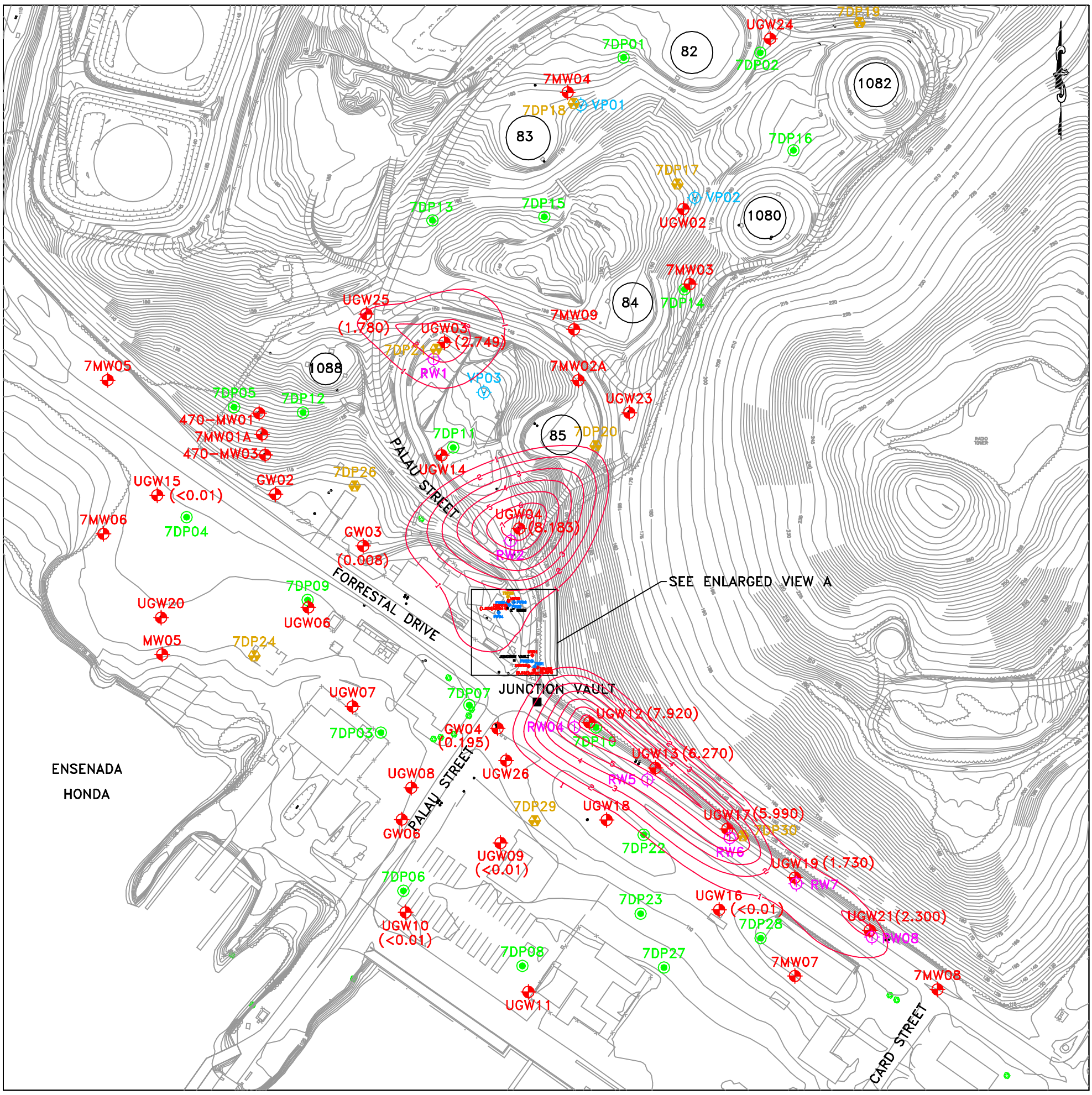
LEGEND

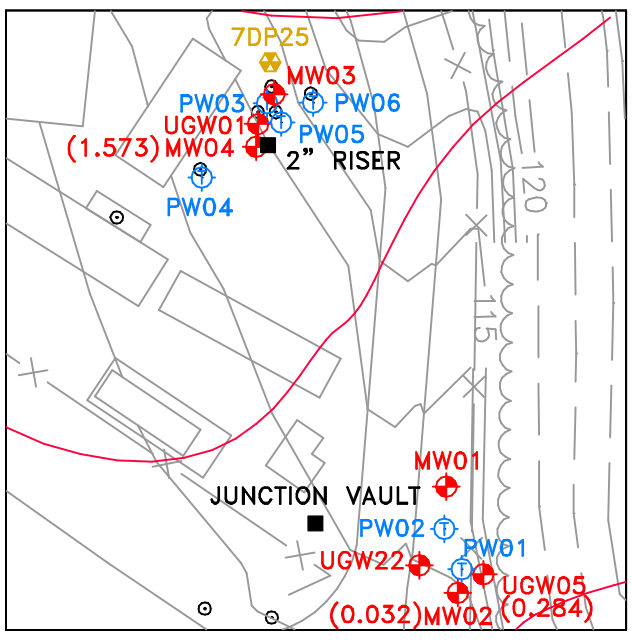
- MONITORING WELL LOCATION
- VERTICAL PERMEABILITY SAMPLE LOCATION
- SOIL BORING LOCATION
- SOIL BORING AND SOIL GAS SAMPLE LOCATION
- TERRAVAC PRODUCT RECOVERY WELL LOCATION
- ICHOR PRODUCT RECOVERY WELL LOCATION
- (29) – TPH DRO CONCENTRATION (mg/L) IN GROUNDWATER
- 10 – ISOCONCENTRATION LINE (mg/L)

SOURCE: LANTDIV, FEB. 1992/1997

FIGURE 3-16
TPH DRO IN GROUNDWATER ISOPLETH MAP
TOW WAY FUEL FARM

NAVAL STATION ROOSEVELT ROADS
PUERTO RICO





VIEW A

50 0 25 50
1 inch = 50 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

277822WP

LEGEND

- MONITORING WELL LOCATION
- VERTICAL PERMEABILITY SAMPLE LOCATION
- SOIL BORING LOCATION
- SOIL BORING AND SOIL GAS SAMPLE LOCATION
- TERRAVAC PRODUCT RECOVERY WELL LOCATION
- ICHOR PRODUCT RECOVERY WELL LOCATION
- —4— FREE PRODUCT THICKNESS

SOURCE: LANTDIV, FEB. 1992/1997

FIGURE 3-17
FREE PRODUCT THICKNESS AND EXTENT MAP
APRIL 1998
TOW WAY FUEL FARM

NAVAL STATION ROOSEVELT ROADS
PUERTO RICO

4.0 REFERENCES

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APPENDIX A
CHAIN-OFCUSTODY RECORDS

5-001

RECRA LabNet Use Only

Custody Transfer Record/Lab Work Request

RECRA LabNet

Client: Baker Env. Inc.
Est. Final Proj. Sampling Date 4/23/98
Project # CTO-0277
Project Contact/Phone # Mark Kines/797-415-4981
RECRA Project Manager Bosco Ramirez
QC D Del D TAT 28 DAY

Date Rec'd _____ Date Due _____
Account # _____

Refrigerator #																	
#/Type Container	Liquid																
	Solid																
Volume	Liquid																
	Solid																
Preservatives																	
ANALYSES REQUESTED →		ORGANIC							INORG								
		VOA	BNA	Pest/PCB	Herb	VOC +/ BTEX	DRO TPH	GRO TPH	Metal	CN							
		RECRA LabNet Use Only															

MATRIX CODES:
S - Soil
SE - Sediment
SO - Solid
SL - Sludge
W - Water
O - Oil
A - Air
DS - Drum Solids
DL - Drum Liquids
L - EP/TCLP Leachate
WI - Wipe
X - Other
F - Fish

Lab ID	Client ID/Description	Matrix QC Chosen (✓) MS	MSD	Matrix	Date Collected	Time Collected	VOA	BNA	Pest/PCB	Herb	VOC +/ BTEX	DRO TPH	GRO TPH	Metal	CN						
	7MW03			W	4/15	1345					X	X	X								
	7MW04			W	4/15	0930					X	X	X								
	UGW2			W	4/15	1245					X		X								
	UGW20			W	4/14	1600					X	X	X								
	TB-01			W							X		X								
	7DP01-05			S	4/14	1450					X	X	X								
	7DP01-08			S	4/14	1504					X	X	X								
	7DP01-11			S	4/14	1525					X	X	X								
	7DP01-13			S	4/14	1619					X	X	X								
	7DP01-14			S	4/14	1700					X	X	X								

FIELD PERSONNEL: COMPLETE ONLY SHADED AREAS

Special Instructions:

FED-EX AIRBILL No.:
400-4076-2105

DATE/REVISIONS:
1. _____
2. _____
3. _____
4. _____
5. _____
6. _____

RECRA LabNet Use Only

Samples were:
1) Shipped ___ or Hand Delivered ___
Airbill # _____
2) Ambient or Chilled
3) Received in Good Condition Y or N
4) Labels Indicate Properly Preserved Y or N
5) Received Within Holding Times Y or N

COC Tape was:
1) Present on Outer Package Y or N
2) Unbroken on Outer Package Y or N
3) Present on Sample Y or N
4) Unbroken on Sample Y or N

COC Record Present Upon Sample Rec't Y or N

Discrepancies Between Samples Lables and COC Record? Y or N
NOTES:

Relinquished by	Received by	Date	Time
Mark C. Kines		4/15	1500

Relinquished by	Received by	Date	Time

CMS-001

RECRA LabNet Use Only

Custody Transfer Record/Lab Work Request

RECRA LabNet

Client: _____
Est. Final Proj. Sampling Date _____
Project # _____
Project Contact/Phone # _____
RECRA Project Manager _____
QC _____ Del _____ TAT _____
Date Rec'd _____ Date Due _____
Account # _____

Refrigerator #																			
#/Type Container	Liquid																		
	Solid																		
Volume	Liquid																		
	Solid																		
Preservatives																			
ANALYSES REQUESTED →		ORGANIC							INORG										
		VOA	BNA	Pest/ PCB	Herb	BTEX	DRO TPH	GRO TPH	Metal	CN	BTEX	TPH	TPH	TOC	BULK DENSITY	GRAIN SIZE
						RECRA LabNet Use Only										

MATRIX CODES:
S - Soil
SE - Sediment
SO - Solid
SL - Sludge
W - Water
O - Oil
A - Air
DS - Drum Solids
DL - Drum Liquids
L - EP/TCLP Leachate
WI - Wipe
X - Other
FI - Fish

Lab ID	Client ID/Description	Matrix QC Chosen (✓) MS	MSD	Matrix	Date Collected	Time Collected	VOA	BNA	Pest/ PCB	Herb	BTEX	DRO TPH	GRO TPH	Metal	CN	BTEX	TPH	TPH	TOC	BULK DENSITY	GRAIN SIZE
	7DP02-05			S	4/15	0756					X	X	X								
	7DP03-01			S	4/15	0919					X	X	X								
	7DP03-02			S	4/15	0928					X	X	X						X	X	
	7DP04-01			S	4/15	1052					X	X	X								
	7DP04-03			S	4/15	1101					X	X	X							X	
	7DP05-01			S	4/15	1229					X	X	X								
	7DP01			S	4/14	1700															X

FIELD PERSONNEL: COMPLETE ONLY SHADED AREAS

Special Instructions:

DATE/REVISIONS:
1. _____
2. _____
3. _____
4. _____
5. _____
6. _____

RECRA LabNet Use Only

Samples were:
1) Shipped ___ or Hand Delivered ___
Airbill # _____
2) Ambient or Chilled
3) Received in Good Condition Y or N
4) Labels Indicate Properly Preserved Y or N
5) Received Within Holding Times Y or N

COC Tape was:
1) Present on Outer Package Y or N
2) Unbroken on Outer Package Y or N
3) Present on Sample Y or N
4) Unbroken on Sample Y or N

COC Record Present Upon Sample Rec't Y or N

Discrepancies Between Samples Lables and COC Record? Y or N
NOTES:

Relinquished by	Received by	Date	Time

Relinquished by	Received by	Date	Time

RECRA LabNet Use Only

Custody Transfer Record/Lab Work Request

RECRA LabNet

Client: BAKER ENVIRONMENTAL, INC
Est. Final Proj. Sampling Date: 4/23/98
Project #: CTO-0277
Project Contact/Phone #: MARK KINES / 787
RECRA Project Manager: BOSCO RAMIREZ
QC: D Del: D TAT: 28 DAY
Date Rec'd: _____ Date Due: _____
Account #: _____

Refrigerator #																	
#/Type Container	Liquid																
	Solid																
Volume	Liquid																
	Solid																
Preservatives																	
ANALYSES REQUESTED →		ORGANIC							INORG								
		VOA	BNA	Pest/ PCB	Herb	VOCs/ BTEX	GRO	DRO	Metal	CN	TOC	BULK DENSITY					
		RECRA LabNet Use Only															

MATRIX CODES:
S - Soil
SE - Sediment
SO - Solid
SL - Sludge
W - Water
O - Oil
A - Air
DS - Drum Solids
DL - Drum Liquids
L - EP/TCLP Leachate
WI - Wipe
X - Other
F - Fish

Lab ID	Client ID/Description	Matrix QC Chosen (✓) MS	MSD	Matrix	Date Collected	Time Collected	VOCs/ BTEX	GRO	DRO	TOC	BULK DENSITY
	7DP05-05			S	4/15	1321	X	X	X		
	7DP06-01			S	4/15	1358	X	X	X		
	7DP06-05			S	4/15	1418	X	X	X		
	7DP07-01			S	4/15	1538	X	X	X		
	7DP07-01D			S	4/15	1538	X	X	X		
	7DP07-04			S	4/15	1542	X	X	X		
	7DP07-04D			S	4/15	1542	X	X	X		
	7DP07-06			S	4/15	1603	X	X	X		
	7DP08-01			S	4/15	1711	X	X	X	X	X
	7DP08-04			S	4/15	1721	X	X	X		

FIELD PERSONNEL: COMPLETE ONLY SHADED AREAS

Special Instructions:

FED-EX AIRBILL No.
400-4076-2116

DATE/REVISIONS:
1. _____
2. _____
3. _____
4. _____
5. _____
6. _____

RECRA LabNet Use Only

Samples were:
1) Shipped ___ or Hand Delivered ___
Airbill # _____
2) Ambient or Chilled
3) Received in Good Condition Y or N
4) Labels Indicate Properly Preserved Y or N
5) Received Within Holding Times Y or N

COC Tape was:
1) Present on Outer Package Y or N
2) Unbroken on Outer Package Y or N
3) Present on Sample Y or N
4) Unbroken on Sample Y or N

COC Record Present Upon Sample Rec't Y or N

Discrepancies Between Samples Lables and COC Record? Y or N
NOTES:

Relinquished by	Received by	Date	Time
Mark Kines		4/16	1500

Relinquished by	Received by	Date	Time

RECRA LabNet Use Only

Custody Transfer Record/Lab Work Request

RECRA LabNet

Client
Est. Final Proj. Sampling Date
Project #
Project Contact/Phone #
RECRA Project Manager
QC Del TAT
Date Rec'd Date Due
Account #

Refrigerator #																
#/Type Container	Liquid															
	Solid															
Volume	Liquid															
	Solid															
Preservatives																
ANALYSES REQUESTED →		ORGANIC							INORG							
		VOA	BNA	Pest/ PCB	Herb	VOCs/ GRO	GRO	DRO	Metal	CN	NITRATE	AMMONIA	SULFATE	CHLORIDE		
		RECRA LabNet Use Only														

MATRIX CODES: S - Soil; SE - Sediment; SO - Solid; SL - Sludge; W - Water; O - Oil; A - Air; DS - Drum Solids; DL - Drum Liquids; C - EP/TCLP Extractate; WI - Wipe; X - Other; F - Fish

Lab ID	Client ID/Description	Matrix QC Chosen (✓) MS	MSD	Matrix	Date Collected	Time Collected													
	7DP09-03			S	4/16	0910				X	X	X							
	7DP10-01			S	4/16	0953				X	X	X							
	7DP10-03			S	4/16	1015				X	X	X							
	7DP11-02			S	4/16	1127				X	X	X							
	7DP11-05			S	4/16	1135				X	X	X							
	1240-7			W	4/15	1810				X	X				~~X~~	~~X~~	~~X~~	~~X~~	CMC
	0240-06			W	4/15	1210				X	X								
	0240-15			W	4/15	1600				X	X								
	0240-18			W	4/16	1130				X	X								
	0240-06			W	4/16	0850				X	X								

FIELD PERSONNEL: COMPLETE ONLY SHADED AREAS

Special Instructions:

DATE/REVISIONS:
1.
2.
3.
4.
5.
6.

RECRA LabNet Use Only

Samples were:
1) Shipped ___ or Hand Delivered ___
Airbill # _____
2) Ambient or Chilled
3) Received in Good Condition Y or N
4) Labels Indicate Properly Preserved Y or N
5) Received Within Holding Times Y or N

COC Tape was:
1) Present on Outer Package Y or N
2) Unbroken on Outer Package Y or N
3) Present on Sample Y or N
4) Unbroken on Sample Y or N

COC Record Present Upon Sample Rec't Y or N

Discrepancies Between Samples Lables and COC Record? Y or N
NOTES:

Relinquished by	Received by	Date	Time	Relinquished by	Received by	Date	Time

RECRA LabNet Use Only

Custody Transfer Record/Lab Work Request

RECRA LabNet

Client
Est. Final Proj. Sampling Date
Project #
Project Contact/Phone #
RECRA Project Manager
QC Del TAT
Date Rec'd Date Due
Account #

Refrigerator #																	
#/Type Container	Liquid																
	Solid																
Volume	Liquid																
	Solid																
Preservatives																	
ANALYSES REQUESTED →		ORGANIC							INORG								
		VOA	BNA	Pest/ PCB	Herb	VOCs/ BTEX	GRO		Metal	CN	NITRATE	ALKALINITY	SULFATE	CHLORIDE			
		RECRA LabNet Use Only															

MATRIX CODES: S - Soil; SE - Sediment; SO - Solid; SL - Sludge; W - Water; O - Oil; A - Air; DS - Drum Solids; DL - Drum Liquids; L - EP/TCLP Leachate; Wi - Wipe; X - Other; F - Fish

Lab ID	Client ID/Description	Matrix QC Chosen (✓) MS	MSD	Matrix	Date Collected	Time Collected														
	MW-2 *			W	4/16	1300									X	X	X	X		
	TB-02			W							X	X								

FIELD PERSONNEL: COMPLETE ONLY SHADED AREAS

Special Instructions:

* LIMITED VOLUME OF SAMPLE

DATE/REVISIONS:

1.
2.
3.
4.
5.
6.

RECRA LabNet Use Only

Samples were:
1) Shipped ___ or Hand Delivered ___
Airbill # _____
2) Ambient or Chilled
3) Received in Good Condition Y or N
4) Labels Indicate Properly Preserved Y or N
5) Received Within Holding Times Y or N

COC Tape was:
1) Present on Outer Package Y or N
2) Unbroken on Outer Package Y or N
3) Present on Sample Y or N
4) Unbroken on Sample Y or N

COC Record Present Upon Sample Rec't Y or N

Discrepancies Between Samples Lables and COC Record? Y or N
NOTES:

Relinquished by	Received by	Date	Time	Relinquished by	Received by	Date	Time

RECRA LabNet Use Only

Custody Transfer Record/Lab Work Request

RECRA LabNet

CMS-003

Client: BAKER ENVR. INC.
Est. Final Proj. Sampling Date: 4/23/98
Project #: CTO-0277
Project Contact/Phone #: MARK KIMES/787
RECRA Project Manager: BOBO RAMIREZ
QC: N/D Del: N/D TAT: 28 DAY
Date Rec'd _____ Date Due _____
Account # _____

Refrigerator #																
#/Type Container	Liquid															
	Solid															
Volume	Liquid															
	Solid															
Preservatives																
ANALYSES REQUESTED →		ORGANIC							INORG							
		VOA	BNA	Pest/PCB	Herb	DRO			Metal	CN	NITRATE	SULFATE	ALKALINITY	CHLORIDE		
		RECRA LabNet Use Only														

Matrix Codes: S - Soil; SE - Sediment; SO - Solid; SL - Sludge; W - Water; O - Oil; A - Air; DS - Drum Solids; DL - Drum Liquids; X - Other; Wi - Wipe; X - Other; P - PSH

Lab ID	Client ID/Description	Matrix QC Chosen (✓) MS	MSD	Matrix	Date Collected	Time Collected	DRO	NITRATE	SULFATE	ALKALINITY	CHLORIDE	
	10GW-7			W	4/16	1225	X	X	X	X	X	SEE ATTACHED
	9GW-7			W	4/15	1810	X					
	8GW-6			W	4/15	1710	X					
	7GW-26			W	4/16	1225		X	X	X	X	
	6GW-15			W	4/15	1600	X					
	5GW-15			W	4/16	1235		X	X	X	X	
	4GW-2			W	4/15	1445	X					
	3GW-8			W	4/16	1130	X	X	X	X	X	
	2GW-26			W	4/16	0850	X	X	X	X	X	
	1GW-26			W	4/16	1230		X	X	X	X	

FIELD PERSONNEL: COMPLETE ONLY SHADED AREAS

Special Instructions:

FED-EX AIRBILL No.:
400-4076-2116

DATE/REVISIONS:

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

Relinquished by	Received by	Date	Time
[illegible]		4/16	1500

Relinquished by	Received by	Date	Time

Discrepancies Between Samples Lables and COC Record? Y or N
NOTES:

RECRA LabNet Use Only

Samples were:
1) Shipped ___ or Hand Delivered ___
Airbill # _____
2) Ambient or Chilled
3) Received in Good Condition Y or N
4) Labels Indicate Properly Preserved Y or N
5) Received Within Holding Times Y or N

COC Tape was:
1) Present on Outer Package Y or N
2) Unbroken on Outer Package Y or N
3) Present on Sample Y or N
4) Unbroken on Sample Y or N
COC Record Present Upon Sample Rec't Y or N

RECRA LabNet Use Only

Custody Transfer Record/Lab Work Request

RECRA LabNet

Client
Est. Final Proj. Sampling Date
Project #
Project Contact/Phone #
RECRA Project Manager
QC Del. TAT
Date Rec'd Date Due
Account #

Refrigerator #																
#/Type Container	Liquid															
	Solid															
Volume	Liquid															
	Solid															
Preservatives																
ANALYSES REQUESTED →		ORGANIC							INORG		NITRATE	ALKALINITY	SULFATE	CHLORIDE		
		VOA	BNA	Pest/ PCB	Herb				Metal	CN						
		RECRA LabNet Use Only														

MATRIX CODES: SL Soil, SE Sediment, SO Solid, SU Sludge, WL Water, OL Oil, AI Air, DS Drum Solids, DL Drum Liquids, LP Leachate, WI Wipe, XX Other, FP Free Product

Lab ID	Client ID/Description	Matrix QC Chosen (✓) MS	MSD	Matrix	Date Collected	Time Collected														
	7MW04			W	4/16	1245									X	X	X	X		
	7MW03			W	4/16	1315									X	X	X	X		

FIELD PERSONNEL: COMPLETE ONLY SHADED AREAS

Special Instructions:

DATE/REVISIONS:
1.
2.
3.
4.
5.
6.

Relinquished by	Received by	Date	Time	Relinquished by	Received by	Date	Time

RECRA LabNet Use Only

Samples were:
1) Shipped ___ or Hand Delivered ___
Airbill # _____
2) Ambient or Chilled
3) Received in Good Condition Y or N
4) Labels Indicate Properly Preserved Y or N
5) Received Within Holding Times Y or N

COC Tape was:
1) Present on Outer Package Y or N
2) Unbroken on Outer Package Y or N
3) Present on Sample Y or N
4) Unbroken on Sample Y or N

COC Record Present Upon Sample Rec't Y or N

Discrepancies Between Samples Lables and COC Record? Y or N
NOTES:

RECRA LabNet Use Only

Custody Transfer Record/Lab Work Request

RECRA LabNet

CMS-004

Client: Baker Corp. Inc.
Est. Final Proj. Sampling Date: 4/23/98
Project #: CTO-0277
Project Contact/Phone #: Mark Kimes / 757-415-4901
RECRA Project Manager: Bosco Ramirez
QC Level: Del. D TAT: 28 DAYS
Date Rec'd _____ Date Due _____
Account #

Refrigerator #																
#/Type Container	Liquid															
	Solid															
Volume	Liquid															
	Solid															
Preservatives																
ANALYSES REQUESTED →		ORGANIC							INORG							
		VOA	BNA	Pest/ PCB	Herb	BTEX VOCs	GRO	DRO	Metal	CN						
		RECRA LabNet Use Only														

MATRIX CODES: SA - Soil, SE - Sediment, SO - Solid, SL - Sludge, W - Water, O - Oil, A - Air, DS - Drum Solids, DL - Drum Liquids, U - Equipment Rinsate, WI - Wipe, X - Other, F - Fish

Lab ID	Client ID/Description	Matrix QC Chosen (✓) MS	MSD	Matrix	Date Collected	Time Collected													
	[illegible]01			W	4/16	1630					X	X	X						
	[illegible]02			W		1645					X	X	X						
	[illegible]03			W		1700					X	X	X						
	[illegible]04			W		1730					X	X							
	[illegible]9			W		1845					X	X							
	[illegible]-10			W		1750					X	X							
	[illegible]-16			W		1445					X	X							
	[illegible]-18			W		1545					X	X							
	[illegible]-2			W	4/17	0930					X	X							
	[illegible]-25			W	4/17	0930					X	X							

FIELD PERSONNEL: COMPLETE ONLY SHADED AREAS

Special Instructions:
FED-Ex Airbill No.:
400-4071-9313

DATE/REVISIONS:
1. _____
2. _____
3. _____
4. _____
5. _____
6. _____

RECRA LabNet Use Only

Samples were:
1) Shipped ___ or Hand Delivered ___
Airbill # _____
2) Ambient or Chilled
3) Received in Good Condition Y or N
4) Labels Indicate Properly Preserved Y or N
5) Received Within Holding Times Y or N

COC Tape was:
1) Present on Outer Package Y or N
2) Unbroken on Outer Package Y or N
3) Present on Sample Y or N
4) Unbroken on Sample Y or N

COC Record Present Upon Sample Rec't Y or N

Discrepancies Between Samples Lables and COC Record? Y or N
NOTES:

Relinquished by	Received by	Date	Time	Relinquished by	Received by	Date	Time
[illegible]		4/17	1500				

RECRA LabNet Use Only

Custody Transfer Record/Lab Work Request

RECRA LabNet

CMS-004

Client:
Est. Final Proj. Sampling Date:
Project:
Project Contact/Phone #:
RECRA Project Manager:
QC: Del: TAT:
Date Rec'd: Date Due:
Account #:

Refrigerator #																
#/Type Container	Liquid															
	Solid															
Volume	Liquid															
	Solid															
Preservatives																
ANALYSES REQUESTED →		ORGANIC							INORG							
		VOA	BNA	Pest/PCB	Herb	BTEX/VOCs	GRO	DRO	Metal	CN	TOC					
		RECRA LabNet Use Only														

MATRIX CODES: S - Soil; SE - Sediment; SO - Solid; SL - Sludge; W - Water; O - Oil; A - Air; DS - Drum Solids; DL - Drum Liquids; C - Chip/Tube/Bag; Cadcrete; Wi - Wipe; N - Sand; P - Pap

Lab ID	Client ID/Description	Matrix QC Chosen (✓) MS	MSD	Matrix	Date Collected	Time Collected													
	10240-45			W	4/17	1030				X	X								
	10240-5D			W	4/17	1030				X	X								
	10240-11			W	4/17	0815				X	X								
	10012-01			S	4/16	1550				X	X	X							
	10243-02			S	4/17	1417				X	X	X							
	10240-01			S	4/17	1029				X	X	X			X				
	10240-05			S	4/17	1040				X	X	X							
	10243-02			S	4/17	0750				X	X	X							
	10243-04			S	4/17	0800				X	X	X							
	10243-07			S	4/17	0819				X	X	X							

FIELD PERSONNEL: COMPLETE ONLY SHADED AREAS

Special Instructions:

DATE/REVISIONS:

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Relinquished by	Received by	Date	Time	Relinquished by	Received by	Date	Time

RECRA LabNet Use Only

Samples were:
1) Shipped ___ or Hand Delivered ___
Airbill # ___
2) Ambient or Chilled
3) Received in Good Condition Y or N
4) Labels Indicate Properly Preserved Y or N
5) Received Within Holding Times Y or N

COC Tape was:
1) Present on Outer Package Y or N
2) Unbroken on Outer Package Y or N
3) Present on Sample Y or N
4) Unbroken on Sample Y or N

COC Record Present Upon Sample Rec't Y or N

Discrepancies Between Samples Lables and COC Record? Y or N
NOTES:

RECRA LabNet Use Only

Custody Transfer Record/Lab Work Request

RECRA LabNet

CMS-004

Client
Est. Final Proj. Sampling Date
Project #
Project Contact/Phone #
RECRA Project Manager
QC Del TAT
Date Rec'd Date Due
Account #

Refrigerator #																
#/Type Container	Liquid															
	Solid															
Volume	Liquid															
	Solid															
Preservatives																
ANALYSES REQUESTED →		ORGANIC							INORG							
		VOA	BNA	Pest/ PCB	Herb	VOCs/ BTEX	GRO	DRO	Metal	CN	TOC					

MATRIX CODES	Lab ID	Client ID/Description	Matrix QC Chosen (✓) MS	MSD	Matrix	Date Collected	Time Collected	RECRA LabNet Use Only													
SL - Sludge		[illegible]-03			S	4/17	0905					X	X	X							
W - Water		[illegible]-05			S	4/17	0918					X	X	X							
DW - Drinking Water		[illegible]17-02			S	4/17	0958					X	X	X							
DL - Drum Liquids		[illegible]17-04			S	4/17	1011					X	X	X			X				
L - EP/TCLP Leachate		[illegible]-02			S	4/17	1118					X	X	X							
WI - Wipe		[illegible]-03										X	X								
A - Air																					
F - Fish																					

FIELD PERSONNEL: COMPLETE ONLY SHADED AREAS

Special Instructions:

DATE/REVISIONS:

1.
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6.

RECRA LabNet Use Only

Samples were:
1) Shipped ___ or Hand Delivered ___
Airbill # _____
2) Ambient or Chilled
3) Received in Good Condition Y or N
4) Labels Indicate Properly Preserved Y or N
5) Received Within Holding Times Y or N

COC Tape was:
1) Present on Outer Package Y or N
2) Unbroken on Outer Package Y or N
3) Present on Sample Y or N
4) Unbroken on Sample Y or N

COC Record Present Upon Sample Rec't Y or N

Discrepancies Between Samples Lables and COC Record? Y or N
NOTES:

Relinquished by	Received by	Date	Time	Relinquished by	Received by	Date	Time

RECRA LabNet Use Only

Custody Transfer Record/Lab Work Request

RECRA LabNet

CMS-005

Client: BAKER ENVIR., INC.
Est. Final Proj. Sampling Date: 4/23/98
Project #: 1610-0277
Project Contact/Phone #: MARK KINES 787-415-4981
RECRA Project Manager: LOSCO RAMIREZ
QC: Del: TAT: 28 DAYS
Date Rec'd: Date Due:
Account #:

Refrigerator #																	
#/Type Container	Liquid																
	Solid																
Volume	Liquid																
	Solid																
Preservatives																	
ANALYSES REQUESTED →		ORGANIC								INORG							
		VOA	BNA	Pest/ PCB	Herb	BTEX/ VOCs	GRO	DRO		Metal	CN	NITRATE	ALKALINITY	SULFATE	CHLOR. DE		
		RECRA LabNet Use Only															

Matrix Codes: S Soil; SE Sediment; SO Solid; SL Sludge; W Water; O Oil; A Air; DS Drum Solids; DL Drum Liquids; L Liquid; P Paint; Wi Wipe; Ko Kolmer; Fi Fish

Lab ID	Client ID/Description	Matrix QC Chosen (✓) MS	MSD	Matrix	Date Collected	Time Collected														
	MW-04			W	4/16	1730							X							
	MW-04			W	4/17	1305						MICK	X		X	X	X	X		
	MW-09			W	4/16	1845							X							
	MW-09			W	4/17	1310									X	X	X	X		
	MW-10			W	4/16	1750							X							
	MW-10			W	4/17	1315									X	X	X	X		
	MW-16			W	4/16	1445							X							
	MW-16			W	4/17	1320									X	X	X	X		
	MW-18			W	4/16	1545							X							
	MW-18			W	4/17	1325									X	X	X	X		

FIELD PERSONNEL: COMPLETE ONLY SHADED AREAS

Special Instructions:

FED EX Airbill No.:
400-4071-9313

DATE/REVISIONS:
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Relinquished by	Received by	Date	Time	Relinquished by	Received by	Date	Time
Mark Kines		4/17	1500				

RECRA LabNet Use Only

Samples were:
1) Shipped ___ or Hand Delivered ___
Airbill # _____
2) Ambient or Chilled
3) Received in Good Condition Y or N
4) Labels Indicate Properly Preserved Y or N
5) Received Within Holding Times Y or N

COC Tape was:
1) Present on Outer Package Y or N
2) Unbroken on Outer Package Y or N
3) Present on Sample Y or N
4) Unbroken on Sample Y or N

COC Record Present Upon Sample Rec't Y or N

Discrepancies Between Samples Lables and COC Record? Y or N
NOTES:

RECRA LabNet Use Only

Custody Transfer Record/Lab Work Request

RECRA LabNet

CMS-006

Client: BAKER ENVIRONMENTAL INC
Est. Final Proj. Sampling Date: 4/23/98
Project #: 2010-0977
Project Contact/Phone #: Mark Kinney/787 415 4981
RECRA Project Manager: Bosco Ramirez
QC: Del #D TAT: 28 DAYS
Date Rec'd _____ Date Due _____
Account # _____

Refrigerator #																	
#/Type Container	Liquid																
	Solid																
Volume	Liquid																
	Solid																
Preservatives																	
ANALYSES REQUESTED →		ORGANIC							INORG								
		VOA	BNA	Pest/PCB	Herb	DRO			Metal	CN	NITRATE	ALKALINITY	SULFATE	CHLORIDE			
						RECRA LabNet Use Only											

MATRIX CODES: SL - Soil; SE - Sediment; SO - Solid; SI - Sludge; W - Water; O - Oil; A - Air; DS - Drum Solids; DL - Drum Liquids; L - Leachate; Wi - Wipe; X - Other; D - Other

Lab ID	Client ID/Description	Matrix QC Chosen (✓) MS	MSD	Matrix	Date Collected	Time Collected														
	MW1-2			W	4/17	0930				X					X	X	X	X		
	MW1-2D			W		0930				X					X	X	X	X		
	MW2-5			W		1030				X					X	X	X	X		
	MW2-5D			W		1030				X					X	X	X	X		
	MW3-11			W		0815				X					X	X	X	X		

FIELD PERSONNEL: COMPLETE ONLY SHADED AREAS

Special Instructions:
FED EX Airbill No.:
400-4071-9313

DATE/REVISIONS:
1. _____
2. _____
3. _____
4. _____
5. _____
6. _____

RECRA LabNet Use Only

Samples were:
1) Shipped ___ or Hand Delivered ___
Airbill # _____
2) Ambient or Chilled
3) Received in Good Condition Y or N
4) Labels Indicate Properly Preserved Y or N
5) Received Within Holding Times Y or N

COC Tape was:
1) Present on Outer Package Y or N
2) Unbroken on Outer Package Y or N
3) Present on Sample Y or N
4) Unbroken on Sample Y or N

COC Record Present Upon Sample Rec't Y or N

Discrepancies Between Samples Lables and COC Record? Y or N
NOTES:

Relinquished by	Received by	Date	Time
[signature]		4/17	1500

Relinquished by	Received by	Date	Time

RECRA LabNet Use Only

Custody Transfer Record/Lab Work Request

RECRA LabNet

CMS-007

Client: Kaiser Environmental Inc
Est. Final Proj. Sampling Date: 4/23/00
Project #: 4070-10297
Project Contact/Phone #: Mack Kimes / 787-415-4981
RECRA Project Manager: Bosco Ramirez
QC: Del: TAT: 28 DAY
Date Rec'd: Date Due:
Account #:

Refrigerator #
#/Type Container: Liquid / Solid
Volume: Liquid / Solid
Preservatives

ANALYSES REQUESTED →

Lab ID	Client ID/Description	Matrix QC Chosen (✓) MS	MSD	Matrix	Date Collected	Time Collected	ORGANIC: VOA	BNA	Pest/PCB	Herb	VOCs/BTEX	GRO	DRO	INORG: Metal	CN	NITRATE	ALKALINITY	SULFATE	CHLORIDE	
	496-MW3 *			W	4/17	1045					X	X	X							
	0GW-21 *			W	4/17	1620					X	X	X							
	0GW-19 *			W	4/17	1800					X	X	X							
	0GW-23			W	4/18	1030					X	X	X							
	HMW09			W	4/18	1100					X	X	X							
	496-MW3 *			W	4/20	1140										X	X	X	X	
	0GW-21			W	4/20	1230										X	X	X	X	
	0GW-19			W	4/20	1320										X	X	X	X	
	0GW-23			W	4/20	1040										X	X	X	X	
	HMW09			W	4/20	1100										X	X	X	X	

QUICK

MATRIX CODES: S - Soil; SE - Sediment; SO - Solid; SL - Sludge; W - Water; O - Oil; A - Air; DS - Drum Solids; DL - Drum Liquids; T - TSP/TCLP Leachate; WI - Wipe; X - Other; F - Fish

FIELD PERSONNEL: COMPLETE ONLY SHADED AREAS

Special Instructions:
FEDEX AIRBILL No.:
4004071-9324
* - FREE PRODUCT PRESENT IN WELL

DATE/REVISIONS:
1.
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4.
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6.

RECRA LabNet Use Only

Samples were:
1) Shipped ___ or Hand Delivered ___
Airbill # ___
2) Ambient or Chilled
3) Received in Good Condition Y or N
4) Labels Indicate Properly Preserved Y or N
5) Received Within Holding Times Y or N

COC Tape was:
1) Present on Outer Package Y or N
2) Unbroken on Outer Package Y or N
3) Present on Sample Y or N
4) Unbroken on Sample Y or N
COC Record Present Upon Sample Rec't Y or N

Discrepancies Between Samples Lables and COC Record? Y or N
NOTES:

Relinquished by	Received by	Date	Time
[signature]		4/20	1500

Relinquished by	Received by	Date	Time

RECRA LabNet Use Only

Custody Transfer Record/Lab Work Request

RECRA LabNet

CMS-008

Client: BAKER EXP. INC
Est. Final Proj. Sampling Date: 4/23/98
Project #: CTO 10244
Project Contact/Phone #: Mark Kimes/707 415-4981
RECRA Project Manager: Bosco Ramirez
QC: Del D TAT 28 Days
Date Rec'd _____ Date Due _____
Account # _____

Refrigerator #																	
#/Type Container	Liquid																
	Solid																
Volume	Liquid																
	Solid																
Preservatives																	
ANALYSES REQUESTED →		ORGANIC							INORG								
		VOA	BNA	Pest/PCB	Herb	DRO			Metal	CN	NITRATE	ALKALINITY	SULFATE	CHLORIDE			
		RECRA LabNet Use Only															

Matrix Codes	Lab ID	Client ID/Description	Matrix QC Chosen (✓) MS	MSD	Matrix	Date Collected	Time Collected														
																	CMC	K			
		FMW08	X	X	W	4/18	1415					X					X				
		FMW08D			W	4/18	1415					X					X				
		1700-MW1 *			W	4/18	1700					X					X				
		FMW08			W	4/20	1250										X	X	X	X	
		FMW08D			W	4/20	1250										X	X	X	X	
		1130-MW1 *			W	4/20	1130										X	X	X	X	
		1230-21			W	4/20	1230										X	X	X	X	

FIELD PERSONNEL: COMPLETE ONLY SHADED AREAS

Special Instructions:

FED-EX AIRBILL No.:
400-4071-9324
* FREE PRODUCT PRESENT IN WELL

DATE/REVISIONS:

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

RECRA LabNet Use Only

Samples were:
1) Shipped ___ or Hand Delivered ___
Airbill # _____
2) Ambient or Chilled
3) Received in Good Condition Y or N
4) Labels Indicate Properly Preserved Y or N
5) Received Within Holding Times Y or N

COC Tape was:
1) Present on Outer Package Y or N
2) Unbroken on Outer Package Y or N
3) Present on Sample Y or N
4) Unbroken on Sample Y or N
COC Record Present Upon Sample Rec't Y or N

Discrepancies Between Samples Lables and COC Record? Y or N
NOTES:

Relinquished by	Received by	Date	Time	Relinquished by	Received by	Date	Time
[illegible]		4/20	1500				

RECRA LabNet Use Only

Custody Transfer Record/Lab Work Request

RECRA LabNet

CMS-009

Client: Baker Env., Inc.
Est. Final Proj. Sampling Date: 4/23/98
Project #: 010-0227
Project Contact/Phone #: Mark Kinney/713 413 4981
RECRA Project Manager: Bosco Ramirez
QC: Del: 15 TAT: 28 Days
Date Rec'd: Date Due:
Account #:

Refrigerator #																		
#/Type Container	Liquid																	
	Solid																	
Volume	Liquid																	
	Solid																	
Preservatives																		
ANALYSES REQUESTED →		ORGANIC							INORG									
		VOA	BNA	Pest/ PCB	Herb	DRO			Metal	CN	NITRATE	ALKALINITY	SULFATE	CHLOR DE				
		RECRA LabNet Use Only																

MATRIX CODES: SO Soil; SE Sediment; SO Solid; SL Sludge; W Water; O Oil; A Air; DS Drum Solids; DL Drum Liquids; TL TCLP/TCLP Leachate; Wi Wipe; Ot Other; Fi Fish

Lab ID	Client ID/Description	Matrix QC Chosen (✓) MS	MSD	Matrix	Date Collected	Time Collected	DRO	NITRATE	ALKALINITY	SULFATE	CHLOR DE
	7MW07	X	X	W	4/19	0830	X				
	7MW07D			W	4/19	0830	X				
	DRW0-24			W	4/19	1030	X				
	7MW07			W	4/20	1240		X	X	X	X
	7MW07D			W	4/20	1240		X	X	X	X
	DRW0-24			W	4/20	1030		X	X	X	X

FIELD PERSONNEL: COMPLETE ONLY SHADED AREAS

Special Instructions:
FED-EX AIRBILL No.:
400-4071-9324
DRW FREE PRODUCT PRESENT IN WELL

DATE/REVISIONS:
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RECRA LabNet Use Only

Samples were:
1) Shipped ___ or Hand Delivered ___
Airbill # ___
2) Ambient or Chilled
3) Received in Good Condition Y or N
4) Labels Indicate Properly Preserved Y or N
5) Received Within Holding Times Y or N

COC Tape was:
1) Present on Outer Package Y or N
2) Unbroken on Outer Package Y or N
3) Present on Sample Y or N
4) Unbroken on Sample Y or N

COC Record Present Upon Sample Rec't Y or N

Discrepancies Between Samples Lables and COC Record? Y or N
NOTES:

Relinquished by	Received by	Date	Time
[illegible]		4/20	1500

Relinquished by	Received by	Date	Time

RECRA LabNet Use Only

Custody Transfer Record/Lab Work Request

RECRA LabNet

CMS-010

Client: Baker Engl. Inc.
Est. Final Proj. Sampling Date: 4/23/98
Project #: CTO-0277
Project Contact/Phone #: Mark Kimes / 787-454-4981
RECRA Project Manager: Bosco Ramirez
QC Level: Del. TAT: 28 Day
Date Rec'd: ____ Date Due: ____
Account #: ____

Refrigerator #																	
#/Type Container	Liquid																
	Solid																
Volume	Liquid																
	Solid																
Preservatives																	
ANALYSES REQUESTED →		ORGANIC							INORG								
		VOA	BNA	Pest/PCB	Herb	DRO			Metal	CN	NITRATE	ALKALINITY	SULFATE	CHLORIDE			
		RECRA LabNet Use Only															

MATRIX CODES: S - Soil; SE - Sediment; SO - Solid; SL - Sludge; W - Water; O - Oil; A - Air; DS - Drum Solids; DL - Drum Liquids; TL - TEP/TCLP Leachate; WI - Wipe; X - Other; P - Paint

Lab ID	Client ID/Description	Matrix QC Chosen (✓) MS	MSD	Matrix	Date Collected	Time Collected	DRO	NITRATE	ALKALINITY	SULFATE	CHLORIDE
	UGW-25 *			W	4/19	1200	X				
	FMW05			W	4/19	1500	X				
	FMW06			W	4/19	1550	X				
	FMW02			W	4/19	1720	X				
	MW-4 *			W	4/19	1800	X				
	UGW-25 →			W	4/20	1120		X	X	X	X
	~~FMW05~~			~~W~~	~~4/20~~	~~1150~~		~~X~~	~~X~~	~~X~~	~~X~~
	FMW06			W	4/20	1200		X	X	X	X
	FMW02			W	4/20	1050		X	X	X	X
	MW-4 *			W	4/20	1210		X	X	X	X

FIELD PERSONNEL: COMPLETE ONLY SHADED AREAS

Special Instructions:
FED-EX Airbill No.:
400-4071-9324
* Free Product Present in Well

DATE/REVISIONS:
1. ____
2. ____
3. ____
4. ____
5. ____
6. ____

RECRA LabNet Use Only

Samples were:
1) Shipped ___ or Hand Delivered ___
Airbill # ____
2) Ambient or Chilled
3) Received in Good Condition Y or N
4) Labels Indicate Properly Preserved Y or N
5) Received Within Holding Times Y or N

COC Tape was:
1) Present on Outer Package Y or N
2) Unbroken on Outer Package Y or N
3) Present on Sample Y or N
4) Unbroken on Sample Y or N

COC Record Present Upon Sample Rec't Y or N

Discrepancies Between Samples Lables and COC Record? Y or N
NOTES:

Relinquished by	Received by	Date	Time
[illegible]		4/20	1500

Relinquished by	Received by	Date	Time

RECRA LabNet Use Only

Custody Transfer Record/Lab Work Request

RECRA LabNet

CMS-011

Client: BAKER ENV., INC.
Est. Final Proj. Sampling Date: 4/23/98
Project #: CTO-0277
Project Contact/Phone #: Mark Kunz / 707-415-4981
RECRA Project Manager: Basu Ramirez
QC: Y/N Del: 10 TAT: 28 DAY
Date Rec'd: _____ Date Due: _____
Account #: _____

Refrigerator #																
#/Type Container	Liquid															
	Solid															
Volume	Liquid															
	Solid															
Preservatives																
ANALYSES REQUESTED →		ORGANIC							INORG							
		VOA	BNA	Pest/PCB	Herb	DRO			Metal	CN	NITRATE	ALKALINITY	SULFATE	CHLORIDE		
		RECRA LabNet Use Only														

MATRIX CODES: SO Soil, SE Sediment, SO Solid, SL Sludge, W Water, O Oil, A Air, DS Drum Solids, DL Drum Liquids, L Liquids (Aqueous), WI Wipe, X Other, F Fish

Lab ID	Client ID/Description	Matrix QC Chosen (✓) MS	MSD	Matrix	Date Collected	Time Collected	DRO	NITRATE	ALKALINITY	SULFATE	CHLORIDE
	U26W-14			W	4/19	1830	X				
	U26W-26	X	X	W	4/20	0900	X	X	X	X	X
	U26W-26D			W	4/20	0900	X	X	X	X	X
	U27W-14			W	4/20	1110		X	X	X	X
	U27-26 QMEK										
	U27W25			W	4/20	1150		X	X	X	X

FIELD PERSONNEL: COMPLETE ONLY SHADED AREAS

Special Instructions:

FED-EX AIRBILL No.:
400-4071-9324
FREE PRODUCT PRESENT IN WELL

DATE/REVISIONS:
1. _____
2. _____
3. _____
4. _____
5. _____
6. _____

RECRA LabNet Use Only

Samples were:
1) Shipped ___ or Hand Delivered ___
Airbill # _____
2) Ambient or Chilled
3) Received in Good Condition Y or N
4) Labels Indicate Properly Preserved Y or N
5) Received Within Holding Times Y or N

COC Tape was:
1) Present on Outer Package Y or N
2) Unbroken on Outer Package Y or N
3) Present on Sample Y or N
4) Unbroken on Sample Y or N

COC Record Present Upon Sample Rec't Y or N

Discrepancies Between Samples Lables and COC Record? Y or N
NOTES:

Relinquished by	Received by	Date	Time
[illegible]		4/20	1500

Relinquished by	Received by	Date	Time

RECRA LabNet Use Only

Custody Transfer Record/Lab Work Request

RECRA LabNet

CMS-012

Client: Baker Env, Inc
Est. Final Proj. Sampling Date: 4/23/98
Project #: CTO-0277
Project Contact/Phone #: Mark Kunz/787 1415-4991
RECRA Project Manager: Boso Ramirez
QC: Del: D TAT: 28 Day
Date Rec'd: _____ Date Due: _____
Account #: _____

Refrigerator #																		
#/Type Container	Liquid																	
	Solid																	
Volume	Liquid																	
	Solid																	
Preservatives																		
ANALYSES REQUESTED →			ORGANIC							INORG								
			VOA	BNA	Pest/ PCB	Herb	BTEX	GRO		Metal	CN							
			RECRA LabNet Use Only															

MATRIX CODES: SL - Soil; SE - Sediment; SOL - Solid; SL - Sludge; W - Water; O - Oil; A - Air; DS - Drum Solids; DL - Drum Liquids; L - EP/TCLP Leachate; WI - Wipes; X - Other; F - Fish

Lab ID	Client ID/Description	Matrix QC Chosen (✓) MS	MSD	Matrix	Date Collected	Time Collected	VOA	BNA	Pest/ PCB	Herb	BTEX	GRO		Metal	CN					
	470-MW3 *			W	4/17	1845					X	X								
	OGW-21 *			W	4/17	1620					X	X								
	OGW-19 *			W	4/17	1800					X	X								
	OGW-23			W	4/18	1030					X	X								
	7MW09			W	4/18	1100					X	X								
	7MW08	X	X	W	4/18	1415					X	X								
	7MW09D			W	4/18	1415					X	X								
	470-MW1 *			W	4/18	1700					X	X								
	7MW03	X	X	W	4/19	0830					X	X								
	7MW03D			W	4/19	0830					X	X								

FIELD PERSONNEL: COMPLETE ONLY SHADED AREAS

Special Instructions:
FEDEX Airbill No: 400-4071-9324
* FREE PRODUCT PRESENT IN WELL

DATE/REVISIONS:
1. _____
2. _____
3. _____
4. _____
5. _____
6. _____

RECRA LabNet Use Only

Samples were:
1) Shipped ___ or Hand Delivered ___
Airbill # _____
2) Ambient or Chilled
3) Received In Good Condition Y or N
4) Labels Indicate Properly Preserved Y or N
5) Received Within Holding Times Y or N

COC Tape was:
1) Present on Outer Package Y or N
2) Unbroken on Outer Package Y or N
3) Present on Sample Y or N
4) Unbroken on Sample Y or N

COC Record Present Upon Sample Rec't Y or N

Discrepancies Between Samples Lables and COC Record? Y or N
NOTES:

Relinquished by	Received by	Date	Time	Relinquished by	Received by	Date	Time
[illegible]		4/20	1500				

RECRA LabNet Use Only

Custody Transfer Record/Lab Work Request

RECRA LabNet

CMS-012

Client
Est. Final Proj. Sampling Date
Project #
Project Contact/Phone #
RECRA Project Manager
QC Del TAT
Date Rec'd Date Due
Account #

Refrigerator #																	
#/Type Container	Liquid																
	Solid																
Volume	Liquid																
	Solid																
Preservatives																	
ANALYSES REQUESTED →		ORGANIC							INORG								
		VOA	BNA	Pest/ PCB	Herb	BTEX	GRO		Metal	CN							

MATRIX CODES: SL - Soil; SE - Sediment; SO - Solid; SL - Sludge; W - Water; O - Oil; A - Air; DS - Drum Solids; DL - Drum Liquids; RP - Rinsate/Leachate; Wipes; Other; Fish

Lab ID	Client ID/Description	Matrix QC Chosen (✓) MS	MSD	Matrix	Date Collected	Time Collected	RECRA LabNet Use Only													
	MW-24			W	4/19	0830					X	X								
	MW-25 *			W	4/19	1200					X	X								
	EMW05			W	4/19	1500					X	X								
	EMW06			W	4/19	1550					X	X								
	EMW02			W	4/19	1720					X	X								
	MW-4 *			W	4/19	1800					X	X								
	MW-14			W	4/19	1830					X	X								
	[illegible]	X	X	W	4/20	0900					X	X								
	[illegible]-DUP			W	4/20	0900					X	X								
	TB-04			W							X	X								

FIELD PERSONNEL: COMPLETE ONLY SHADED AREAS

Special Instructions:

* FREE PRODUCT PRESENT IN WELL

DATE/REVISIONS:

1.
2.
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6.

Relinquished by	Received by	Date	Time	Relinquished by	Received by	Date	Time
[illegible]		4/20	1500				

Discrepancies Between Samples Lables and COC Record? Y or N
NOTES:

RECRA LabNet Use Only

Samples were:
1) Shipped ___ or Hand Delivered ___
Airbill # _____
2) Ambient or Chilled
3) Received in Good Condition Y or N
4) Labels Indicate Properly Preserved Y or N
5) Received Within Holding Times Y or N

COC Tape was:
1) Present on Outer Package Y or N
2) Unbroken on Outer Package Y or N
3) Present on Sample Y or N
4) Unbroken on Sample Y or N

COC Record Present Upon Sample Rec't Y or N

RECRA LabNet Use Only

Custody Transfer Record/Lab Work Request

RECRA LabNet

CMS-013

Client: Boeing Emp. Inc.
Est. Final Proj. Sampling Date: 4/23/98
Project #: CTO-0277
Project Contact/Phone #: Mark Kiraly/702 415 4081
RECRA Project Manager: Rosa Ramirez
QC: Del: D TAT: 28 Day
Date Rec'd: _____ Date Due: _____
Account #: _____

Refrigerator #																	
#/Type Container	Liquid																
	Solid																
Volume	Liquid																
	Solid																
Preservatives																	
ANALYSES REQUESTED →		ORGANIC							INORG								
		VOA	BNA	Pest/ PCB	Herb	BTEX	GRO	DRO	Metal	CN	TOC						
		RECRA LabNet Use Only															

MATRIX CODES: S - Soil; SE - Sediment; SO - Solid; SL - Sludge; W - Water; O - Oil; A - Air; DS - Drum Solids; DL - Drum Liquids; P - Particulate; Wi - Wipe; X - Other; F - Fish

Lab ID	Client ID/Description	Matrix QC Chosen (✓) MS	MSD	Matrix	Date Collected	Time Collected													
	[illegible]-03			S	4/17	1312				X	X	X							
	[illegible]-06			S	4/17	1320				X	X	X							
	[illegible]-08			S	4/17	1344				X	X	X							
	[illegible]-02			S	4/17	1437				X	X	X							
	[illegible]-05			S	4/17	1453				X	X	X							
	[illegible]-01			S	4/18	1510				X	X	X			X				
	[illegible]-01			S	4/18	1434				X	X	X							
	[illegible]-02	X	X	S	4/18	1132				X	X	X			X				
	[illegible]-01	X	X	S	4/18	1301				X	X	X							
	[illegible]-03			S	4/18	1715				X	X	X							

FIELD PERSONNEL: COMPLETE ONLY SHADED AREAS

Special Instructions:
FED-Ex Airbill No.:
400-4071-9324

DATE/REVISIONS:
1. _____
2. _____
3. _____
4. _____
5. _____
6. _____

RECRA LabNet Use Only

Samples were:
1) Shipped ___ or Hand Delivered ___
Airbill # _____
2) Ambient or Chilled
3) Received in Good Condition Y or N
4) Labels Indicate Properly Preserved Y or N
5) Received Within Holding Times Y or N

COC Tape was:
1) Present on Outer Package Y or N
2) Unbroken on Outer Package Y or N
3) Present on Sample Y or N
4) Unbroken on Sample Y or N

COC Record Present Upon Sample Rec't Y or N

Discrepancies Between Samples Lables and COC Record? Y or N
NOTES:

Relinquished by	Received by	Date	Time	Relinquished by	Received by	Date	Time
[signature]		4/20	1500				

RECRA LabNet Use Only

Custody Transfer Record/Lab Work Request

RECRA LabNet

CMS-013

Client
Est. Final Proj. Sampling Date
Project #
Project Contact/Phone #
RECRA Project Manager
QC Del TAT
Date Rec'd Date Due
Account #

Refrigerator #																
#/Type Container	Liquid															
	Solid															
Volume	Liquid															
	Solid															
Preservatives																
ANALYSES REQUESTED →		ORGANIC							INORG							
		VOA	BNA	Pest/ PCB	Herb	BTEX	GRO	DRO	Metal	CN						

RECRA LabNet Use Only

MATRIX CODES: S - Soil; SE - Sediment; SO - Solid; SL - Sludge; W - Water; O - Oil; A - Air; DS - Drum Solids; DL - Drum Liquids; L - Liquids; Wi - Wipes; Xo - Other; P - Paint

Lab ID	Client ID/Description	Matrix QC Chosen (✓) MS	MSD	Matrix	Date Collected	Time Collected														
	70P24-03D			S	4/18	1718				X	X	X								
	70P24-05			S	4/18	1739				X	X	X								
	70P25-01			S	4/19	0900				X	X	X								
	70P25-01D			S		0900				X	X	X								
	70P25-03			S		0913				X	X	X								
	70P25-06			S		0836				X	X	X								
	70P26-02			S		1005				X	X	X								
	70P26-04			S		1017				X	X	X								
	70P26-04D			S		1017				X	X	X								
	70P26-06			S		1027				X	X	X								

FIELD PERSONNEL: COMPLETE ONLY SHADED AREAS

Special Instructions:

DATE/REVISIONS:

1.
2.
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6.

Relinquished by	Received by	Date	Time	Relinquished by	Received by	Date	Time

RECRA LabNet Use Only

Samples were:
1) Shipped ___ or Hand Delivered ___
Airbill # _____
2) Ambient or Chilled
3) Received in Good Condition Y or N
4) Labels Indicate Properly Preserved Y or N
5) Received Within Holding Times Y or N

COC Tape was:
1) Present on Outer Package Y or N
2) Unbroken on Outer Package Y or N
3) Present on Sample Y or N
4) Unbroken on Sample Y or N

COC Record Present Upon Sample Rec't Y or N

Discrepancies Between Samples Lables and COC Record? Y or N
NOTES:

RECRA LabNet Use Only

Custody Transfer Record/Lab Work Request

RECRA LabNet

CMS-013

Client
Est. Final Proj. Sampling Date
Project #
Project Contact/Phone #
RECRA Project Manager
QC Del TAT
Date Rec'd Date Due
Account #

Refrigerator #																
#/Type Container	Liquid															
	Solid															
Volume	Liquid															
	Solid															
Preservatives																
ANALYSES REQUESTED →		ORGANIC							INORG							
		VOA	BNA	Pest/ PCB	Herb	BTEX	GRO	DRO	Metal	CN	TOC					
		RECRA LabNet Use Only														

MATRIX CODES
SL - Soil
SE - Sediment
SO - Solid
SL - Sludge
WA - Water
O - Oil
A - Air
DS - Drum Solids
DL - Drum Liquids
TL - TEP/TCLP Leachates
WI - Wipe
X - Other
FI - Fish

Lab ID	Client ID/Description	Matrix QC Chosen (✓) MS	MSD	Matrix	Date Collected	Time Collected	BTEX	GRO	DRO	TOC
	7DP27-01			S	4/19	1255	X	X	X	
	7DP27-04			S		1301	X	X	X	X
	7DP28-01			S		1354	X	X	X	X
	7DP29-01			S		1441	X	X	X	
	7DP29-04			S		1458	X	X	X	
	7DP29-04D			S		1458	X	X	X	
	7DP30-01			S		1610	X	X	X	
	7DP30-03			S		1646	X	X	X	
	TB-05			W			X	X		

FIELD PERSONNEL: COMPLETE ONLY SHADED AREAS

Special Instructions:

DATE/REVISIONS:
1.
2.
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6.

RECRA LabNet Use Only

Samples were:
1) Shipped ___ or Hand Delivered ___
Airbill # _____
2) Ambient or Chilled
3) Received in Good Condition Y or N
4) Labels Indicate Properly Preserved Y or N
5) Received Within Holding Times Y or N

COC Tape was:
1) Present on Outer Package Y or N
2) Unbroken on Outer Package Y or N
3) Present on Sample Y or N
4) Unbroken on Sample Y or N

COC Record Present Upon Sample Rec't Y or N

Discrepancies Between Samples Lables and COC Record? Y or N
NOTES:

Relinquished by	Received by	Date	Time	Relinquished by	Received by	Date	Time

RECRA LabNet Use Only

Custody Transfer Record/Lab Work Request

RECRA LabNet

CMS-14

Client: BAKER ENVIRONMENTAL INC.
Est. Final Proj. Sampling Date: 4/21/98
Project #: CTO-0277
Project Contact/Phone #: MARK KINES/
RECRA Project Manager: BERO RAMIREZ
QC: Del: TAT: 7 DAY

Date Rec'd _____ Date Due _____
Account # _____

Refrigerator #																	
#/Type Container	Liquid																
	Solid																
Volume	Liquid																
	Solid																
Preservatives																	
ANALYSES REQUESTED →		ORGANIC							INORG								
		VOA	BNA	Pest/PCB	Herb	BTEX	GRO	DRO	Metal	CN	NITRATE	ALKALINITY	SULFATE	CHLORIDE			
		RECRA LabNet Use Only															

MATRIX CODES: S - Soil; SE - Sediment; SO - Solid; SL - Sludge; W - Water; O - Oil; A - Air; DS - Drum Solids; DL - Drum Liquids; L - EP/TCLP Leachate; WI - Wipe; X - Other; F - Fish

Lab ID	Client ID/Description	Matrix QC Chosen (✓) MS	MSD	Matrix	Date Collected	Time Collected	VOA	BNA	Pest/PCB	Herb	BTEX	GRO	DRO	Metal	CN	NITRATE	ALKALINITY	SULFATE	CHLORIDE		
	JMW01A			W	4/20	1620					X	X	X								
	JMW01A			W	4/21	1050										X	X	X	X		
	JGW-3 *			W	4/20	1710					X	X	X								
	JGW-4 *			W	4/20	1806					X	X	X								
	JGW-12 *			W	4/20	1820					X	X	X								
	JGW-3 *			W	4/21	1100										X	X	X	X		
	JGW-4 *			W	4/21	1110										X	X	X	X		
	JGW-12 *			W	4/21	1120										X	X	X	X		
	TB-106										X	X									

FIELD PERSONNEL: COMPLETE ONLY SHADED AREAS

Special Instructions:

FED-EX AIRBILL No.:
400 - 4071 - 9291

* FREE PRODUCT PRESENT IN WELLS

DATE/REVISIONS:

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

RECRA LabNet Use Only

Samples were:
1) Shipped ___ or Hand Delivered ___
Airbill # _____
2) Ambient or Chilled
3) Received in Good Condition Y or N
4) Labels Indicate Properly Preserved Y or N
5) Received Within Holding Times Y or N

COC Tape was:
1) Present on Outer Package Y or N
2) Unbroken on Outer Package Y or N
3) Present on Sample Y or N
4) Unbroken on Sample Y or N

COC Record Present Upon Sample Rec't Y or N

Discrepancies Between Samples Lables and COC Record? Y or N
NOTES:

Relinquished by	Received by	Date	Time
Mark Kines		4/21	1500

Relinquished by	Received by	Date	Time

RECRA LabNet Use Only

Custody Transfer Record/Lab Work Request

RECRA LabNet

CMS-15

Client: KAISER ENG. INC.
Est. Final Proj. Sampling Date: 4/21/98
Project #: CTO-0277
Project Contact/Phone #: MARK KINES
RECRA Project Manager: BOSCO DAMIRES
QC: TD Del: D TAT: 28 DAY

Date Rec'd _____ Date Due _____
Account # _____

Refrigerator #																	
#/Type Container	Liquid																
	Solid																
Volume	Liquid																
	Solid																
Preservatives																	
ANALYSES REQUESTED →		ORGANIC							INORG								
		VOA	BNA	Pest/PCB	Herb	BTEX	GRO	DRO	Metal	CN	NITRATE	ALKALINITY	SULFATE	CHLORIDE			
		RECRA LabNet Use Only															

MATRIX CODES: SO - Soil; SE - Sediment; SO - Solid; SL - Sludge; W - Water; OIL - Oil; AIR - Air; DS - Drum Solids; DL - Drum Liquids; EP - Free Product; Leachate; WIPE - Wipe; OTHER - Other; TP - Trip

Lab ID	Client ID/Description	Matrix QC Chosen (✓) MS	MSD	Matrix	Date Collected	Time Collected	VOA	BNA	Pest/PCB	Herb	BTEX	GRO	DRO	Metal	CN	NITRATE	ALKALINITY	SULFATE	CHLORIDE		
	GW-02			W	4/21	1020					X	X	X			X	X	X	X		
	GW-03 *			W	4/21	0730					X	X	X			X	X	X	X		
	GW-13 *			W	4/21	0940					X	X	X			X	X	X	X		
	GW-17 *			W	4/21	0850					X	X	X			X	X	X	X		
	TB-07			W							X	X				NH					

FIELD PERSONNEL: COMPLETE ONLY SHADED AREAS

Special Instructions:

FED-EX AIRBILL NO.:
4 00-4071-9291
*FREE PRODUCT PRESENT IN WELLS

DATE/REVISIONS:
1. _____
2. _____
3. _____
4. _____
5. _____
6. _____

RECRA LabNet Use Only

Samples were:
1) Shipped ___ or Hand Delivered ___
Airbill # _____
2) Ambient or Chilled
3) Received In Good Condition Y or N
4) Labels Indicate Properly Preserved Y or N
5) Received Within Holding Times Y or N

COC Tape was:
1) Present on Outer Package Y or N
2) Unbroken on Outer Package Y or N
3) Present on Sample Y or N
4) Unbroken on Sample Y or N

COC Record Present Upon Sample Rec't Y or N

Discrepancies Between Samples Lables and COC Record? Y or N
NOTES:

Relinquished by	Received by	Date	Time
[signature]		4/21	1500

Relinquished by	Received by	Date	Time

RECRA LabNet Use Only

Custody Transfer Record/Lab Work Request

RECRA LabNet

CMS-116

Client: BAKER ENV., INC.
Est. Final Proj. Sampling Date: 4/21/98
Project #: CTO-0277
Project Contact/Phone #: MARK KEMES
RECRA Project Manager: BOSCO RAMIREZ
QC: D Del: D TAT: 28 DAYS
Date Rec'd _____ Date Due _____
Account # _____

Refrigerator #																	
#/Type Container	Liquid																
	Solid																
Volume	Liquid																
	Solid																
Preservatives																	
ANALYSES REQUESTED →		ORGANIC							INORG								
		VOA	BNA	Pest/PCB	Herb	BTEX	GRO	DRO	Metal	CN							

MATRIX CODES: SL Soil; SE Sediment; SO Solid; SL Sludge; WS Water; O Oil; A Air; DS Drum Solids; DL Drum Liquids; EP EPTOX/TCLP Leachate; WI Wipe; XX Other; F Rain

Lab ID	Client ID/Description	Matrix QC Chosen (✓) MS	MSD	Matrix	Date Collected	Time Collected	RECRA LabNet Use Only													
	FB-01			W	4/21	1240					X	X	X							
	FB-02			W	4/21	1245					X	X	X							
	FB-03			W	4/21	1250					X	X	X							
	FB-04			W	4/21	1300					X	X	X							
	FB-08			W							X	X								

FIELD PERSONNEL: COMPLETE ONLY SHADED AREAS

Special Instructions:
FED-EX AIRBILL NO.:
400-4071-9291

DATE/REVISIONS:
1. _____
2. _____
3. _____
4. _____
5. _____
6. _____

RECRA LabNet Use Only

Samples were:
1) Shipped ___ or Hand Delivered ___
Airbill # _____
2) Ambient or Chilled
3) Received in Good Condition Y or N
4) Labels Indicate Properly Preserved Y or N
5) Received Within Holding Times Y or N

COC Tape was:
1) Present on Outer Package Y or N
2) Unbroken on Outer Package Y or N
3) Present on Sample Y or N
4) Unbroken on Sample Y or N
COC Record Present Upon Sample Rec't Y or N

Discrepancies Between Samples Lables and COC Record? Y or N
NOTES:

Relinquished by	Received by	Date	Time
[signature]		4/21	1500

Relinquished by	Received by	Date	Time

RECRA LabNet Use Only

Custody Transfer Record/Lab Work Request

RECRA LabNet

CMS-017

Client: BAKER ENV. INC
Est. Final Proj. Sampling Date: 4/21/98
Project #: CTO-0077
Project Contact/Phone #: MARK KILLES
RECRA Project Manager: BOSCO RAMIREZ
QC: TD Del: D TAT: 28 DAY

Date Rec'd _____ Date Due _____
Account # _____

Refrigerator #																	
#/Type Container	Liquid																
	Solid																
Volume	Liquid																
	Solid																
Preservatives																	
ANALYSES REQUESTED →		ORGANIC							INORG								
		VOA	BNA	Pest/PCB	Herb	GRAIN SIZE	BULK DENSITY		Metal	CN							
		RECRA LabNet Use Only															

MATRIX CODES: S - Soil, SE - Sediment, SO - Solid, SL - Sludge, W - Water, O - Oil, A - Air, DS - Drum Solids, DL - Drum Liquids, E - EP/TCLP, L - Leachate, WI - Wipe, X - Other, F - Fish

Lab ID	Client ID/Description	Matrix QC Chosen (✓) MS	MSD	Matrix	Date Collected	Time Collected	VOA	BNA	Pest/PCB	Herb	GRAIN SIZE	BULK DENSITY		Metal	CN					
	7DP07-01			S	4/13	1542					X									
	7DP24-02			S	4/18	1700					X									
	7DP09			S	4/16	0930					X									
	7DP03-02			S	4/13	0928					X									
	7DP28-01			S	4/19	1354					X									
	7DP29-01			S	4/19	1441					X									
	7DP-TURF-01			S	4/21	1330					X									
	7DP20			S	4/17	1511					X									
	7DP05-02			S	4/15	1229						X								
	7DP02/10			S	4/16	1040						X								

FIELD PERSONNEL: COMPLETE ONLY SHADED AREAS

Special Instructions:
FEDEX AIRBILL No.:
400-4071-9291

DATE/REVISIONS:
1. _____
2. _____
3. _____
4. _____
5. _____
6. _____

RECRA LabNet Use Only

Samples were:
1) Shipped ___ or Hand Delivered ___
Airbill # _____
2) Ambient or Chilled
3) Received in Good Condition Y or N
4) Labels Indicate Properly Preserved Y or N
5) Received Within Holding Times Y or N

COC Tape was:
1) Present on Outer Package Y or N
2) Unbroken on Outer Package Y or N
3) Present on Sample Y or N
4) Unbroken on Sample Y or N

COC Record Present Upon Sample Rec't Y or N

Discrepancies Between Samples Lables and COC Record? Y or N
NOTES:

Relinquished by	Received by	Date	Time
[signature]		4/21/98	1500

Relinquished by	Received by	Date	Time

RECRA LabNet Use Only

Custody Transfer Record/Lab Work Request

RCRA LabNet

CMS-017

Client
Est. Final Proj. Sampling Date
Project #
Project Contact/Phone #
RECRA Project Manager
QC _____ Del _____ TAT _____
Date Rec'd _____ Date Due _____
Account #

Refrigerator #																	
#/Type Container	Liquid																
	Solid																
Volume	Liquid																
	Solid																
Preservatives																	
ANALYSES REQUESTED →		ORGANIC							INORG								
		VOA	BNA	Pest/ PCB	Herb	Gran Size			Metal	CN							
		RECRA LabNet Use Only															

MATRIX CODES:
S - Soil
SE - Sediment
SO - Solid
SL - Sludge
W - Water
O - Oil
A - Air
DS - Drum Solids
DL - Drum Liquids
L - EP/TCLP Leachate
WI - Wipe
X - Other
F - Fish

Lab ID	Client ID/Description	Matrix QC Chosen (✓) MS	MSD	Matrix	Date Collected	Time Collected														
	7DP-TWFF-J			S	4/21	1330					X									

FIELD PERSONNEL: COMPLETE ONLY SHADED AREAS

Special Instructions:

DATE/REVISIONS:
1. _____
2. _____
3. _____
4. _____
5. _____
6. _____

RECRA LabNet Use Only

Samples were:
1) Shipped ___ or Hand Delivered ___
Airbill # _____
2) Ambient or Chilled
3) Received in Good Condition Y or N
4) Labels Indicate Properly Preserved Y or N
5) Received Within Holding Times Y or N

COC Tape was:
1) Present on Outer Package Y or N
2) Unbroken on Outer Package Y or N
3) Present on Sample Y or N
4) Unbroken on Sample Y or N

COC Record Present Upon Sample Rec't Y or N

Discrepancies Between Samples Lables and COC Record? Y or N
NOTES:

Relinquished by	Received by	Date	Time	Relinquished by	Received by	Date	Time

RECRA LabNet Use Only

Custody Transfer Record/Lab Work Request

RECRA LabNet

TEG-001

Client: BAKER ENV. INC.
Est. Final Proj. Sampling Date: 4/23/98
Project #: CTO-0277
Project Contact/Phone #: MARK KIMES/787-415-4981
RECRA Project Manager: KEVIN SHELBURNE
QC: Del #D TAT: 28 DAY
Date Rec'd: _____ Date Due: _____
Account #: _____

Refrigerator #																
#/Type Container	Liquid															
	Solid															
Volume	Liquid															
	Solid															
Preservatives																
ANALYSES REQUESTED →		ORGANIC							INORG							
		VOA	BNA	Pest/PCB	Herb	METHane			Metal	CN						
		RECRA LabNet Use Only														

MATRIX CODES: SO - Soil; SE - Sediment; SO - Solid; SL - Sludge; W - Water; O - Oil; A - Air; DS - Drum Solids; DL - Drum Liquids; EP - Extract/Eluate; Leachate; WI - Wipe; X - Other; FP - Paint

Lab ID	Client ID/Description	Matrix QC Chosen (✓) MS	MSD	Matrix	Date Collected	Time Collected	METHane
	UGW-20			W	4/14	1600	X
	UGW-06			W	4/15	1710	X
	UGW-7			W	4/15	1810	X
	UGW-2			W	4/15	1245	X
	FMW04			W	4/15	0830	X
	FMW03			W	4/15	1345	X
	UGW-15			W	4/15	1600	X
	UGW-8			W	4/16	1130	X
	UGW-06			W	4/16	0850	X
	UGW-16			W	4/16	1445	X

FIELD PERSONNEL: COMPLETE ONLY SHADED AREAS

Special Instructions:

DATE/REVISIONS:
1. _____
2. _____
3. _____
4. _____
5. _____
6. _____

RECRA LabNet Use Only

Samples were:
1) Shipped ___ or Hand Delivered ___
Airbill # _____
2) Ambient or Chilled
3) Received in Good Condition Y or N
4) Labels Indicate Properly Preserved Y or N
5) Received Within Holding Times Y or N

COC Tape was:
1) Present on Outer Package Y or N
2) Unbroken on Outer Package Y or N
3) Present on Sample Y or N
4) Unbroken on Sample Y or N

COC Record Present Upon Sample Rec't Y or N

Discrepancies Between Samples Lables and COC Record? Y or N
NOTES:

Relinquished by	Received by	Date	Time
[illegible]	Shelburne	4/16	1708

Relinquished by	Received by	Date	Time

RECRA LabNet Use Only

Custody Transfer Record/Lab Work Request

RECRA LabNet

TEG-001

Client
Est. Final Proj. Sampling Date
Project #
Project Contact/Phone #
RECRA Project Manager
QC Del TAT
Date Rec'd Date Due
Account #

Refrigerator #																
#/Type Container	Liquid															
	Solid															
Volume	Liquid															
	Solid															
Preservatives																
ANALYSES REQUESTED →		ORGANIC							INORG							
		VOA	BNA	Pest/ PCB	Herb	METHANE			Metal	CN						

MATRIX CODES: S - Soil; SE - Sediment; SO - Solid; SL - Sludge; W - Water; O - Oil; A - Air; DS - Drum Solids; DL - Drum Liquids; DG - DRUM GRAB; Wi - Wipe; X - Other; F - Filter

Lab ID	Client ID/Description	Matrix QC Chosen (✓) MS	MSD	Matrix	Date Collected	Time Collected	RECRA LabNet Use Only												
	OGW-18			W	4/16	1545					X								

FIELD PERSONNEL: COMPLETE ONLY SHADED AREAS

Special Instructions:

DATE/REVISIONS:

1.
2.
3.
4.
5.
6.

RECRA LabNet Use Only

Samples were:
1) Shipped ___ or Hand Delivered ___
Airbill # _____
2) Ambient or Chilled
3) Received in Good Condition Y or N
4) Labels Indicate Properly Preserved Y or N
5) Received Within Holding Times Y or N

COC Tape was:
1) Present on Outer Package Y or N
2) Unbroken on Outer Package Y or N
3) Present on Sample Y or N
4) Unbroken on Sample Y or N

COC Record Present Upon Sample Rec't Y or N

Discrepancies Between Samples Lables and COC Record? Y or N
NOTES:

Relinquished by	Received by	Date	Time	Relinquished by	Received by	Date	Time

RECRA LabNet Use Only

Custody Transfer Record/Lab Work Request

RECRA LabNet

TEG-002

Client: Baker Env, Inc
Est. Final Proj. Sampling Date: 4/23/98
Project #: CTO - 0277
Project Contact/Phone #: Mark Kinney/787 415 4981
RECRA Project Manager: Keith Sherburne
QC Level: Del. TAT: 28 DAY

Date Rec'd _____ Date Due _____
Account # _____

Refrigerator #																	
#/Type Container	Liquid																
	Solid																
Volume	Liquid																
	Solid																
Preservatives																	
ANALYSES REQUESTED →		ORGANIC								INORG							
		VOA	BNA	Pest/ PCB	Herb	Methane				Metal	CN						

MATRIX CODES: S - Soil; SE - Sediment; SO - Solid; SL - Sludge; W - Water; O - Oil; A - Air; DS - Drum Solids; DL - Drum Liquids; L - EP/TCLP Leachate; WI - Wipe; X - Other; F - Fish

Lab ID	Client ID/Description	Matrix QC Chosen (✓) MS	MSD	Matrix	Date Collected	Time Collected	RECRA LabNet Use Only												
	OGW-9			W	4/16	1845					X								
	OGW-10			W	4/16	1750					X								
	GW-04			W	4/16	1730					X								
	OGW-5D			W	4/17	1030					X								
	OGW-5			W	4/17	1030					X								
	MW-7			W	4/17	0930					X								
	MW-7D			W	4/17	0930					X								
	OGW-11			W	4/17	0815					X								
	OGW-21			W	4/17	1020					X								

FIELD PERSONNEL: COMPLETE ONLY SHADED AREAS

Special Instructions:

DATE/REVISIONS:

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

RECRA LabNet Use Only

Samples were:
1) Shipped ___ or Hand Delivered ___
Airbill # _____
2) Ambient or Chilled
3) Received in Good Condition Y or N
4) Labels Indicate Properly Preserved Y or N
5) Received Within Holding Times Y or N

COC Tape was:
1) Present on Outer Package Y or N
2) Unbroken on Outer Package Y or N
3) Present on Sample Y or N
4) Unbroken on Sample Y or N

COC Record Present Upon Sample Rec't Y or N

Discrepancies Between Samples Lables and COC Record? Y or N
NOTES:

Relinquished by	Received by	Date	Time
Mark L. Kinney	K. Sherburne	4/17	1800

Relinquished by	Received by	Date	Time

RECRA LabNet Use Only

Custody Transfer Record/Lab Work Request

RECRA LabNet

TEG-003

Client: BAKER ENV. INC
Est. Final Proj. Sampling Date: 4/23/98
Project #: CTO-0277
Project Contact/Phone #: MARK KIMES
RECRA Project Manager: KEVIN SHELBURNE
QC: D Del: D TAT: 28 DAY

Date Rec'd _____ Date Due _____
Account # _____

Refrigerator #																
#/Type Container	Liquid															
	Solid															
Volume	Liquid															
	Solid															
Preservatives																
ANALYSES REQUESTED →		ORGANIC							INORG							
		VOA	BNA	Pest/PCB	Herb	METHANE			Metal	CN						
		RECRA LabNet Use Only														

MATRIX CODES: SL - Soil; SE - Sediment; SO - Solids; SL - Sludge; W - Water; O - Oil; A - Air; DS - Drum Solids; DL - Drum Liquids; L - EP/TCLP Leachate; WI - Wipe; X - Other; F - Fish

Lab ID	Client ID/Description	Matrix QC Chosen (✓) MS	MSD	Matrix	Date Collected	Time Collected	VOA	BNA	Pest/PCB	Herb	METHANE			Metal	CN					
	470-MW3			W	4/17	1845					X			X						
	~~UGW-21~~			~~W~~	~~4/17~~	~~1620~~					~~X~~			~~X~~						
	UGW-19			W	4/17	1800					X									
	UGW-23			W	4/18	1030					X									
	7MW09			W	4/18	1100					X									
	7MW08			W	4/18	1415					X									
	7MW08D			W	4/18	1415					X									
	470-MW1			W	4/18	1700														

FIELD PERSONNEL: COMPLETE ONLY SHADED AREAS

Special Instructions:

DATE/REVISIONS:
1. _____
2. _____
3. _____
4. _____
5. _____
6. _____

RECRA LabNet Use Only

Samples were:
1) Shipped ___ or Hand Delivered ___
Airbill # _____
2) Ambient or Chilled
3) Received in Good Condition Y or N
4) Labels Indicate Properly Preserved Y or N
5) Received Within Holding Times Y or N

COC Tape was:
1) Present on Outer Package Y or N
2) Unbroken on Outer Package Y or N
3) Present on Sample Y or N
4) Unbroken on Sample Y or N

COC Record Present Upon Sample Rec't Y or N

Discrepancies Between Samples Lables and COC Record? Y or N
NOTES:

Relinquished by	Received by	Date	Time
[illegible]	[illegible]	4/18	4/18

Relinquished by	Received by	Date	Time

RECRA LabNet Use Only

Custody Transfer Record/Lab Work Request

RECRA LabNet

FEG-0041

Client: Baker Eng. Inc
Est. Final Proj. Sampling Date: 4/23/98
Project #: CTO-0277
Project Contact/Phone #: Mark Kimes
RECRA Project Manager: Kevin Shelbourne
QC: B Del: D TAT: 20 Days

Date Rec'd _____ Date Due _____
Account # _____

Refrigerator #																		
#/Type Container	Liquid																	
	Solid																	
Volume	Liquid																	
	Solid																	
Preservatives																		
ANALYSES REQUESTED →		ORGANIC							INORG									
		VOA	BNA	Pest/PCB	Herb	METHANE			Metal	CN								
		RECRA LabNet Use Only																

MATRIX CODES: S = Soil, SE = Sediment, SO = Solid, SL = Sludge, W = Water, O = Oil, A = Air, DS = Drum Solids, DL = Drum Liquids, L = EP/TCLP Leachate, Wi = Wipes, X = Other, F = Fish

Lab ID	Client ID/Description	Matrix QC Chosen (✓) MS	MSD	Matrix	Date Collected	Time Collected													
	7MW07			W	4/19	0930					X								
	7MW07D					0830					X								
	UGW-24					1030					X								
	UGW-25					1200					X								
	7MW05					1600					X								
	7MW06					1560					X								
	7MW02					1720					X								

FIELD PERSONNEL: COMPLETE ONLY SHADED AREAS

Special Instructions:

DATE/REVISIONS:

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

RECRA LabNet Use Only

Samples were:
1) Shipped ___ or Hand Delivered ___
Airbill # _____
2) Ambient or Chilled
3) Received in Good Condition Y or N
4) Labels Indicate Properly Preserved Y or N
5) Received Within Holding Times Y or N

COC Tape was:
1) Present on Outer Package Y or N
2) Unbroken on Outer Package Y or N
3) Present on Sample Y or N
4) Unbroken on Sample Y or N

COC Record Present Upon Sample Rec't Y or N

Discrepancies Between Samples Lables and COC Record? Y or N
NOTES:

Relinquished by	Received by	Date	Time
Mark C. Kimes	K. Shelbourne	4/19/98	1710

Relinquished by	Received by	Date	Time

teg Transglobal Environmental Geochemistry

Chain of Custody Record

TEG [illegible]05

PO # _____

Client: BAKER ENVIRONMENTAL

Address _____

Phone 415-4981 FAX _____

Client Project # _____ Project Manager Kimes

Date 4/20/98 Page 1 of 1

TEG Project # 98I0420BAK Outside Lab.# _____

Location ROOSEVELT ROADS FUEL FARM

Collector TEG STAFF Date of Collection 4/20/98

Sample #	Depth	Time	Sample Type	Container Type	VOA 8010	VOA 8020 (BTEX)	VOA 8260	SEMI VOL 8270	TRPH 418.1	TPH 8015 (gasoline)	TPH 8015 (diesel)	TPH 8015 (gas & diesel)	TPH 8015 (oil)	PNA 610/8100	TOTAL LEAD	pH	METALS	RCI	Oxygen	CO_2	Methane				FIELD NOTES / PRESERVATION	Total # of Containers
7SG01		9:30	Vapor	Vial								X							X	X	X					2
7SG02		10:00										X							X	X	X					2
7SG03		10:20										X							X	X	X					2
7SG04		10:45										X							X	X	X					2
7SG05		11:00										X							X	X	X					2
7SG06		11:15										X							X	X	X					2
7SG06D		11:15										X							X	X	X					2
7SG07		11:45										X							X	X	X					2
7SG08		12:05										X							X	X	X					2
7SG09		12:15										X							X	X	X					2
7SG10		12:30										X							X	X	X					2
11GW-14	4/19	18:30	H_2O	VOA	40mL																X					2
MW-4	4/19	18:00	H_2O	Vials																	X					2

RELINQUISHED BY (signature)	Date/Time	RECEIVED BY (signature)	Date/Time
[signature]	4/20 1300	[signature]	4/20/98 1:00 pm
RELINQUISHED BY (signature)	Date/Time	RECEIVED BY (signature)	Date/Time

Total # of containers	22	TEMPERATURE
Chain of Custody seals Y / N / NA	NA	Room
Seals intact? Y / N / NA	NA	
Received good conditions / cold	NO	

Sample disposal Instructions: _____ TEG Disposal @ $2.00 each _____ Return to client _____ Pickup

RECRA LabNet Use Only

Custody Transfer Record/Lab Work Request

RECRA LabNet

TEG-CCG

Client: BAKER ENV, INC
Est. Final Proj. Sampling Date: 4/21/98
Project #: CTO-0277
Project Contact/Phone #: MARK KIMES (757) 415-4921
RECRA Project Manager: KEVIN SHELBURNE
QC: D Del: D TAT: 28 DAY
Date Rec'd: _____ Date Due: _____
Account #: _____

Refrigerator #																	
#/Type Container	Liquid																
	Solid																
Volume	Liquid																
	Solid																
Preservatives																	
ANALYSES REQUESTED →		ORGANIC							INORG								
		VOA	BNA	Pest/ PCB	Herb	METHANE			Metal	CN							

MATRIX CODES:
S - Soil
SE - Sediment
SO - Solid
SL - Sludge
W - Water
O - Oil
A - Air
DS - Drum Solids
DL - Drum Liquids
L - EP/TCLP Leachate
WI - Wipe
X - Other
F - Fish

Lab ID	Client ID/Description	Matrix QC Chosen (✓) MS	MSD	Matrix	Date Collected	Time Collected	RECRA LabNet Use Only												
	UGW-26			W	4/20	0900					X								
	7MW01A			W	4/20	1620					X								
	UGW-3			W	4/20	1710					X								
	UGW-4			W	4/20	1800					X								
	UGW-12			W	4/20	1830					X								
	GW-02			W	4/21	1020					X								
	GW-03			W	4/21	0730					X								
	UGW-13			W	4/21	0940					X								
	UGW-17			W	4/21	0850					X								
	UGW-26 D			W	4/20	0900					X								

FIELD PERSONNEL: COMPLETE ONLY SHADED AREAS

Special Instructions:

DO NOT ANALYZE 7SG01 THROUGH 7SG10 FOR METHANE AS LISTED ON COC FROM 4/20/98.

DATE/REVISIONS:

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

RECRA LabNet Use Only

Samples were:
1) Shipped ___ or Hand Delivered ___
Airbill # _____
2) Ambient or Chilled
3) Received in Good Condition Y or N
4) Labels Indicate Properly Preserved Y or N
5) Received Within Holding Times Y or N

COC Tape was:
1) Present on Outer Package Y or N
2) Unbroken on Outer Package Y or N
3) Present on Sample Y or N
4) Unbroken on Sample Y or N

COC Record Present Upon Sample Rec't Y or N

Discrepancies Between Samples Lables and COC Record? Y or N
NOTES:

Relinquished by	Received by	Date	Time
[signature]	[signature]	4/21	1723

Relinquished by	Received by	Date	Time

APPENDIX B
TEST BORING RECORDS

Baker

Baker Environmental

TEST BORING RECORD

PROJECT: Tow Way Fuel Farm CMS Investigation Naval Station Roosevelt Roads, Puerto Rico

CTO NO.: 62470-277 BORING NO.: 7DP01

COORDINATES: EAST: 782,301.64 NORTH: 147,110.65

SURFACE ELEVATION: 184.61

Rig: Truck-Mounted Earthprobe 200								
	Sampler	**Casing**	**Augers**	**Core Barrel**	**Date**	**Progress (Ft.)**	**Weather**	**Depth to Water (Ft.)**
Size (ID)	1"	2"			4/14/98	28.0	P. Sunny	
Length	2'	4'						
Type	Split barrel	Steel						
Hammer Wt.								
Fall								

Remarks:

SAMPLE TYPE

S = Soil Sample A = Auger
T = Shelby Tube W = Wash
R = Air Rotary C = Core
D = Direct Push P = Piston
N = No Sample H= By Hand

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) BG	PID (ppm) PS	Visual Description	Elev. (Ft. MSL)
1 2 3 4 4.0	D-N	--			--	--	Direct Push, No Sampling	
5 5.5	S-1	1.0 67%			0.1	0.1	ROCK FRAGMENTS & CLAY, trace fine sand; brown; very hard; dry	
6 7 8 8.0	D-N	--			--	--	Direct Push, No Sampling	
							8.0	176.61
9 10 10.0	S-2	2.0 100%		05	0.1	0.1	FINE to COARSE SAND, trace silt; brown & white; hard; dry - appears to be weathered bedrock	
							Match to Sheet 2	

DRILLING CO.: Transglobal Environmental Group BAKER REP.: Mark DeJohn

DRILLER: Kevin Shelburne BORING NO.: 7DP01 SHEET 1 OF 2

Baker

Baker Environmental

TEST BORING RECORD

PROJECT: Tow Way Fuel Farm CMS Investigation Naval Station Roosevelt Roads, Puerto Rico

CTO NO.: 62470-277 BORING NO.: 7DP01

SAMPLE TYPE

S = Soil Sample 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

Depth (Ft.)		Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab ID	PID (ppm) BG	PID (ppm) PS	Visual Description	Elev. (Ft. MSL)
11								Continued from Sheet 1	
12		D-N	--			--	--	Direct Push, No Sampling	
13									
14	14.0								
15		S-3	1.5 75%		08	0.1	0.1	As above with frequent zones of iron staining	
16	16.0								
17									
18		D-N	--			--	--	Direct Push, No Sampling	
19									
20	20.0								
21		S-4	2.0 100%		11	0.1	0.1	As above with clayey zone @ 18.0 - 18.2'; now damp	
22	22.0								
23		D-N	--			--	--	Direct Push, No Sampling	
24	24.0								
25		S-5	2.0 100%		13	0.1	0.1	As above with clayey zone @ 25.7 - 26.0'; damp	
26	26.0								
27	27.0	D-N	--			--	--	Direct Push, No Sampling	
28	28.5	S-6	1.5 100%		14	0.1	0.1	CLAY, some FINE to COARSE SAND; dark brown & white; hard; damp End of boring "Refusal" 28.5'	156.11
29									
30									

DRILLING CO.: Transglobal Environmental Group BAKER REP.: Mark DeJohn

DRILLER: Kevin Shelburne BORING NO.: 7DP01 SHEET 2 OF 2

Baker

Baker Environmental

TEST BORING RECORD

PROJECT: Tow Way Fuel Farm CMS Investigation Naval Station Roosevelt Roads, Puerto Rico

CTO NO.: 62470-277 BORING NO.: 7DP02

COORDINATES: EAST: 782,540.66 NORTH: 147,118.81

SURFACE ELEVATION: 176.85

Rig: Truck-Mounted Earthprobe 200	Sampler	Casing	Augers	Core Barrel	Date	Progress (Ft.)	Weather	Depth to Water (Ft.)
Size (ID)	1"	2"			4/15/98	15.0	P. Sunny, Breezy	
Length	2'	4'						
Type	Split barrel	Steel						
Hammer Wt.								
Fall								

Remarks:

SAMPLE TYPE

S = Soil Sample A = Auger
T = Shelby Tube W = Wash
R = Air Rotary C = Core
D = Direct Push P = Piston
N = No Sample H= By Hand

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) BG/PS		Visual Description	Elev. (Ft. MSL)
1, 2, 3, 4	4.0	D-N	--			--	--	Direct Push, No Sampling	
5, 6	6.0	S-1	0.0 0%					No Recovery	
7, 8	8.0	D-N	--			--	--	Direct Push, No Sampling	
9, 10	10.0	S-2	2.0 100%		05 (9-10')	0.2	0.2	FINE SAND, trace rock fragments; coarse sand & silt; gray becoming brown with depth; dense; dry	
								Match to Sheet 2	

DRILLING CO.: Transglobal Environmental Group BAKER REP.: Mark DeJohn

DRILLER: Kevin Shelburne BORING NO.: 7DP02 SHEET 1 OF 2

Baker

Baker Environmental

TEST BORING RECORD

PROJECT: Tow Way Fuel Farm CMS Investigation Naval Station Roosevelt Roads, Puerto Rico

CTO NO.: 62470-277 BORING NO.: 7DP02

SAMPLE TYPE	DEFINITIONS
S = Soil Sample A = Auger	SPT = Standard Penetration Test (ASTM D1586)
T = Shelby Tube W = Wash	PID = Photo Ionization Detector Measurement
R = Air Rotary C = Core	MSL = Mean Sea Level
D = Direct Push P = Piston N = No Sample	BG/PS = Background/Point Source

Depth (Ft.)		Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab ID	PID (ppm) BG/PS		Visual Description	Elev. (Ft. MSL)
11								Continued from Sheet 1	
12		D-N	--			--	--	Direct Push, No Sampling	
13	13.0							13.0	
14		S-3	0.7 35%			0.2	0.2	WEATHERED ROCK; grayish-brown; dense; dry	
15	15.0							End of Boring "Refusal" 15.0'	161.85
16									
17									
18									
19									
20									
21									
22									
23									
24									
25									
26									
27									
28									
29									
30									

DRILLING CO.: Transglobal Environmental Group BAKER REP.: Mark DeJohn

DRILLER: Kevin Shelburne BORING NO.: 7DP02 SHEET 2 OF 2

Baker

Baker Environmental

TEST BORING RECORD

PROJECT: Tow Way Fuel Farm CMS Investigation Naval Station Roosevelt Roads, Puerto Rico

CTO NO.: 62470-277 BORING NO.: 7DP03

COORDINATES: EAST: 781,876.96 NORTH: 145,928.94

SURFACE ELEVATION: 108.23

Rig: Truck-Mounted Earthprobe 200	Sampler	Casing	Augers	Core Barrel	Date	Progress (Ft.)	Weather	Depth to Water (Ft.)
Size (ID)	2"				4/15/98	14.0	P. Sunny, Breezy	12.0
Length	4'							
Type	Macro							
Hammer Wt.								
Fall								

Remarks:

SAMPLE TYPE

S = Soil Sample A = Auger
T = Shelby Tube W = Wash
R = Air Rotary C = Core
D = Direct Push P = Piston
N = No Sample H= By Hand

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) BG	PID (ppm) PS	Visual Description	Elev. (Ft. MSL)
1, 2, 3, 4	4.0	S-1	4.0 100%		01 (1-2')	0.2	0.2	FINE SAND, some silt, little shell fragments; tan; damp (1.9)	
								SILT, little shell fragments, trace clay & fine sand gray; moist - wet @ 4.0-5.0' (5.0)	
5, 6, 7, 8	8.0	S-2	2.0 50%		02 (3-4')	0.2	0.2	CLAY, little rock fragments & course sand; brown; moist to wet; soft (9.0)	
9, 10		S-3	2.1 53%			0.2	0.5	Match to Sheet 2	

DRILLING CO.: Transglobal Environmental Group BAKER REP.: Mark DeJohn

DRILLER: Kevin Shelburne BORING NO.: 7DP03 SHEET 1 OF 2

Baker

Baker Environmental

TEST BORING RECORD

PROJECT: Tow Way Fuel Farm CMS Investigation Naval Station Roosevelt Roads, Puerto Rico

CTO NO.: 62470-277 BORING NO.: 7DP03

SAMPLE TYPE	DEFINITIONS
S = Soil Sample A = Auger	SPT = Standard Penetration Test (ASTM D1586)
T = Shelby Tube W = Wash	PID = Photo Ionization Detector Measurement
R = Air Rotary C = Core	MSL = Mean Sea Level
D = Direct Push P = Piston N = No Sample	BG/PS = Background/Point Source

Depth (Ft.)		Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab ID	PID (ppm) BG/PS		Visual Description	Elev. (Ft. MSL)
11								Continued from Sheet 1	
12	12.0							CLAY, little rock frag & course sand; dark brown; moist	
13		S-4	2.0 100%			0.1	0.3	CLAY, trace rock fragment & course sand; dark brown; wet	
14	14.0							End of Boring 14.0'	94.23
15									
16									
17									
18									
19									
20									
21									
22									
23									
24									
25									
26									
27									
28									
29									
30									

DRILLING CO.: Transglobal Environmental Group BAKER REP.: Mark DeJohn

DRILLER: Kevin Shelburne BORING NO.: 7DP03 SHEET 2 OF2

Baker

Baker Environmental

TEST BORING RECORD

PROJECT: Tow Way Fuel Farm CMS Investigation Naval Station Roosevelt Roads, Puerto Rico

CTO NO.: 62470-277 BORING NO.: 7DP04

COORDINATES: EAST: 781,536.91 NORTH: 146,305.85

SURFACE ELEVATION: 110.65

Rig: Truck-Mounted Earthprobe 200								
	Sampler	**Casing**	**Augers**	**Core Barrel**	**Date**	**Progress (Ft.)**	**Weather**	**Depth to Water (Ft.)**
Size (ID)	2"				4/15/98	12.0	P. Sunny, Breezy	10.0
Length	4'							
Type	Macro							
Hammer Wt.								
Fall								

Remarks:

SAMPLE TYPE

S = Soil Sample A = Auger
T = Shelby Tube W = Wash
R = Air Rotary C = Core
D = Direct Push P = Piston
N = No Sample H= By Hand

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) BG/PS		Visual Description	Elev. (Ft. MSL)
1 2 3 4	4.0	S-1	3.2 80%		01 (1-3')	0.2	0.2	ROCK FRAGMENTS, some fine sand, trace silt; brown; dense; dry; increasing silt content @ bottom, clayey zones throughout	
5 6 7 8	8.0	S-2	3.2 80%		03(5-7')	0.2	1.5	FINE to COARSE SAND, trace silt (weathered rock); greenish-gray; damp; slight hydrocarbon odor	
9 10		S-3	1.0 25%			0.2	177	ROCK FRAGMENTS; some clay; dark greenish gray; wet; strong hydrocarbon odor; water likely at approximately 10 ft. Match to Sheet 2	

DRILLING CO.: Transglobal Environmental Group BAKER REP.: Mark DeJohn

DRILLER: Kevin Shelburne BORING NO.: 7DP04 SHEET 1 OF 2

Baker

Baker Environmental

TEST BORING RECORD

PROJECT: Tow Way Fuel Farm CMS Investigation Naval Station Roosevelt Roads, Puerto Rico

CTO NO.: 62470-277 BORING NO.: 7DP04

SAMPLE TYPE	DEFINITIONS
S = Soil Sample A = Auger	SPT = Standard Penetration Test (ASTM D1586)
T = Shelby Tube W = Wash	PID = Photo Ionization Detector Measurement
R = Air Rotary C = Core	MSL = Mean Sea Level
D = Direct Push P = Piston N = No Sample	BG/PS = Background/Point Source

Depth (Ft.)		Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab ID	PID (ppm) BG/PS		Visual Description		Elev. (Ft. MSL)
11								Continued from Sheet 1		
12	12.0							BOH @ 12.0'	12.0	98.65
13										
14										
15										
16										
17										
18										
19										
20										
21										
22										
23										
24										
25										
26										
27										
28										
29										
30										

DRILLING CO.: Transglobal Environmental Group BAKER REP.: Mark DeJohn

DRILLER: Kevin Shelburne BORING NO.: 7DP04 SHEET 2 OF 2

Baker

Baker Environmental

TEST BORING RECORD

PROJECT: Tow Way Fuel Farm CMS Investigation Naval Station Roosevelt Roads, Puerto Rico

CTO NO.: 62470-277 BORING NO.: 7DP05

COORDINATES: EAST: 781,620.12 NORTH: 146,498.51

SURFACE ELEVATION: 129.19

Rig: Truck-Mounted Earthprobe 200	Sampler	Casing	Augers	Core Barrel	Date	Progress (Ft.)	Weather	Depth to Water (Ft.)
Size (ID)	2"				4/15/98	12.0	M. Cloudy, Breezy	
Length	4'							
Type	Macro							
Hammer Wt.								
Fall								

Remarks:

SAMPLE TYPE

S = Soil Sample A = Auger
T = Shelby Tube W = Wash
R = Air Rotary C = Core
D = Direct Push P = Piston
N = No Sample H= By Hand

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) BG	PID (ppm) PS	Visual Description	Elev. (Ft. MSL)
1, 2, 3, 4 (4.0)	S-1	3.4 85%		01 (2-3')	0.2	0.2	ROCK FRAGMENTS & FINE SAND, trace silt; yellowish-brown; dense; dry	
5, 6, 7 (7.0)	S-2	3.0 100%			0.1	0.1	As above with trace clay & lighter in color with depth	
8, 9 (9.0)	D-N	--			--	--	(Switched to double cased sampling system)	
10	S-3	1.5 75%		05	0.1	0.1	As above, no clay Match to Sheet 2	

DRILLING CO.: Transglobal Environmental Group BAKER REP.: Mark DeJohn

DRILLER: Kevin Shelburne BORING NO.: 7DP05 SHEET 1 OF 2

Baker

Baker Environmental

TEST BORING RECORD

PROJECT: Tow Way Fuel Farm CMS Investigation Naval Station Roosevelt Roads, Puerto Rico

CTO NO.: 62470-277 BORING NO.: 7DP05

SAMPLE TYPE	DEFINITIONS
S = Soil Sample A = Auger	SPT = Standard Penetration Test (ASTM D1586)
T = Shelby Tube W = Wash	PID = Photo Ionization Detector Measurement
R = Air Rotary C = Core	MSL = Mean Sea Level
D = Direct Push P = Piston N = No Sample	BG/PS = Background/Point Source

Depth (Ft.)		Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab ID	PID (ppm) BG/PS		Visual Description	Elev. (Ft. MSL)
11	11.0							Continued from Sheet 1	
		D-N	--			--	--		
12	12.0							BOH @ 12.0' REFUSAL 12.0	117.19
13									
14									
15									
16									
17									
18									
19									
20									
21									
22									
23									
24									
25									
26									
27									
28									
29									
30									

DRILLING CO.: Transglobal Environmental Group BAKER REP.: Mark DeJohn

DRILLER: Kevin Shelburne BORING NO.: 7DP05 SHEET 2 OF 2

Baker

Baker Environmental

TEST BORING RECORD

PROJECT: Tow Way Fuel Farm CMS Investigation Naval Station Roosevelt Roads, Puerto Rico

CTO NO.: 62470-277 BORING NO.: 7DP06

COORDINATES: EAST: 781,916.16 NORTH: 145,651.71

SURFACE ELEVATION: 109.01

Rig: Truck-Mounted Earthprobe 200	Sampler	Casing	Augers	Core Barrel	Date	Progress (Ft.)	Weather	Depth to Water (Ft.)
Size (ID)	2"				4/15/98	15.0	M. Cloudy, Breezy	12.0
Length	4'							
Type	Macro							
Hammer Wt.								
Fall								

Remarks:

SAMPLE TYPE

S = Soil Sample A = Auger
T = Shelby Tube W = Wash
R = Air Rotary C = Core
D = Direct Push P = Piston
N = No Sample H= By Hand

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) BG	PID (ppm) PS	Visual Description	Elev. (Ft. MSL)
1, 2, 3, 4	4.0	S-1	3.3 83%		01	0.1	0.1	ROCK FRAGMENTS & FINE SAND, trace silt & clay; brown; dry; increasing clay content with depth	
5, 6, 7, 8	8.0	S-2	2.1 53%			0.1	16	ROCK FRAGMENTS; some fine sand, little clay; brown, then dark green; damp; hydrocarbon odor @ 7.5'	
9, 10		S-3	1.5 38%		05	0.2	12	ROCK FRAGMENTS; little coarse sand & clay; dark green; moist; hydrocarbon Match to Sheet 2	

DRILLING CO.: Transglobal Environmental Group BAKER REP.: Mark DeJohn

DRILLER: Kevin Shelburne BORING NO.: 7DP06 SHEET 1 OF 2

Baker

Baker Environmental

TEST BORING RECORD

PROJECT: Tow Way Fuel Farm CMS Investigation Naval Station Roosevelt Roads, Puerto Rico

CTO NO.: 62470-277 BORING NO.: 7DP06

SAMPLE TYPE	DEFINITIONS
S = Soil Sample A = Auger	SPT = Standard Penetration Test (ASTM D1586)
T = Shelby Tube W = Wash	PID = Photo Ionization Detector Measurement
R = Air Rotary C = Core	MSL = Mean Sea Level
D = Direct Push P = Piston N = No Sample	BG/PS = Background/Point Source

Depth (Ft.)		Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab ID	PID (ppm) BG/PS		Visual Description	Elev. (Ft. MSL)
11								Continued from Sheet 1	
								odor, free product on tools	
12	12.0							12.0	
13		S-4	3.0					WEATHERED BEDROCK; black; wet	
14			100%					free product & hydrocarbon odor	
15	15.0							BOH @ 15.0' 15.0	94.01
16									
17									
18									
19									
20									
21									
22									
23									
24									
25									
26									
27									
28									
29									
30									

DRILLING CO.: Transglobal Environmental Group BAKER REP.: Mark DeJohn

DRILLER: Kevin Shelburne BORING NO.: 7DP06 SHEET 2 OF 2

Baker

Baker Environmental

TEST BORING RECORD

PROJECT: Tow Way Fuel Farm CMS Investigation Naval Station Roosevelt Roads, Puerto Rico

CTO NO.: 62470-277 BORING NO.: 7DP07

COORDINATES: EAST: 782,031.44 NORTH: 145,976.92

SURFACE ELEVATION: 110.41

Rig: Truck-Mounted Earthprobe 200	Sampler	Casing	Augers	Core Barrel	Date	Progress (Ft.)	Weather	Depth to Water (Ft.)
Size (ID)	2"				4/15/98	15.5	M. Cloudy, Breezy	
Length	4'							
Type	Macro							
Hammer Wt.								
Fall								

Remarks:

SAMPLE TYPE

S = Soil Sample A = Auger
T = Shelby Tube W = Wash
R = Air Rotary C = Core
D = Direct Push P = Piston
N = No Sample H= By Hand

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) BG	PID (ppm) PS	Visual Description	Elev. (Ft. MSL)
1, 2, 3, 4	4.0	S-1	4.0 (Duplicate) 100%		01	0.2	0.2	ROCK FRAGMENTS & FINE to COARSE SAND, trace silt; tan to gray; dry 2.4	
5, 6, 7, 8	8.0	S-2	4.0 (Duplicate) 100%		04	0.2	85	FINE SAND, little silt, trace rock fragments & clay; orangish-brown; damp; beginning @ 6.8' green staining & hydrocarbon odor	
9, 10		S-3	3.0 100%			0.2	165	Hydrocarbon odor; green staining Match to Sheet 2	

DRILLING CO.: Transglobal Environmental Group BAKER REP.: Mark DeJohn

DRILLER: Kevin Shelburne BORING NO.: 7DP07 SHEET 1 OF 2

Baker

Baker Environmental

TEST BORING RECORD

PROJECT: Tow Way Fuel Farm CMS Investigation Naval Station Roosevelt Roads, Puerto Rico

CTO NO.: 62470-277 BORING NO.: 7DP07

SAMPLE TYPE

S = Soil Sample 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

Depth (Ft.)		Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab ID	PID (ppm) BG	PID (ppm) PS	Visual Description	Elev. (Ft. MSL)
11	11.0							Continued from Sheet 1	
12		S-4	3.0 100%		06	0.2	92	As above, PID readings decrease with depth; staining gone @ 13.8'; damp	
13									
14	14.0								
15		S-5	1.5 100%			0.2	5.5	FINE SAND, little rock fragments & silt; brown; dry BOH @ 15.5' REFUSAL	
	15.5								94.91
16									
17									
18									
19									
20									
21									
22									
23									
24									
25									
26									
27									
28									
29									
30									

DRILLING CO.: Transglobal Environmental Group BAKER REP.: Mark DeJohn

DRILLER: Kevin Shelburne BORING NO.: 7DP07 SHEET 2 OF 2

Baker

Baker Environmental

TEST BORING RECORD

PROJECT: Tow Way Fuel Farm CMS Investigation Naval Station Roosevelt Roads, Puerto Rico

CTO NO.: 62470-277 BORING NO.: 7DP08

COORDINATES: EAST: 782,124.40 NORTH: 145,520.33

SURFACE ELEVATION: 107.45

Rig: Truck-Mounted Earthprobe 200	Sampler	Casing	Augers	Core Barrel	Date	Progress (Ft.)	Weather	Depth to Water (Ft.)
Size (ID)	2"				4/15/98	8.0	M. Cloudy, Breezy	7.5
Length	4'							
Type	Macro							
Hammer Wt.								
Fall								

Remarks:

SAMPLE TYPE

S = Soil Sample A = Auger
T = Shelby Tube W = Wash
R = Air Rotary C = Core
D = Direct Push P = Piston
N = No Sample H= By Hand

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) BG	PID (ppm) PS	Visual Description	Elev. (Ft. MSL)
1, 2, 3, 4	4.0	S-1	3.7 93%		01	0.3	0.7	ROCK FRAGMENTS & FINE SAND, trace silt; brown; dry — 2.3	
5, 6, 7, 8	8.0	S-2	3.0 75%		04	0.3	0.3	FINE to MEDIUM SAND, some coral fragments; tan; dry as above; water @ 7.5' — BOH @ 8.0' — 8.0	99.45
9, 10									

DRILLING CO.: Transglobal Environmental Group BAKER REP.: Mark DeJohn

DRILLER: Kevin Shelburne BORING NO.: 7DP08 SHEET 1 OF 1

Baker

Baker Environmental

TEST BORING RECORD

PROJECT: Tow Way Fuel Farm CMS Investigation Naval Station Roosevelt Roads, Puerto Rico

CTO NO.: 62470-277 BORING NO.: 7DP09

COORDINATES: EAST: 781,748.58 NORTH: 146,160.83

SURFACE ELEVATION: 109.58

Rig: Truck-Mounted Earthprobe 200	Sampler	Casing	Augers	Core Barrel	Date	Progress (Ft.)	Weather	Depth to Water (Ft.)
Size (ID)	1.125				4/16/98	9.0	M. Cloudy, Breezy	8.0
Length	2'							
Type	Large Core							
Hammer Wt.								
Fall								

Remarks:

SAMPLE TYPE

S = Soil Sample A = Auger
T = Shelby Tube W = Wash
R = Air Rotary C = Core
D = Direct Push P = Piston
N = No Sample H= By Hand

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) BG	PID (ppm) PS	Visual Description	Elev. (Ft. MSL)
1		S-1						Blockage @ 1' move rig & start again	
2		S-1A	3.0 75%			0.3	0.3	FINE SAND, some rock fragments; little silt & clay; grayish-brown; damp	
3									
4	4.0							Tool refusal @ 4' move rig with direct push & no sampling from 0-5'	
5									
6		S-1B	1.7 57%		03	0.2	3	FINE SAND, some rock fragments, silt & clay; brown; damp; green staining @ 6.5' slight hydrocarbon odor	
7	7.0								
8		S-2	1.0 50%			0.3	192	green staining; wet; strong hydrocarbon odor 8.5	
9	9.0							PEAT; dark brown; damp; strong hydrocarbon odor / BOH @ 9.0'	100.58
10									

DRILLING CO.: Transglobal Environmental Group BAKER REP.: Mark DeJohn

DRILLER: Kevin Shelburne BORING NO.: 7DP09 SHEET 1 OF 1

Baker

Baker Environmental

TEST BORING RECORD

PROJECT: Tow Way Fuel Farm CMS Investigation Naval Station Roosevelt Roads, Puerto Rico

CTO NO.: 62470-277 BORING NO.: 7DP10

COORDINATES: EAST: 782,253.26 NORTH: 145,937.78

SURFACE ELEVATION: 112.19

Rig: Truck-Mounted Earthprobe 200	Sampler	Casing	Augers	Core Barrel	Date	Progress (Ft.)	Weather	Depth to Water (Ft.)
Size (ID)	1.125				4/16/98	12.0	M. Cloudy, Breezy	
Length	2'							
Type	Large Core							
Hammer Wt.								
Fall								

Remarks:

SAMPLE TYPE

S = Soil Sample A = Auger
T = Shelby Tube W = Wash
R = Air Rotary C = Core
D = Direct Push P = Piston
N = No Sample H= By Hand

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) BG	PID (ppm) PS	Visual Description	Elev. (Ft. MSL)
1	1.0	D-N	--			--	--	Direct Push, No Sampling	
2	2.0	S-1	1.0 100%		01			FINE to COARSE SAND, little fine rock fragments, trace silt; grayish-brown; damp	
3 4 5	5.0	D-N	--			--	--	Direct Push, No Sampling	
6 7	7.0	S-2	2.0 100%		03	0.2	166	FINE to COARSE SAND, little fine rock fragments & silt; brown w/ green stained streaks; damp; hydrocarbon odor	
8 9 10	10.0	D-N	--			--	--	Direct Push, No Sampling	
								Match to Sheet 2	

DRILLING CO.: Transglobal Environmental Group BAKER REP.: Mark DeJohn

DRILLER: Kevin Shelburne BORING NO.: 7DP10 SHEET 1 OF 2

Baker

Baker Environmental

TEST BORING RECORD

PROJECT: Tow Way Fuel Farm CMS Investigation Naval Station Roosevelt Roads, Puerto Rico

CTO NO.: 62470-277 BORING NO.: 7DP10

SAMPLE TYPE	DEFINITIONS
S = Soil Sample A = Auger	SPT = Standard Penetration Test (ASTM D1586)
T = Shelby Tube W = Wash	PID = Photo Ionization Detector Measurement
R = Air Rotary C = Core	MSL = Mean Sea Level
D = Direct Push P = Piston N = No Sample	BG/PS = Background/Point Source

Depth (Ft.)		Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab ID	PID (ppm) BG/PS		Visual Description	Elev. (Ft. MSL)
11		S-3			05			Continued from Sheet 1 Sample stuck in sampler, contractor retreived and jarred sample later at laboratory BOH @ 12.0 FT. Refusal	
12	12.0								100.19
13									
14									
15									
16									
17									
18									
19									
20									
21									
22									
23									
24									
25									
26									
27									
28									
29									
30									

DRILLING CO.: Transglobal Environmental Group BAKER REP.: Mark DeJohn

DRILLER: Kevin Shelburne BORING NO.: 7DP10 SHEET 2 OF 2

Baker

Baker Environmental

TEST BORING RECORD

PROJECT: Tow Way Fuel Farm CMS Investigation Naval Station Roosevelt Roads, Puerto Rico

CTO NO.: 62470-277 BORING NO.: 7DP11

COORDINATES: EAST: 782,003.40 NORTH: 146,427.69

SURFACE ELEVATION: 117.29

Rig: Truck-Mounted Earthprobe 200	Sampler	Casing	Augers	Core Barrel	Date	Progress (Ft.)	Weather	Depth to Water (Ft.)
Size (ID)	1"	2"			4/16/98	15.0	M. Cloudy, Breezy	
Length	2'	4'						
Type	Split barrel	Steel						
Hammer Wt.								
Fall								

Remarks:

SAMPLE TYPE

S = Soil Sample A = Auger
T = Shelby Tube W = Wash
R = Air Rotary C = Core
D = Direct Push P = Piston
N = No Sample H= By Hand

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) BG	PID (ppm) PS	Visual Description	Elev. (Ft. MSL)
1, 2, 3, 4	4.0	D-N	--		--	--	--	Direct Push, No Sampling	
5, 6	6.0	S-1	1.7 85%		02	0.3	0.3	FINE to COARSE SAND, trace fine rock fragments, silt & clay; brown; damp	
7, 8, 9, 10	10.0	D-N	--			--	--	Direct Push, No Sampling	
								Match to Sheet 2 10.0	
								ROCK FRAGMENTS (fine), little fine	

DRILLING CO.: Transglobal Environmental Group BAKER REP.: Mark DeJohn

DRILLER: Kevin Shelburne BORING NO.: 7DP11 SHEET 1 OF 2

Baker

Baker Environmental

TEST BORING RECORD

PROJECT: Tow Way Fuel Farm CMS Investigation Naval Station Roosevelt Roads, Puerto Rico

CTO NO.: 62470-277 BORING NO.: 7DP11

SAMPLE TYPE

S = Soil Sample 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

Depth (Ft.)		Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab ID	PID (ppm) BG/PS		Visual Description	Elev. (Ft. MSL)
11		S-2	1.3		05	0.2	101	to coarse sand, trace clay & silt; brown to gray (at bottom.); damp; strong hydrocarbon odor @ bottom 11.5	
12	12.0								
13		D-N	--			--	--	Direct Push, No Sampling	
14	14.0								
15	15.0	S-3	0.9 90%			0.2	5	WEATHERED BEDROCK, some clay; dark greenish-gray; damp strong hydro. odor; insufficient volume to sample	102.29
16								BOH @ 15.0' Refusal	
17									
18									
19									
20									
21									
22									
23									
24									
25									
26									
27									
28									
29									
30									

DRILLING CO.: Transglobal Environmental Group BAKER REP.: Mark DeJohn

DRILLER: Kevin Shelburne BORING NO.: 7DP11 SHEET 2 OF 2

Baker

Baker Environmental

TEST BORING RECORD

PROJECT: Tow Way Fuel Farm CMS Investigation Naval Station Roosevelt Roads, Puerto Rico

CTO NO.: 62470-277 BORING NO.: 7DP12

COORDINATES: EAST: 781,740.79 NORTH: 146,488.97

SURFACE ELEVATION: 131.42

Rig: Truck-Mounted Earthprobe 200								
	Sampler	**Casing**	**Augers**	**Core Barrel**	**Date**	**Progress (Ft.)**	**Weather**	**Depth to Water (Ft.)**
Size (ID)	1"	2"			4/16/98	4.5	M. Cloudy, Breezy	
Length	2'	4'						
Type	Split barrel	Steel						
Hammer Wt.								
Fall								

Remarks:

SAMPLE TYPE

S = Soil Sample A = Auger
T = Shelby Tube W = Wash
R = Air Rotary C = Core
D = Direct Push P = Piston
N = No Sample H= By Hand

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) BG/PS		Visual Description	Elev. (Ft. MSL)
1		S-1	1.9 95%		01 (1-3')	0.2	0.2	FINE to COARSE SAND, little fine rock fragments, trace of silt & clay; gray; dry	
2	2.0								
3		S-2	2.0 100%		01(1-3')	0.2	0.2	FINE to COARSE SAND, some fine rock fragments , trace silt, light brown; very dense; dry	
4	4.0							End of Boring Refusal @ 4.0'	127.42
5									
6									
7									
8									
9									
10									

DRILLING CO.: Transglobal Environmental Group BAKER REP.: Mark DeJohn

DRILLER: Kevin Shelburne BORING NO.: 7DP12 SHEET 1 OF 1

Baker

Baker Environmental

TEST BORING RECORD

PROJECT: Tow Way Fuel Farm CMS Investigation Naval Station Roosevelt Roads, Puerto Rico

CTO NO.: 62470-277 BORING NO.: 7DP13

COORDINATES: EAST: 781,966.94 NORTH: 146,825.66

SURFACE ELEVATION: 158.27

Rig: Truck-Mounted Earthprobe 200								
	Sampler	**Casing**	**Augers**	**Core Barrel**	**Date**	**Progress (Ft.)**	**Weather**	**Depth to Water (Ft.)**
Size (ID)	1"	2"			4/16/98	7.0	M. Cloudy, Breezy	
Length	2'	4'						
Type	Split barrel	Steel						
Hammer Wt.								
Fall								

Remarks:

SAMPLE TYPE

S = Soil Sample A = Auger
T = Shelby Tube W = Wash
R = Air Rotary C = Core
D = Direct Push P = Piston
N = No Sample H= By Hand

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) BG/PS		Visual Description	Elev. (Ft. MSL)
1, 2, 3, 4	4.0	D-N	--			--	--	Direct Push, No Sampling	
5	5.5	S-1	1.4 93%		02	0.2	0.2	FINE to COARSE SAND, little fine rock fragments, trace silt & clay; reddish-brown; damp	
6, 7	7.0	D-N	--			--	--	Direct Push, No Sampling BOH 7.0' Drive Point Refusal	151.27
8, 9, 10									

DRILLING CO.: Transglobal Environmental Group BAKER REP.: Mark DeJohn

DRILLER: Kevin Shelburne BORING NO.: 7DP13 SHEET 1 OF 1

Baker

Baker Environmental

TEST BORING RECORD

PROJECT: Tow Way Fuel Farm CMS Investigation Naval Station Roosevelt Roads, Puerto Rico

CTO NO.: 62470-277 BORING NO.: 7DP14

COORDINATES: EAST: 782,408.07 NORTH: 146,704.59

SURFACE ELEVATION: 176.13

Rig: Truck-Mounted Earthprobe 200	Sampler	Casing	Augers	Core Barrel	Date	Progress (Ft.)	Weather	Depth to Water (Ft.)
Size (ID)	1"	2"			4/16/98	9.0	M. Cloudy, Breezy	
Length	2'	4'						
Type	Split barrel	Steel						
Hammer Wt.								
Fall								

Remarks:

SAMPLE TYPE

S = Soil Sample A = Auger
T = Shelby Tube W = Wash
R = Air Rotary C = Core
D = Direct Push P = Piston
N = No Sample H= By Hand

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) BG/PS		Visual Description	Elev. (Ft. MSL)
1		S-1	1.5 75%		01 (1-3')	0.3	0.3	CLAY, some silt, trace of sand; tan; dry appearance of weathered bedrock	
2	2.0								
3		S-2	1.1 55%		01 (1-3')	0.3	0.3	As above with gray & tan color	
4	4.0								
5	5.5	S-3	1.4 93%			0.2	0.2	As above with dark gray & tan color	
6									
7		S-4	1.1 44%			0.2	0.2	More "competent" weathered rock; insufficient volume quality to sample	
8	8.0								
9	9.0	S-5	1.0 100%					M/C SAND & ROCK FRAG; brown; dry weathered bedrock - spilled sample on ground, unable to collect for analysis	167.13
10								BOH @ 9.0' Drive Bit Refusal	

DRILLING CO.: Transglobal Environmental Group BAKER REP.: Mark DeJohn

DRILLER: Kevin Shelburne BORING NO.: 7DP14 SHEET 1 OF 1

Baker

Baker Environmental

TEST BORING RECORD

PROJECT: Tow Way Fuel Farm CMS Investigation Naval Station Roosevelt Roads, Puerto Rico

CTO NO.: 62470-277 BORING NO.: 7DP15

COORDINATES: EAST: 782,162.67 NORTH: 146,831.64

SURFACE ELEVATION: 152.75

Rig: Truck-Mounted Earthprobe 200								
	Sampler	**Casing**	**Augers**	**Core Barrel**	**Date**	**Progress (Ft.)**	**Weather**	**Depth to Water (Ft.)**
Size (ID)	1"	2"			4/17/98	14.5	M. Sunny, Breezy	
Length	2'	4'						
Type	Split barrel	Steel						
Hammer Wt.								
Fall								

Remarks:

SAMPLE TYPE

S = Soil Sample A = Auger
T = Shelby Tube W = Wash
R = Air Rotary C = Core
D = Direct Push P = Piston
N = No Sample H= By Hand

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) BG	PID (ppm) PS	Visual Description	Elev. (Ft. MSL)
1		S-1	0.8 40%			0.3	0.3	CLAY, some rock fragment & silt; brown & gray; damp	
2	2.0							2.0	
3		S-2	1.2 60%		02 (3-5')	0.3	7	FINE to COARSE SAND, some clay, little fine rock fragments; brown; damp hydrocarbon odor	
4	4.0								
5		S-3	1.3 87%		02 (3-5')	0.3	27	As above	
	5.5								
6									
7		S-4	0.8 32%		04	0.3	14	As above with thick petroleum product & strong hydrocarbon odor	
8	8.0							8.0	
9		S-5	1.1 55%			0.3	1.7	CLAY, some fine to coarse sand, little fine rock fragments; dark greenish gray; moist; no product or hydrocarbon odor	
10	10.0								
								Match to Sheet 2	

DRILLING CO.: Transglobal Environmental Group BAKER REP.: Mark DeJohn

DRILLER: Kevin Shelburne BORING NO.: 7DP15 SHEET 1 OF 2

Baker

Baker Environmental

TEST BORING RECORD

PROJECT: Tow Way Fuel Farm CMS Investigation Naval Station Roosevelt Roads, Puerto Rico

CTO NO.: 62470-277 BORING NO.: 7DP15

SAMPLE TYPE

S = Soil Sample 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

Depth (Ft.)		Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab ID	PID (ppm) BG/PS		Visual Description	Elev. (Ft. MSL)
11		S-6	0.2 10%			0.3	0.3	Continued from Sheet 1 As above, slight hydrocarbon odor	
12	12.0								
13		S-7	1.3 65%		07	0.3	40		
14	14.0							13.5 WEATHERED BEDROCK; gray; very dense BOH @ 14.5' "Refusal"	
	14.5	D-N	--			--	--		138.25
15									
16									
17									
18									
19									
20									
21									
22									
23									
24									
25									
26									
27									
28									
29									
30									

DRILLING CO.: Transglobal Environmental Group BAKER REP.: Mark DeJohn

DRILLER: Kevin Shelburne BORING NO.: 7DP15 SHEET 2 OF 2

Baker

Baker Environmental

TEST BORING RECORD

PROJECT: Tow Way Fuel Farm CMS Investigation Naval Station Roosevelt Roads, Puerto Rico

CTO NO.: 62470-277 BORING NO.: 7DP16

COORDINATES: EAST: 782,598.66 NORTH: 146,948.02

SURFACE ELEVATION: 175.35

Rig: Truck-Mounted Earthprobe 200	Sampler	Casing	Augers	Core Barrel	Date	Progress (Ft.)	Weather	Depth to Water (Ft.)
Size (ID)	1"	2"			4/17/98	9.0	M. Sunny, Breezy	
Length	2'	4'						
Type	Split barrel	Steel						
Hammer Wt.								
Fall								

Remarks:

SAMPLE TYPE

S = Soil Sample A = Auger
T = Shelby Tube W = Wash
R = Air Rotary C = Core
D = Direct Push P = Piston
N = No Sample H= By Hand

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) BG	PID (ppm) PS	Visual Description	Elev. (Ft. MSL)
1 – 2.0	S-1	1.6 80%			0.3	0.3	CLAY & SILT, trace fine sand; brown to orangish-brown; slight mottled; hard; damp	
3 – 4.0	S-2	1.8 90%		03 (3-5')	0.2	16	SILT, trace of sand & clay; brown; dry appearance of weathered bedrock; slight hydrocarbon odor	
5 – 6.0	S-3	1.6 80%		03 (3-5')	0.2	21	6.0	
7 – 8.0	S-4	1.8 90%			0.3	0.3	WEATHERED BEDROCK, light tan, white & black	
9 – 10.0	S-5	2.0 100%			0.3	0.3		
							Match to Sheet 2	

DRILLING CO.: Transglobal Environmental Group BAKER REP.: Mark DeJohn

DRILLER: Kevin Shelburne BORING NO.: 7DP16 SHEET 1 OF 2

Baker

Baker Environmental

TEST BORING RECORD

PROJECT: Tow Way Fuel Farm CMS Investigation Naval Station Roosevelt Roads, Puerto Rico

CTO NO.: 62470-277 BORING NO.: 7DP16

SAMPLE TYPE	DEFINITIONS
S = Soil Sample A = Auger	SPT = Standard Penetration Test (ASTM D1586)
T = Shelby Tube W = Wash	PID = Photo Ionization Detector Measurement
R = Air Rotary C = Core	MSL = Mean Sea Level
D = Direct Push P = Piston N = No Sample	BG/PS = Background/Point Source

Depth (Ft.)		Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab ID	PID (ppm) BG/PS		Visual Description	Elev. (Ft. MSL)
11								Continued from Sheet 1	
		S-6	1.8		05	0.3	0.3		
12	12.0		90%					BOH @ 12.0' Drive Point Refusal	163.35
13									
14									
15									
16									
17									
18									
19									
20									
21									
22									
23									
24									
25									
26									
27									
28									
29									
30									

DRILLING CO.: Transglobal Environmental Group BAKER REP.: Mark DeJohn

DRILLER: Kevin Shelburne BORING NO.: 7DP16 SHEET 2 OF 2

Baker

Baker Environmental

TEST BORING RECORD

PROJECT: Tow Way Fuel Farm CMS Investigation Naval Station Roosevelt Roads, Puerto Rico

CTO NO.: 62470-277 BORING NO.: 7DP17

COORDINATES: EAST: 782,395.54 NORTH: 146,889.11

SURFACE ELEVATION: 160.35

Rig: Truck-Mounted Earthprobe 200								
	Sampler	**Casing**	**Augers**	**Core Barrel**	**Date**	**Progress (Ft.)**	**Weather**	**Depth to Water (Ft.)**
Size (ID)	1"	2"			4/17/98	9.0	M. Sunny, Breezy	
Length	2'	4'						
Type	Split barrel	Steel						
Hammer Wt.								
Fall								

Remarks:

SAMPLE TYPE

S = Soil Sample A = Auger
T = Shelby Tube W = Wash
R = Air Rotary C = Core
D = Direct Push P = Piston
N = No Sample H= By Hand

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) BG	PID (ppm) PS	Visual Description	Elev. (Ft. MSL)
1									
2	2.0	S-1	0.7 35%			0.2	0.2	SILT, some fine rock fragments, trace fine sand & clay; dark brown; damp	
3		S-2	1.2 60%		02 (3-6')	0.2	0.3	SILT, some fine sand & clay; brown; damp	
4	4.0							4.5	
5		S-3	1.7 85%		02 (3-6')	0.2	0.3	CLAY, trace silt; brown with gray streaks; damp	
6	6.0								
7		S-4	2.0 100%		04 (7-9')	0.2	0.2	6.9	
8	8.0							SILT, little clay, trace fine sand; orangish-brown; damp	
9	9.0	S-5	1.0 100%		04 (7-9')	0.2	0.2	BOH @ 9.0' Drive Point Refusal	151.35
10									

DRILLING CO.: Transglobal Environmental Group BAKER REP.: Mark DeJohn

DRILLER: Kevin Shelburne BORING NO.: 7DP17 SHEET 1 OF 1

Baker

Baker Environmental

TEST BORING RECORD

PROJECT: Tow Way Fuel Farm CMS Investigation Naval Station Roosevelt Roads, Puerto Rico

CTO NO.: 62470-277 BORING NO.: 7DP18

COORDINATES: EAST: 782,214.02 NORTH: 147,030.67

SURFACE ELEVATION: 178.33

Rig: Truck-Mounted Earthprobe 200	Sampler	Casing	Augers	Core Barrel	Date	Progress (Ft.)	Weather	Depth to Water (Ft.)
Size (ID)	1"	2"			4/17/98	8.0	M. Sunny, Breezy	
Length	2'	4'						
Type	Split barrel	Steel						
Hammer Wt.								
Fall								

Remarks:

SAMPLE TYPE

S = Soil Sample A = Auger
T = Shelby Tube W = Wash
R = Air Rotary C = Core
D = Direct Push P = Piston
N = No Sample H= By Hand

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) BG	PID (ppm) PS	Visual Description	Elev. (Ft. MSL)
1, 2, 3, 4	4.0	D-N	--			--	--	Direct Push, No Sampling Many rock fragments in 0-4' interval	
5, 6	6.0	S-1	1.5 75%		02	0.2	0.2	WEATHERED BEDROCK, tan, gray & white; dense; dry	
7, 8	8.0	S-2	1.8 90%			0.2	0.2	BOH @ 8.0' Drive Point Refusal	170.33
9, 10									

DRILLING CO.: Transglobal Environmental Group BAKER REP.: Mark DeJohn

DRILLER: Kevin Shelburne BORING NO.: 7DP18 SHEET 1 OF 1

Baker

Baker Environmental

TEST BORING RECORD

PROJECT: Tow Way Fuel Farm CMS Investigation Naval Station Roosevelt Roads, Puerto Rico

CTO NO.: 62470-277 BORING NO.: 7DP19

COORDINATES: EAST: 782,714.34 NORTH: 147,171.48

SURFACE ELEVATION: 172.46

Rig: Truck-Mounted Earthprobe 200	Sampler	Casing	Augers	Core Barrel	Date	Progress (Ft.)	Weather	Depth to Water (Ft.)
Size (ID)	1"	2"			4/17/98	18.0	M. Sunny, Breezy	
Length	2'	4'						
Type	Split barrel	Steel						
Hammer Wt.								
Fall								

Remarks:

SAMPLE TYPE

S = Soil Sample A = Auger
T = Shelby Tube W = Wash
R = Air Rotary C = Core
D = Direct Push P = Piston
N = No Sample H= By Hand

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) BG	PID (ppm) PS	Visual Description	Elev. (Ft. MSL)
1 – 2.0	S-1	1.1 55%			0.2	0.2	SILT, some fine to medium sand, little fine rock fragments & clay; brown; damp	
3 – 4.0	S-2	1.7 85%			0.2	0.2	CLAY, some fine to coarse sand; green staining; damp; hydrocarbon odor	
5 – 6.0	S-3	0.6 30%		03 (5-7')	0.2	22	As above	
7 – 8.0	S-4	1.7 85%		03 (5-7')	0.2	22	As above	
9 – 10.0	S-5	1.1 55%			0.2	36	As above, but trace coarse sand; green staining; hydrocarbon odor	
							Match to Sheet 2	

DRILLING CO.: Transglobal Environmental Group BAKER REP.: Mark DeJohn

DRILLER: Kevin Shelburne BORING NO.: 7DP19 SHEET 1 OF 2

Baker

Baker Environmental

TEST BORING RECORD

PROJECT: Tow Way Fuel Farm CMS Investigation Naval Station Roosevelt Roads, Puerto Rico

CTO NO.: 62470-277 BORING NO.: 7DP19

SAMPLE TYPE

S = Soil Sample 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

Depth (Ft.)		Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab ID	PID (ppm) BG/PS		Visual Description	Elev. (Ft. MSL)
11								Continued from Sheet 1	
		S-6	0.5 25%			0.7	0.7	CLAY, trace fine sand; greenish-brown; plastic; damp; no odor	
12	12.0								
13		S-7	1.0 50%		06	0.5	0.6	Reddish-brown; plastic; damp; no odor	
14	14.0							14.0	
15		S-8	2.0 100%			0.3	0.8	WEATHERED BEDROCK; tan; white; dry	
16	16.0								
17		S-9	2.0 100%		08	0.2	0.2		
18	18.0							BOH @ 18.0' "Refusal"	154.46
19									
20									
21									
22									
23									
24									
25									
26									
27									
28									
29									
30									

DRILLING CO.: Transglobal Environmental Group BAKER REP.: Mark DeJohn

DRILLER: Kevin Shelburne BORING NO.: 7DP19 SHEET 2 OF 2

Baker

Baker Environmental

TEST BORING RECORD

PROJECT: Tow Way Fuel Farm CMS Investigation Naval Station Roosevelt Roads, Puerto Rico

CTO NO.: 62470-277 BORING NO.: 7DP20

COORDINATES: EAST: 782,252.41 NORTH: 146,430.93

SURFACE ELEVATION: 145.88

Rig: Truck-Mounted Earthprobe 200	Sampler	Casing	Augers	Core Barrel	Date	Progress (Ft.)	Weather	Depth to Water (Ft.)
Size (ID)	1"	2"			4/17/98	17.0	M. Sunny, Breezy	
Length	2'	4'						
Type	Split barrel	Steel						
Hammer Wt.								
Fall								

Remarks:

SAMPLE TYPE

S = Soil Sample A = Auger
T = Shelby Tube W = Wash
R = Air Rotary C = Core
D = Direct Push P = Piston
N = No Sample H= By Hand

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) BG/PS		Visual Description	Elev. (Ft. MSL)
1		S-1	1.4 70%		02 (3-5')	0.2	0.2	SILT, little rock fragments some fine; trace fine sand & clay; tan & white; damp	
2	2.0								
3		S-2	1.6 80%		02 (3-5')	0.3	0.3		
4	4.0								
5		S-3	1.8 90%			0.3	0.3	5.0	
6	6.0							CLAY, little fine to coarse sand & silt, trace fine rock fragments; brown; damp	
7		S-4	1.5 75%			0.3	0.3	As above	
8	8.0								
9		S-5	0.0 0%					No recovery (rock in shoe)	
10	10.0							10.0	
								Match to Sheet 2	

DRILLING CO.: Transglobal Environmental Group BAKER REP.: Mark DeJohn

DRILLER: Kevin Shelburne BORING NO.: 7DP20 SHEET 1 OF 2

Baker

Baker Environmental

TEST BORING RECORD

PROJECT: Tow Way Fuel Farm CMS Investigation Naval Station Roosevelt Roads, Puerto Rico

CTO NO.: 62470-277 BORING NO.: 7DP20

SAMPLE TYPE

S = Soil Sample 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

Depth (Ft.)		Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab ID	PID (ppm) BG/PS		Visual Description	Elev. (Ft. MSL)
11								Continued from Sheet 1	
		S-6	1.5		05	0.2	0.2	FINE to COARSE SAND, some silt,	
12	12.0		75%					trace clay & rock fragments; tan & white; damp	
13		S-7	1.0			0.2	0.2	As above, but little silt & clay; brown &	
			50%					tan; damp	
14	14.0								
15		S-8	0.0			--	--	No Recovery	
			0%						
16	16.0								
			0.2			--	--	ROCK FRAGMENTS; gray & green	
17	17.0	S-9	20%					BOH @ 17.0' Drive Point Refusal	128.88
18									
19									
20									
21									
22									
23									
24									
25									
26									
27									
28									
29									
30									

DRILLING CO.: Transglobal Environmental Group BAKER REP.: Mark DeJohn

DRILLER: Kevin Shelburne BORING NO.: 7DP20 SHEET 2 OF 2

Baker

Baker Environmental

TEST BORING RECORD

PROJECT: Tow Way Fuel Farm CMS Investigation Naval Station Roosevelt Roads, Puerto Rico

CTO NO.: 62470-277 BORING NO.: 7DP21

COORDINATES: EAST: NORTH:

SURFACE ELEVATION:

Rig: Truck-Mounted Earthprobe 200								
	Split Spoon	Casing	Augers	Core Barrel	Date	Progress (Ft.)	Weather	Depth to Water (Ft.)
Size (ID)		1"			4/18/98		M. Sunny, Breezy	
Length		2'						
Type		Double						
Hammer Wt.								
Fall								

Remarks:

SAMPLE TYPE

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

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) BG	PID (ppm) PS	Visual Description	Elev. (Ft. MSL)
1 2	S-1	0.7			1	1	SILT, some fine rock fragments & fine to coarse sand; brown to gray; dry	
3 4	S-2	0.3					CLAY, trace coarse sand; brown; damp	
5 6	S-3	0.5					As above	
7 8	S-4	0.0					No Recovery Drive Point Refusal @ 8.0'; (1) PID momentarily not available; new location re-push	
9 10								

DRILLING CO.: Transglobal Environmental Group BAKER REP.: Mark DeJohn

DRILLER: Kevin Shelburne BORING NO.: 7DP21 SHEET 1 OF 1

Baker

Baker Environmental

TEST BORING RECORD

PROJECT: Tow Way Fuel Farm CMS Investigation Naval Station Roosevelt Roads, Puerto Rico

CTO NO.: 62470-277 BORING NO.: 7DP21

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
BG/PS = Background/Point Source

Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab ID	PID (ppm) BG	PID (ppm) PS	Visual Description	Elev. (Ft. MSL)
11–12	S-6	1.5		05	0.2	0.2	FINE to COARSE SAND, some silt, trace clay & rock fragments; tan & white; damp	
13–14	S-7	1.0			0.2	0.2	Little silt & clay; brown & tan; damp	
15–16	S-8	0.0					No Recovery	
17	S-9	0.2					ROCK FRAGMENTS; gray & green BOH @ 17.0' Drive Point Refusal	
18								
19								
20								
21								
22								
23								
24								
25								
26								
27								
28								
29								
30								

DRILLING CO.: Transglobal Environmental Group BAKER REP.: Mark DeJohn

DRILLER: Kevin Shelburne BORING NO.: 7DP21 SHEET 2 OF2

Baker

Baker Environmental

TEST BORING RECORD

PROJECT: Tow Way Fuel Farm CMS Investigation Naval Station Roosevelt Roads, Puerto Rico

CTO NO.: 62470-277 BORING NO.: 7DP21

COORDINATES: EAST: 781,973.30 NORTH: 146,599.89

SURFACE ELEVATION: 121.77

Rig: Truck-Mounted Earthprobe 200	Sampler	Casing	Augers	Core Barrel	Date	Progress (Ft.)	Weather	Depth to Water (Ft.)
Size (ID)	1"	2"			4/18/98		M. Sunny, Breezy	
Length	2'	4'						
Type	Split barrel	Steel						
Hammer Wt.								
Fall								

Remarks: (1) Note: PID momentarily not available.

SAMPLE TYPE

S = Soil Sample A = Auger
T = Shelby Tube W = Wash
R = Air Rotary C = Core
D = Direct Push P = Piston
N = No Sample H= By Hand

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) BG	PID (ppm) PS	Visual Description	Elev. (Ft. MSL)
1		S-5	1.7 85 %		01 (1-3')	(1)	(1)	SILT, trace coarse sand with zones of fine gray rock fragments; brown; damp	
2	2.0							2.0	
3		S-6	1.5 75%		01 (1-3')	(1)	(1)	CLAY, trace coarse sand; brown; & gray; damp	
4	4.0								
5		S-7	1.7 85%			(1)	(1)	As above	
6	6.0							Refusal just after 6' bgs. BOH @ 6.0'	115.77
7								Rig moved from original location to collect soil sample because of problems with refusal. The above is a description of the new location.	
8									
9									
10									

DRILLING CO.: Transglobal Environmental Group BAKER REP.: Mark DeJohn

DRILLER: Kevin Shelburne BORING NO.: 7DP21 SHEET 1 OF 1

Baker

Baker Environmental

TEST BORING RECORD

PROJECT: Tow Way Fuel Farm CMS Investigation Naval Station Roosevelt Roads, Puerto Rico

CTO NO.: 62470-277 BORING NO.: 7DP21

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
BG/PS = Background/Point Source

Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab ID	PID (ppm) BG/PS		Visual Description	Elev. (Ft. MSL)
11 – 12	S-6	1.5		05	0.2	0.2	FINE to COARSE SAND, some silt, trace clay & rock fragments; tan & white; damp	
13 – 14	S-7	1.0			0.2	0.2	Little silt & clay; brown & tan; damp	
15 – 16	S-8	0.0					No Recovery	
17	S-9	0.2					ROCK FRAGMENTS; gray & green BOH @ 17.0' Drive Point Refusal	
18								
19								
20								
21								
22								
23								
24								
25								
26								
27								
28								
29								
30								

DRILLING CO.: Transglobal Environmental Group BAKER REP.: Mark DeJohn

DRILLER: Kevin Shelburne BORING NO.: 7DP21 SHEET 2 OF2

Baker

Baker Environmental

TEST BORING RECORD

PROJECT: Tow Way Fuel Farm CMS Investigation Naval Station Roosevelt Roads, Puerto Rico

CTO NO.: 62470-277 BORING NO.: 7DP22

COORDINATES: EAST: 782,336.51 NORTH: 145,750.00

SURFACE ELEVATION: 112.48

Rig: Truck-Mounted Earthprobe 200	Sampler	Casing	Augers	Core Barrel	Date	Progress (Ft.)	Weather	Depth to Water (Ft.)
Size (ID)	1"	2"			4/18/98		M. Sunny, Breezy	
Length	2'	4'						
Type	Split barrel	Steel						
Hammer Wt.								
Fall								

Remarks:

SAMPLE TYPE

S = Soil Sample A = Auger
T = Shelby Tube W = Wash
R = Air Rotary C = Core
D = Direct Push P = Piston
N = No Sample H= By Hand

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) BG/PS		Visual Description	Elev. (Ft. MSL)
1 2 3 4 (4.0)	S-1	3.0 75%		01 ms/msd	0.2	0.2	FINE TO COARSE SAND, some fine to coarse coarse rock fragments, little silt; gray; dry; loose	
5 6 (6.0)	S-2	2.0 100%			0.3	0.3	FINE TO COARSE GRAVEL, some fine to coarse sand; trace silt; more dense than above; dry (6.0)	
7 8 9 10	D-N D-N						Problems with rocks in formation - Difficult to penetrate; several retries of 0-6 performed (5 Times) See Above for description from 0-6' Remaining probe refusal @ 5' move, try boring again Attempting boring with dual casing; could not penetrate beyond 4' here. No further attempts here	

DRILLING CO.: Transglobal Environmental Group BAKER REP.: Mark DeJohn

DRILLER: Kevin Shelburne BORING NO.: 7DP22 SHEET 1 OF 1

Baker

Baker Environmental

TEST BORING RECORD

PROJECT: Tow Way Fuel Farm CMS Investigation Naval Station Roosevelt Roads, Puerto Rico

CTO NO.: 62470-277 BORING NO.: 7DP22

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
BG/PS = Background/Point Source

Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab ID	PID (ppm) BG/PS		Visual Description	Elev. (Ft. MSL)
11 – 12	S-6	1.5		05	0.2	0.2	FINE to COARSE SAND, some silt, trace clay & rock fragments; tan & white; damp	
13 – 14	S-7	1.0			0.2	0.2	Little silt & clay; brown & tan; damp	
15 – 16	S-8	0.0					No Recovery	
17	S-9	0.2					ROCK FRAGMENTS; gray & green BOH @ 17.0' Drive Point Refusal	
18								
19								
20								
21								
22								
23								
24								
25								
26								
27								
28								
29								
30								

DRILLING CO.: Transglobal Environmental Group BAKER REP.: Mark DeJohn

DRILLER: Kevin Shelburne BORING NO.: 7DP22 SHEET 2 OF 2

Baker

Baker Environmental

TEST BORING RECORD

PROJECT: Tow Way Fuel Farm CMS Investigation Naval Station Roosevelt Roads, Puerto Rico

CTO NO.: 62470-277 BORING NO.: 7DP23

COORDINATES: EAST: NORTH:

SURFACE ELEVATION:

Rig: Truck-Mounted Earthprobe 200

	Split Spoon	Casing	Augers	Core Barrel	Date	Progress (Ft.)	Weather	Depth to Water (Ft.)
Size (ID)		1"			4/18/98		M. Sunny, Breezy	
Length		2'						
Type		Double						
Hammer Wt.								
Fall								

Remarks:

SAMPLE TYPE

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

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) BG	PID (ppm) PS	Visual Description	Elev. (Ft. MSL)
1	S-1	1.5			0.2	0.2	FINE to COARSE ROCK FRAGMENTS little fine to coarse sand & silt, trace clay; gray; dry (FILL)	
2								
3	S-2	1.0					Formation too dense, move & try again	
4							Again, too much rock from 0-2' to penetrate, try drive point without sampler	
5								
6							Again, could not penetrate. Abandoned any further attempts here	
7								
8								
9								
10								

DRILLING CO.: Transglobal Environmental Group BAKER REP.: Mark DeJohn

DRILLER: Kevin Shelburne BORING NO.: 7DP23 SHEET 1 OF 1

Baker

Baker Environmental

TEST BORING RECORD

PROJECT: Tow Way Fuel Farm CMS Investigation Naval Station Roosevelt Roads, Puerto Rico

CTO NO.: 62470-277 BORING NO.: 7DP23

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
BG/PS = Background/Point Source

Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab ID	PID (ppm) BG	PID (ppm) PS	Visual Description	Elev. (Ft. MSL)
11–12	S-6	1.5		05	0.2	0.2	FINE to COARSE SAND, some silt, trace clay & rock fragments; tan & white; damp	
13–14	S-7	1.0			0.2	0.2	Little silt & clay; brown & tan; damp	
15–16	S-8	0.0					No Recovery	
17	S-9	0.2					ROCK FRAGMENTS; gray & green BOH @ 17.0' Drive Point Refusal	
18								
19								
20								
21								
22								
23								
24								
25								
26								
27								
28								
29								
30								

DRILLING CO.: Transglobal Environmental Group BAKER REP.: Mark DeJohn

DRILLER: Kevin Shelburne BORING NO.: 7DP23 SHEET 2 OF2

Baker

Baker Environmental

TEST BORING RECORD

PROJECT: Tow Way Fuel Farm CMS Investigation Naval Station Roosevelt Roads, Puerto Rico

CTO NO.: 62470-277 BORING NO.: 7DP23

COORDINATES: EAST: 782,331.34 NORTH: 145,611.84

SURFACE ELEVATION: 109.41

Rig: Truck-Mounted Earthprobe 200								
	Sampler	**Casing**	**Augers**	**Core Barrel**	**Date**	**Progress (Ft.)**	**Weather**	**Depth to Water (Ft.)**
Size (ID)	2"				4/19/98	5.0	M. Sunny, Breezy	
Length	4'							
Type	Macro							
Hammer Wt.								
Fall								

Remarks:

SAMPLE TYPE

S = Soil Sample A = Auger
T = Shelby Tube W = Wash
R = Air Rotary C = Core
D = Direct Push P = Piston
N = No Sample H= By Hand

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) BG/PS		Visual Description	Elev. (Ft. MSL)
1 2 3 4	4.0	S-1	3.7 93%		02 (3-4') ms/msd	0.2	0.2	SILT, some rock fragments, little fine to coarse sand & clay; rock fragment layers; brown; dry	
5	5.0	S-2	1.0 100%			0.2	0.2	As above	104.41
6 7 8 9 10								BOH @ 5.0' Tool Refusal	

DRILLING CO.: Transglobal Environmental Group BAKER REP.: Mark DeJohn

DRILLER: Kevin Shelburne BORING NO.: 7DP23 SHEET 1 OF 1

Baker

Baker Environmental

TEST BORING RECORD

PROJECT: Tow Way Fuel Farm CMS Investigation Naval Station Roosevelt Roads, Puerto Rico

CTO NO.: 62470-277 BORING NO.: 7DP23

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
BG/PS = Background/Point Source

Depth (Ft.)	Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab ID	PID (ppm) BG/PS		Visual Description	Elev. (Ft. MSL)
11 – 12	S-6	1.5		05	0.2	0.2	FINE to COARSE SAND, some silt, trace clay & rock fragments; tan & white; damp	
13 – 14	S-7	1.0			0.2	0.2	Little silt & clay; brown & tan; damp	
15 – 16	S-8	0.0					No Recovery	
17	S-9	0.2					ROCK FRAGMENTS; gray & green BOH @ 17.0' Drive Point Refusal	
18								
19								
20								
21								
22								
23								
24								
25								
26								
27								
28								
29								
30								

DRILLING CO.: Transglobal Environmental Group BAKER REP.: Mark DeJohn

DRILLER: Kevin Shelburne BORING NO.: 7DP23 SHEET 2 OF2

Baker

Baker Environmental

TEST BORING RECORD

PROJECT: Tow Way Fuel Farm CMS Investigation Naval Station Roosevelt Roads, Puerto Rico

CTO NO.: 62470-277 BORING NO.: 7DP24

COORDINATES: EAST: 781,655.42 NORTH: 146,063.22

SURFACE ELEVATION: 108.74

Rig: Truck-Mounted Earthprobe 200	Sampler	Casing	Augers	Core Barrel	Date	Progress (Ft.)	Weather	Depth to Water (Ft.)
Size (ID)	2"				4/18/98	12.0'	M. Sunny, Breezy	11.7
Length	4'							
Type	Macro							
Hammer Wt.								
Fall								

Remarks: (1) Difficulty penetrating below 5' bgs. successful penetration on the fifth attempt. The description below are from the final attempt.

SAMPLE TYPE

S = Soil Sample A = Auger
T = Shelby Tube W = Wash
R = Air Rotary C = Core
D = Direct Push P = Piston
N = No Sample H= By Hand

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) BG/PS		Visual Description	Elev. (Ft. MSL)
1 2 3 4	4.0	S-1C	3.0 75%		01 (3-5')	--	--	FINE to COARSE SAND, some fine to coarse rock fragments, little silt; gray; dry 4.0	
5 6 7 8	8.0	S-2B (1)	2.0 50%		03 (5-7') Duplicate	0.2	0.2	Silt, little clay, trace coarse sand & fine rock fragments; brown; damp As above 8.0	
9 10	10.0	S-3	0.9 45%			0.2	116	(Switch to large core sampler) CLAY, little fine to coarse sand, trace silt; green stained; moist; strong hydrocarbon odor	
								Match to Sheet 2	

DRILLING CO.: Transglobal Environmental Group BAKER REP.: Mark DeJohn

DRILLER: Kevin Shelburne BORING NO.: 7DP24 SHEET 1 OF 2

Baker

Baker Environmental

TEST BORING RECORD

PROJECT: Tow Way Fuel Farm CMS Investigation Naval Station Roosevelt Roads, Puerto Rico

CTO NO.: 62470-277 BORING NO.: 7DP24

SAMPLE TYPE

S = Soil Sample 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

Depth (Ft.)		Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab ID	PID (ppm) BG	PID (ppm) PS	Visual Description	Elev. (Ft. MSL)
11		S-4	1.8 90%		05 (10-11')	0.2	0.2	Continued from Sheet 1	
12	12.0							11.7' ROCK FRAGMENTS (FINE), trace silt & clay; dark green; wet; very slight hydrocarbon odor Groundwater at 11.7'	96.74
13								BOH @ 12.0'	
14									
15									
16									
17									
18									
19									
20									
21									
22									
23									
24									
25									
26									
27									
28									
29									
30									

DRILLING CO.: Transglobal Environmental Group BAKER REP.: Mark DeJohn

DRILLER: Kevin Shelburne BORING NO.: 7DP24 SHEET 2 OF 2

Baker

Baker Environmental

TEST BORING RECORD

PROJECT: Tow Way Fuel Farm CMS Investigation Naval Station Roosevelt Roads, Puerto Rico

CTO NO.: 62470-277 BORING NO.: 7DP25

COORDINATES: EAST: 782,099.31 NORTH: 146,166.65

SURFACE ELEVATION: 115.44

Rig: Truck-Mounted Earthprobe 200	Sampler	Casing	Augers	Core Barrel	Date	Progress (Ft.)	Weather	Depth to Water (Ft.)
Size (ID)	2"				4/19/98	13.5	M. Sunny, Breezy	
Length	4'							
Type	Macro							
Hammer Wt.								
Fall								

Remarks:

SAMPLE TYPE

S = Soil Sample A = Auger
T = Shelby Tube W = Wash
R = Air Rotary C = Core
D = Direct Push P = Piston
N = No Sample H= By Hand

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) BG/PS		Visual Description	Elev. (Ft. MSL)
1, 2, 3, 4 (4.0)	S-1	4.0 100%		01 Duplicate	0.2	112	FINE to COARSE SAND, some silt, trace fine rock fragments; brownish-gray; damp; hydrocarbon odor 2.3	
							CLAY, trace coarse sand & silt; olive drab; damp; slight hydrocarbon odor 4.6	
5, 6, 7 (7.0)	S-2	3.0 100%		03	0.2	94	ROCK FRAG(FINE) some f/c sand, trace silt; green staining; hydro. odor 5.3'	
							SILT, some medium to coarse sand & fine to coarse rock fragments, light brown; dry slight hydrocarbon odor 7.0	
8, 9, 10 (10.0)	S-3	3.0 100%			0.2	108	MEDIUM to COARSE SAND, little fine rock fragments, silt & clay; green & orangish brown; damp; slight hydrocarbon odor, increase clay content & less green staining with depth 10.0	
							Match to Sheet 2	

DRILLING CO.: Transglobal Environmental Group BAKER REP.: Mark DeJohn

DRILLER: Kevin Shelburne BORING NO.: 7DP25 SHEET 1 OF 2

Baker

Baker Environmental

TEST BORING RECORD

PROJECT: Tow Way Fuel Farm CMS Investigation Naval Station Roosevelt Roads, Puerto Rico

CTO NO.: 62470-277 BORING NO.: 7DP25

SAMPLE TYPE

S = Soil Sample 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

Depth (Ft.)		Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab ID	PID (ppm) BG/PS		Visual Description	Elev. (Ft. MSL)
11								Continued from Sheet 1	
12		S-4	3.0 100%		06	0.3	108	FINE to COARSE SAND, some fine to coarse rock fragments, trace silt & clay; green staining; damp; hydrocarbon odor;	
13	13.0								
	13.5	S-5	0.2 40%					As above, but little clay, trace of fine rock fragments & silt; green staining hydrocarbon odor	101.94
14									
15								BOH 13.5' Tool Refusal	
16									
17									
18									
19									
20									
21									
22									
23									
24									
25									
26									
27									
28									
29									
30									

DRILLING CO.: Transglobal Environmental Group BAKER REP.: Mark DeJohn

DRILLER: Kevin Shelburne BORING NO.: 7DP25 SHEET 2 OF 2

Baker

Baker Environmental

TEST BORING RECORD

PROJECT: Tow Way Fuel Farm CMS Investigation Naval Station Roosevelt Roads, Puerto Rico

CTO NO.: 62470-277 BORING NO.: 7DP26

COORDINATES: EAST: 781,831.02 NORTH: 146,360.12

SURFACE ELEVATION: 112.23

Rig: Truck-Mounted Earthprobe 200	Sampler	Casing	Augers	Core Barrel	Date	Progress (Ft.)	Weather	Depth to Water (Ft.)
Size (ID)	1"	2"			4/19/98	17.5	M. Sunny, Breezy	
Length	2'	4'						
Type	Split barrel	Steel						
Hammer Wt.								
Fall								

Remarks:

SAMPLE TYPE

S = Soil Sample A = Auger
T = Shelby Tube W = Wash
R = Air Rotary C = Core
D = Direct Push P = Piston
N = No Sample H= By Hand

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) BG	PID (ppm) PS	Visual Description	Elev. (Ft. MSL)
1								Poor recovery another drive taken beside	
2	2.0	D-N	--			--	--	Direct Push, No Sampling	
3		S-2	2.0 100%		02	0.3	0.3	SILT, trace fine sand & clay; green; damp	
4	4.0								
5		S-3	1.6 80%			0.3	0.7	As above, but some clay, little fine to coarse sand; green; moist	
6	6.0								
7		S-4	1.4 70%		04 (6-10') Duplicate	0.3	168	Strong hydrocarbon odor	
8	8.0							8.0	
9		S-5	1.6 80%			--	--	CLAY, some silt, trace fine sand; green, becoming dark brown with depth; damp	
10	10.0								
								match to Sheet 2	

DRILLING CO.: Transglobal Environmental Group BAKER REP.: Mark DeJohn

DRILLER: Kevin Shelburne BORING NO.: 7DP26 SHEET 1 OF 2

Baker

Baker Environmental

TEST BORING RECORD

PROJECT: Tow Way Fuel Farm CMS Investigation Naval Station Roosevelt Roads, Puerto Rico

CTO NO.: 62470-277 BORING NO.: 7DP26

SAMPLE TYPE

S = Soil Sample 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

Depth (Ft.)		Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab ID	PID (ppm) BG	PID (ppm) PS	Visual Description	Elev. (Ft. MSL)
11								Continued from Sheet 1	
		S-6	0.9			0.3	19	As above, but trace fine sand; dark	
12	12.0		45%					greenish-brown; damp; no odor	
					06				
13		S-7	1.2		(12-14')	0.9	0.9	As above, but trace coarse sand & silt; no	
			60%					odor	
14	14.0							14.0	
15		S-8	1.2			0.6	0.6	FINE ROCK FRAGMENT, little fine to	
			60%					coarse sand & silt; brown; dry	
16	16.0								
17		S-9	0.5			0.3	0.3		
	18.0		25%					WEATHERED BEDROCK; brown & tan;	94.73
18								dry BOH @ 17.5' Tool Refusal	
19									
20									
21									
22									
23									
24									
25									
26									
27									
28									
29									
30									

DRILLING CO.: Transglobal Environmental Group BAKER REP.: Mark DeJohn

DRILLER: Kevin Shelburne BORING NO.: 7DP26 SHEET 2 OF 2

Baker

Baker Environmental

TEST BORING RECORD

PROJECT: Tow Way Fuel Farm CMS Investigation Naval Station Roosevelt Roads, Puerto Rico

CTO NO.: 62470-277 BORING NO.: 7DP27

COORDINATES: EAST: 782,372.06 NORTH: 145,517.57

SURFACE ELEVATION: 108.43

Rig: Truck-Mounted Earthprobe 200	Sampler	Casing	Augers	Core Barrel	Date	Progress (Ft.)	Weather	Depth to Water (Ft.)
Size (ID)	2"				4/19/98	11.0	M. Sunny, Breezy	
Length	4'							
Type	Macro							
Hammer Wt.								
Fall								

Remarks:

SAMPLE TYPE

S = Soil Sample A = Auger
T = Shelby Tube W = Wash
R = Air Rotary C = Core
D = Direct Push P = Piston
N = No Sample H= By Hand

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) BG	PID (ppm) PS	Visual Description	Elev. (Ft. MSL)
1, 2, 3, 4 (4.0)	S-1	4.0 100%		01	0.2	0.2	FINE to COARSE SAND, some fine to coarse rock fragments, little silt (little clay @ 1-3'); brown; damp (6.7)	
5, 6, 7, 8 (8.0)	S-2	3.4 85%		04 (7-8')	0.2	0.2	CLAY, trace of sand & silt; reddish-brown to dark greenish-gray; damp (8.0)	
9, 10	S-3	3.0 100%			0.3	0.2	ROCK FRAGMENTS, trace clay & fine sand; blueish-gray, tan & yellowish-tan; damp (WEATHERED BEDROCK?) Match to Sheet 2	

DRILLING CO.: Transglobal Environmental Group BAKER REP.: Mark DeJohn

DRILLER: Kevin Shelburne BORING NO.: 7DP27 SHEET 1 OF 2

Baker

Baker Environmental

TEST BORING RECORD

PROJECT: Tow Way Fuel Farm CMS Investigation Naval Station Roosevelt Roads, Puerto Rico

CTO NO.: 62470-277 BORING NO.: 7DP27

SAMPLE TYPE	DEFINITIONS
S = Soil Sample A = Auger	SPT = Standard Penetration Test (ASTM D1586)
T = Shelby Tube W = Wash	PID = Photo Ionization Detector Measurement
R = Air Rotary C = Core	MSL = Mean Sea Level
D = Direct Push P = Piston N = No Sample	BG/PS = Background/Point Source

Depth (Ft.)		Sample Type & No.	Sample Rec. (Ft.,%)	SPT	Lab ID	PID (ppm) BG/PS		Visual Description	Elev. (Ft. MSL)
11	11.0							Continued from Sheet 1	97.43
12								BOH @ 11.0' Tool Refusal	
13									
14									
15									
16									
17									
18									
19									
20									
21									
22									
23									
24									
25									
26									
27									
28									
29									
30									

DRILLING CO.: Transglobal Environmental Group BAKER REP.: Mark DeJohn

DRILLER: Kevin Shelburne BORING NO.: 7DP27 SHEET 2 OF 2

Baker

Baker Environmental

TEST BORING RECORD

PROJECT: Tow Way Fuel Farm CMS Investigation Naval Station Roosevelt Roads, Puerto Rico

CTO NO.: 62470-277 BORING NO.: 7DP28

COORDINATES: EAST: 782,541.30 NORTH: 145,568.85

SURFACE ELEVATION: 112.50

Rig: Truck-Mounted Earthprobe 200	Sampler	Casing	Augers	Core Barrel	Date	Progress (Ft.)	Weather	Depth to Water (Ft.)
Size (ID)	2"				4/19/98	5.0	M. Sunny, Breezy	
Length	4'							
Type	Macro							
Hammer Wt.								
Fall								

Remarks:

SAMPLE TYPE

S = Soil Sample A = Auger
T = Shelby Tube W = Wash
R = Air Rotary C = Core
D = Direct Push P = Piston
N = No Sample H= By Hand

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) BG	PID (ppm) PS	Visual Description	Elev. (Ft. MSL)
1 2 3 4	4.0	S-1	4.0 100%		01 (1-3')	0.2	0.2	FINE to COARSE SAND, some rock fragments, little silt; brown; dry with layers of rock fragments	
5	5.0	S-2	0.0 0%			--	--	Tool Refusal @ 5.0' Move & try again. Tool refusal a second time - could not penetrate below 5 ft bgs	
6 7 8 9 10									

DRILLING CO.: Transglobal Environmental Group BAKER REP.: Mark DeJohn

DRILLER: Kevin Shelburne BORING NO.: 7DP28 SHEET 1 OF 1

Baker

Baker Environmental

TEST BORING RECORD

PROJECT: Tow Way Fuel Farm CMS Investigation Naval Station Roosevelt Roads, Puerto Rico

CTO NO.: 62470-277 BORING NO.: 7DP29

COORDINATES: EAST: 782,145.85 NORTH: 145,774.69

SURFACE ELEVATION: 110.53

Rig: Truck-Mounted Earthprobe 200								
	Sampler	**Casing**	**Augers**	**Core Barrel**	**Date**	**Progress (Ft.)**	**Weather**	**Depth to Water (Ft.)**
Size (ID)	2"				4/19/98	9.0	M. Sunny, Breezy	
Length	4'							
Type	Macro							
Hammer Wt.								
Fall								

Remarks:

SAMPLE TYPE

S = Soil Sample A = Auger
T = Shelby Tube W = Wash
R = Air Rotary C = Core
D = Direct Push P = Piston
N = No Sample H= By Hand

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) BG	PID (ppm) PS	Visual Description	Elev. (Ft. MSL)
1, 2, 3, 4	4.0	S-1	4.0 100%		01 (1-3')	0.2	0.2	FINE SAND, little silt, trace rock fragments; brown; dry	
								2.5	
5, 6, 7, 8	8.0	S-2	1.8 45%		04 (7-8')	0.2	0.2	SILT, trace clay; rock fragments; rust, gray & tan; mottled with black root races; damp (FILL)	
								Tool Refusal, switch to dual casing	
								7.5	
								ROCK FRAG., some f/c sand, trace silt; gray; dry 8.0	
9	9.0	S-3	1.1 110%			0.1	0.1	WEATHERED BEDROCK; tan & white damp	101.53
10								BOH @ 9.0' - Tool Refusal	

DRILLING CO.: Transglobal Environmental Group BAKER REP.: Mark DeJohn

DRILLER: Kevin Shelburne BORING NO.: 7DP29 SHEET 1 OF 1

Baker

Baker Environmental

TEST BORING RECORD

PROJECT: Tow Way Fuel Farm CMS Investigation Naval Station Roosevelt Roads, Puerto Rico

CTO NO.: 62470-277 BORING NO.: 7DP30

COORDINATES: EAST: 782,510.08 NORTH: 145,747.92

SURFACE ELEVATION: 110.92

Rig: Truck-Mounted Earthprobe 200								
	Sampler	**Casing**	**Augers**	**Core Barrel**	**Date**	**Progress (Ft.)**	**Weather**	**Depth to Water (Ft.)**
Size (ID)	2"				4/19/98	6.0	M. Sunny, Breezy	
Length	4'							
Type	Macro							
Hammer Wt.								
Fall								

Remarks: Three attempts required to penetrate below 3 feet bgs. Sample "01" collected on first attempt. Description are from final attempt.

SAMPLE TYPE

S = Soil Sample A = Auger
T = Shelby Tube W = Wash
R = Air Rotary C = Core
D = Direct Push P = Piston
N = No Sample H= By Hand

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) BG/PS		Visual Description	Elev. (Ft. MSL)
1									
2		S-1B	3.3 83%		01 (1-3')	0.2	0.2		
3									
4	4.0							WEATHERED BEDROCK; light green staining; no odor	
5		S-2	2.0 100%		03 (5-6')	0.2	0.2	As above	
6	6.0							Tool Refusal @ 6.0' BOH	104.29
7									
8									
9									
10									

DRILLING CO.: Transglobal Environmental Group BAKER REP.: Mark DeJohn

DRILLER: Kevin Shelburne BORING NO.: 7DP30 SHEET 1 OF 1

APPENDIX C
PARTICLE SIZE ANALYSIS OF SOILS

RECRA
LabNet
Division of Recra Environmental, Inc.
Virtual Laboratories Everywhere

Rcvd 5/20

May 19, 1998

Mr. Mark Kimes
Baker Environmental, Inc.
420 Rouser Road, AOP Building 3
Coraopolis, PA 15108

RE: CTO #277
Lot 9804G386

Dear Mr. Kimes:

The enclosed analytical report is for the project and lot number listed above. The electronic deliverable (EDD) will be sent when completed. If you have any questions, please contact me at 708-534-5200.

Sincerely,

Recra LabNet - Chicago

Bosco Ramirez
Technical Director

sj

Enclosures

cc: Heartland - Full Data Package and Summary

Approved By:

Michael J. Healy
Vice President

The results presented in this report relate only to the analytical testing and conditions of sample at receipt. This report pertains to only those samples actually tested. All 32 pages of this report are integral parts of the analytical data. Therefore, this report should be reproduced only in its entirety.

2417 Bond Street • University Park, IL 60466-3182 • (708) 534-5200 • Fax (708) 534-5211

PARTICLE SIZE

PATRICK
ENGINEERING INC.

Transportation
Infrastructure
Environmental
Planning
Architecture
Design/Build
Surveying

May 5, 1998

Recra LabNet
2417 Bond Street
University Park, IL 60466-3182

Attention: Mr. Bosco Ramirez

Reference: Sample Batch Number-9804G386 & 9804G287
P.O. #-U2052
PEI Project Number-8026.A0

Dear Mr. Ramirez:

Attached are the results from testing done on samples delivered to our lab from the above referenced project.

The following procedure was used for this testing:
Standard Test Method for Particle Size Analysis of Soils (ASTM D 422)

We will return the remainder of your samples via UPS. An invoice will be mailed separately.

Please call if you have any questions and thank you for letting us serve you on this project.

Very truly yours,

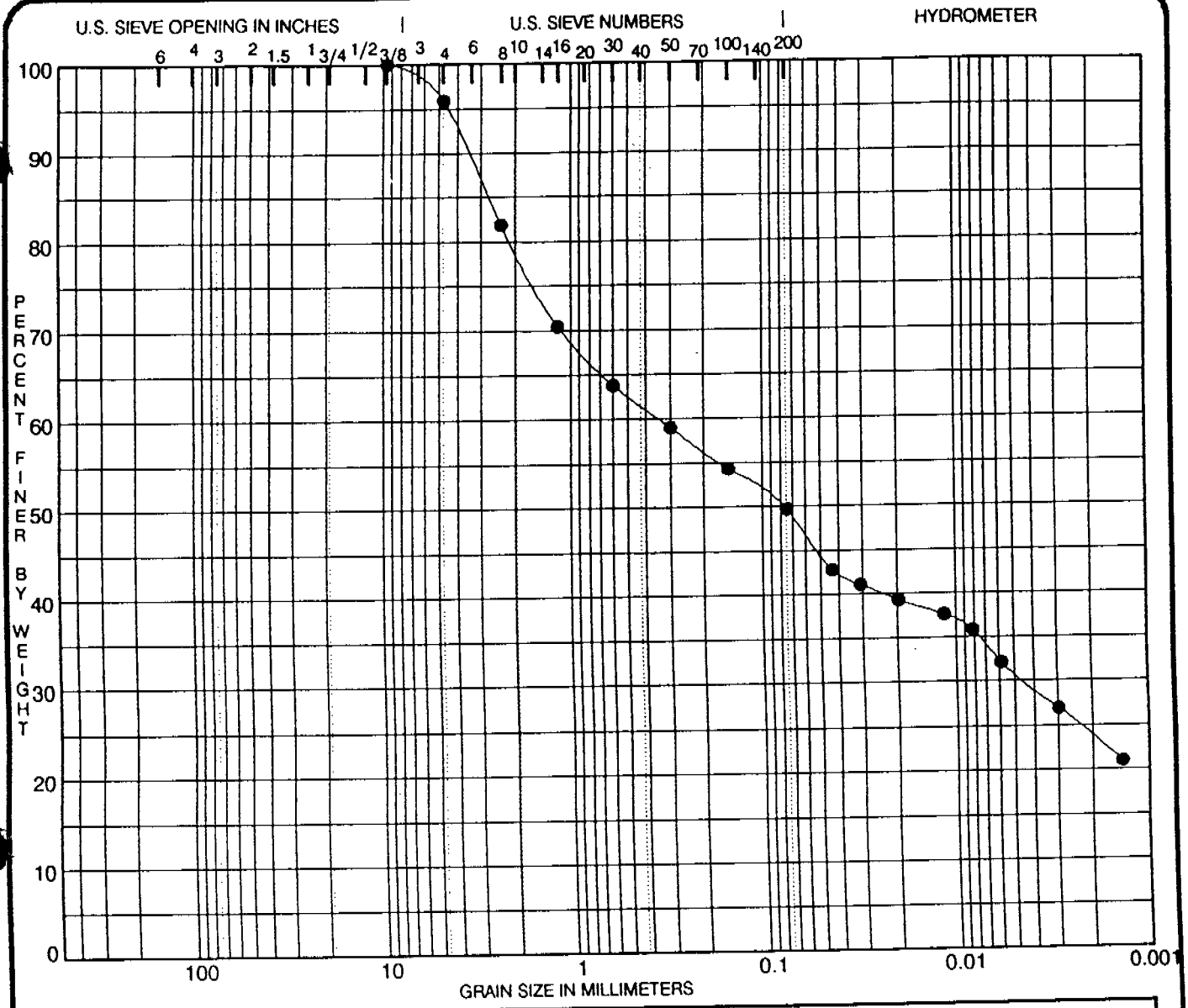
PATRICK ENGINEERING INC.

Michael J. Stewart
Lab Manager

Enclosures: Particle Size Graphs (10)
Chain of Custody Record

4985 Varsity Drive • Lisle Illinois 60532-4144 Tel (630) 434-7050 • Fax: (630) 434-8400

Printed on recycled paper



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification		Classification	MC%	LL	PL	PI	Cc	Cu
●	7DP01	7DP01	Brown Silty Clay and Coarse to Fine Sand,						
		0.0-0.0'	Trace F Gravel CL						

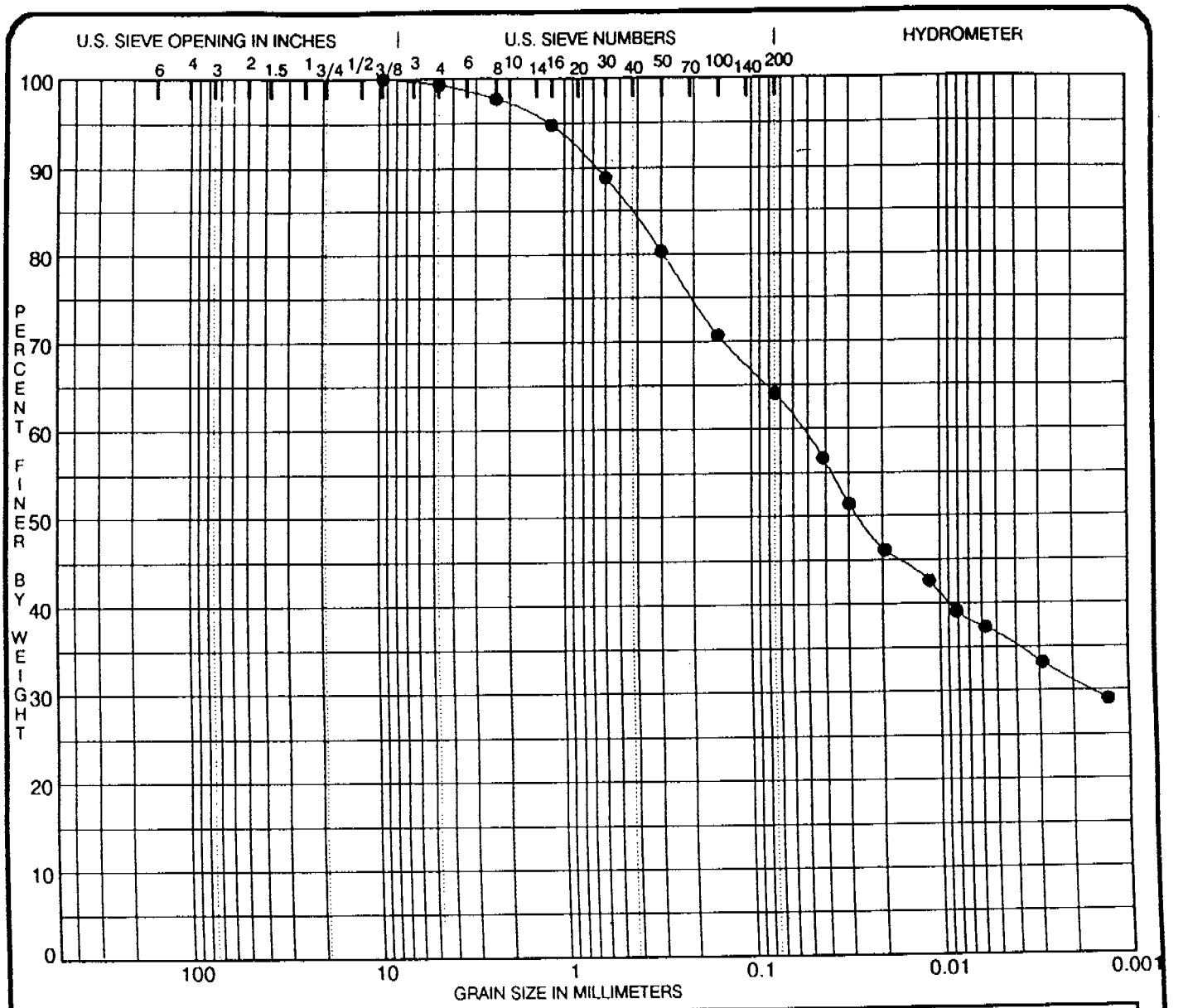
	Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	7DP01	0.0	9.50	0.35	0.005		4.1	46.2	25.9	23.8

PROJECT Recra LabNet - Naval Station Roosevelt Roads-Pto Rico

JOB NO. 8026.A0
DATE 5/5/98

GRADATION CURVES

Patrick Engineering
Glen Ellyn, Illinois



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification	Classification	MC%	LL	PL	PI	Cc	Cu
●	7DP03-02	Gray Silty Clay and Coarse to Fine Sand CL						
	0.0-0.0'							

	Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	7DP03-02	0.0	9.50	0.05	0.002		0.7	35.3	32.7	31.3

PROJECT Recra LabNet - Naval Station Roosevelt Roads-Pto Rico

JOB NO. 8026.A0
DATE 5/5/98

GRADATION CURVES

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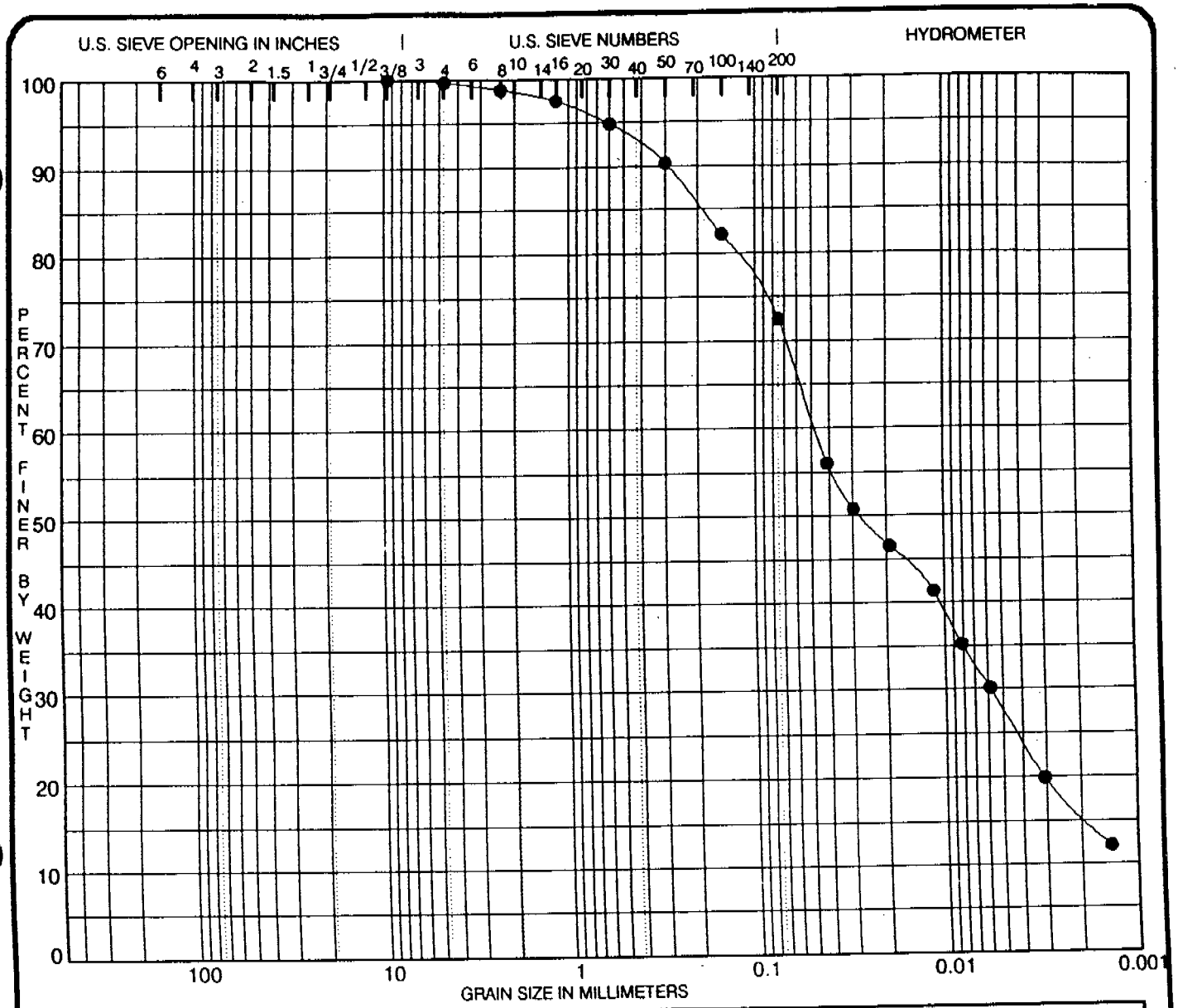
Glen Ellyn, Illinois



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification	Classification	MC%	LL	PL	PI	Cc	Cu
●	7DP07-01 0.0-0.0'	Orangeish Brown Clayey Silt, Some Coarse to Fine Sand CL-ML						

	Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	7DP07-01 0.0	9.50	0.05	0.006		0.3	27.3	56.8	15.6

PROJECT Recra LabNet - Naval Station Roosevelt Roads-Pto Rico

JOB NO. 8026.A0
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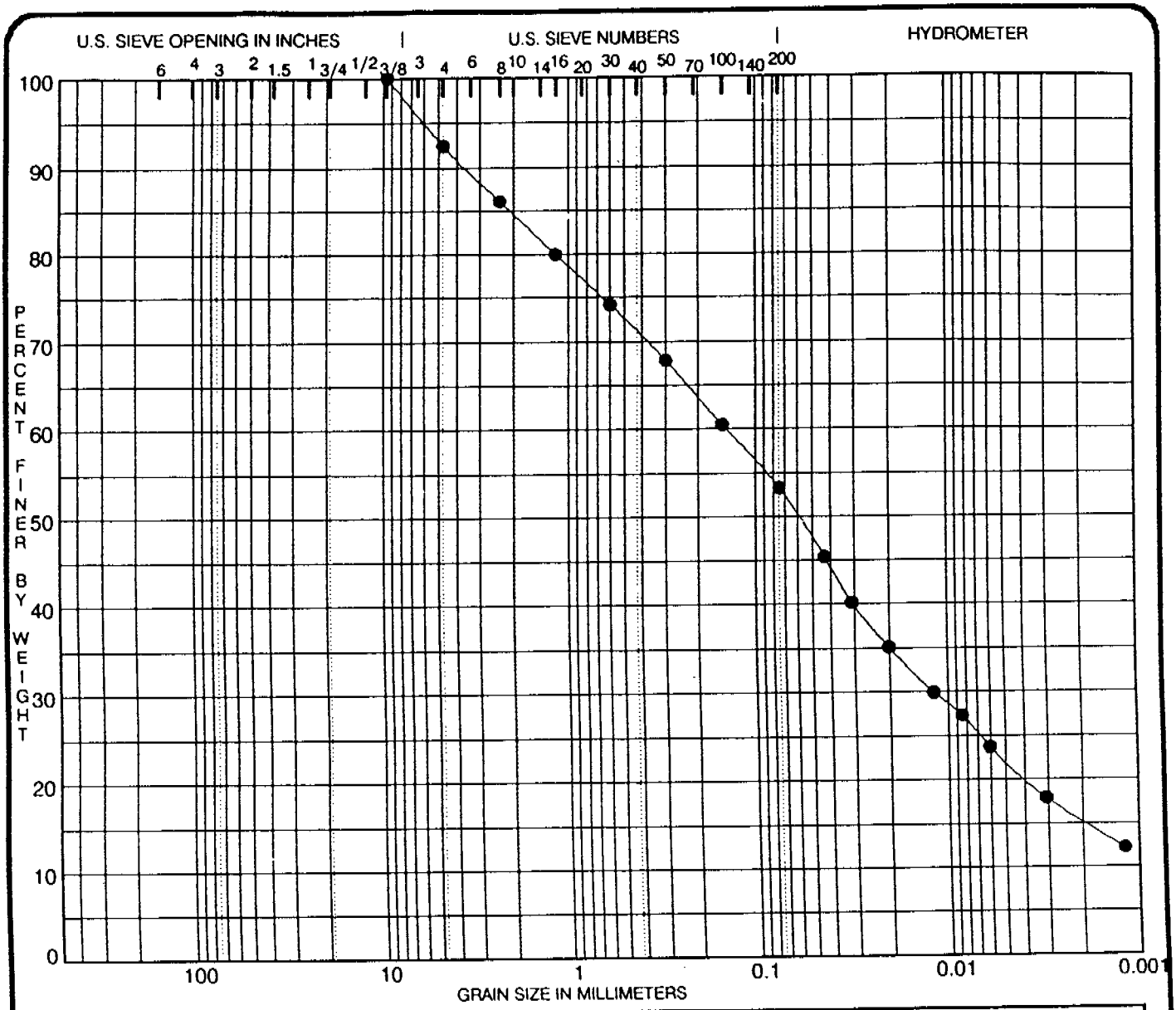
GRADATION CURVES

Patrick Engineering
Glen Ellyn, Illinois



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification		Classification	MC%	LL	PL	PI	Cc	Cu
●	7DP09		Brown Clayey Silt and C to F Sand, Trace F						
		0.0-0.0'	Gravel CL-ML						

	Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	7DP09	0.0	9.50	0.14	0.012		7.6	39.1	38.0	15.3

PROJECT Recra LabNet - Naval Station Roosevelt Roads-Pto Rico

JOB NO. 8026.A0
DATE 5/5/98

GRADATION CURVES

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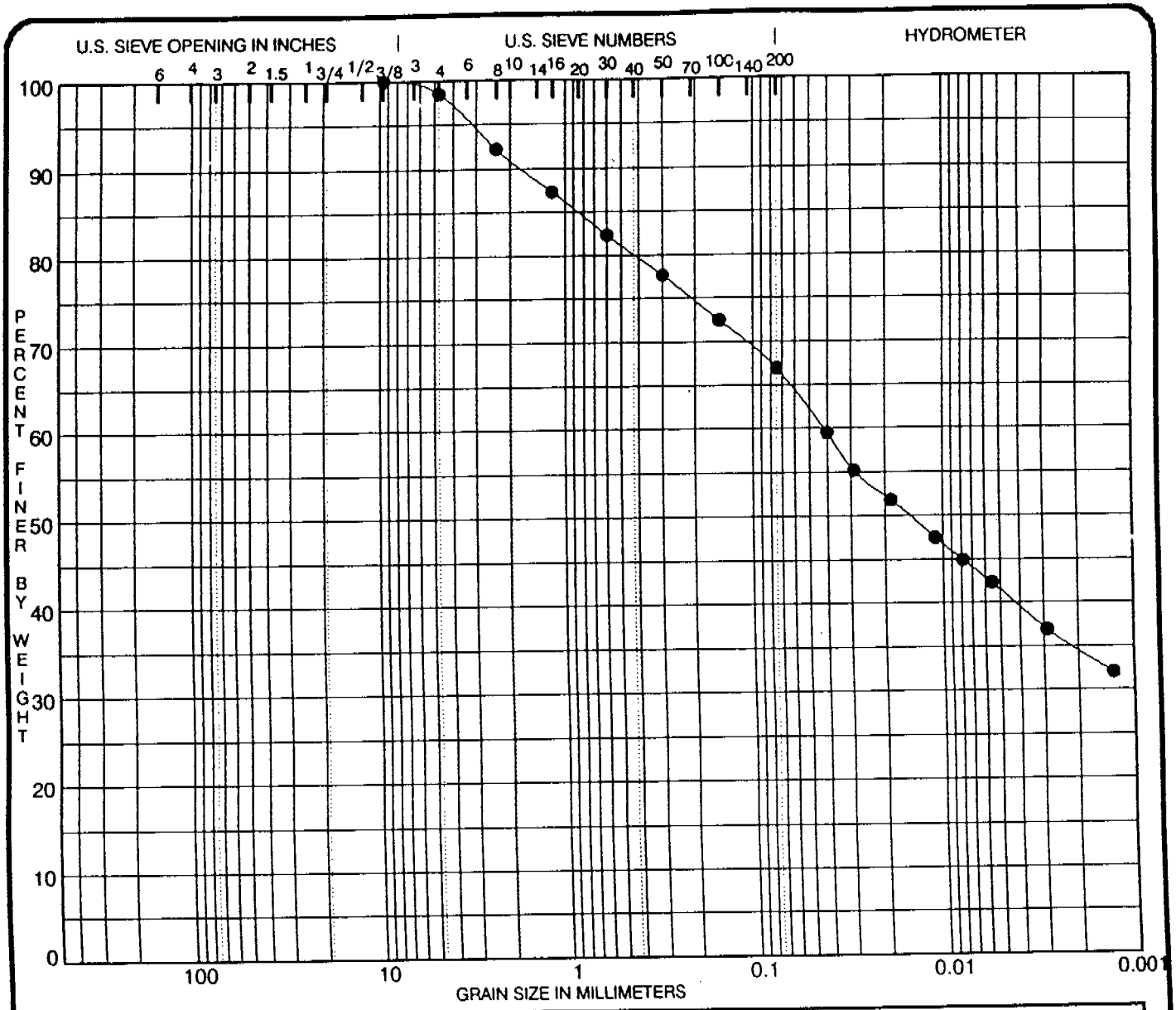
Glen Ellyn, Illinois



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification		Classification	MC%	LL	PL	PI	Cc	Cu
●	7DP20	7DP20 0.0-0.0'	Brown Silty Clay and Coarse to Fine Sand, Trace F Gravel CL			-			

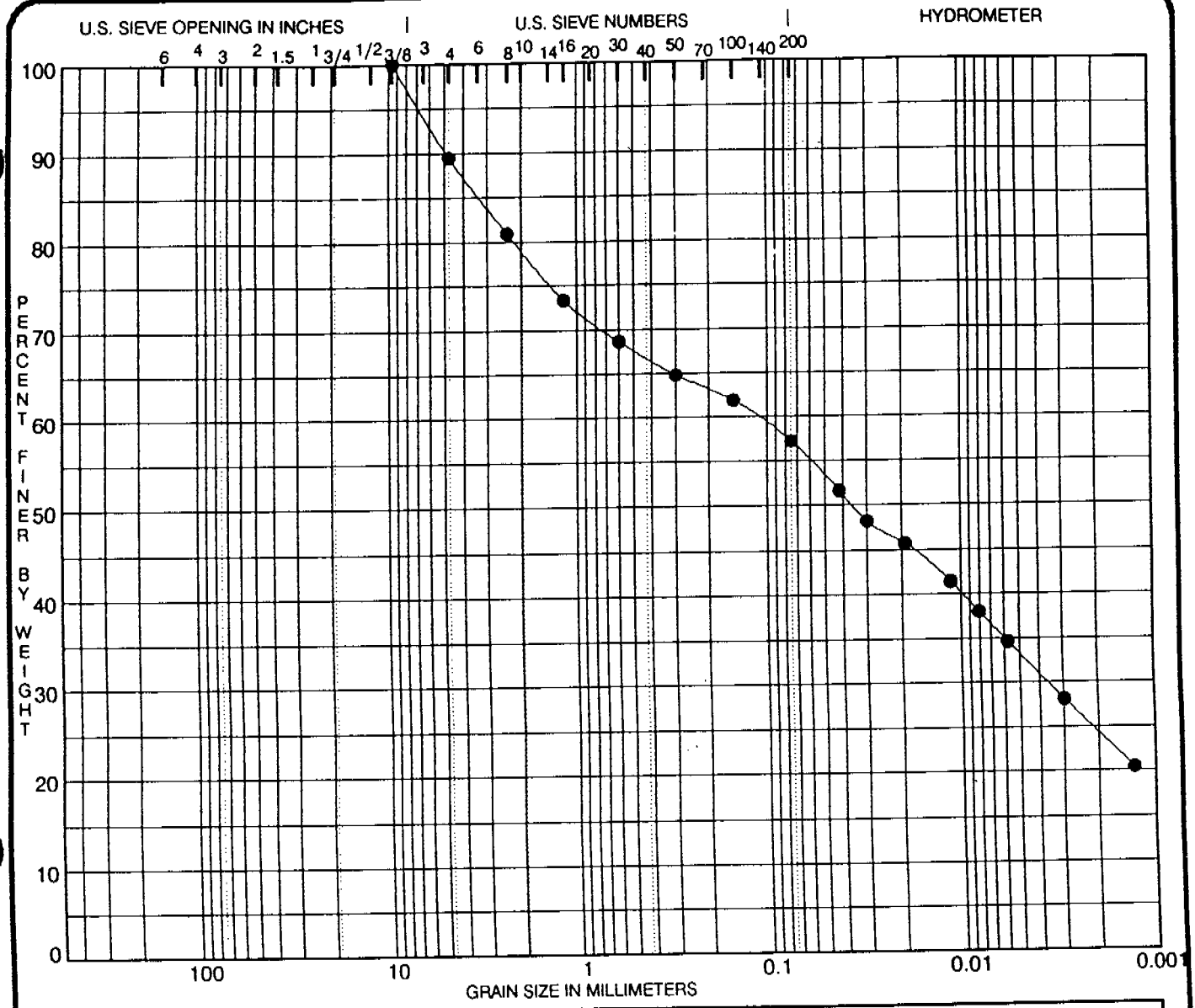
	Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	7DP20	0.0	9.50	0.04			1.5	31.6	32.3	34.6

PROJECT Recra LabNet - Naval Station Roosevelt Roads-Pto Rico

JOB NO. 8026.A0
DATE 5/5/98

GRADATION CURVES

Patrick Engineering
Glen Ellyn, Illinois



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification	Classification	MC%	LL	PL	PI	Cc	Cu
●	7DP24-02 0.0-0.0'	Brown Silty Clay and Coarse to Fine Sand, Little F Gravel CL			-			

	Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	7DP24-02 0.0	9.50	0.11	0.004		10.6	32.2	32.8	24.4

PROJECT Recra LabNet - Naval Station Roosevelt Roads-Pto Rico

JOB NO. 8026.A0
DATE 5/5/98

GRADATION CURVES

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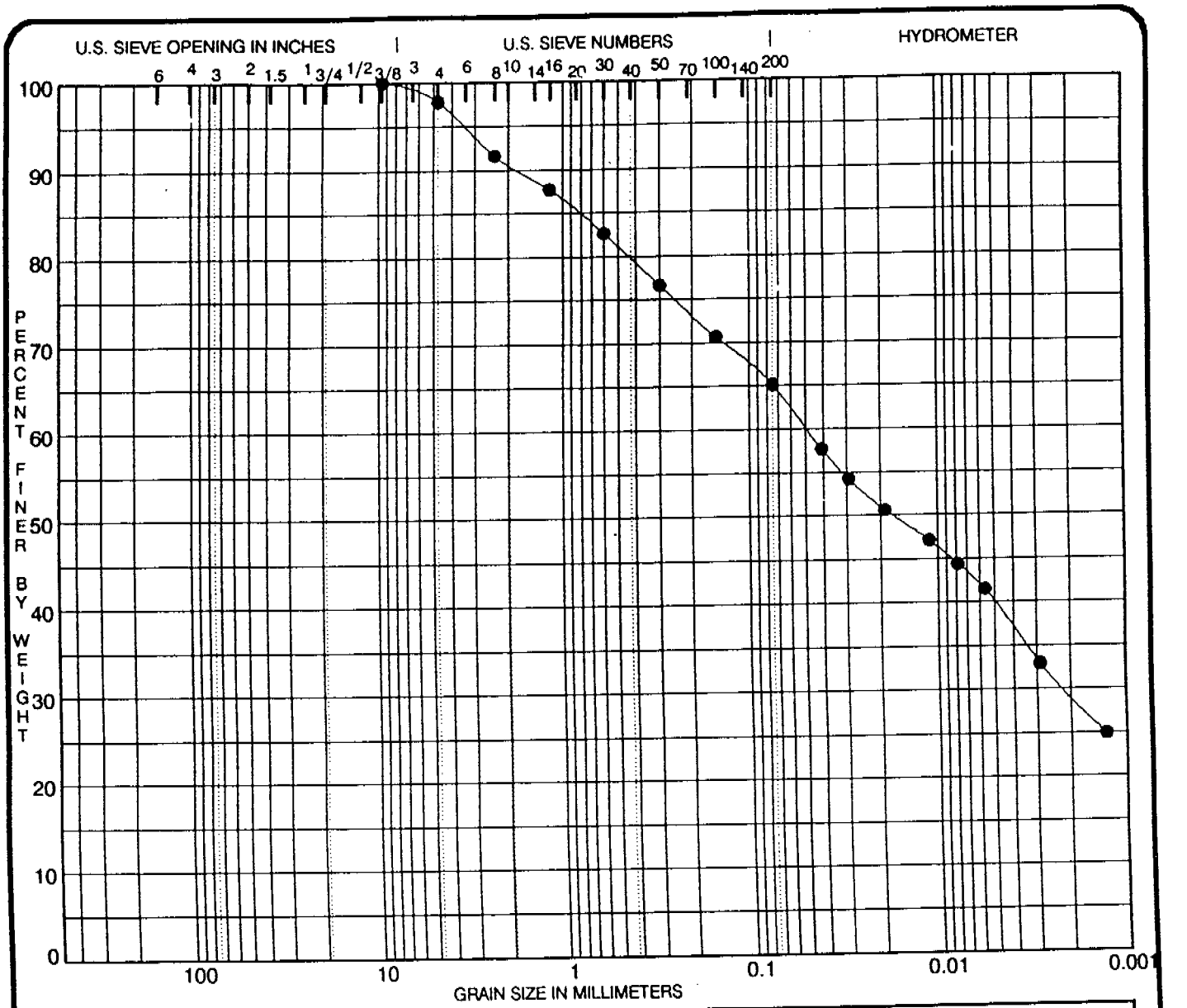
Glen Ellyn, Illinois



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification	Classification	MC%	LL	PL	PI	Cc	Cu
●	7DP28 01 0.0-0.0'	Yellowish Brown Silty Clay and C to F Sand, Trace Gravel CL						

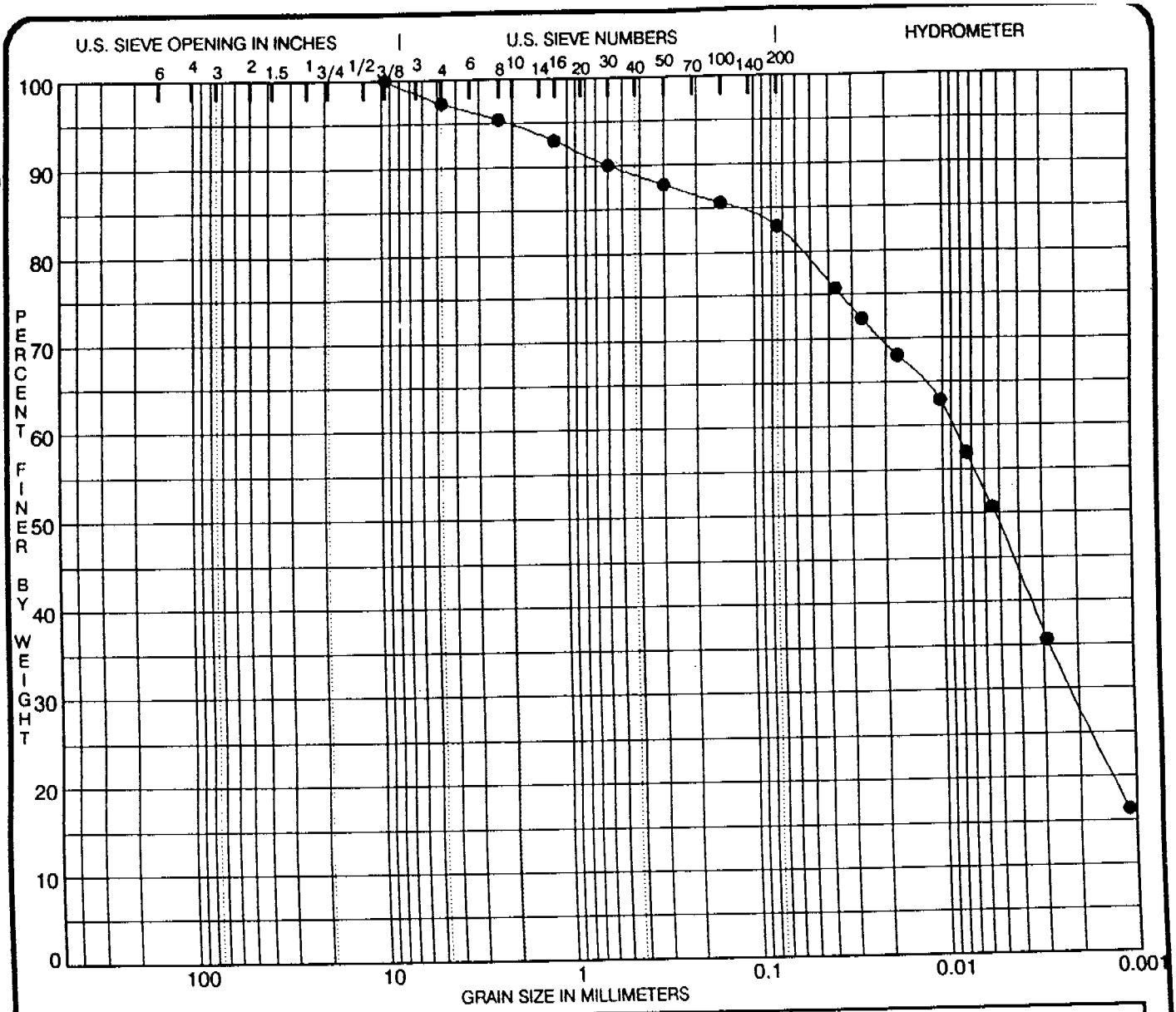
	Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	7DP28 01 0.0	9.50	0.05	0.002		2.2	32.7	35.9	29.2

PROJECT Recra LabNet - Naval Station Roosevelt Roads-Pto Rico

JOB NO. 8026.A0
DATE 5/5/98

GRADATION CURVES

Patrick Engineering
Glen Ellyn, Illinois



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification	Classification	MC%	LL	PL	PI	Cc	Cu
●	7DP29-01 0.0-0.0'	Brown Clayey Silt, Little C to F Sand, Trace Gravel CL-ML			-			

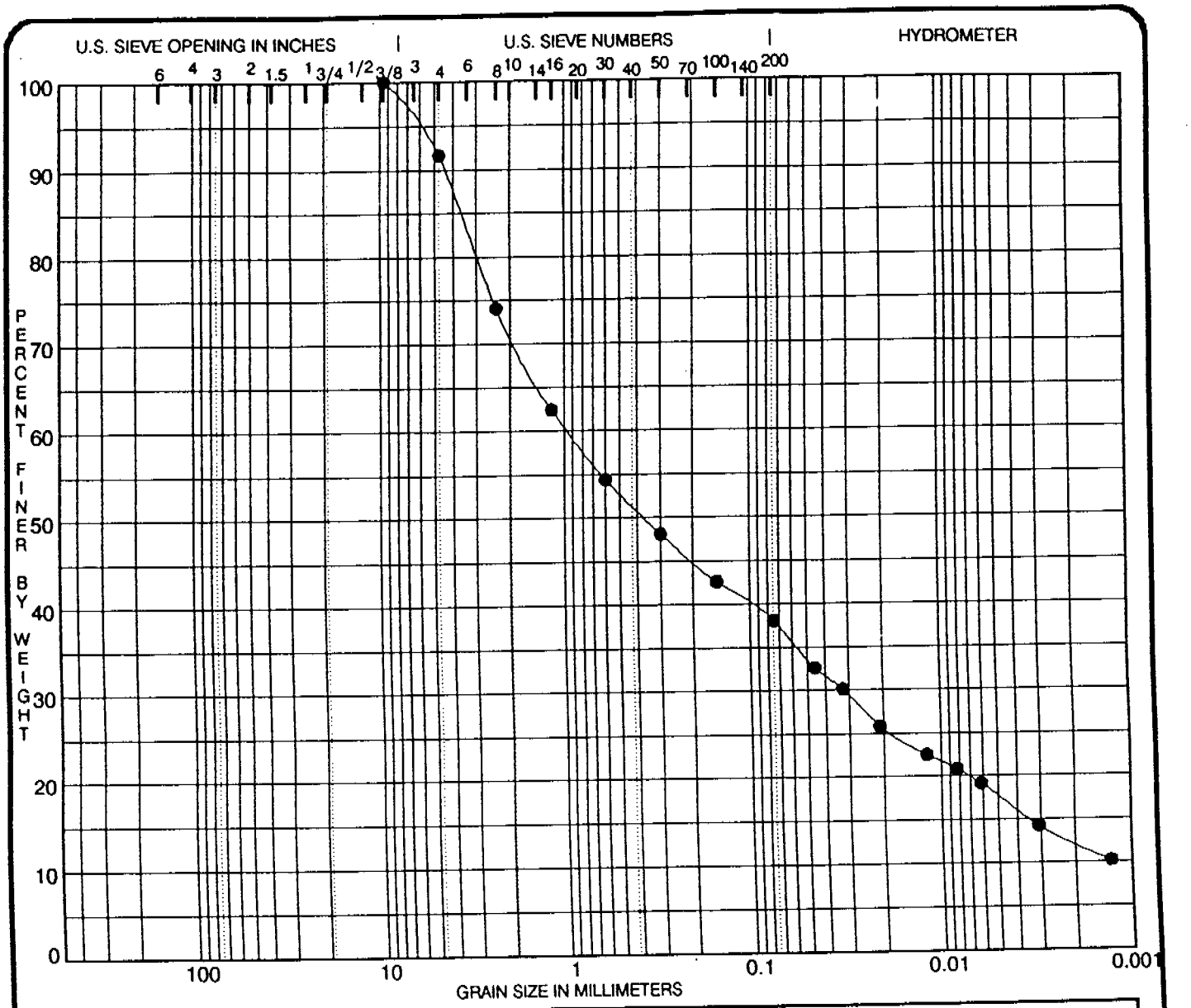
	Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	7DP29-01 0.0	9.50	0.01	0.002		2.7	14.4	54.7	28.2

PROJECT Recra LabNet - Naval Station Roosevelt Roads-Pto Rico

JOB NO. 8026.A0
DATE 5/5/98

GRADATION CURVES

Patrick Engineering
Glen Ellyn, Illinois



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification	Classification	MC%	LL	PL	PI	Cc	Cu
●	7DPTWFFU 0.0-0.0'	Yellowish Brown C to F Sand and Clayey Silt, Trace Gravel SM			-			

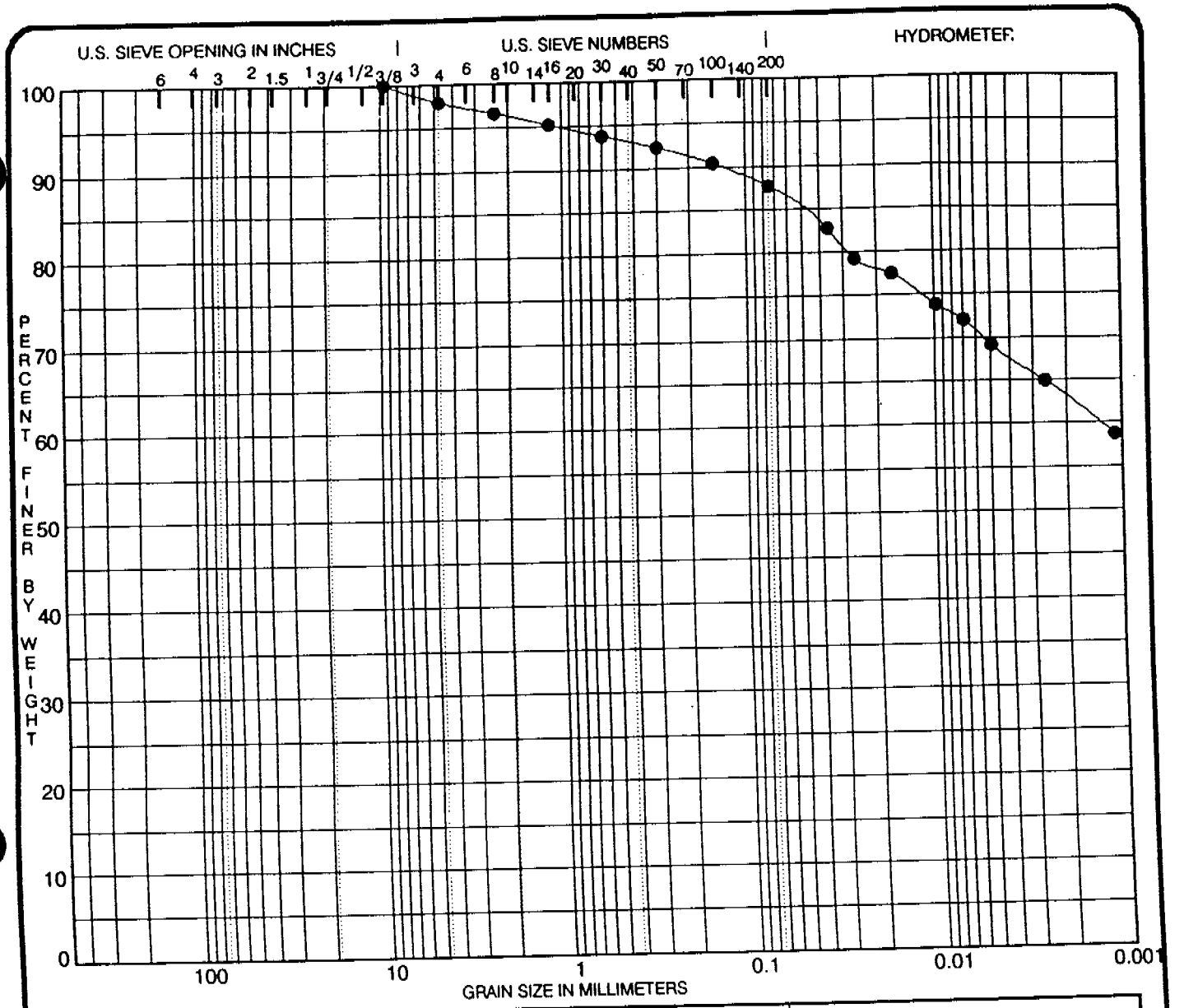
	Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	7DPTWFFU 0.0	9.50	0.96	0.032		8.4	53.5	25.9	12.2

PROJECT Recra LabNet - Naval Station Roosevelt Roads-Pto Rico

JOB NO. 8026.A0
DATE 5/5/98

GRADATION CURVES

Patrick Engineering
Glen Ellyn, Illinois



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification	Classification	MC%	LL	PL	PI	Cc	Cu
●	7DPTWFU1 0.0-0.0'	Gray Silty Clay, Little C to F Sand, Trace Fine Gravel CL						

	Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	7DPTWFU1 0.0	9.50	0.00			2.1	10.2	24.7	63.0

PROJECT Recra LabNet - Naval Station Roosevelt Roads-Pto Rico

JOB NO. 8026.A0
DATE 5/5/98

GRADATION CURVES

Patrick Engineering
Glen Ellyn, Illinois

10

RECRA LabNet

Custody Transfer Record/Lab Work Request

11

RECRA LabNet Use Only
98046287

Client: Recra LabNet Chicago
Project #: 8026.A0
Date Rec'd.: 4/16/98 Date Due:
RECRA PM: Bosco Ramirez
Client Contact/Phone:

Refrigerator#			S/O								
#/Type Container			1/G								
Volume			32oz								
Preservative											
ANALYSIS REQUESTED			Grain Size								
RECRA Use Only Lab ID	Client ID/Description	Matrix	Date Collected								
017	7DP01+	S	4/14/98	X							

Matrix: S - Soil, SE - Sediment, SO - Solid, W - Water, O - Oil, A - Air, Wi - Wipe, DS - Drum Solids, DL - Drum Liquids, F - Fish, L - EP/TCLP Leachate, X- Other

Special Instructions:

Item/Reason	Relinquished by	Received by	Date	Time	Item/Reason	Relinquished by	Received by	Date	Time
	P. Butler	FX→Patrick	4/23/98	1605					
		[illegible]	4/27/98	8:40am					
	[illegible]		5/5/98	12:05pm					

RECRA LabNet Use Only

Samples Were:
1 Shipped or Hand-Delivered FX
NOTES:

2 Ambient or chilled
NOTES:

3 Received Broken/Leaking (Improperly Sealed) Y N
NOTES:

4 Properly Preserved Y N
NOTES:

5 Received Within Holding Times Y N
NOTES:

COC Tape Was:
1 Present on Outer Package Y N
2 Unbroken on Outer Package Y N
3 Present on Sample Y N
4 Unbroken on Sample Y N
NOTES:

COC Record Was:
1 Present Upon Receipt of Samples Y N

Discrepancies Between Sample Labels and COC Record? Y N
NOTES:

RECRA LabNet

Custody Transfer Record/Lab Work Request

RECRA LabNet Use Only
9804G386

Client: Recra LabNet Chicago
Project #:
Date Rec'd: 4/22/98 Date Due:
RECRA PM: Bosco Ramirez
Client Contact/Phone:

Refrigerator#	S/O									
#/Type Container	1/G									
Volume	32oz									
Preservative										
ANALYSIS REQUESTED	Grain size									

RECRA Use Only Lab ID	Client ID/Description	Matrix	Date Collected								
001	7DP07-01+	S	4/15/98	X							
002	7DP24-02+		4/18/98								
003	7DP09 +		4/16/98								
004	7DP03-02+		4/13/98								
005	7DP28-01+		4/19/98								
006	7DP29-01+		1								
007	7DP-TWFF-U1+		4/21/98								
008	7DP20 +		4/17/98								
011	7DP-TWFF-U-		4/21/98								

Matrix: S - Soil, SE - Sediment, SO - Solid, W - Water, O - Oil, A - Air, WI - Wipe, DS - Drum Solids, DL - Drum Liquids, F - Fish, L - EP/TCLP Leachate, X- Other

Special Instructions:

Item/Reason	Relinquished by	Received by	Date	Time	Item/Reason	Relinquished by	Received by	Date	Time
	P. Bak	FX → Patrick	4/23/98	1605					
		Michelle	4/27/98	8:40am					
	Michelle		5/5/98	12:05pm					

RECRA LabNet Use Only

Samples Were:
1 Shipped or Hand-Delivered FX
NOTES:

2 Ambient or chilled
NOTES:

3 Received Broken/Leaking (Improperly Sealed) Y N
NOTES:

4 Properly Preserved Y N
NOTES:

5 Received Within Holding Times Y N
NOTES:

COC Tape Was:
1 Present on Outer Package Y N
2 Unbroken on Outer Package Y N
3 Present on Sample Y N
4 Unbroken on Sample Y N
NOTES:

COC Record Was:
1 Present Upon Receipt of Samples Y N

Discrepancies Between Sample Labels and COC Record? Y N
NOTES:

APPENDIX D
ANALYTICAL LABORATORY RESULTS

Data Qualifiers:

U - Not detected. The associated number indicates the approximate sample concentration necessary to be detected.
UJ - Not detected, quantitation limit may be inaccurate or imprecise.
J - Analyte. Reported value may not be accurate or precise.
R - Unreliable result. Analyte may or may not be present in the sample.
Supporting data necessary to confirm result.

Notes:

NA - Not Analyzed.

APPENDIX D.1
SUBSURFACE SOIL

APPENDIX D.1

SUBSURFACE SOIL
TOW WAY FUEL FARM
CMS INVESTIGATION
NAVAL STATION ROOSEVELT ROADS, PUERTO RICO

Sample ID	7DP-TWFF-U	7DP-TWFF-U1	7DP01	7DP01-05	7DP01-08	7DP01-11	7DP01-13
Sample Date	04/21/98	04/21/98	04/14/98	04/14/98	04/14/98	04/14/98	04/14/98
Depth Range (ft)			0.00-29.00	8.00-10.00	14.00-16.00	20.00-22.00	24.00-26.00
BTEX (ug/kg)							
Benzene	NA	NA	NA	1.2 U	1.2 U	1.1 U	1.1 U
Ethylbenzene	NA	NA	NA	1.2 U	1.2 U	1.1 U	1.1 U
Toluene	NA	NA	NA	1.2 U	1.2 U	1.1 U	1.1 U
Xylenes	NA	NA	NA	1.2 U	1.2 U	3.4	1.1 U
TPH (ug/kg)							
Diesel Range Organics	NA	NA	NA	12,000	11,000	5,300 J	6,900 U
Gasoline Range Organics	NA	NA	NA	58 U	32 J	79	55 U
Grain-size							
% Clay	12.2	63	23.8	NA	NA	NA	NA
% Silt	25.9	24.7	25.9	NA	NA	NA	NA
% Gravel	8.4	2.1	4.1	NA	NA	NA	NA
% Sand	53.5	10.2	46.2	NA	NA	NA	NA
Engineering Properties							
Total organic carbon (ug/kg)	NA	NA	NA	NA	NA	NA	NA
DENSITY							
Density (g/ml)	NA	NA	NA	NA	NA	NA	NA

APPENDIX D.1 (continued)

SUBSURFACE SOIL
TOW WAY FUEL FARM
CMS INVESTIGATION
NAVAL STATION ROOSEVELT ROADS, PUERTO RICO

Sample ID	7DP01-14	7DP02-05	7DP02/10	7DP03-01	7DP03-02	7DP04-01	7DP04-03
Sample Date	04/14/98	04/15/98	04/16/98	04/15/98	04/15/98	04/15/98	04/15/98
Depth Range (ft)	27.00-28.50	9.00-10.00		1.00-2.00	3.00-4.00	1.00-3.00	5.00-7.00
BTEX (ug/kg)							
Benzene	1.1 U	1.1 U	NA	1.2 U	1.3 U	1.2 U	1.2 U
Ethylbenzene	1.1 U	1.1 U	NA	1.2 U	1.3 U	1.2 U	10
Toluene	1.1 U	1.1 U	NA	1.2 J	0.68 J	1.2 U	2.3
Xylenes	0.82 J	0.6 J	NA	2.7	1.2 J	1.2 U	10
TPH (ug/kg)							
Diesel Range Organics	15,000	26,000	NA	7,300 U	8,100 U	7,300 U	6,900 U
Gasoline Range Organics	65	54 U	NA	59 U	66 U	61 U	1,100 J
Grain-size							
% Clay	NA	NA	NA	NA	31.3	NA	NA
% Silt	NA	NA	NA	NA	32.7	NA	NA
% Gravel	NA	NA	NA	NA	0.7	NA	NA
% Sand	NA	NA	NA	NA	35.3	NA	NA
Engineering Properties							
Total organic carbon (ug/kg)	NA	NA	NA	NA	0.77	NA	NA
DENSITY							
Density (g/ml)	NA	NA	1.05	NA	1.4	NA	1.37

APPENDIX D.1 (continued)

SUBSURFACE SOIL
TOW WAY FUEL FARM
CMS INVESTIGATION
NAVAL STATION ROOSEVELT ROADS, PUERTO RICO

Sample ID	7DP05-02	7DP05-01	7DP05-05	7DP06-01	7DP06-05	7DP07-01	7DP07-04
Sample Date	04/15/98	04/15/98	04/15/98	04/15/98	04/15/98	04/15/98	04/15/98
Depth Range (ft)	3.00-5.00	2.00-3.00	9.00-11.00	0.00-4.00	8.00-12.00	0.00-4.00	4.00-8.00
BTEX (ug/kg)							
Benzene	NA	1.1 U	1.1 U	1.2 U	4.5	1.2 U	28 J
Ethylbenzene	NA	1.1 U	1.1 U	1.2 U	3.8	1.2 U	12,000
Toluene	NA	1.1 U	1.1 U	1.2 U	0.92 J	1.2 U	37 J
Xylenes	NA	1.1 U	1.1 U	1.2 U	9	1.9	560
TPH (ug/kg)							
Diesel Range Organics	NA	6,600 U	6,900 U	7,600 U	13,000 J	35,000	5,700,000
Gasoline Range Organics	NA	29 J	57 U	61 U	2,100	110	730,000
Grain-size							
% Clay	NA	NA	NA	NA	NA	15.6	NA
% Silt	NA	NA	NA	NA	NA	56.8	NA
% Gravel	NA	NA	NA	NA	NA	0.3	NA
% Sand	NA	NA	NA	NA	NA	27.3	NA
Engineering Properties							
Total organic carbon (ug/kg)	NA	NA	NA	NA	NA	NA	NA
DENSITY							
Density (g/ml)	1.1	NA	NA	NA	NA	NA	NA

APPENDIX D.1 (continued)

SUBSURFACE SOIL
TOW WAY FUEL FARM
CMS INVESTIGATION
NAVAL STATION ROOSEVELT ROADS, PUERTO RICO

Sample ID	7DP07-06	7DP08-01	7DP08-04	7DP09	7DP09-03	7DP10-01	7DP10-03
Sample Date	04/15/98	04/15/98	04/15/98	04/16/98	04/16/98	04/16/98	04/16/98
Depth Range (ft)	12.00-14.00	0.00-4.00	4.00-8.00	0.00-9.00	5.00-7.00	1.00-2.00	5.00-7.00
BTEX (ug/kg)							
Benzene	6.2 U	1.1 U	1.1 U	NA	2.5 U	1.2 U	12 U
Ethylbenzene	31 J	1.1 U	1.1 U	NA	2.5 U	1.2 U	180 J
Toluene	24 J	1.1 U	1.1 U	NA	2.5 U	1.2 U	190 J
Xylenes	53 J	0.75 J	1.1 U	NA	1.7 J	1.2	450 J
TPH (ug/kg)							
Diesel Range Organics	270,000 J	6,700 UJ	6,700 U	NA	7,900 U	7,100 U	8,400,000
Gasoline Range Organics	60,000	54 U	56 U	NA	640	51 J	220,000
Grain-size							
% Clay	NA	NA	NA	15.3	NA	NA	NA
% Silt	NA	NA	NA	38	NA	NA	NA
% Gravel	NA	NA	NA	7.6	NA	NA	NA
% Sand	NA	NA	NA	39.1	NA	NA	NA
Engineering Properties							
Total organic carbon (ug/kg)	NA	0.34	NA	NA	NA	NA	NA
DENSITY							
Density (g/ml)	NA	1	NA	NA	NA	NA	NA

APPENDIX D.1 (continued)

SUBSURFACE SOIL
TOW WAY FUEL FARM
CMS INVESTIGATION
NAVAL STATION ROOSEVELT ROADS, PUERTO RICO

Sample ID	7DP10-05	7DP11-02	7DP11-05	7DP12-01	7DP13-02	7DP14-01	7DP15-02
Sample Date	04/16/98	04/16/98	04/16/98	04/16/98	04/16/98	04/16/98	04/17/98
Depth Range (ft)	10.00-12.00	4.00-6.00	10.00-12.00	1.00-3.00	4.00-5.50	1.00-3.00	3.00-5.00
BTEX (ug/kg)							
Benzene	6 U	1.2 U	10 J	1.1 U	1.2 U	1.2 U	150 J
Ethylbenzene	41	1.2 U	140 J	1.1 U	1.2 U	1.2 U	2,300
Toluene	8.4	1.2 U	15 J	1.1 U	1.2 U	1.2 U	680
Xylenes	54	1.2 U	170 J	1.1 U	0.7 J	0.17 J	2,300
TPH (ug/kg)							
Diesel Range Organics	2,300,000	93,000	1,100,000	19,000	5,800 J	7,500 U	7,900,000 J
Gasoline Range Organics	180,000	62 U	280,000	56 U	58 U	60 U	540,000
Grain-size							
% Clay	NA	NA	NA	NA	NA	NA	NA
% Silt	NA	NA	NA	NA	NA	NA	NA
% Gravel	NA	NA	NA	NA	NA	NA	NA
% Sand	NA	NA	NA	NA	NA	NA	NA
Engineering Properties							
Total organic carbon (ug/kg)	NA	NA	NA	NA	NA	0.09	NA
DENSITY							
Density (g/ml)	NA	NA	NA	NA	NA	NA	NA

APPENDIX D.1 (continued)

SUBSURFACE SOIL
TOW WAY FUEL FARM
CMS INVESTIGATION
NAVAL STATION ROOSEVELT ROADS, PUERTO RICO

Sample ID	7DP15-04	7DP15-07	7DP16-03	7DP16-05	7DP17-02	7DP17-04	7DP18-02
Sample Date	04/17/98	04/17/98	04/17/98	04/17/98	04/17/98	04/17/98	04/17/98
Depth Range (ft)	6.00-8.00	12.00-14.00	2.00-6.00	10.00-12.00	3.00-6.00	7.00-9.00	4.00-6.00
BTEX (ug/kg)							
Benzene	340 U	140 U	2.8 U	1.1 U	1.3 U	1.2 U	1.2 U
Ethylbenzene	3,400	140 U	2.8 U	1.1 U	1.3 U	1.2 U	1.2 U
Toluene	340 U	140 U	2.8 U	1.1 U	1.3 U	1.2 U	1.2 U
Xylenes	2,000	910 J	9.5	0.82 J	1.8	1.2 U	0.82 J
TPH (ug/kg)							
Diesel Range Organics	22,000,000	9,400,000	9,500,000	3,800 J	5,500 J	5,500 J	7,400 U
Gasoline Range Organics	660,000	340,000	1,200	46 J	95	60 U	61 U
Grain-size							
% Clay	NA	NA	NA	NA	NA	NA	NA
% Silt	NA	NA	NA	NA	NA	NA	NA
% Gravel	NA	NA	NA	NA	NA	NA	NA
% Sand	NA	NA	NA	NA	NA	NA	NA
Engineering Properties							
Total organic carbon (ug/kg)	NA	NA	NA	NA	NA	0.053	NA
DENSITY							
Density (g/ml)	NA	NA	NA	NA	NA	NA	NA

APPENDIX D.1 (continued)

SUBSURFACE SOIL
TOW WAY FUEL FARM
CMS INVESTIGATION
NAVAL STATION ROOSEVELT ROADS, PUERTO RICO

Sample ID	7DP19-03	7DP19-06	7DP19-08	7DP20	7DP20-02	7DP20-05	7DP21-01
Sample Date	04/17/98	04/17/98	04/17/98	04/17/98	04/17/98	04/17/98	04/18/98
Depth Range (ft)	5.00-7.00	12.00-14.00	16.00-18.00	0.00-9.00	3.00-5.00	10.00-12.00	1.00-3.00
BTEX (ug/kg)							
Benzene	6.2 U	1.2 J	1.3 U	NA	1.2 U	1.2 U	1.3 U
Ethylbenzene	6.2 U	7.4	0.79 J	NA	1.2 U	1.2 U	1.3 U
Toluene	6.2 U	2.8	0.81 J	NA	1.2 U	1.2 U	1.3 U
Xylenes	12	35	3.9	NA	1.2 U	1.2 U	0.71 J
TPH (ug/kg)							
Diesel Range Organics	3,200,000	15,000	8,100 U	NA	7,100 U	5,300 J	8,000 U
Gasoline Range Organics	3,600	3,800	71	NA	59 U	58 U	49 J
Grain-size							
% Clay	NA	NA	NA	34.6	NA	NA	NA
% Silt	NA	NA	NA	32.3	NA	NA	NA
% Gravel	NA	NA	NA	1.5	NA	NA	NA
% Sand	NA	NA	NA	31.6	NA	NA	NA
Engineering Properties							
Total organic carbon (ug/kg)	NA	NA	NA	NA	NA	NA	0.17
DENSITY							
Density (g/ml)	NA	NA	NA	NA	NA	NA	NA

APPENDIX D.1 (continued)

SUBSURFACE SOIL
TOW WAY FUEL FARM
CMS INVESTIGATION
NAVAL STATION ROOSEVELT ROADS, PUERTO RICO

Sample ID	7DP22-01	7DP23-02	7DP24-02	7DP24-01	7DP24-03	7DP24-05	7DP25-01
Sample Date	04/18/98	04/18/98	04/18/98	04/18/98	04/18/98	04/18/98	04/19/98
Depth Range (ft)	0.00-4.00	3.00-4.00	3.00-5.00	3.00-5.00	5.00-7.00	10.00-11.00	0.00-4.00
BTEX (ug/kg)							
Benzene	1.1 U	1.1 U	NA	1.1 U	1.2 R	1.4 U	160 U
Ethylbenzene	1.1 U	1.1 U	NA	1.1 U	1.2 R	1.4 U	1,300 J
Toluene	1.1 U	1.1 U	NA	1.1 U	1.2 R	1.4 U	160 U
Xylenes	1.1 U	1.1 U	NA	1.1 U	1.2 R	1.4 U	820 J
TPH (ug/kg)							
Diesel Range Organics	6,000 J	6,500 U	NA	5,800 J	7,600 U	8,500 U	3,600,000
Gasoline Range Organics	54 U	53 U	NA	57 U	62 R	160	1,000,000 J
Grain-size							
% Clay	NA	NA	24.4	NA	NA	NA	NA
% Silt	NA	NA	32.8	NA	NA	NA	NA
% Gravel	NA	NA	10.6	NA	NA	NA	NA
% Sand	NA	NA	32.2	NA	NA	NA	NA
Engineering Properties							
Total organic carbon (ug/kg)	NA	0.046	NA	NA	NA	NA	NA
DENSITY							
Density (g/ml)	NA	NA	NA	NA	NA	NA	NA

APPENDIX D.1 (continued)

SUBSURFACE SOIL
TOW WAY FUEL FARM
CMS INVESTIGATION
NAVAL STATION ROOSEVELT ROADS, PUERTO RICO

Sample ID	7DP25-03	7DP25-06	7DP26-02	7DP26-04	7DP26-06	7DP27-01	7DP27-04
Sample Date	04/19/98	04/19/98	04/19/98	04/19/98	04/19/98	04/19/98	04/19/98
Depth Range (ft)	4.00-7.00	10.00-13.00	2.00-4.00	6.00-10.00	12.00-14.00	0.00-4.00	7.00-8.00
BTEX (ug/kg)							
Benzene	5.3 U	140 U	1.2 U	24 J	1.3 U	1.2 U	1.5 U
Ethylbenzene	17	1,700 J	1.2 U	87 J	1.3 U	1.2 U	1.5 U
Toluene	2.7 J	140 U	1.2 U	29 J	1.3 U	1.2 U	1.5 U
Xylenes	43	1,200 J	2.4	370 J	1.3 U	1.2 U	1.5 U
TPH (ug/kg)							
Diesel Range Organics	280,000 J	4,000,000	7,600 U	2,500,000 J	20,000 U	7,200 U	9,100 U
Gasoline Range Organics	64,000	1,100,000 J	720 J	310,000	290	58 U	73 U
Grain-size							
% Clay	NA	NA	NA	NA	NA	NA	NA
% Silt	NA	NA	NA	NA	NA	NA	NA
% Gravel	NA	NA	NA	NA	NA	NA	NA
% Sand	NA	NA	NA	NA	NA	NA	NA
Engineering Properties							
Total organic carbon (ug/kg)	NA	NA	NA	NA	NA	NA	0.39
DENSITY							
Density (g/ml)	NA	NA	NA	NA	NA	NA	NA

APPENDIX D.1 (continued)

SUBSURFACE SOIL
TOW WAY FUEL FARM
CMS INVESTIGATION
NAVAL STATION ROOSEVELT ROADS, PUERTO RICO

Sample ID	7DP28-01	7DP29-01	7DP29-04	7DP30-01	7DP30-03
Sample Date	04/19/98	04/19/98	04/19/98	04/19/98	04/19/98
Depth Range (ft)	1.00-3.00	1.00-3.00	7.00-8.00	1.00-3.00	5.00-6.00
BTEX (ug/kg)					
Benzene	1.1 U	1.3 U	1.3 U	1.1 U	1.1 U
Ethylbenzene	1.1 U	1.3 U	1.3 U	1.1 U	1.1 U
Toluene	1.1 U	1.3 U	1.3 U	1.1 U	1.1 U
Xylenes	1.1 U	1.3 U	1.3 U	1.1 U	1.1 U
TPH (ug/kg)					
Diesel Range Organics	15,000	14,000	8,200 U	6,800 U	7,100 UJ
Gasoline Range Organics	54 U	65 U	67 U	55 U	36 J
Grain-size					
% Clay	29.2	28.2	NA	NA	NA
% Silt	35.9	54.7	NA	NA	NA
% Gravel	2.2	2.7	NA	NA	NA
% Sand	32.7	14.4	NA	NA	NA
Engineering Properties					
Total organic carbon (ug/kg)	0.051	NA	NA	NA	NA
DENSITY					
Density (g/ml)	NA	NA	NA	NA	NA

APPENDIX D.2
SOIL GAS

APPENDIX D.2

SOIL GAS
TOW WAY FUEL FARM
CMS INVESTIGATION
NAVAL STATION ROOSEVELT ROADS, PUERTO RICO

Sample ID	7DP19	7DP18	7DP17	7DP20	7DP21	7DP25	7DP24	7DP29	7DP30	7DP26
Sample Date	04/21/98	04/21/98	04/21/98	04/21/98	04/21/98	04/21/98	04/21/98	04/21/98	04/21/98	04/21/98
TPH (ppmv)										
Diesel Range Organics	9 U	9 U	9 U	9 U	9 U	9 U	9 U	9 U	9 U	9 U
Gasoline Range Organ	15	3.6 U	3.6 U	3.6 U	23	45	3.6 U	3.6 U	3.6 U	5.6
Soil Gas										
Carbon Dioxide (%)	20.8	0.9	3	1.6	4.7	0	2.1	1.8	1.1	4.8
Oxygen (%)	7.6	23.8	21.7	24.1	17.5	25.4	22.7	23.4	24	16

APPENDIX D.3
GROUNDWATER

APPENDIX D.3

GROUNDWATER
TOW WAY FUEL FARM
CMS INVESTIGATION
NAVAL STATION ROOSEVELT ROADS, PUERTO RICO

Sample ID	470-MW1	470-MW3	7MW01A	7MW02	7MW03	7MW04	7MW05	7MW06	7MW07
Sample Date	04/18/98	04/17/98	04/20/98	04/19/98	04/15/98	04/15/98	04/19/98	04/19/98	04/19/98
Volatiles (ug/l)									
Dichlorodifluoromethane	50 U	250 UJ	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U	0.5 UJ
Chloromethane	50 U	250 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Vinyl chloride	50 U	250 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Bromomethane	50 U	250 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Chloroethane	50 U	250 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Trichlorofluoromethane	50 U	250 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1-Dichloroethene	50 U	250 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Methylene chloride	50 U	250 U	0.6 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
trans-1,2-Dichloroethene	50 U	250 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1-Dichloroethane	50 U	250 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
cis-1,2-Dichloroethene	50 U	250 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	6
2,2-Dichloropropane	50 R	250 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Bromochloromethane	50 U	250 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Chloroform	50 U	250 U	34 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1,1-Trichloroethane	50 U	250 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1-Dichloropropene	50 U	250 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Carbon tetrachloride	50 U	250 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Benzene	26,000	18,000	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dichloroethane	50 U	250 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Trichloroethene	50 U	250 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	2,000 J
1,2-Dichloropropane	50 U	250 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Dibromomethane	50 U	250 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Bromodichloromethane	50 U	250 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
cis-1,3-Dichloropropene	50 U	250 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Toluene	7,800	4,400	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
trans-1,3-Dichloropropene	50 U	250 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1,2-Trichloroethane	50 U	250 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5
1,3-Dichloropropane	50 U	250 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Tetrachloroethene	50 U	250 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Dibromochloromethane	50 U	250 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dibromoethane	50 U	250 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Chlorobenzene	50 U	250 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1,1,2-Tetrachloroethane	50 U	250 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Ethylbenzene	2,100	2,900	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U

APPENDIX D.3 (continued)

GROUNDWATER
TOW WAY FUEL FARM
CMS INVESTIGATION
NAVAL STATION ROOSEVELT ROADS, PUERTO RICO

Sample ID	470-MW1	470-MW3	7MW01A	7MW02	7MW03	7MW04	7MW05	7MW06	7MW07
Sample Date	04/18/98	04/17/98	04/20/98	04/19/98	04/15/98	04/15/98	04/19/98	04/19/98	04/19/98
Volatiles (ug/l) (cont)									
m/p-xylene	9,400	13,000	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
o-Xylene	4,600	5,900	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Styrene	50 U	250 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Bromoform	50 U	250 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Isopropylbenzene	130	250 U	0.5 U	2	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1,2,2-Tetrachloroethane	50 U	250 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Bromobenzene	50 U	250 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2,3-Trichloropropane	50 U	250 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
n-Propylbenzene	340	250 U	0.5 U	3	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
2-Chlorotoluene	50 U	250 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,3,5-Trimethylbenzene	1,100	250 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
4-Chlorotoluene	50 U	250 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
tert-Butylbenzene	50 U	250 U	0.5 U	1	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2,4-Trimethylbenzene	3,900	4,600	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
sec-Butylbenzene	50 U	250 U	0.5 U	6	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,3-Dichlorobenzene	50 U	250 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
p-Isopropyltoluene	50 U	250 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,4-Dichlorobenzene	50 U	250 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
n-Butylbenzene	50 U	250 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dichlorobenzene	50 U	250 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dibromo-3-chloropropane	50 U	250 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2,4-Trichlorobenzene	50 U	250 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Hexachlorobutadiene	50 U	250 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Naphthalene	970	250 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2,3-Trichlorobenzene	50 U	250 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
TPH (ug/l)									
Diesel Range Organics	21,000	33,000	120 J	1,400	130 U	150	130 U	140 U	130 U
Gasoline Range Organics	100,000	89,000	76 U	540	50 U	50 U	50 U	50 U	560

APPENDIX D.3 (continued)

GROUNDWATER
TOW WAY FUEL FARM
CMS INVESTIGATION
NAVAL STATION ROOSEVELT ROADS, PUERTO RICO

Sample ID	470-MW1	470-MW3	7MW01A	7MW02	7MW03	7MW04	7MW05	7MW06	7MW07
Sample Date	04/18/98	04/17/98	04/20/98	04/19/98	04/15/98	04/15/98	04/19/98	04/19/98	04/19/98
Engineering Properties (ug/l)									
Alkalinity	1,400,000	728,000	998,000	681,000	354,000	582,000	650,000	900,000	234,000
Nitrate-N by IC	100 U	1,300	10,000 U	100 U	10,000 U	10,000 U	870	10,000 U	770
Sulfate by IC	200 U	200 U	1,200	580	244,000	508,000	112,000	382,000	23,100
Chloride	130,000	1,320,000	1,040,000	80,700	5,280,000	3,000,000	314,000	8,340,000	57,500
Ferrous Iron	1,830	9,750	80	3,540	1,320	740	900	2,900	320
Soil Gas (ppm)									
Methane	17	1.2	0.15	55	0.02	1.4	0.05	0.38	0.75

APPENDIX D.3 (continued)

GROUNDWATER
TOW WAY FUEL FARM
CMS INVESTIGATION
NAVAL STATION ROOSEVELT ROADS, PUERTO RICO

Sample ID	7MW08	7MW09	GW-02	GW-03	GW-04	GW-06	MW-2	MW-4	UGW-10
Sample Date	04/18/98	04/18/98	04/21/98	04/21/98	04/16/98	04/16/98	04/17/98	04/19/98	04/16/98
Volatiles (ug/l)									
Dichlorodifluoromethane	0.5 U	0.5 U	5 UJ	0.5 UJ	12 U	0.5 U	0.5 U	2 U	0.5 U
Chloromethane	0.5 U	0.5 U	5 UJ	0.5 UJ	12 U	0.5 U	0.5 U	2 U	0.5 U
Vinyl chloride	0.5 U	0.5 U	5 UJ	0.5 UJ	12 U	0.5 U	0.5 U	2 U	0.5 U
Bromomethane	0.5 U	0.5 U	5 UJ	0.5 UJ	12 U	0.5 U	0.5 U	2 U	0.5 U
Chloroethane	0.5 U	0.5 U	5 UJ	0.5 UJ	12 U	0.5 U	0.5 U	2 U	0.5 U
Trichlorofluoromethane	0.5 U	0.5 U	5 UJ	0.5 UJ	12 U	0.5 U	0.5 U	2 U	0.5 U
1,1-Dichloroethene	0.5 U	0.5 U	5 UJ	0.5 UJ	12 U	0.5 U	0.5 U	2 U	0.5 U
Methylene chloride	0.5 U	0.5 U	5 UJ	0.5 UJ	12 U	0.5 U	0.5 U	2 U	0.5 U
trans-1,2-Dichloroethene	0.5 U	0.5 U	5 UJ	0.5 UJ	12 U	0.5 U	0.5 U	2 U	0.5 U
1,1-Dichloroethane	0.5 U	0.5 U	5 UJ	0.5 UJ	12 U	0.5 U	0.5 U	2 U	0.5 U
cis-1,2-Dichloroethene	0.5 U	0.5 U	5 UJ	0.5 UJ	12 U	0.5 U	0.5 U	2 U	0.5 U
2,2-Dichloropropane	0.5 R	0.5 U	5 UJ	0.5 UJ	12 U	0.5 U	0.5 U	2 U	0.5 U
Bromochloromethane	0.5 U	0.5 U	5 UJ	0.5 UJ	12 U	0.5 U	0.5 U	2 U	0.5 U
Chloroform	0.5 U	0.5 U	5 UJ	0.5 UJ	12 U	0.5 U	0.5 U	2 U	0.5 U
1,1,1-Trichloroethane	0.5 U	0.5 U	5 UJ	0.5 UJ	12 U	0.5 U	0.5 U	2 U	0.5 U
1,1-Dichloropropene	0.5 U	0.5 U	5 UJ	0.5 UJ	12 U	0.5 U	0.5 U	2 U	0.5 U
Carbon tetrachloride	0.5 U	0.5 U	5 UJ	0.5 UJ	12 U	0.5 U	0.5 U	2 U	0.5 U
Benzene	0.5 U	0.5 U	3,000	0.5 UJ	12 U	0.5 U	0.8 J	2	0.5 U
1,2-Dichloroethane	0.5 U	0.5 U	5 UJ	0.5 UJ	12 U	0.5 U	0.5 U	2 U	0.5 U
Trichloroethene	3	0.5 U	5 UJ	0.5 UJ	12 U	0.5 U	0.5 U	2 U	0.5 U
1,2-Dichloropropane	0.5 U	0.5 U	5 UJ	0.5 UJ	12 U	0.5 U	0.5 U	2 U	0.5 U
Dibromomethane	0.5 U	0.5 U	5 UJ	0.5 UJ	12 U	0.5 U	0.5 U	2 U	0.5 U
Bromodichloromethane	0.5 U	0.5 U	5 UJ	0.5 UJ	12 U	0.5 U	0.5 U	2 U	0.8
cis-1,3-Dichloropropene	0.5 U	0.5 U	5 UJ	0.5 UJ	12 U	0.5 U	0.5 U	2 U	0.5 U
Toluene	0.5 U	0.5 U	85 J	0.5 UJ	12 U	0.5 U	0.5 U	2 U	0.5 U
trans-1,3-Dichloropropene	0.5 U	0.5 U	5 UJ	0.5 UJ	12 U	0.5 U	0.5 U	2 U	0.5 U
1,1,2-Trichloroethane	0.5 U	0.5 U	5 UJ	0.5 UJ	12 U	0.5 U	0.5 U	2 U	0.5 U
1,3-Dichloropropane	0.5 U	0.5 U	5 UJ	0.5 UJ	12 U	0.5 U	0.5 U	2 U	0.5 U
Tetrachloroethene	0.5 U	0.5 U	5 UJ	0.5 UJ	12 U	0.5 U	0.5 U	2 U	0.5 U
Dibromochloromethane	0.5 U	0.5 U	5 UJ	0.5 UJ	12 U	0.5 U	0.5 U	2 U	0.5 U
1,2-Dibromoethane	0.5 U	0.5 U	5 UJ	0.5 UJ	12 U	0.5 U	0.5 U	2 U	0.5 U
Chlorobenzene	0.5 U	0.5 U	5 UJ	0.5 UJ	12 U	0.5 U	0.5 U	2 U	0.5 U
1,1,1,2-Tetrachloroethane	0.5 U	0.5 U	5 UJ	0.5 UJ	12 U	0.5 U	0.5 U	2 U	0.5 U
Ethylbenzene	0.5 U	0.5 U	820	0.5 UJ	12 U	0.5 U	2 J	40	0.5 U

APPENDIX D.3 (continued)

GROUNDWATER
TOW WAY FUEL FARM
CMS INVESTIGATION
NAVAL STATION ROOSEVELT ROADS, PUERTO RICO

Sample ID	7MW08	7MW09	GW-02	GW-03	GW-04	GW-06	MW-2	MW-4	UGW-10
Sample Date	04/18/98	04/18/98	04/21/98	04/21/98	04/16/98	04/16/98	04/17/98	04/19/98	04/16/98
Volatiles (ug/l) (cont)									
m/p-xylene	0.5 U	0.5 U	760 J	0.5 UJ	12 U	0.5 U	0.5 U	28	0.5 U
o-Xylene	0.5 U	0.5 U	270 J	0.5 UJ	12 U	0.5 U	0.5 U	2 U	0.5 U
Styrene	0.5 U	0.5 U	5 UJ	0.5 UJ	12 U	0.5 U	0.5 U	2 U	0.5 U
Bromoform	0.5 U	0.5 U	5 UJ	0.5 UJ	12 U	0.5 U	0.5 U	2 U	0.5 U
Isopropylbenzene	0.5 U	0.5 U	69 J	0.5 J	12 U	0.5 U	15 J	34	3
1,1,2,2-Tetrachloroethane	0.5 U	0.5 U	5 UJ	0.5 UJ	12 U	0.5 U	0.5 U	2 U	0.5 U
Bromobenzene	0.5 U	0.5 U	5 UJ	0.5 UJ	12 U	0.5 U	0.5 U	2 U	0.5 U
1,2,3-Trichloropropane	0.5 U	0.5 U	5 UJ	0.5 UJ	12 U	0.5 U	0.5 U	2 U	0.5 U
n-Propylbenzene	0.5 U	0.5 U	220 J	0.8 J	12 U	0.5 U	25 J	68	3
2-Chlorotoluene	0.5 U	0.5 U	5 UJ	0.5 UJ	12 U	0.5 U	0.5 U	2 U	0.5 U
1,3,5-Trimethylbenzene	0.5 U	0.5 U	300 J	1 J	12 U	0.5 U	2 J	54	0.5 U
4-Chlorotoluene	0.5 U	0.5 U	5 UJ	0.5 UJ	12 U	0.5 U	0.5 U	2 U	0.5 U
tert-Butylbenzene	0.5 U	0.5 U	5 UJ	0.5 UJ	12 U	0.5 U	0.5 U	2 U	0.5 U
1,2,4-Trimethylbenzene	0.5 U	0.5 U	740 J	5 J	12 U	0.5 U	8 J	120	0.5 U
sec-Butylbenzene	0.5 U	0.5 U	5 UJ	1 J	35	0.5 U	13 J	70	2
1,3-Dichlorobenzene	0.5 U	0.5 U	5 UJ	0.5 UJ	12 U	0.5 U	0.5 U	2 U	0.5 U
p-Isopropyltoluene	0.5 U	0.5 U	11 J	0.6 J	12 U	0.5 U	3 J	46	0.5 U
1,4-Dichlorobenzene	0.5 U	0.5 U	5 UJ	0.5 UJ	12 U	0.5 U	0.5 U	2 U	0.5 U
n-Butylbenzene	0.5 U	0.5 U	59 J	2 J	12 U	0.5 U	12 J	2 U	2
1,2-Dichlorobenzene	0.5 U	0.5 U	5 UJ	0.5 UJ	12 U	0.5 U	0.5 U	2 U	0.5 U
1,2-Dibromo-3-chloropropane	0.5 U	0.5 U	5 UJ	0.5 UJ	12 U	0.5 U	0.5 U	2 U	0.5 U
1,2,4-Trichlorobenzene	0.5 U	0.5 U	5 UJ	0.5 UJ	12 U	0.5 U	0.5 U	2 U	0.5 U
Hexachlorobutadiene	0.5 U	0.5 U	5 UJ	0.5 UJ	12 U	0.5 U	0.5 U	2 U	0.5 U
Naphthalene	18	0.5 U	89 J	7 J	12 U	0.5 U	110 J	430 J	0.5 U
1,2,3-Trichlorobenzene	0.5 U	0.5 U	5 UJ	0.5 UJ	12 U	0.5 U	0.5 U	2 U	0.5 U
TPH (ug/l)									
Diesel Range Organics	360	100 J	4,700	3,100 J	270,000	320	29,000	250,000	1,600
Gasoline Range Organics	34 J	50 U	23,000	140 U	24,000	50 U	1,000 U	28,000	280 U

APPENDIX D.3 (continued)

GROUNDWATER
TOW WAY FUEL FARM
CMS INVESTIGATION
NAVAL STATION ROOSEVELT ROADS, PUERTO RICO

Sample ID	7MW08	7MW09	GW-02	GW-03	GW-04	GW-06	MW-2	MW-4	UGW-10
Sample Date	04/18/98	04/18/98	04/21/98	04/21/98	04/16/98	04/16/98	04/17/98	04/19/98	04/16/98
Engineering Properties (ug/l)									
Alkalinity	473,000	936,000	894,000	676,000	515,000	478,000	494,000	832,000	796,000
Nitrate-N by IC	1,300	640	190	10,000 U	100 U	20,000 U	100 U	290	100 U
Sulfate by IC	223,000	188,000	6,500	445,000	440	681,000	400	200 U	930
Chloride	1,630,000	831,000	463,000	2,710,000	14,500	3,920,000	44,300	86,400	77,100
Ferrous Iron	190	0	140	1,020	290	2,340	440	5,000	550
Soil Gas (ppm)									
Methane	0.058	0.28	5.5	0.67	43	0.07	22	41	27

APPENDIX D.3 (continued)

GROUNDWATER
TOW WAY FUEL FARM
CMS INVESTIGATION
NAVAL STATION ROOSEVELT ROADS, PUERTO RICO

Sample ID	UGW-11	UGW-12	UGW-13	UGW-14	UGW-15	UGW-16	UGW-17	UGW-18	UGW-19
Sample Date	04/17/98	04/20/98	04/21/98	04/19/98	04/15/98	04/16/98	04/21/98	04/16/98	04/17/98
Volatiles (ug/l)									
Dichlorodifluoromethane	0.5 UJ	25 U	12 UJ	0.5 U	0.5 U	0.5 U	50 UJ	0.5 U	5 UJ
Chloromethane	0.5 UJ	25 U	12 UJ	0.5 U	0.5 U	0.5 U	50 UJ	0.5 U	5 UJ
Vinyl chloride	0.5 UJ	25 U	12 UJ	0.5 U	0.5 U	0.5 U	50 UJ	0.5 U	5 UJ
Bromomethane	0.5 UJ	25 U	12 UJ	0.5 U	0.5 U	0.5 U	50 UJ	0.5 U	5 UJ
Chloroethane	0.5 UJ	25 U	12 UJ	0.5 U	0.5 U	0.5 U	50 UJ	0.5 U	5 UJ
Trichlorofluoromethane	0.5 UJ	25 U	12 UJ	0.5 U	0.5 U	0.5 U	50 UJ	0.5 U	5 UJ
1,1-Dichloroethene	0.5 UJ	25 U	12 UJ	0.5 U	0.5 U	2	50 UJ	0.5 U	5 UJ
Methylene chloride	0.5 UJ	25 U	12 UJ	0.5 U	0.5 U	0.5 U	50 UJ	0.5 U	5 UJ
trans-1,2-Dichloroethene	0.5 UJ	25 U	12 UJ	0.5 U	0.5 U	0.5 U	50 UJ	0.5 U	5 UJ
1,1-Dichloroethane	0.5 UJ	25 U	12 UJ	0.5 U	0.5 U	0.5 U	50 UJ	0.5 U	5 UJ
cis-1,2-Dichloroethene	0.5 UJ	25 U	12 UJ	0.5 U	0.5 U	0.5 U	50 UJ	0.5 U	5 UJ
2,2-Dichloropropane	0.5 UJ	25 U	12 UJ	0.5 U	0.5 U	0.5 U	50 UJ	0.5 U	5 UJ
Bromochloromethane	0.5 UJ	25 U	12 UJ	0.5 U	0.5 U	0.5 U	50 UJ	0.5 U	5 UJ
Chloroform	0.5 UJ	25 U	12 UJ	0.5 U	0.5 U	0.5 U	50 UJ	2	5 UJ
1,1,1-Trichloroethane	0.5 UJ	25 U	12 UJ	0.5 U	0.5 U	0.5 U	50 UJ	0.5 U	5 UJ
1,1-Dichloropropene	0.5 UJ	25 U	12 UJ	0.5 U	0.5 U	0.5 U	50 UJ	0.5 U	5 UJ
Carbon tetrachloride	0.5 UJ	25 U	12 UJ	0.5 U	0.5 U	0.5 U	50 UJ	0.5 U	5 UJ
Benzene	0.8 J	25 U	12 UJ	0.5 U	0.5 U	0.5 U	50 UJ	0.5 U	5 UJ
1,2-Dichloroethane	0.5 UJ	25 U	12 UJ	0.5 U	0.5 U	0.5 U	50 UJ	0.5 U	5 UJ
Trichloroethene	0.5 UJ	25 U	12 UJ	0.5 U	0.5 U	0.5 U	50 UJ	0.5 U	5 UJ
1,2-Dichloropropane	0.5 UJ	25 U	12 UJ	0.5 U	0.5 U	0.5 U	50 UJ	0.5 U	5 UJ
Dibromomethane	0.5 UJ	25 U	12 UJ	0.5 U	0.5 U	0.5 U	50 UJ	0.5 U	5 UJ
Bromodichloromethane	0.5 UJ	25 U	12 UJ	0.5 U	0.5 U	0.5 U	50 UJ	0.5 U	5 UJ
cis-1,3-Dichloropropene	0.5 UJ	25 U	12 UJ	0.5 U	0.5 U	0.5 U	50 UJ	0.5 U	5 UJ
Toluene	0.5 UJ	25 U	12 UJ	0.5 U	0.5 U	0.5 U	50 UJ	0.5 U	5 UJ
trans-1,3-Dichloropropene	0.5 UJ	25 U	12 UJ	0.5 U	0.5 U	0.5 U	50 UJ	0.5 U	5 UJ
1,1,2-Trichloroethane	0.5 UJ	25 U	12 UJ	0.5 U	0.5 U	0.5 U	50 UJ	0.5 U	5 UJ
1,3-Dichloropropane	0.5 UJ	25 U	12 UJ	0.5 U	0.5 U	0.5 U	50 UJ	0.5 U	5 UJ
Tetrachloroethene	0.5 UJ	25 U	12 UJ	0.5 U	0.5 U	0.5 U	50 UJ	0.5 U	5 UJ
Dibromochloromethane	0.5 UJ	25 U	12 UJ	0.5 U	0.5 U	0.5 U	50 UJ	0.5 U	5 UJ
1,2-Dibromoethane	0.5 UJ	25 U	12 UJ	0.5 U	0.5 U	0.5 U	50 UJ	0.5 U	5 UJ
Chlorobenzene	0.5 UJ	25 U	12 UJ	0.5 U	0.5 U	0.5 U	50 UJ	0.5 U	5 UJ
1,1,1,2-Tetrachloroethane	0.5 UJ	25 U	12 UJ	0.5 U	0.5 U	0.5 U	50 UJ	0.5 U	5 UJ
Ethylbenzene	2 J	120	86 J	2	0.5 U	0.5 U	50 UJ	0.5 U	5 UJ

APPENDIX D.3 (continued)

GROUNDWATER
TOW WAY FUEL FARM
CMS INVESTIGATION
NAVAL STATION ROOSEVELT ROADS, PUERTO RICO

Sample ID	UGW-11	UGW-12	UGW-13	UGW-14	UGW-15	UGW-16	UGW-17	UGW-18	UGW-19
Sample Date	04/17/98	04/20/98	04/21/98	04/19/98	04/15/98	04/16/98	04/21/98	04/16/98	04/17/98
Volatiles (ug/l) (cont)									
m/p-xylene	0.5 UJ	170	86 J	0.5 U	0.5 U	0.5 U	50 UJ	0.5 U	11 J
o-Xylene	0.5 UJ	25 U	12 UJ	0.5 U	0.5 U	0.5 U	50 UJ	0.5 U	5 UJ
Styrene	0.5 UJ	25 U	12 UJ	0.5 U	0.5 U	0.5 U	50 UJ	0.5 U	5 UJ
Bromoform	0.5 UJ	25 U	12 UJ	0.5 U	0.5 U	0.5 U	50 UJ	0.5 U	5 UJ
Isopropylbenzene	12 J	44	69 J	8	0.6	0.5 U	50 UJ	0.5 U	15 J
1,1,2,2-Tetrachloroethane	0.5 UJ	25 U	12 UJ	0.5 U	0.5 U	0.5 U	50 UJ	0.5 U	5 UJ
Bromobenzene	0.5 UJ	25 U	12 UJ	0.5 U	0.5 U	0.5 U	50 UJ	0.5 U	5 UJ
1,2,3-Trichloropropane	0.5 UJ	25 U	12 UJ	0.5 U	0.5 U	0.5 U	50 UJ	0.5 U	5 UJ
n-Propylbenzene	20 J	92	150 J	15	0.5 U	0.5 U	50 UJ	0.5 U	18 J
2-Chlorotoluene	0.5 UJ	25 U	12 UJ	0.5 U	0.5 U	0.5 U	50 UJ	0.5 U	5 UJ
1,3,5-Trimethylbenzene	3 J	180	250 J	0.5 U	0.5 U	0.5 U	50 UJ	0.5 U	72 J
4-Chlorotoluene	0.5 UJ	25 U	12 UJ	0.5 U	0.5 U	0.5 U	50 UJ	0.5 U	5 UJ
tert-Butylbenzene	0.5 UJ	25 U	12 UJ	0.5 U	0.5 U	0.5 U	50 UJ	0.5 U	5 UJ
1,2,4-Trimethylbenzene	9 J	780	12 UJ	0.5 U	0.5 U	0.5 U	150 J	0.5 U	310 J
sec-Butylbenzene	13 J	81	160 J	18	0.5 U	0.5 U	62 J	0.5 U	21 J
1,3-Dichlorobenzene	0.5 UJ	25 U	12 UJ	0.5 U	0.5 U	0.5 U	50 UJ	0.5 U	5 UJ
p-Isopropyltoluene	0.5 UJ	93	170 J	0.5 U	0.5 U	0.5 U	50 UJ	0.5 U	27 UJ
1,4-Dichlorobenzene	0.5 UJ	25 U	12 UJ	0.5 U	0.5 U	0.5 U	50 UJ	0.5 U	5 UJ
n-Butylbenzene	14 J	210	360 J	0.5 U	0.5 U	0.5 U	92 J	0.5 U	5 UJ
1,2-Dichlorobenzene	0.5 UJ	25 U	12 UJ	0.5 U	0.5 U	0.5 U	50 UJ	0.5 U	5 UJ
1,2-Dibromo-3-chloropropane	0.5 UJ	25 U	12 UJ	0.5 U	0.5 U	0.5 U	50 UJ	0.5 U	5 UJ
1,2,4-Trichlorobenzene	0.5 UJ	25 U	530 J	0.5 U	0.5 U	0.5 U	50 UJ	0.5 U	5 UJ
Hexachlorobutadiene	0.5 UJ	25 U	12 UJ	0.5 U	0.5 U	0.5 U	50 UJ	0.5 U	5 UJ
Naphthalene	260 J	690	760 J	22	0.5 U	0.5 U	250 J	0.5 U	290 J
1,2,3-Trichlorobenzene	0.5 UJ	25 U	12 UJ	0.5 U	0.5 U	0.5 U	50 UJ	0.5 U	5 UJ
TPH (ug/l)									
Diesel Range Organics	24,000	390,000	120,000	3,600	180	130 U	180,000	120 U	22,000
Gasoline Range Organics	3,600	9,800	15,000 J	2,500	110	48 U	3,400	31 U	7,200

APPENDIX D.3 (continued)

GROUNDWATER
TOW WAY FUEL FARM
CMS INVESTIGATION
NAVAL STATION ROOSEVELT ROADS, PUERTO RICO

Sample ID	UGW-11	UGW-12	UGW-13	UGW-14	UGW-15	UGW-16	UGW-17	UGW-18	UGW-19
Sample Date	04/17/98	04/20/98	04/21/98	04/19/98	04/15/98	04/16/98	04/21/98	04/16/98	04/17/98
Engineering Properties (ug/l)									
Alkalinity	510,000	629,000	281,000	1,030,000	936,000	317,000	598,000	156,000	458,000
Nitrate-N by IC	440	5,000 U	100 U	2,100	20,000 U	420	100 U	760	100 U
Sulfate by IC	255,000	610	1,200	17,700	497,000	60,700	9,500	110,000	260
Chloride	804,000	123,000	357,000	1,500,000	6,150,000	125,000	81,000	543,000	14,100
Ferrous Iron	1,630	3,000	2,030	2,110	700	90	460	510	2,320
Soil Gas (ppm)									
Methane	5.8	37	26	17	1	0.024	17	0.004	18

APPENDIX D.3 (continued)

GROUNDWATER
TOW WAY FUEL FARM
CMS INVESTIGATION
NAVAL STATION ROOSEVELT ROADS, PUERTO RICO

Sample ID	UGW-2	UGW-20	UGW-21	UGW-23	UGW-24	UGW-25	UGW-26	UGW-3	UGW-4
Sample Date	04/15/98	04/14/98	04/17/98	04/18/98	04/19/98	04/19/98	04/20/98	04/20/98	04/20/98
Volatiles (ug/l)									
Dichlorodifluoromethane	50 U	0.5 UJ	250 UJ	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U	12 U
Chloromethane	50 U	0.5 U	250 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	12 U
Vinyl chloride	50 U	0.5 U	250 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	12 U
Bromomethane	50 U	0.5 U	250 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	12 U
Chloroethane	50 U	0.5 U	250 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	12 U
Trichlorofluoromethane	50 U	0.5 U	250 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	12 U
1,1-Dichloroethene	50 U	0.5 U	250 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	12 U
Methylene chloride	54	0.5 U	250 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	12 U
trans-1,2-Dichloroethene	50 U	0.5 U	250 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	12 U
1,1-Dichloroethane	50 U	0.5 U	250 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	12 U
cis-1,2-Dichloroethene	50 U	0.5 U	250 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	12 U
2,2-Dichloropropane	50 U	0.5 U	250 U	0.5 R	0.5 U	0.5 U	0.5 U	0.5 U	12 U
Bromochloromethane	50 U	0.5 U	250 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	12 U
Chloroform	50 U	0.5 U	250 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	12 U
1,1,1-Trichloroethane	50 U	0.5 U	250 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	12 U
1,1-Dichloropropene	50 U	0.5 U	250 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	12 U
Carbon tetrachloride	50 U	0.5 U	250 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	12 U
Benzene	50 U	0.5 U	250 U	0.5 U	0.5 U	13	0.5 U	9	12 U
1,2-Dichloroethane	50 U	0.5 U	250 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	12 U
Trichloroethene	50 U	0.5 U	250 U	0.5 U	2	0.5 U	0.5 U	0.5 U	12 U
1,2-Dichloropropane	50 U	0.5 U	250 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	12 U
Dibromomethane	50 U	0.5 U	250 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	12 U
Bromodichloromethane	50 U	0.5 U	250 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	12 U
cis-1,3-Dichloropropene	50 U	0.5 U	250 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	12 U
Toluene	50 U	0.5 U	250 U	0.5 U	0.5 U	1	0.5 U	3	12 U
trans-1,3-Dichloropropene	50 U	0.5 U	250 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	12 U
1,1,2-Trichloroethane	50 U	0.5 U	250 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	12 U
1,3-Dichloropropane	50 U	0.5 U	250 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	12 U
Tetrachloroethene	50 U	0.5 U	250 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	12 U
Dibromochloromethane	50 U	0.5 U	250 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	12 U
1,2-Dibromoethane	50 U	0.5 U	250 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	12 U
Chlorobenzene	50 U	0.5 U	250 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	12 U
1,1,1,2-Tetrachloroethane	50 U	0.5 U	250 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	12 U
Ethylbenzene	78	0.5 U	250 U	0.5 U	0.5 U	7	0.5 U	22	27

APPENDIX D.3 (continued)

GROUNDWATER
TOW WAY FUEL FARM
CMS INVESTIGATION
NAVAL STATION ROOSEVELT ROADS, PUERTO RICO

Sample ID	UGW-2	UGW-20	UGW-21	UGW-23	UGW-24	UGW-25	UGW-26	UGW-3	UGW-4
Sample Date	04/15/98	04/14/98	04/17/98	04/18/98	04/19/98	04/19/98	04/20/98	04/20/98	04/20/98
Volatiles (ug/l) (cont)									
m/p-xylene	50 U	0.5 U	250 U	0.5 U	0.5 U	33	0.5 U	17	42
o-Xylene	50 U	0.5 U	250 U	0.5 U	0.5 U	7	0.5 U	11	12 U
Styrene	50 U	0.5 U	250 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	12 U
Bromoform	50 U	0.5 U	250 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	12 U
Isopropylbenzene	50 U	0.5 U	250 U	0.5 U	0.5 U	19	0.5 U	10	16
1,1,2,2-Tetrachloroethane	50 U	0.5 U	250 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	12 U
Bromobenzene	50 U	0.5 U	250 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	12 U
1,2,3-Trichloropropane	50 U	0.5 U	250 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	12 U
n-Propylbenzene	50 U	0.5 U	250 U	0.5 U	0.5 U	20	0.5 U	16	31
2-Chlorotoluene	50 U	0.5 U	250 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	12 U
1,3,5-Trimethylbenzene	50 U	0.5 U	250 U	0.5 U	0.5 U	54 J	0.5 U	22	57
4-Chlorotoluene	50 U	0.5 U	250 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	12 U
tert-Butylbenzene	50 U	0.5 U	250 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	12 U
1,2,4-Trimethylbenzene	50 U	0.5 U	260	0.5 U	0.5 U	160 J	0.5 U	150	230
sec-Butylbenzene	50 U	0.5 U	250 U	0.5 U	0.5 U	27	0.5 U	10	21
1,3-Dichlorobenzene	50 U	0.5 U	250 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	12 U
p-Isopropyltoluene	50 U	0.5 U	250 U	0.5 U	0.5 U	19	0.5 U	10	23
1,4-Dichlorobenzene	50 U	0.5 U	250 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	12 U
n-Butylbenzene	50 U	0.5 U	250 U	0.5 U	0.5 U	0.5 U	0.5 U	18	12 U
1,2-Dichlorobenzene	50 U	0.5 U	250 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	12 U
1,2-Dibromo-3-chloropropane	50 U	0.5 U	250 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	12 U
1,2,4-Trichlorobenzene	50 U	0.5 U	250 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	12 U
Hexachlorobutadiene	50 U	0.5 U	250 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	12 U
Naphthalene	50 U	0.5 U	250 U	0.5 U	0.5 U	200 J	0.5 U	220	300
1,2,3-Trichlorobenzene	50 U	0.5 U	250 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	12 U
TPH (ug/l)									
Diesel Range Organics	270,000	65 J	79,000	180	91 J	960,000	130 U	32,000	700,000
Gasoline Range Organics	360,000	50 U	420,000 J	41 J	29 J	420,000 J	50 U	2,800	2,400

APPENDIX D.3 (continued)

GROUNDWATER
TOW WAY FUEL FARM
CMS INVESTIGATION
NAVAL STATION ROOSEVELT ROADS, PUERTO RICO

Sample ID	UGW-2	UGW-20	UGW-21	UGW-23	UGW-24	UGW-25	UGW-26	UGW-3	UGW-4
Sample Date	04/15/98	04/14/98	04/17/98	04/18/98	04/19/98	04/19/98	04/20/98	04/20/98	04/20/98
Engineering Properties (ug/l)									
Alkalinity	463,000	962,000	494,000	832,000	749,000	1,010,000	614,000	801,000	1,080,000
Nitrate-N by IC	1,000 U	10,000 U	100 U	3,200	800	670	1,200	10,000 U	5,000 U
Sulfate by IC	4,500	20,200	610	46,600	252,000	37,700	361,000	194,000	2,700
Chloride	5,220,000	7,770,000	40,100	105,000	554,000	241,000	1,150,000	2,340,000	145,000
Ferrous Iron	28,000	9,280	6,960	180	0	3,210	80	1,030	850
Soil Gas (ppm)									
Methane	20	27	42	0.042	0.037	36	0.81	3.2	9.7

APPENDIX D.3 (continued)

GROUNDWATER
TOW WAY FUEL FARM
CMS INVESTIGATION
NAVAL STATION ROOSEVELT ROADS, PUERTO RICO

Sample ID	UGW-5	UGW-6	UGW-7	UGW-8	UGW-9
Sample Date	04/17/98	04/15/98	04/15/98	04/16/98	04/16/98
Volatiles (ug/l)					
Dichlorodifluoromethane	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Chloromethane	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Vinyl chloride	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Bromomethane	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Chloroethane	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Trichlorofluoromethane	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1-Dichloroethene	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Methylene chloride	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
trans-1,2-Dichloroethene	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1-Dichloroethane	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
cis-1,2-Dichloroethene	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
2,2-Dichloropropane	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Bromochloromethane	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Chloroform	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1,1-Trichloroethane	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1-Dichloropropene	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Carbon tetrachloride	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Benzene	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dichloroethane	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Trichloroethene	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dichloropropane	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Dibromomethane	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Bromodichloromethane	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
cis-1,3-Dichloropropene	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Toluene	0.5	0.5 U	0.5 U	0.5 U	0.5 U
trans-1,3-Dichloropropene	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1,2-Trichloroethane	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,3-Dichloropropane	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Tetrachloroethene	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Dibromochloromethane	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dibromoethane	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Chlorobenzene	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1,1,2-Tetrachloroethane	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Ethylbenzene	3	0.5 U	0.5 U	0.5 U	0.5 U

APPENDIX D.3 (continued)

GROUNDWATER
TOW WAY FUEL FARM
CMS INVESTIGATION
NAVAL STATION ROOSEVELT ROADS, PUERTO RICO

Sample ID	UGW-5	UGW-6	UGW-7	UGW-8	UGW-9
Sample Date	04/17/98	04/15/98	04/15/98	04/16/98	04/16/98
Volatiles (ug/l) (cont)					
m/p-xylene	0.6	0.5 U	0.5 U	0.5 U	0.5 U
o-Xylene	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Styrene	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Bromoform	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Isopropylbenzene	33	0.5 U	0.5 U	1	0.5 U
1,1,2,2-Tetrachloroethane	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Bromobenzene	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2,3-Trichloropropane	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
n-Propylbenzene	360 J	0.5 U	0.5 U	0.5 U	0.5 U
2-Chlorotoluene	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,3,5-Trimethylbenzene	18	0.5 U	0.5 U	0.5 U	0.5 U
4-Chlorotoluene	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
tert-Butylbenzene	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2,4-Trimethylbenzene	37	0.5 U	0.5 U	0.5 U	0.5 U
sec-Butylbenzene	24	0.5 U	0.5 U	0.5 U	0.5 U
1,3-Dichlorobenzene	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
p-Isopropyltoluene	15	0.5 U	0.5 U	0.5 U	0.5 U
1,4-Dichlorobenzene	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
n-Butylbenzene	27	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dichlorobenzene	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dibromo-3-chloropropane	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2,4-Trichlorobenzene	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Hexachlorobutadiene	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Naphthalene	430 J	0.5 U	0.5 U	0.5 U	0.5 U
1,2,3-Trichlorobenzene	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
TPH (ug/l)					
Diesel Range Organics	82,000	88 J	120 U	310	180
Gasoline Range Organics	5,000	36 J	35 J	500	29 U

APPENDIX D.3 (continued)

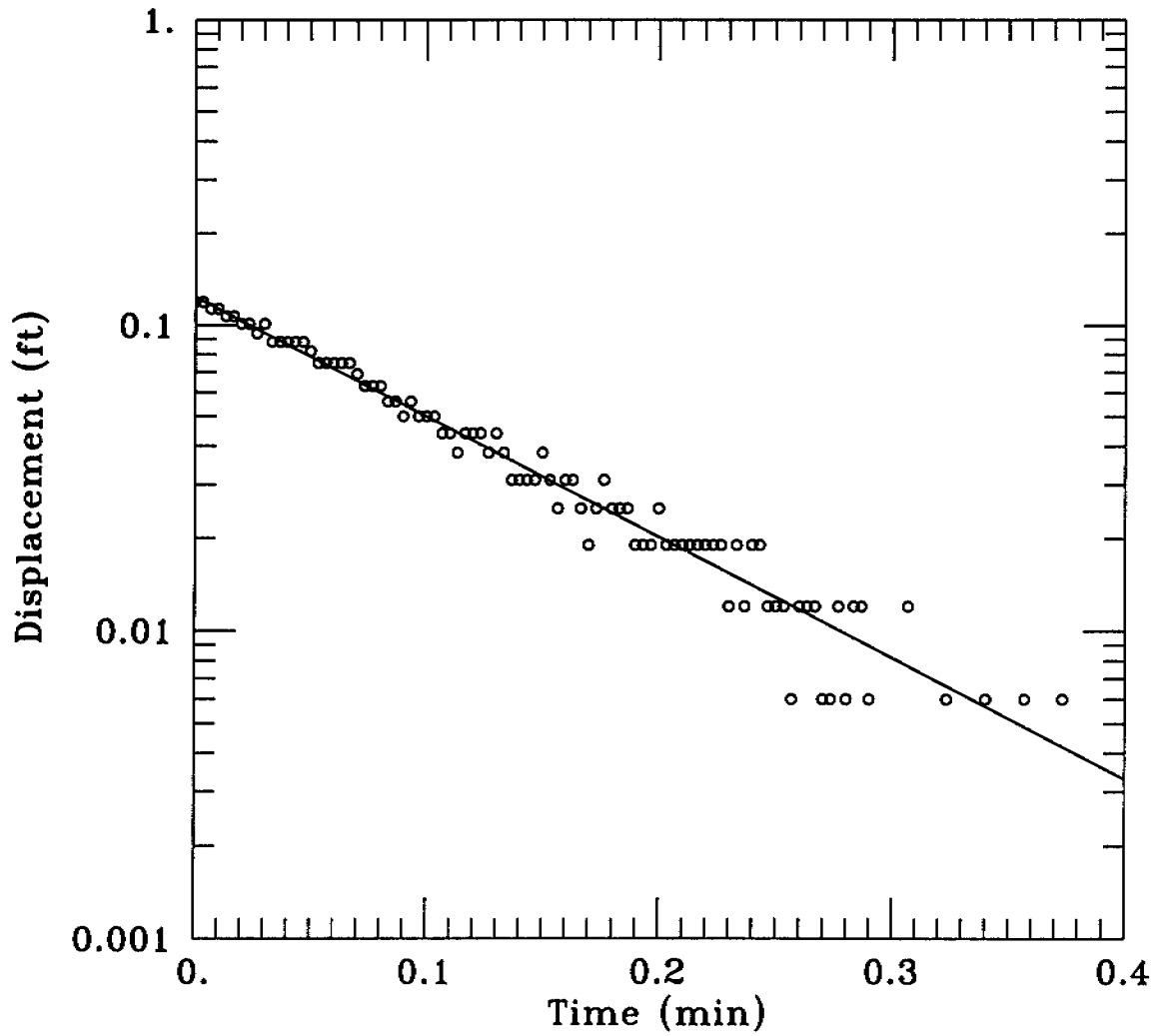
GROUNDWATER
TOW WAY FUEL FARM
CMS INVESTIGATION
NAVAL STATION ROOSEVELT ROADS, PUERTO RICO

Sample ID	UGW-5	UGW-6	UGW-7	UGW-8	UGW-9
Sample Date	04/17/98	04/15/98	04/15/98	04/16/98	04/16/98
Engineering Properties (ug/l)					
Alkalinity	624,000	338,000	988,000	832,000	411,000
Nitrate-N by IC	100 U	100 U	2,200	100 U	110
Sulfate by IC	1,100	9,800	402,000	3,400	86,100
Chloride	117,000	67,900	2,220,000	133,000	183,000
Ferrous Iron	840	250	810	1,750	320
Soil Gas (ppm)					
Methane	34	0.013	3	9.1	0.11

APPENDIX E
WELLHEAD TEST DATA (SLUG TESTS)

Client: LANTDIV	Company: **Baker Environmental, Inc.**
Location: **SWMU 7 – Roosevelt Roads**	Project: **CTO-277**

7MW01A Falling Head Test



DATA SET:
7MW01AF.DAT
05/08/98

AQUIFER MODEL:
Unconfined

SOLUTION METHOD:
Bouwer-Rice

PROJECT DATA:
test date: April 21, 1998

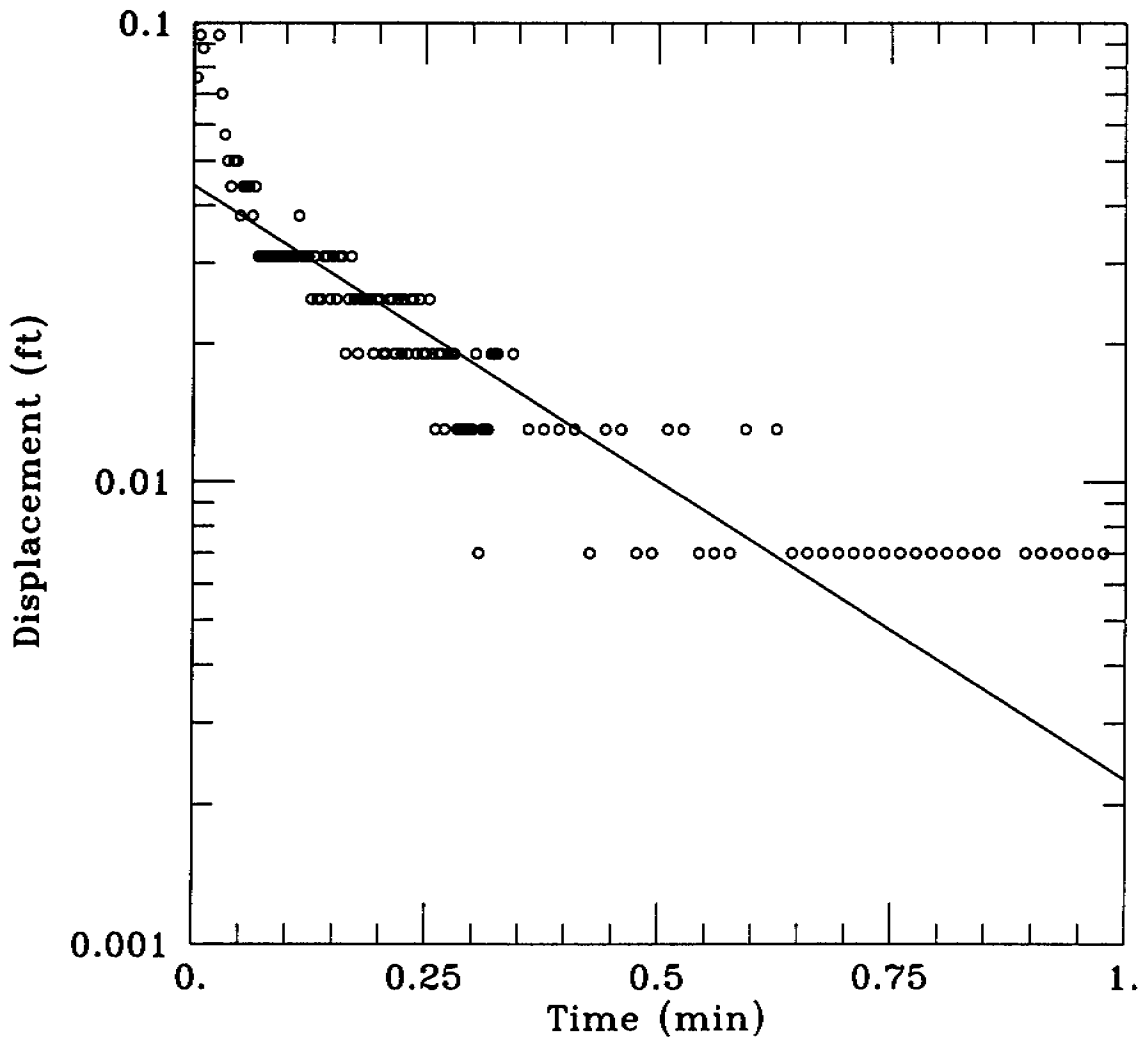
TEST DATA:
H0 = 0.119 ft
rc = 0.083 ft
rw = 0.25 ft
L = 20. ft
b = 47.07 ft
H = 47.07 ft

PARAMETER ESTIMATES:
K = 30.03 ft/day
y0 = 0.1235 ft

AQTESOLV

Client: LANTDIV	Company: Baker Environmental, Inc.
Location: SWMU 7 - Roosevelt Roads	Project: CTO-277

7MW01A Rising Head Test



DATA SET:
7MW01AR.DAT
05/07/98

AQUIFER MODEL:
Unconfined

SOLUTION METHOD:
Bouwer-Rice

PROJECT DATA:
test date: April 21, 1998

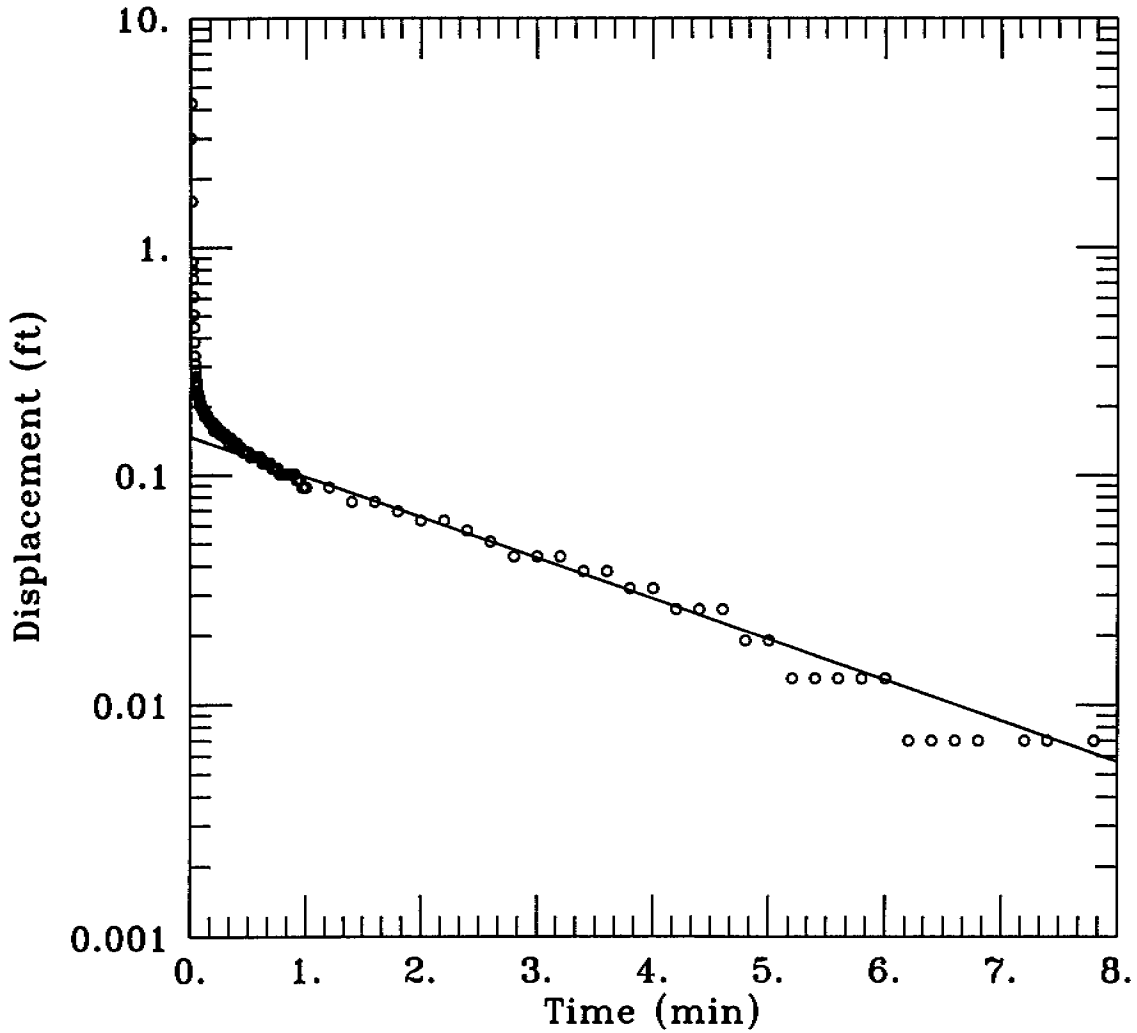
TEST DATA:
H0 = 0.101 ft
rc = 0.083 ft
rw = 0.25 ft
L = 20. ft
b = 47.07 ft
H = 47.07 ft

PARAMETER ESTIMATES:
K = 9.855 ft/day
y0 = 0.04428 ft

AQTESOLV

Client: LANTDIV	Company: Baker Environmental, Inc.
Location: SWMU 7 – Roosevelt Roads	Project: CTO-277

7MW02A Rising Head Test



DATA SET:
7MW02AR.DAT
05/08/98

AQUIFER MODEL:
Unconfined

SOLUTION METHOD:
Bouwer-Rice

PROJECT DATA:
test date: April 18, 1998

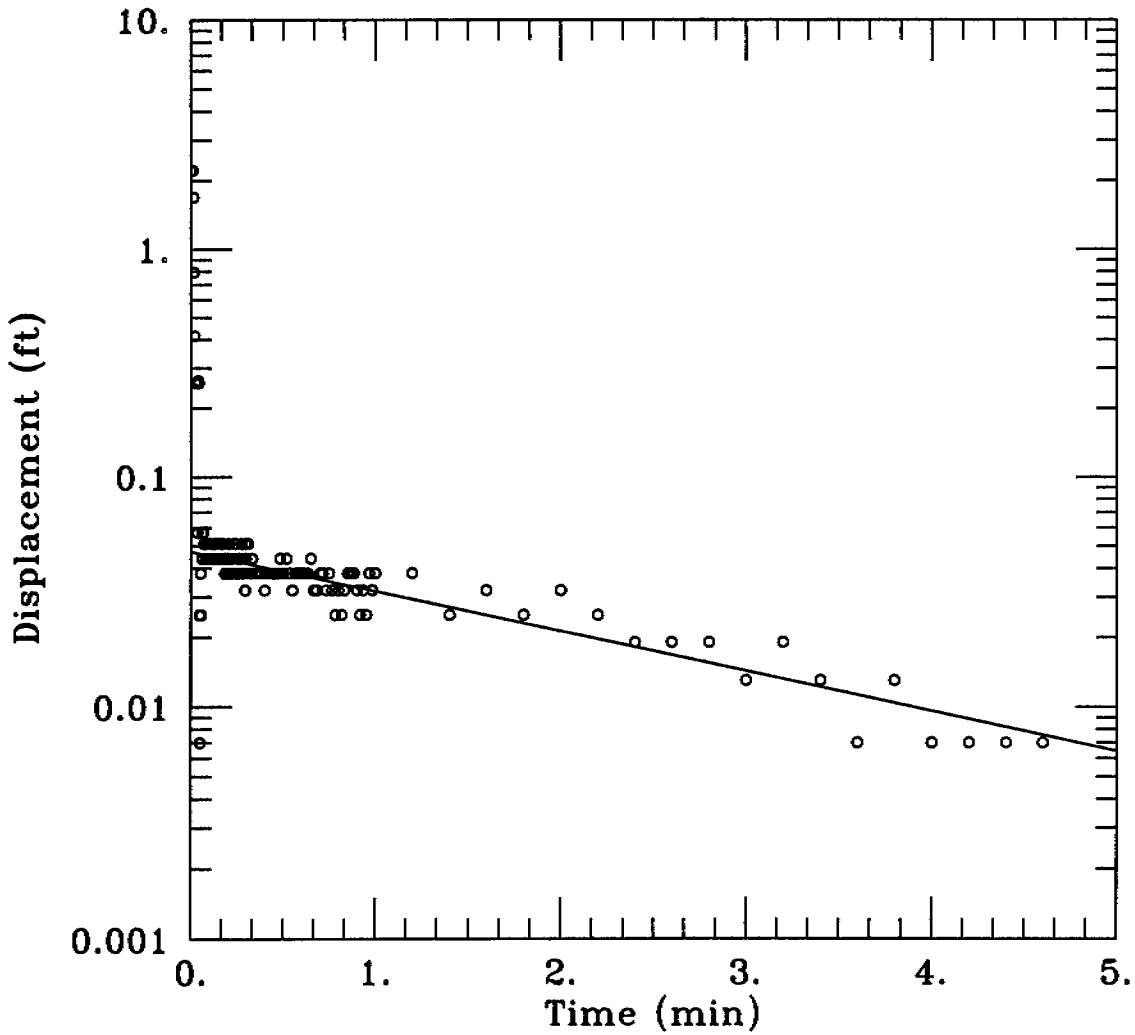
TEST DATA:
H0 = 3.004 ft
rc = 0.083 ft
rw = 0.25 ft
L = 20. ft
b = 20. ft
H = 20. ft

PARAMETER ESTIMATES:
K = 1.161 ft/day
y0 = 0.1467 ft

AQTESOLV

Client: LANTDIV	Company: Baker Environmental, Inc.
Location: SWMU 7 – Roosevelt Roads	Project: CTO-277

7MW03 Falling Head Test



DATA SET:
7MW03F.DAT
05/08/98

AQUIFER MODEL:
Unconfined

SOLUTION METHOD:
Bouwer-Rice

PROJECT DATA:
test date: April 20, 1998

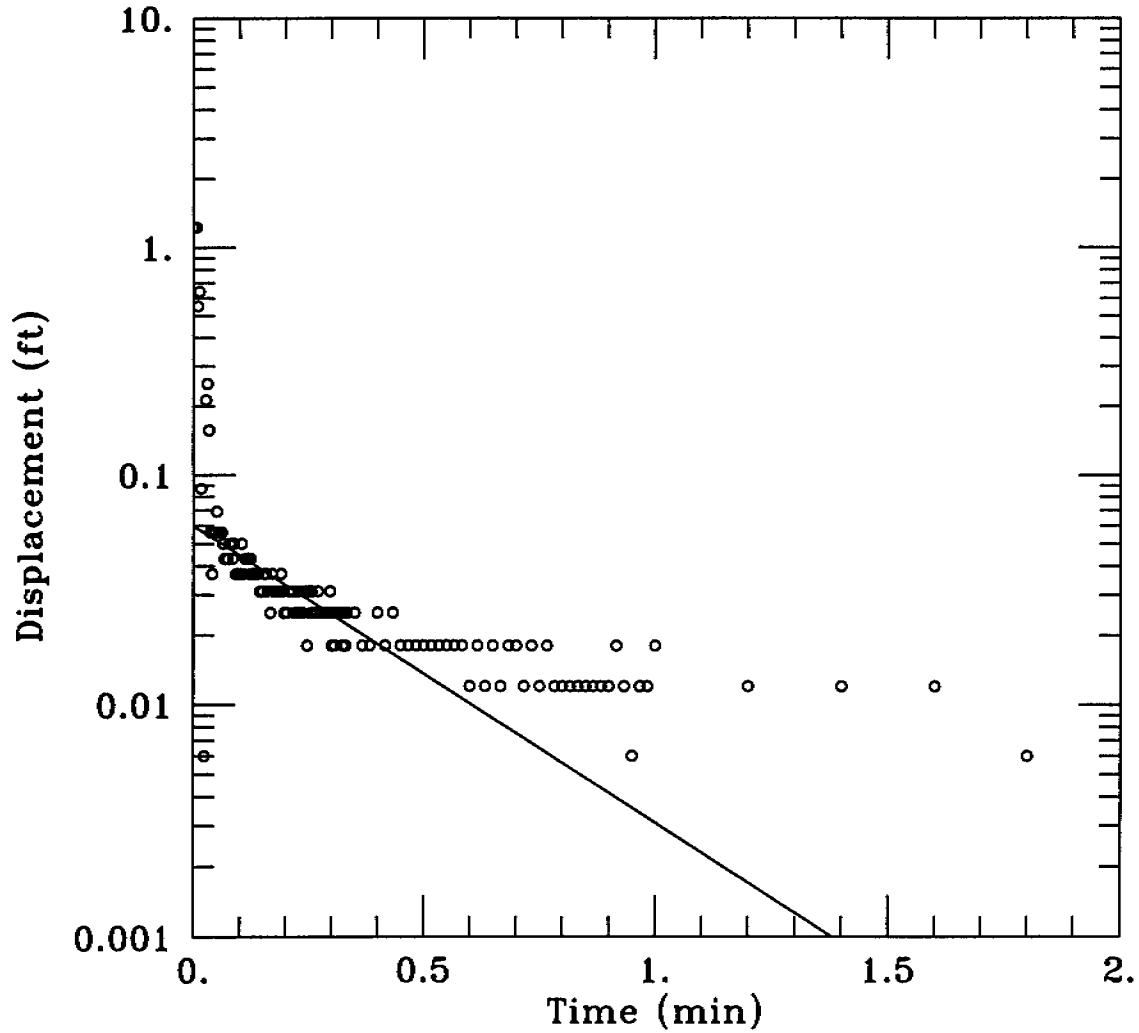
TEST DATA:
H0 = 2.207 ft
rc = 0.083 ft
rw = 0.25 ft
L = 40. ft
b = 63.24 ft
H = 63.24 ft

PARAMETER ESTIMATES:
K = 0.7146 ft/day
y0 = 0.04715 ft

AQTESOLV

Client: LANTDIV	Company: Baker Environmental, Inc.
Location: SWMU 7 – Roosevelt Roads	Project: CTO-277

7MW03 Rising Head Test



DATA SET:
7MW03R.DAT
05/08/98

AQUIFER MODEL:
Unconfined

SOLUTION METHOD:
Bouwer-Rice

PROJECT DATA:
test date: April 20, 1998

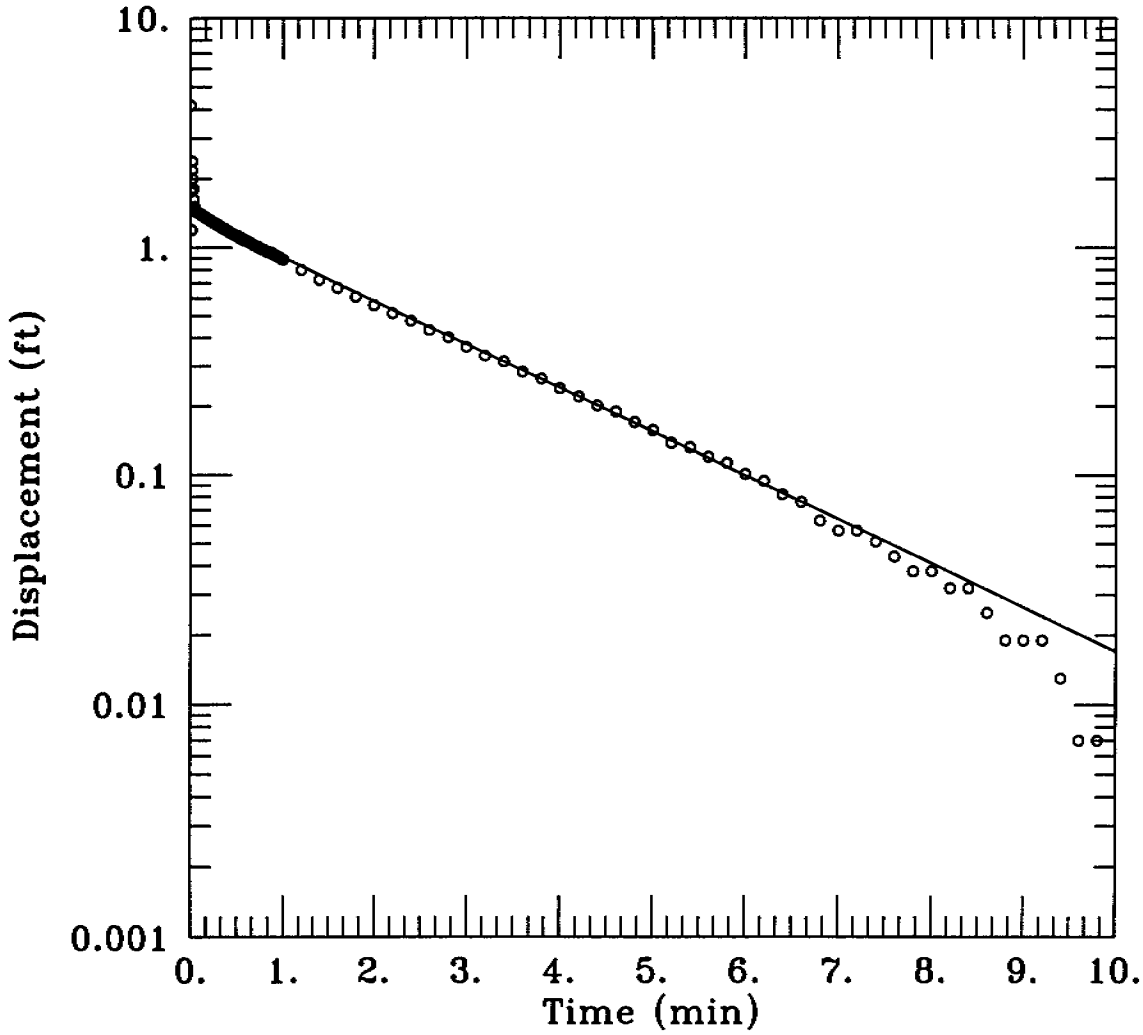
TEST DATA:
H0 = 1.224 ft
rc = 0.083 ft
rw = 0.25 ft
L = 40. ft
b = 63.24 ft
H = 63.24 ft

PARAMETER ESTIMATES:
K = 5.318 ft/day
y0 = 0.05975 ft

AQTESOLV

Client: LANTDIV	Company: Baker Environmental, Inc.
Location: SWMU 7 – Roosevelt Roads	Project: CTO-277

7MW04 Falling Head Test



DATA SET:
7MW04F.DAT
05/08/98

AQUIFER MODEL:
Unconfined

SOLUTION METHOD:
Bouwer-Rice

PROJECT DATA:
test date: April 20, 1998

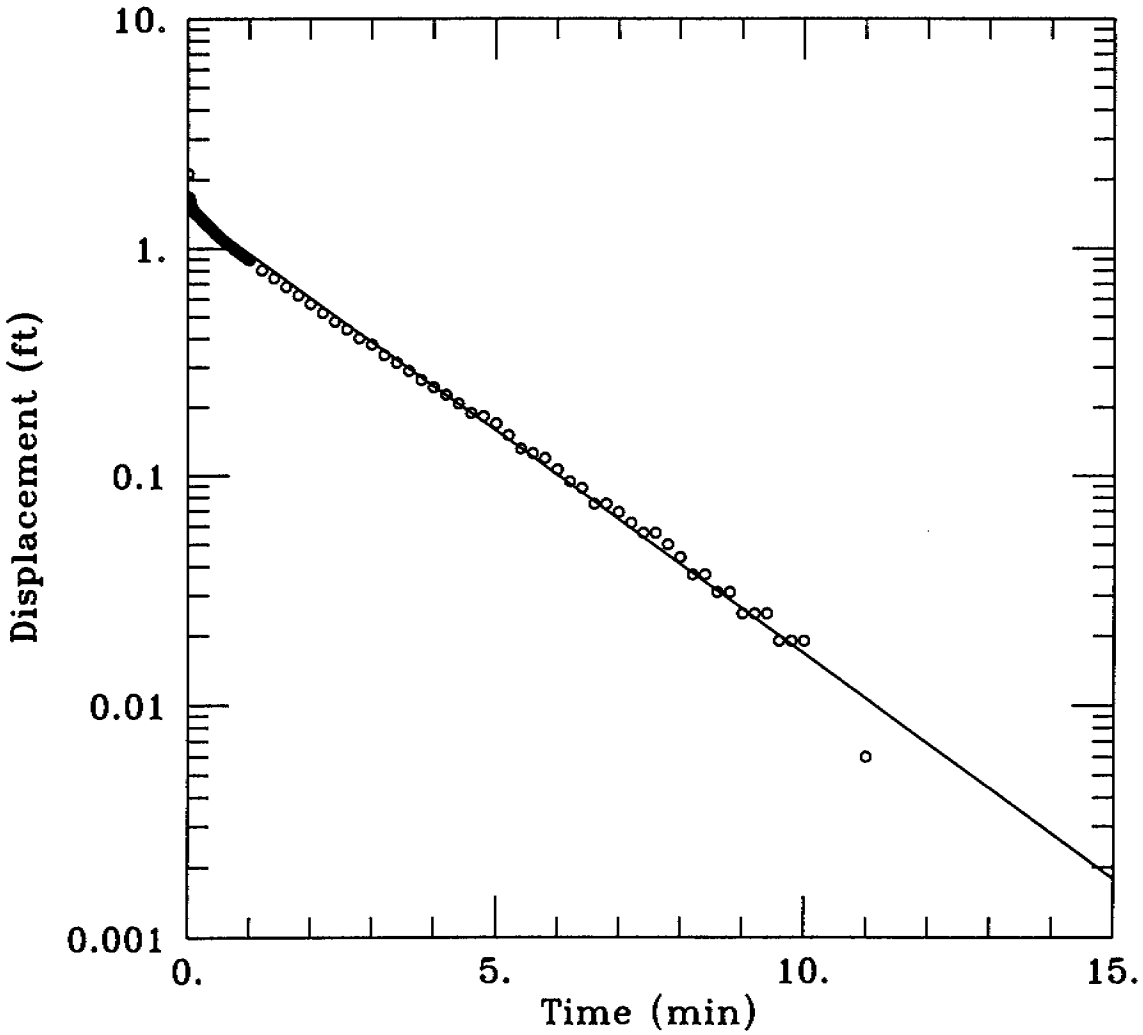
TEST DATA:
H0 = 4.155 ft
rc = 0.083 ft
rw = 0.25 ft
L = 10. ft
b = 29.76 ft
H = 29.76 ft

PARAMETER ESTIMATES:
K = 2.609 ft/day
y0 = 1.41 ft

AQTESOLV

Client: LANTDIV	Company: **Baker Environmental, Inc.**
Location: **SWMU 7 – Roosevelt Roads**	Project: **CTO–277**

7MW04 Rising Head Test



DATA SET:
7MW04R.DAT
05/08/98

AQUIFER MODEL:
Unconfined

SOLUTION METHOD:
Bouwer-Rice

PROJECT DATA:
test date: April 20, 1998

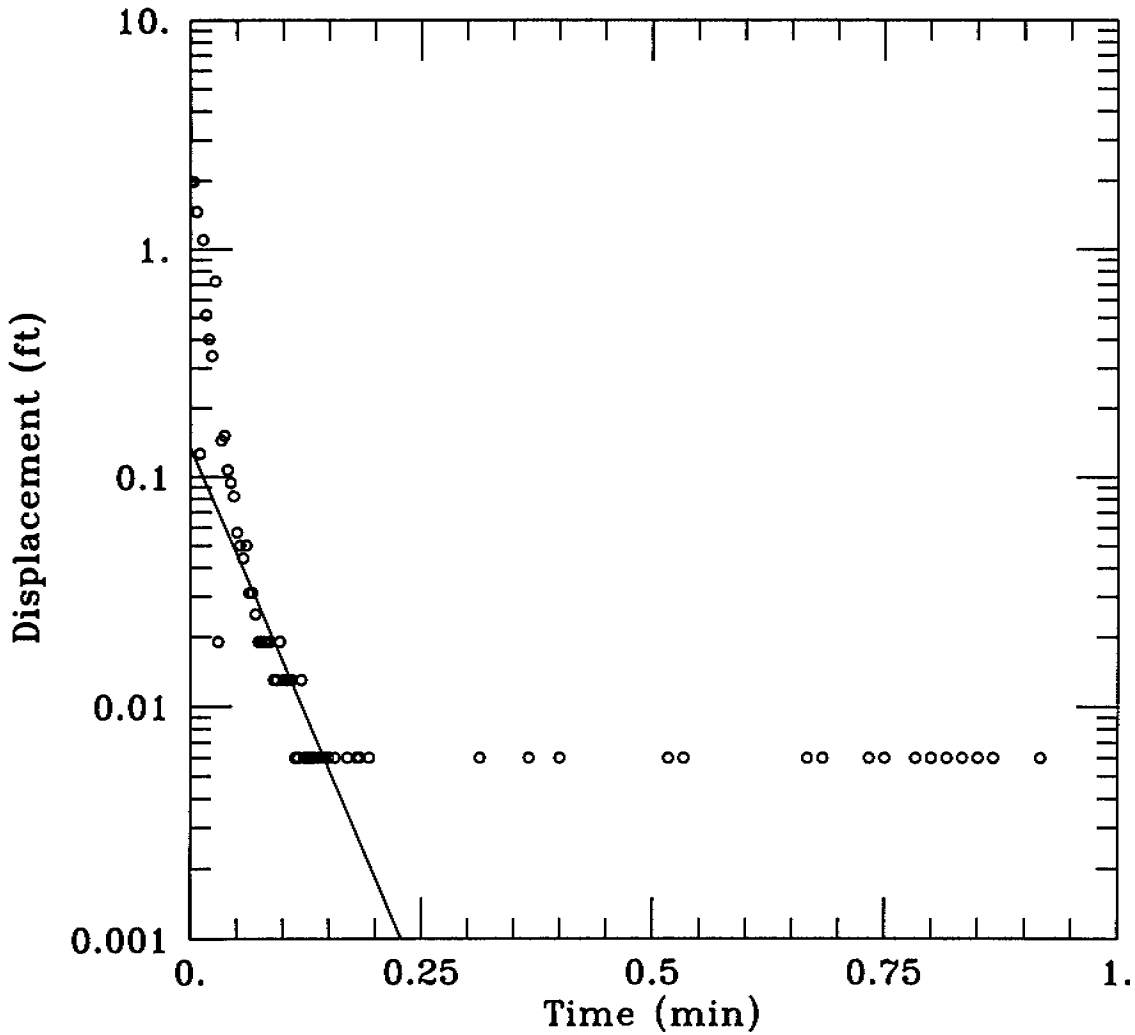
TEST DATA:
H0 = 2.119 ft
rc = 0.083 ft
rw = 0.25 ft
L = 10. ft
b = 29.76 ft
H = 29.76 ft

PARAMETER ESTIMATES:
K = 2.644 ft/day
y0 = 1.479 ft

AQTESOLV

Client: LANTDIV	Company: Baker Environmental, Inc.
Location: SWMU 7 – Roosevelt Roads	Project: CTO-277

UGW-11 Rising Head Test



DATA SET:
UGW-11R.DAT
05/08/98

AQUIFER MODEL:
Unconfined

SOLUTION METHOD:
Bouwer-Rice

PROJECT DATA:
test date: April 18, 1998

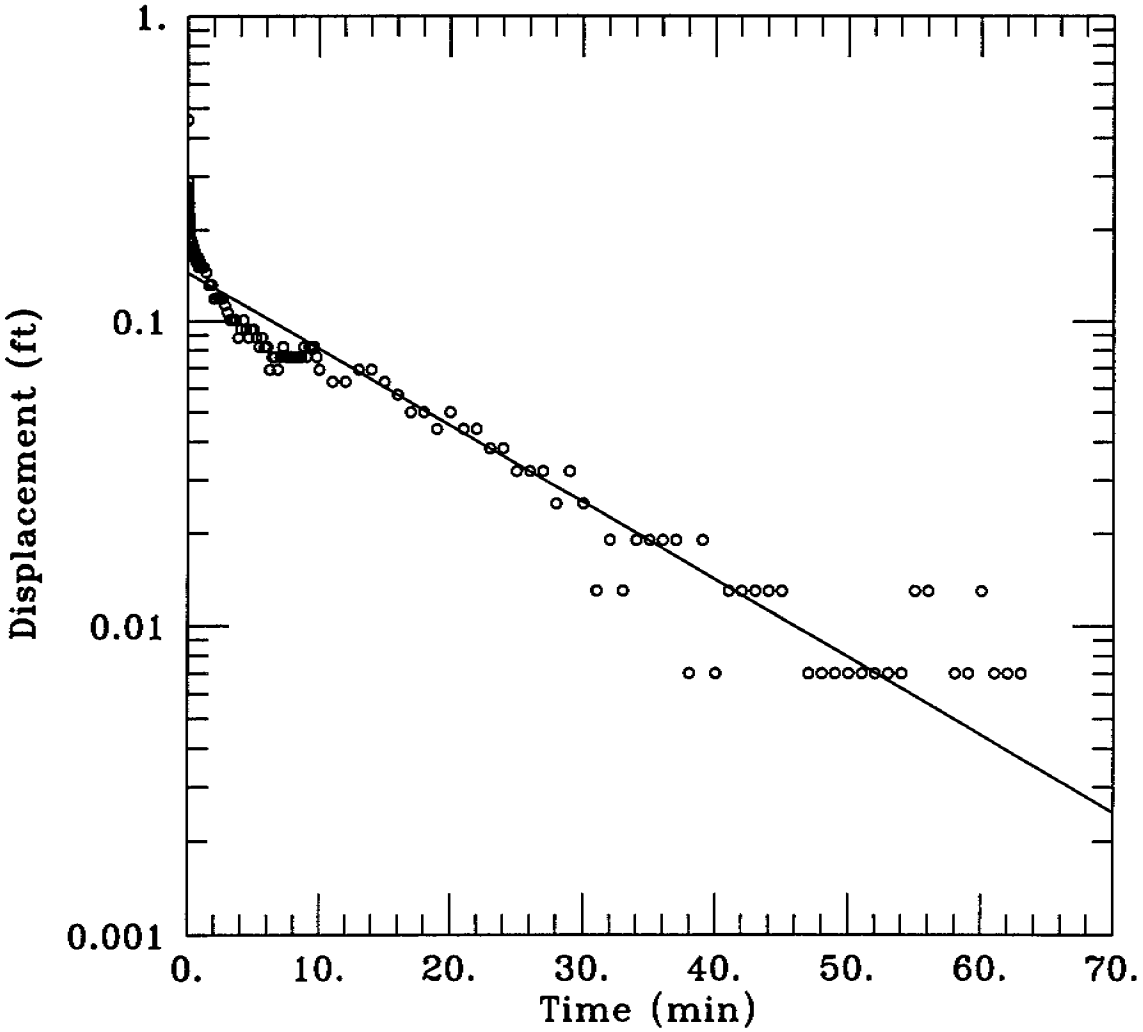
TEST DATA:
H0 = 1.977 ft
rc = 0.083 ft
rw = 0.313 ft
L = 10. ft
b = 10. ft
H = 10. ft

PARAMETER ESTIMATES:
K = 138.5 ft/day
y0 = 0.1328 ft

AQTESOLV

Client: LANTDIV	Company: Baker Environmental, Inc.
Location: SWMU 7 – Roosevelt Roads	Project: CTO-277

UGW-24 Rising Head Test



DATA SET:
UGW-24R.DAT
05/08/98

AQUIFER MODEL:
Unconfined

SOLUTION METHOD:
Bouwer-Rice

PROJECT DATA:
test date: April 18, 1998

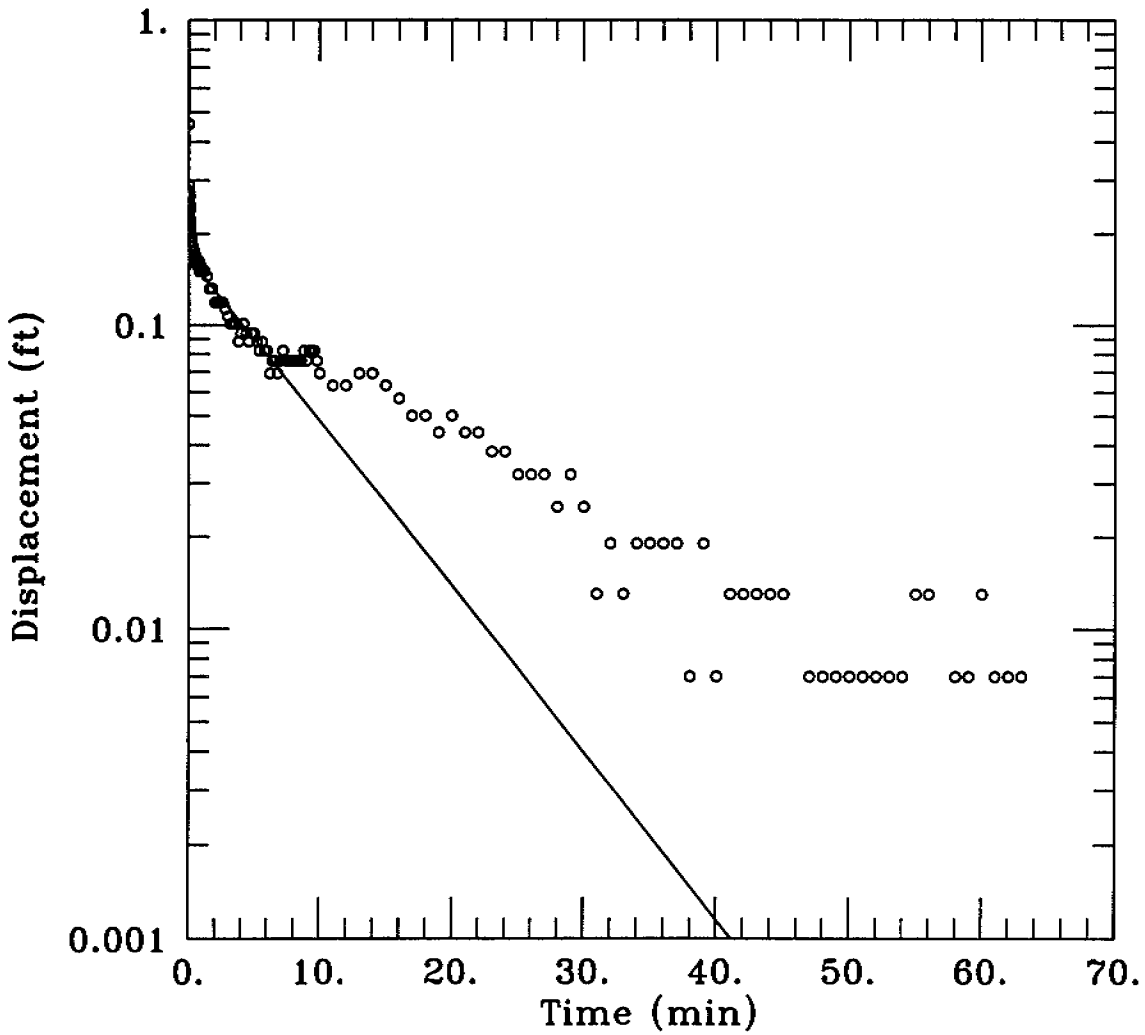
TEST DATA:
H0 = 0.458 ft
rc = 0.167 ft
rw = 0.333 ft
L = 15. ft
b = 15. ft
H = 15. ft

PARAMETER ESTIMATES:
K = 0.4283 ft/day
y0 = 0.1444 ft

AQTESOLV

Client: LANTDIV	Company: Baker Environmental, Inc.
Location: SWMU 7 – Roosevelt Roads	Project: CTO-277

UGW-24 Rising Head Test



DATA SET:
UGW-24R.DAT
05/08/98

AQUIFER MODEL:
Unconfined

SOLUTION METHOD:
Bouwer-Rice

PROJECT DATA:
test date: April 18, 1998

TEST DATA:
H0 = 0.458 ft
rc = 0.167 ft
rw = 0.333 ft
L = 15. ft
b = 15. ft
H = 15. ft

PARAMETER ESTIMATES:
K = 0.9178 ft/day
y0 = 0.1671 ft

AQTESOLV

APPENDIX F
QA/QC RESULTS

Data Qualifiers:

U - Not detected. The associated number indicates the approximate sample concentration necessary to be detected.

UJ - Not detected, quantitation limit may be inaccurate or imprecise.

J - Analyte. Reported value may not be accurate or precise.

Notes:

NA - Not Analyzed.

APPENDIX F.1
EQUIPMENT RINSATE SAMPLES

APPENDIX F.1

EQUIPMENT RINSATE SAMPLES
TOW WAY FUEL FARM
CMS INVESTIGATION
NAVAL STATION ROOSEVELT ROADS, PUERTO RICO

Sample ID	ER-01	ER-02	ER-03	ER-04
Sample Date	04/16/98	04/16/98	04/16/98	04/21/98
Volatiles (ug/l)				
Dichlorodifluoromethane	0.5 U	0.5 U	0.5 U	0.5 U
Chloromethane	0.5 U	0.5 U	0.5 U	0.5 U
Vinyl chloride	0.5 U	0.5 U	0.5 U	0.5 U
Bromomethane	0.5 U	0.5 U	0.5 U	0.5 U
Chloroethane	0.5 U	0.5 U	0.5 U	0.5 U
Trichlorofluoromethane	0.5 U	0.5 U	0.5 U	0.5 U
1,1-Dichloroethene	0.5 U	0.5 U	0.5 U	0.5 U
Methylene chloride	0.9	1	1	1
trans-1,2-Dichloroethene	0.5 U	0.5 U	0.5 U	0.5 U
1,1-Dichloroethane	0.5 U	0.5 U	0.5 U	0.5 U
cis-1,2-Dichloroethene	0.5 U	0.5 U	0.5 U	0.5 U
2,2-Dichloropropane	0.5 U	0.5 U	0.5 U	0.5 U
Bromochloromethane	0.5 U	0.5 U	0.5 U	0.5 U
Chloroform	0.5 U	0.5 U	0.5 U	0.5 U
1,1,1-Trichloroethane	0.5 U	0.5 U	0.5 U	0.5 U
1,1-Dichloropropene	0.5 U	0.5 U	0.5 U	0.5 U
Carbon tetrachloride	0.5 U	0.5 U	0.5 U	0.5 U
Benzene	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dichloroethane	0.5 U	0.5 U	0.5 U	0.5 U
Trichloroethene	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dichloropropane	0.5 U	0.5 U	0.5 U	0.5 U
Dibromomethane	0.5 U	0.5 U	0.5 U	0.5 U
Bromodichloromethane	0.5 U	0.5 U	0.5 U	0.5 U
cis-1,3-Dichloropropene	0.5 U	0.5 U	0.5 U	0.5 U
Toluene	0.5 U	0.5 U	0.5 U	0.5 U
trans-1,3-Dichloropropene	0.5 U	0.5 U	0.5 U	0.5 U
1,1,2-Trichloroethane	0.5 U	0.5 U	0.5 U	0.5 U
1,3-Dichloropropane	0.5 U	0.5 U	0.5 U	0.5 U
Tetrachloroethene	0.5 U	0.5 U	0.5 U	0.5 U
Dibromochloromethane	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dibromoethane	0.5 U	0.5 U	0.5 U	0.5 U
Chlorobenzene	0.5 U	0.5 U	0.5 U	0.5 U
1,1,1,2-Tetrachloroethane	0.5 U	0.5 U	0.5 U	0.5 U

APPENDIX F.1 (continued)

EQUIPMENT RINSATE SAMPLES
TOW WAY FUEL FARM
CMS INVESTIGATION
NAVAL STATION ROOSEVELT ROADS, PUERTO RICO

Sample ID	ER-01	ER-02	ER-03	ER-04
Sample Date	04/16/98	04/16/98	04/16/98	04/21/98
Volatiles (ug/l) (cont)				
Ethylbenzene	0.5 U	0.5 U	0.5 U	0.5 U
m/p-xylene	0.5 U	0.5 U	0.5 U	0.5 U
o-Xylene	0.5 U	0.5 U	0.5 U	0.5 U
Styrene	0.5 U	0.5 U	0.5 U	0.5 U
Bromoform	0.5 U	0.5 U	0.5 U	0.5 U
Isopropylbenzene	0.5 U	0.5 U	0.5 U	0.5 U
1,1,2,2-Tetrachloroethane	0.5 U	0.5 U	0.5 U	0.5 U
Bromobenzene	0.5 U	0.5 U	0.5 U	0.5 U
1,2,3-Trichloropropane	0.5 U	0.5 U	0.5 U	0.5 U
n-Propylbenzene	0.5 U	0.5 U	0.5 U	0.5 U
2-Chlorotoluene	0.5 U	0.5 U	0.5 U	0.5 U
1,3,5-Trimethylbenzene	0.5 U	0.5 U	0.5 U	0.5 U
4-Chlorotoluene	0.5 U	0.5 U	0.5 U	0.5 U
tert-Butylbenzene	0.5 U	0.5 U	0.5 U	0.5 U
1,2,4-Trimethylbenzene	0.5 U	0.5 U	0.5 U	0.5 U
sec-Butylbenzene	0.5 U	0.5 U	0.5 U	0.5 U
1,3-Dichlorobenzene	0.5 U	0.5 U	0.5 U	0.5 U
p-Isopropyltoluene	0.5 U	0.5 U	0.5 U	0.5 U
1,4-Dichlorobenzene	0.5 U	0.5 U	0.5 U	0.5 U
n-Butylbenzene	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dichlorobenzene	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dibromo-3-chloropropane	0.5 U	0.5 U	0.5 U	0.5 U
1,2,4-Trichlorobenzene	0.5 U	0.5 U	0.5 U	0.5 U
Hexachlorobutadiene	0.5 U	0.5 U	0.5 U	0.5 U
Naphthalene	0.5 U	0.5 U	0.5 U	0.5 U
1,2,3-Trichlorobenzene	0.5 U	0.5 U	0.5 U	0.5 U
TPH (ug/l)				
Diesel Range Organics	130 U	120 U	130 U	130 U
Gasoline Range Organics	50 U	57	460	50 U

APPENDIX F.2
FIELD BLANK SAMPLES

APPENDIX F.2

FIELD BLANK SAMPLES
TOW WAY FUEL FARM
CMS INVESTIGATION
NAVAL STATION ROOSEVELT ROADS, PUERTO RICO

Sample ID	FB-01	FB-02	FB-03
Sample Date	04/21/98	04/21/98	04/21/98
Volatiles (ug/l)			
Dichlorodifluoromethane	0.5 U	0.5 U	0.5 U
Chloromethane	0.5 U	0.5 U	0.5 U
Vinyl chloride	0.5 U	0.5 U	0.5 U
Bromomethane	0.5 U	0.5 U	0.5 U
Chloroethane	0.5 U	0.5 U	0.5 U
Trichlorofluoromethane	0.5 U	0.5 U	0.5 U
1,1-Dichloroethene	0.5 U	0.5 U	0.5 U
Methylene chloride	1	0.5 U	0.5 U
trans-1,2-Dichloroethene	0.5 U	0.5 U	0.5 U
1,1-Dichloroethane	0.5 U	0.5 U	0.5 U
cis-1,2-Dichloroethene	0.5 U	0.5 U	0.5 U
2,2-Dichloropropane	0.5 U	0.5 U	0.5 U
Bromochloromethane	0.5 U	0.5 U	0.5 U
Chloroform	0.5 U	0.5 U	11 J
1,1,1-Trichloroethane	0.5 U	0.5 U	0.5 U
1,1-Dichloropropene	0.5 U	0.5 U	0.5 U
Carbon tetrachloride	0.5 U	0.5 U	0.5 U
Benzene	0.5 U	0.5 U	0.5 U
1,2-Dichloroethane	0.5 U	0.5 U	0.5 U
Trichloroethene	1	0.5 U	0.5 U
1,2-Dichloropropane	0.5 U	0.5 U	0.5 U
Dibromomethane	0.5 U	0.5 U	0.5 U
Bromodichloromethane	0.5 U	0.5 U	14
cis-1,3-Dichloropropene	0.5 U	0.5 U	0.5 U
Toluene	0.5 U	0.5 U	0.5 U
trans-1,3-Dichloropropene	0.5 U	0.5 U	0.5 U
1,1,2-Trichloroethane	0.5 U	0.5 U	0.5 U
1,3-Dichloropropane	0.5 U	0.5 U	0.5 U
Tetrachloroethene	0.5 U	0.5 U	0.5 U
Dibromochloromethane	0.5 U	0.5 U	2
1,2-Dibromoethane	0.5 U	0.5 U	0.5 U
Chlorobenzene	0.5 U	0.5 U	0.5 U
1,1,1,2-Tetrachloroethane	0.5 U	0.5 U	0.5 U
Ethylbenzene	0.5 U	0.5 U	0.5 U

APPENDIX F.2 (continued)

FIELD BLANK SAMPLES
TOW WAY FUEL FARM
CMS INVESTIGATION
NAVAL STATION ROOSEVELT ROADS, PUERTO RICO

Sample ID	FB-01	FB-02	FB-03
Sample Date	04/21/98	04/21/98	04/21/98
Volatiles (ug/l) (cont)			
m/p-xylene	0.5 U	0.5 U	0.5 U
o-Xylene	0.5 U	0.5 U	0.5 U
Styrene	0.5 U	0.5 U	0.5 U
Bromoform	0.5 U	0.5 U	0.5 U
Isopropylbenzene	0.5 U	0.5 U	0.5 U
1,1,2,2-Tetrachloroethane	0.5 U	0.5 U	0.5 U
Bromobenzene	0.5 U	0.5 U	0.5 U
1,2,3-Trichloropropane	0.5 U	0.5 U	0.5 U
n-Propylbenzene	0.5 U	0.5 U	0.5 U
2-Chlorotoluene	0.5 U	0.5 U	0.5 U
1,3,5-Trimethylbenzene	0.5 U	0.5 U	0.5 U
4-Chlorotoluene	0.5 U	0.5 U	0.5 U
tert-Butylbenzene	0.5 U	0.5 U	0.5 U
1,2,4-Trimethylbenzene	0.5 U	0.5 U	0.5 U
sec-Butylbenzene	0.5 U	0.5 U	0.5 U
1,3-Dichlorobenzene	0.5 U	0.5 U	0.5 U
p-Isopropyltoluene	0.5 U	0.5 U	0.5 U
1,4-Dichlorobenzene	0.5 U	5	0.5 U
n-Butylbenzene	0.5 U	0.5 U	0.5 U
1,2-Dichlorobenzene	0.5 U	0.5 U	0.5 U
1,2-Dibromo-3-chloropropane	0.5 U	0.5 U	0.5 U
1,2,4-Trichlorobenzene	0.5 U	0.5 U	0.5 U
Hexachlorobutadiene	0.5 U	0.5 U	0.5 U
Naphthalene	0.5 U	0.5 U	0.5 U
1,2,3-Trichlorobenzene	0.5 U	0.5 U	0.5 U
TPH (ug/l)			
Diesel Range Organics	120 U	130 U	130 U
Gasoline Range Organics	50 U	50 U	34 J

APPENDIX F.3
TRIP BLANK SAMPLES

APPENDIX F.3

TRIP BLANK SAMPLES
TOW WAY FUEL FARM
CMS INVESTIGATION
NAVAL STATION ROOSEVELT ROADS, PUERTO RICO

Sample ID	TB-01	TB-02	TB-03	TB-04	TB-05	TB-06	TB-07	TB-08
Sample Date	04/14/98	04/15/98	04/16/98	04/18/98	04/18/98	04/20/98	04/21/98	04/21/98
Volatiles (ug/l)								
Dichlorodifluoromethane	0.5 UJ	0.5 U	0.5 U	0.5 U	NA	0.5 U	0.5 UJ	0.5 UJ
Chloromethane	0.5 U	0.5 U	0.5 U	0.5 U	NA	0.5 U	0.5 UJ	0.5 UJ
Vinyl chloride	0.5 U	0.5 U	0.5 U	0.5 U	NA	0.5 U	0.5 UJ	0.5 UJ
Bromomethane	0.5 U	0.5 U	0.5 U	0.5 U	NA	0.5 U	0.5 UJ	0.5 UJ
Chloroethane	0.5 U	0.5 U	0.5 U	0.5 U	NA	0.5 U	0.5 UJ	0.5 UJ
Trichlorofluoromethane	0.5 U	0.5 U	0.5 U	0.5 U	NA	0.5 U	0.5 UJ	0.5 UJ
1,1-Dichloroethene	0.5 U	0.5 U	0.5 U	0.5 U	NA	0.5 U	0.5 UJ	0.5 UJ
Methylene chloride	0.5 U	0.5 U	0.5 U	0.5 U	NA	0.5 U	0.5 UJ	0.5 UJ
trans-1,2-Dichloroethene	0.5 U	0.5 U	0.5 U	0.5 U	NA	0.5 U	0.5 UJ	0.5 UJ
1,1-Dichloroethane	0.5 U	0.5 U	0.5 U	0.5 U	NA	0.5 U	0.5 UJ	0.5 UJ
cis-1,2-Dichloroethene	0.5 U	0.5 U	0.5 U	0.5 U	NA	0.5 U	0.5 UJ	0.5 UJ
2,2-Dichloropropane	0.5 U	0.5 U	0.5 U	0.5 R	NA	0.5 U	0.5 UJ	0.5 UJ
Bromochloromethane	0.5 U	0.5 U	0.5 U	0.5 U	NA	0.5 U	0.5 UJ	0.5 UJ
Chloroform	0.5 U	0.5 U	0.5 U	0.5 U	NA	0.5 U	0.5 UJ	0.5 UJ
1,1,1-Trichloroethane	0.5 U	0.5 U	0.5 U	0.5 U	NA	0.5 U	0.5 UJ	0.5 UJ
1,1-Dichloropropene	0.5 U	0.5 U	0.5 U	0.5 U	NA	0.5 U	0.5 UJ	0.5 UJ
Carbon tetrachloride	0.5 U	0.5 U	0.5 U	0.5 U	NA	0.5 U	0.5 UJ	0.5 UJ
Benzene	0.5 U	0.5 U	0.5 U	0.5 U	NA	0.5 U	0.5 UJ	0.5 UJ
1,2-Dichloroethane	0.5 U	0.5 U	0.5 U	0.5 U	NA	0.5 U	0.5 UJ	0.5 UJ
Trichloroethene	0.5 U	0.5 U	0.5 U	0.5 U	NA	0.5 U	0.5 UJ	0.5 UJ
1,2-Dichloropropane	0.5 U	0.5 U	0.5 U	0.5 U	NA	0.5 U	0.5 UJ	0.5 UJ
Dibromomethane	0.5 U	0.5 U	0.5 U	0.5 U	NA	0.5 U	0.5 UJ	0.5 UJ
Bromodichloromethane	0.5 U	0.5 U	0.5 U	0.5 U	NA	0.5 U	0.5 UJ	0.5 UJ
cis-1,3-Dichloropropene	0.5 U	0.5 U	0.5 U	0.5 U	NA	0.5 U	0.5 UJ	0.5 UJ
Toluene	0.5 U	0.5 U	0.5 U	0.5 U	NA	0.5 U	0.5 UJ	0.5 UJ
trans-1,3-Dichloropropene	0.5 U	0.5 U	0.5 U	0.5 U	NA	0.5 U	0.5 UJ	0.5 UJ
1,1,2-Trichloroethane	0.5 U	0.5 U	0.5 U	0.5 U	NA	0.5 U	0.5 UJ	0.5 UJ
1,3-Dichloropropane	0.5 U	0.5 U	0.5 U	0.5 U	NA	0.5 U	0.5 UJ	0.5 UJ
Tetrachloroethene	0.5 U	0.5 U	0.5 U	0.5 U	NA	0.5 U	0.5 UJ	0.5 UJ
Dibromochloromethane	0.5 U	0.5 U	0.5 U	0.5 U	NA	0.5 U	0.5 UJ	0.5 UJ
1,2-Dibromoethane	0.5 U	0.5 U	0.5 U	0.5 U	NA	0.5 U	0.5 UJ	0.5 UJ
Chlorobenzene	0.5 U	0.5 U	0.5 U	0.5 U	NA	0.5 U	0.5 UJ	0.5 UJ
1,1,1,2-Tetrachloroethane	0.5 U	0.5 U	0.5 U	0.5 U	NA	0.5 U	0.5 UJ	0.5 UJ
Ethylbenzene	0.5 U	0.5 U	0.5 U	0.5 U	NA	0.5 U	0.5 UJ	0.5 UJ

APPENDIX F.3 (continued)

TRIP BLANK SAMPLES
TOW WAY FUEL FARM
CMS INVESTIGATION
NAVAL STATION ROOSEVELT ROADS, PUERTO RICO

Sample ID	TB-01	TB-02	TB-03	TB-04	TB-05	TB-06	TB-07	TB-08
Sample Date	04/14/98	04/15/98	04/16/98	04/18/98	04/18/98	04/20/98	04/21/98	04/21/98
Volatiles (ug/l) (cont)								
m/p-xylene	0.5 U	0.5 U	0.5 U	0.5 U	NA	0.5 U	0.5 UJ	0.5 UJ
o-Xylene	0.5 U	0.5 U	0.5 U	0.5 U	NA	0.5 U	0.5 UJ	0.5 UJ
Styrene	0.5 U	0.5 U	0.5 U	0.5 U	NA	0.5 U	0.5 UJ	0.5 UJ
Bromoform	0.5 U	0.5 U	0.5 U	0.5 U	NA	0.5 U	0.5 UJ	0.5 UJ
Isopropylbenzene	0.5 U	0.5 U	0.5 U	0.5 U	NA	0.5 U	0.5 UJ	0.5 UJ
1,1,2,2-Tetrachloroethane	0.5 U	0.5 U	0.5 U	0.5 U	NA	0.5 U	0.5 UJ	0.5 UJ
Bromobenzene	0.5 U	0.5 U	0.5 U	0.5 U	NA	0.5 U	0.5 UJ	0.5 UJ
1,2,3-Trichloropropane	0.5 U	0.5 U	0.5 U	0.5 U	NA	0.5 U	0.5 UJ	0.5 UJ
n-Propylbenzene	0.5 U	0.5 U	0.5 U	0.5 U	NA	0.5 U	0.5 UJ	0.5 UJ
2-Chlorotoluene	0.5 U	0.5 U	0.5 U	0.5 U	NA	0.5 U	0.5 UJ	0.5 UJ
1,3,5-Trimethylbenzene	0.5 U	0.5 U	0.5 U	0.5 U	NA	0.5 U	0.5 UJ	0.5 UJ
4-Chlorotoluene	0.5 U	0.5 U	0.5 U	0.5 U	NA	0.5 U	0.5 UJ	0.5 UJ
tert-Butylbenzene	0.5 U	0.5 U	0.5 U	0.5 U	NA	0.5 U	0.5 UJ	0.5 UJ
1,2,4-Trimethylbenzene	0.5 U	0.5 U	0.5 U	0.5 U	NA	0.5 U	0.5 UJ	0.5 UJ
sec-Butylbenzene	0.5 U	0.5 U	0.5 U	0.5 U	NA	0.5 U	0.5 UJ	0.5 UJ
1,3-Dichlorobenzene	0.5 U	0.5 U	0.5 U	0.5 U	NA	0.5 U	0.5 UJ	0.5 UJ
p-Isopropyltoluene	0.5 U	0.5 U	0.5 U	0.5 U	NA	0.5 U	0.5 UJ	0.5 UJ
1,4-Dichlorobenzene	0.5 U	0.5 U	0.5 U	0.5 U	NA	0.5 U	0.5 UJ	0.5 UJ
n-Butylbenzene	0.5 U	0.5 U	0.5 U	0.5 U	NA	0.5 U	0.5 UJ	0.5 UJ
1,2-Dichlorobenzene	0.5 U	0.5 U	0.5 U	0.5 U	NA	0.5 U	0.5 UJ	0.5 UJ
1,2-Dibromo-3-chloropropane	0.5 U	0.5 U	0.5 U	0.5 U	NA	0.5 U	0.5 UJ	0.5 UJ
1,2,4-Trichlorobenzene	0.5 U	0.5 U	0.5 U	0.5 U	NA	0.5 U	0.5 UJ	0.5 UJ
Hexachlorobutadiene	0.5 U	0.5 U	0.5 U	0.5 U	NA	0.5 U	0.5 UJ	0.5 UJ
Naphthalene	0.5 U	0.5 U	0.5 U	0.5 U	NA	0.5 U	0.5 UJ	0.5 UJ
1,2,3-Trichlorobenzene	0.5 U	0.5 U	0.5 U	0.5 U	NA	0.5 U	0.5 UJ	0.5 UJ
BTEX (ug/l)								
Benzene	NA	NA	NA	NA	1 U	NA	NA	NA
Ethylbenzene	NA	NA	NA	NA	1 U	NA	NA	NA
Toluene	NA	NA	NA	NA	1 U	NA	NA	NA
Xylenes	NA	NA	NA	NA	1 U	NA	NA	NA
TPH (ug/l)								
Gasoline Range Organics	50 U	50 U	50 U	50 U	50 U	30 J	26 J	50 U