

N60234.AR.000055
NAS SAUFLEY FIELD
5090.3a

SITE ASSESSMENT REPORT ADDENDUM WITH TRANSMITTAL FOR UNDERGROUND
STORAGE TANK 2406 NAVAL EDUCATION AND TRAINING PROFESSIONAL
DEVELOPMENT AND TECHNICAL CENTER (NETPDTC) SAUFLEY FIELD FL
3/14/2001
TETRA TECH INC



TETRA TECH NUS, INC.

1401 Oven Park Drive • Suite 102 • Tallahassee, FL 32312
(850) 385-9899 • FAX (850) 385-9860 • www.tetrattech.com

F031

March 14, 2001

Project Number 0401

Joe Fugitt, P.G.
Remedial Project Manager
Technical Review/Federal Facilities
Florida Department of Environmental Protection
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

**Reference: Clean Contract No. N62467-94-D0888
Contract Task Order No. 0112**

**Subject: Site Assessment Report Addendum
For Site 2406, Saufly Field
Naval Education and Training Professional Development and Technical Center
Pensacola, Florida**

Tetra Tech NUS, Inc. (TtNUS) is pleased to submit the Site Assessment Report Addendum (SARA) for the referenced Contract Task Order (CTO). This report has been prepared for the U.S. Navy Southern Division Naval Facilities Engineering Command under CTO-0112, for the Comprehensive Long-term Environmental Action Navy (CLEAN) Contract Number N62467-94-D-0888.

Site Assessment Report Addendum Objectives. The objective of the SARA is to address concerns about the Site Assessment Report (SAR) expressed by the Florida Department of Environmental Protection (FDEP) in a technical review letter dated October 5, 1999.

Previous Investigations. In May 1994 during routine water analysis at Saufly Field, benzene was detected at potable water well 4 in exceedance of FDEP regulatory limits. The well was consequently removed from service. A field investigation was performed by Health and Rehabilitative Services (HRS) in June 1994 and indicated that four abandoned USTs, designated 804C, 804D, 804E and 804F, and the 10-inch product lines supplying the old refueling pits were possible sources of contamination. In response to this field investigation, a SAR investigation was initiated. SAR field activities conducted during April and May 1997 included a hand auger soil survey and the installation of nine shallow monitoring wells and one deep monitoring well. In March 1998, the Naval Air Station Pensacola (NASP) Navy Public Works Center (NPWC) submitted the SAR based on the investigative results.

Upon review of the SAR, FDEP issued a letter providing comments on the SAR and requiring the preparation of a SAR Addendum for the site. The letter detailed eight (8) comments to be addressed in order to meet the requirements of Chapter 62-770, Florida Administrative Code (F.A.C.). A copy of the letter is provided in Attachment A. This letter report addresses these comments and, in so doing, provides a summary of the work performed by TtNUS and the resulting data.

Response To Comments.

Comment 1. Additional assessment should be conducted to delineate the extent of contaminated soil and determine its source. Also, soil samples should be collected and analyzed for the gasoline and kerosene analytical groups in accordance with the procedures specified in the Department's February 3, 1998 memo entitled "Interim Guidance for Laboratory Analyses of Soil Samples for Petroleum Contamination Site Assessments".

On August 9, 2000, TtNUS personnel completed seven soil borings (SB-1 through SB-7) to a depth of 42 feet below land surface (bls) at Site 2406 using Direct Push Technology (DPT). The soil borings were completed to further characterize the extent of contaminated soil and to determine its source. During soil boring operations, an onsite geologist recorded lithologic descriptions of the soil and screened the borings for excessively contaminated soil using a flame ionization detector (FID). Soil boring locations are shown on Figure 1, Attachment B. All sampling activities were conducted in accordance with TtNUS' FDEP approved, Comp QAP #980038.

A single soil sample was collected from five of the soil borings (SB-1, SB-4 through SB-7) at the interval with the highest FID responses. When the reading was zero, an intermediate depth sample was collected. Following collection of the soil samples, the sample bottles were packed on ice and shipped via overnight transport to Accutest Laboratories in Orlando, Florida. The soil samples were analyzed for compounds specified in the Gasoline and Kerosene analytical groups. Soil sampling field forms and soil boring logs are provided in Attachment C. The analytical results for the soil samples are summarized in Table 1, Attachment D. A copy of the validated laboratory report is provided in Attachment E.

No volatile organic compounds (VOCs), polycyclic aromatic hydrocarbons (PAHs), or total petroleum hydrocarbons (TPHs) were detected from the soil borings analyzed for Site 2406.

Comment 2. A water table monitoring well should be installed approximately halfway between monitoring wells MW-4 and MW-6. During monitoring well installation, soils should be screened with an OVA. If contaminated or excessively contaminated soil is discovered, soil samples should be collected and analyzed for the gasoline and kerosene analytical groups.

Monitoring well MW-11 was installed approximately halfway between monitoring wells MW-4 and MW-6 (see Figure 1, Attachment B). Standard split spoon samplers were used to collect soil samples for soil headspace gas screening in accordance with Chapter 62-770, F.A.C. None of the soil sampled was reported to contain a FID reading above background conditions, therefore, "excessively contaminated soil", as defined by Chapter 62-770, was not identified. The soil gas screening data, lithologic logs, and well installation logs are located in Attachment C.

Comment 3. An intermediate depth monitoring well should be installed downgradient of MW-3. The well should be screened from approximately 65 to 70 feet below land surface. During monitoring well installation, soils should be screened with an OVA. If contaminated or excessively contaminated soil is discovered, soil samples should be collected and analyzed for the gasoline and kerosene analytical groups.

Deep monitoring well DMW-12 was installed downgradient of monitoring well MW-3 (see Figure 2, Attachment B). Standard split spoon samplers were used to collect soil samples every five feet (ft) from 50 ft to 65 ft for soil headspace gas screening in accordance with Chapter 62-770, F.A.C. None of the soil sampled was reported to contain a FID reading above background conditions,

therefore, "excessively contaminated soil", as defined by Chapter 62-770, was not identified. The soil gas screening data, lithologic logs, and well installation logs are located in Attachment C.

Comment 4. Further assessment work is required to determine if the deeper reaches of the Sand and Gravel aquifer continue to be contaminated with benzene or have been impacted by other constituents. A deep monitoring well should be installed between the abandoned potable water well #4 and monitoring well MW-3 and should be screened approximately 130 to 140 feet below land surface. During monitoring well installation, soils should be screened with an OVA. If contaminated or excessively contaminated soil is discovered, soil samples should be collected and analyzed for the gasoline and kerosene analytical groups. A detailed lithographic log should be provided to depict the presence or absence of a confining layer between the surficial and deeper levels of the Sand and Gravel aquifer.

Deep monitoring well DMW-13 was installed between abandoned potable water well #4 and monitoring well MW-3 (see Figure 1, Attachment B). Because mud rotary drilling was used for the monitoring well installation, continuous split spoons were not collected. However, lithologic descriptions of the well cuttings did not identify the presence of a clay confining layer. The lithologic and well installation logs are located in Attachment C.

Comment 5. Monitoring wells MW-3, MW-4, DMW-10, and the wells requested above should be sampled and analyzed for the gasoline and kerosene analytical groups. Prior to sampling groundwater, a complete set of groundwater level measurements should be taken of all wells, including deep wells.

On July 13 and 19, 2000, TtNUS personnel collected groundwater samples from monitoring wells DMW-10, DMW-12, and DMW-13 located on Site 2406. MW-3, MW-4, and MW-11 were not sampled due to drought conditions that caused a lower water table below the bottom of the monitoring wells. The monitoring well locations are shown on Figure 1, Attachment B. All sampling activities were conducted in accordance with Tetra Tech NUS, Inc., FDEP approved, Comp QAP #980038.

All monitoring wells were purged prior to collecting groundwater samples. Purging and sampling were performed with a peristaltic pump using the low flow quiescent method. Following collection of the groundwater samples, the sample bottles were packed on ice and shipped via overnight transport to Accutest Laboratories in Orlando, Florida. The groundwater samples were analyzed for compounds specified in the Gasoline and Kerosene analytical groups. Groundwater sampling field forms are provided in Attachment F. The analytical results for the monitoring wells are summarized in Table 2, Attachment D. A copy of the validated laboratory report is provided in Attachment E.

The groundwater sample from monitoring well DMW-12 was the only sample to contain VOCs. 1,2-Dibromoethane, benzene, and total xylenes were detected in the groundwater sample collected from monitoring well DMW-12. 1,2-Dibromoethane and benzene were both detected at concentrations exceeding the Florida Groundwater Cleanup Target Levels (GCTL) of 0.02 µg/L and 1.0 µg/L, respectively. Benzene was detected at a concentration 400 times the Florida GCTL.

The groundwater samples were also analyzed for PAHs, TPHs, and total lead. No PAHs were detected in the groundwater samples. TPH was detected in the groundwater sample from DMW-13 at a concentration of 410 µg/L, which is less than the GCTL. Lead was not detected in any of the groundwater samples collected during this investigation.

On February 17, 2001, water level measurements were recorded for each onsite monitoring well using a water-level indicator probe. The depth-to-water measurements, along with top-of-casing elevations, were used to calculate groundwater elevations. Monitoring wells MW-2, MW-3, MW-4, MW-6, MW-7, and MW-8 were dry at the time of measurement, and monitoring well MW-9 (located inside a building) was inaccessible. Based on the recorded elevations in the remaining monitoring wells, the groundwater appears to flow to the north-northwest. Figure 2, Attachment B depicts the groundwater elevations. Depth-to-water measurements, top-of-casing elevations, and groundwater elevation data are provided in Table 3, Attachment D.

Comment 6. A diagram should be provided showing the 10" product line, the four abandoned USTs (804-C-F), abandoned potable water well #4, and monitoring wells installed for site assessment to better delineate the spatial relationship between potential sources of contamination and impacted wells.

Figure 1, Attachment B provides the locations of the 10-inch product line, the four abandoned USTs, abandoned potable water well #4, and the monitoring wells at Site 2406.

Comment 7. Please specify whether there are any other private supply wells (including potable, irrigation, and industrial) within a ¼ mile radius of the site or any municipal or public water supply wells within ½ mile radius of the site.

According to a permit listing from the Northwest Florida Water Management District (NFWMD) dated February 21, 2001, seventeen private supply wells are located on Saufly Pines Road, south of Saufly Field. This road is the only residential road within a ¼ mile of Site 2406 on which private wells are located. The exact number of these wells actually located within ¼ mile of the site is unknown. According to the same NFWMD permit listing, no municipal or public water supply wells, other than those located at Saufly Field and referred to in the SAR, are located within a ½ mile radius of Site 2406.

Comment 8. Slug tests should be performed on a minimum of three monitoring wells to determine site specific aquifer properties. The data used in the SAR to estimate hydraulic conductivity was from Site 3810 N and Site 3221 SW of Naval Air Station Pensacola.

On July 27, 2000, TtNUS conducted aquifer slug tests in monitoring wells DMW-10, DMW-12, and DMW-13. Because the screened section of each well tested was completely submerged, only falling head tests (slug introduced to the well or slug-in) were conducted. Slug test data was recorded using an InSitu Hermit 1000® data logger and down well pressure transducer. A minimum of two falling head tests was performed at each well. In each case, successive tests were initiated once the water level in the well returned to 90% (minimum) of equilibrium conditions. Slug test data is provided in Attachment G.

A total of six slug tests were performed in the three wells. Of the six tests, four tests (one from deep monitoring wells DMW-10 and DMW-13, two from deep monitoring well DMW-12) are considered to be representative and are used in estimating the groundwater seepage velocity. Slug test data, seepage velocity calculations, and hydraulic gradient calculations are provided in Attachment G. Monitoring wells DMW-10 and MW-11 were used to calculate the vertical hydraulic gradient as the nested well pairs on the site all contained one dry well. The estimated vertical hydraulic gradient for Site 2406 is 0.0024 feet/foot downwards.

The horizontal hydraulic gradient calculations estimate the gradient to be 0.011 feet/foot. Using this hydraulic gradient, a hydraulic conductivity of 3.551×10^{-4} feet/second, and an effective porosity of 0.15, the estimated groundwater seepage velocity is 1,297 feet/year.

The velocity estimation above does not take into consideration natural processes that effect groundwater movement such as advection, dispersion, and retardation. When retardation is taken into account, by introducing a retardation factor into the velocity equation (Attachment G), the estimated groundwater seepage velocity decreases to 717 feet/year.

Conclusions.

- Current groundwater elevation data indicates a groundwater flow towards the north-northwest of the site.
- Groundwater samples collected from deep monitoring well DMW-12 exceeded FDEP's GCTLs for 1,2-dibromoethane and benzene.
- Soil samples collected from Site 2406 soil borings did not contain "excessively contaminated soil" or analyzed compounds at concentrations exceeding detection limits.
- The estimated vertical hydraulic gradient for Site 2406 is 0.0024 feet/foot downwards. The horizontal hydraulic gradient is estimated to be 0.011 feet/foot. Using this horizontal hydraulic gradient, a hydraulic conductivity of 3.551×10^{-4} feet/second, and an effective porosity of 0.15, the estimated groundwater seepage velocity is 1,297 feet/year. When retardation is taken into account, the estimated groundwater seepage velocity decreases to 717 feet/year.

Recommendations. Based upon the findings of the current SARA and historical data, TtNUS recommends further assessment in order to determine the source of the contamination at Saufly Field, Site 2406. Once the source is determined, TtNUS recommends that a Remedial Action Plan addressing groundwater be prepared for the site.

If you have any questions with regard to this submittal, please contact me at (850) 385 -9899.

Sincerely,

Gerald A. Walker, P.G.
Task Order Manager
Florida License No. PG-0001180

SS/gw

Enclosures

CC: B. Glover, SOUTHNAVFACENGCOM
D. Wroblewski (cover letter only), TtNUS
M. Perry/(unbound), TtNUS

ATTACHMENT A
FDEP Technical Review Letter

Department of Environmental Protection

Lawton Chiles
Governor

Twin Towers Building
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

Virginia B. Wetherell
Secretary

April 9, 1998

Mr. Byas Glover
Code 18410
Southern Division
Naval Facilities Engineering Command
2155 Eagle Drive
P.O. Box 190010
North Charleston, South Carolina 29419-9010

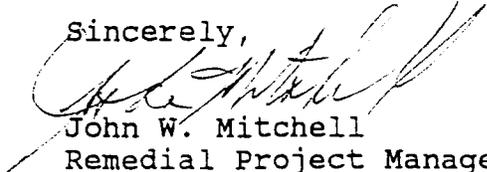
RE: Saufley Field, Site 2406
Naval Education and Training Professional Development and
Technical Center, Pensacola, Florida
FDEP #178628753

Dear Mr. Glover:

I have completed the technical review of the Site Assessment Report (SAR) dated March 1998 (received March 9, 1998) submitted for this site 2406. Please submit a Site Assessment Report Addendum which addresses the comments in the attached memorandum from David Grabka.

If I can be of any further assistance with this matter, please contact me at (904) 921-9989.

Sincerely,



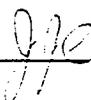
John W. Mitchell
Remedial Project Manager

cc: Dean Spencer, NAS Pensacola
Greg Campbell, NAS Pensacola
Tom Moody, FDEP Northwest District

TJB

JRC
ESTB

JJC



ESN

ESN

Memorandum

Florida Department of Environmental Protection

TO: John Mitchell, E.S. III, Remedial Project Manager, Technical Review Section

THROUGH: Tim Bahr, P.G. Supervisor, Technical Review Section *TB*

FROM: David P. Grabka, E.S. I, Technical Review Section *D.P.G.*

DATE: April 1, 1998

SUBJECT: Site Assessment Report (SAR), March 3, 1998, Site 2406, Saufley Field, Naval Education and Training Professional Development and Technical Center (NETPDTC), Pensacola, Florida, DEP Facility ID# 178628753

I have completed my review of the Site Assessment Report (SAR), prepared by the Navy Public Works Center, for the above-referenced facility. In order to meet the requirements of Chapter 62-770, Florida Administrative Code (F.A.C.), the following comments need to be addressed in a Site Assessment Report Addendum:

- (1) Additional assessment should be conducted to delineate the extent of contaminated soil and determine its source. Also, soil samples should be collected and analyzed for the gasoline and kerosene analytical groups in accordance with the procedures specified in the Department's February 3, 1998 memo titled "Interim Guidance for Laboratory Analyses of Soil Samples for Petroleum Contamination Site Assessments."
- (2) A water table monitoring well should be installed approximately halfway between monitoring wells MW-4 and MW-6. During monitoring well installation, soils should be screened with an OVA. If contaminated or excessively contaminated soil is discovered, soil samples should be collected and analyzed for the gasoline and kerosene analytical groups.
- (3) An intermediate depth monitoring well should be installed downgradient of MW-3. The well should be screened from approximately 65 to 70 feet below land surface. During monitoring well installation, soils should be screened with an OVA. If contaminated or excessively contaminated soil is discovered, soil samples should be collected and analyzed for the gasoline and kerosene analytical groups.
- (4) Further assessment work is required to determine if the deeper reaches of the Sand and Gravel aquifer continue to be contaminated with benzene or have been impacted by other constituents. A deep monitoring well should be installed between abandoned potable water well #4 and monitoring well MW-3 and should be screened approximately 130 to 140 feet below land surface. During monitoring well installation, soils should be screened with an OVA. If contaminated or excessively contaminated soil is discovered, soil samples should be collected and

MEMORANDUM

Saufley Field, Site 2406

Page Two

April 1, 1998

analyzed for the gasoline and kerosene analytical groups. A detailed lithologic log should be provided to depict the presence or absence of a confining layer between the surficial and deeper levels of the Sand and Gravel aquifer.

(5) Monitoring wells MW-3, MW-4, DMW-10 and the wells requested above should be sampled and analyzed for the gasoline and kerosene analytical groups. Prior to sampling groundwater, a complete set of groundwater level measurements should be taken from all wells, including deep wells.

(6) A diagram should be provided showing the 10" product line, the four abandoned USTs (804 C-F), abandoned potable water well #4 and monitoring wells installed for site assessment to better delineate the spatial relationship between potential sources of contamination and impacted wells.

(7) Please specify whether there are any other private supply wells (including potable, irrigation and industrial) within a 1/4 mile radius of the site or any municipal or public water supply wells within a 1/2 mile radius of the site.

(8) Slug tests should be performed on a minimum of three monitoring wells to determine site specific aquifer properties. The data used in the SAR to estimate hydraulic conductivity was from Site 3810 N and Site 3221 SW of Naval Air Station Pensacola.

ATTACHMENT B
Figures

SOURCE:

LOCATIONS OF ROADS AND BUILDINGS ARE TAKEN FROM NAVY PUBLIC WORKS CENTER DRAWING NO. 686017 "NETPDTG SAUFLEY FIELD, GENERAL DEVELOPMENT MAP, EXISTING CONDITIONS". WELL AND BORING LOCATIONS ARE APPROXIMATE.

LEGEND

- ⊙ MW-7 MONITORING WELL LOCATION AND DESIGNATION
- ⊕ DMW-10 DEEP MONITORING WELL LOCATION AND DESIGNATION
- ▣ 07 SOIL BORING LOCATION AND DESIGNATION

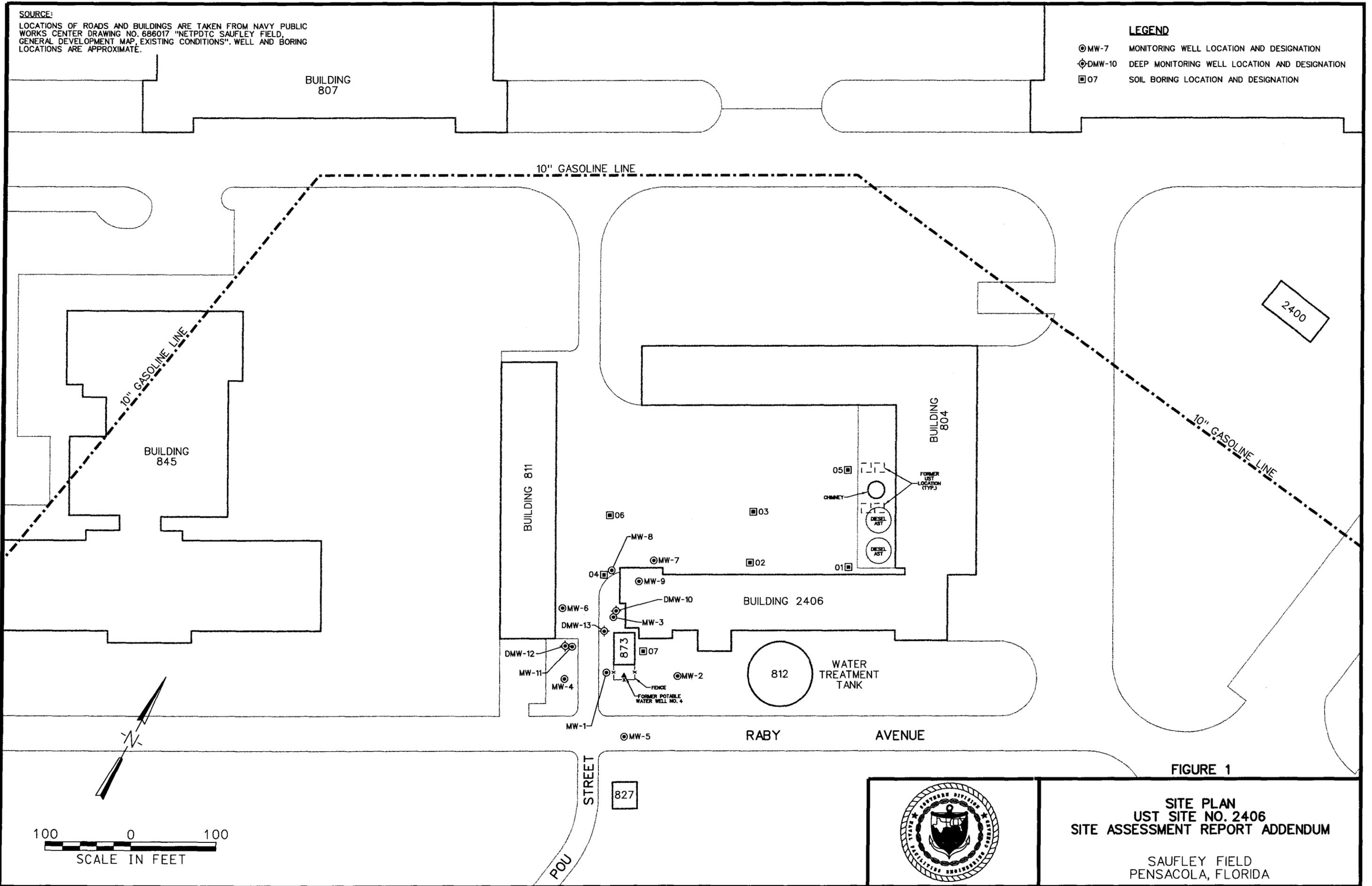
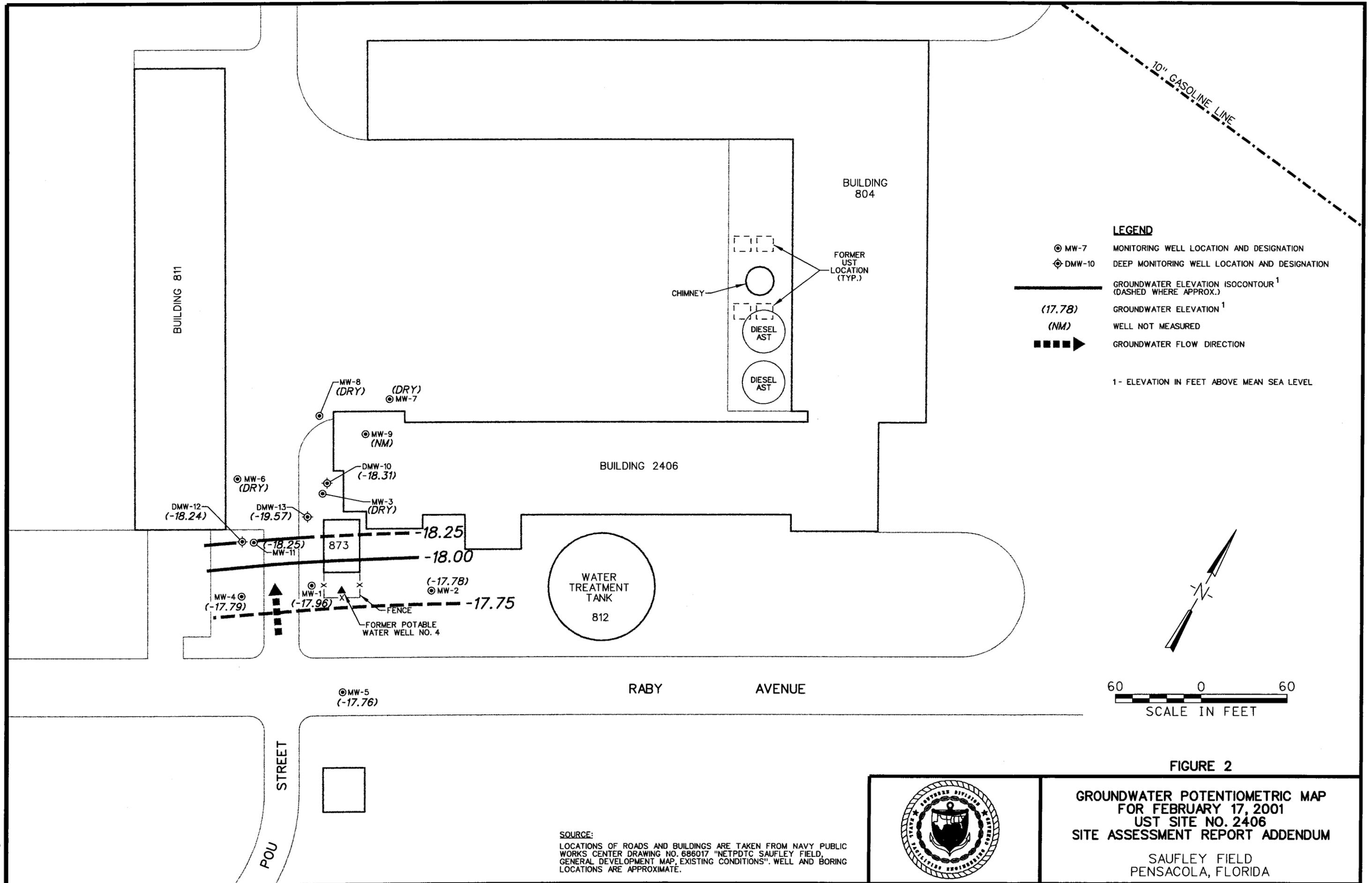


FIGURE 1

**SITE PLAN
UST SITE NO. 2406
SITE ASSESSMENT REPORT ADDENDUM**

SAUFLEY FIELD
PENSACOLA, FLORIDA





LEGEND

- ⊙ MW-7 MONITORING WELL LOCATION AND DESIGNATION
- ⊕ DMW-10 DEEP MONITORING WELL LOCATION AND DESIGNATION
- GROUNDWATER ELEVATION ISOCONTOUR¹ (DASHED WHERE APPROX.)
- (17.78) GROUNDWATER ELEVATION¹
- (NM) WELL NOT MEASURED
- ▬▬▬▬▬ GROUNDWATER FLOW DIRECTION

1 - ELEVATION IN FEET ABOVE MEAN SEA LEVEL

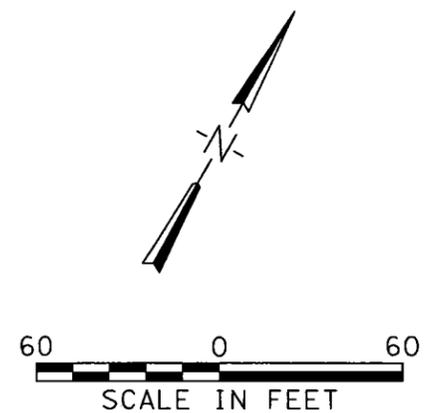


FIGURE 2
GROUNDWATER POTENTIOMETRIC MAP
FOR FEBRUARY 17, 2001
UST SITE NO. 2406
SITE ASSESSMENT REPORT ADDENDUM
 SAUFLEY FIELD
 PENSACOLA, FLORIDA

SOURCE:
 LOCATIONS OF ROADS AND BUILDINGS ARE TAKEN FROM NAVY PUBLIC WORKS CENTER DRAWING NO. 686017 "NETPDTIC SAUFLEY FIELD, GENERAL DEVELOPMENT MAP, EXISTING CONDITIONS". WELL AND BORING LOCATIONS ARE APPROXIMATE.



n11x17b.dgn

ATTACHMENT C
Soil Boring and Sampling Logs
Well Boring and Installation Logs



BORING LOG

PROJECT NAME: OLF Saugley - site 2406 BORING NUMBER: SBD1
 PROJECT NUMBER: 0401 DATE: 5-19-00
 DRILLING COMPANY: Groundwater Protection Inc. GEOLOGIST: S. Barton
 DRILLING RIG: Diedrich D120 DRILLER: J. Ziegler

Sample No. and Type or ROD	Depth (Ft.) or Run No.	Blows/6" or ROD (%)	Sample Recovery/ Sample Length	Time	Lithology Change (Depth/Ft.) or Screened Level	MATERIAL DESCRIPTION		U S C S	Remarks	PID/FID Reading (ppm)			
						Soil Density/ Consistency or Rock Hardness	Color			Material Classification	Sample	Sampler BZ	Borehole
HA	0	/	/	0734					NO OBSTRUCTIONS	0			
	4	/	/										
SS	5	1	6/6	0735					damp	0			
	7	1	6/6										
SS	10	4	6/6	0736					damp	3	0		
	12	3	6/6						NO odor				
									same as 5'-7' above				
SS	15	4	6/6	0738					moist	6	0		
	17	7	6/6						PAINT ODOR				
									LAB SAMPLE COLLECTED				
SS	20	4	6/6	0739					moist	4	0		
	22	10	4										

* When rock coring, enter rock brokenness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated response is read.

Remarks: _____

Drilling Area Background (ppm): 48

Converted to Well? Yes _____ No

Well I.D. #: _____



BORING LOG

PROJECT NAME: _____ BORING NUMBER: SB01
 PROJECT NUMBER: _____ DATE: 5-19-00
 DRILLING COMPANY: _____ GEOLOGIST: S. Barton
 DRILLING RIG: _____ DRILLER: J. Ziegler

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows/ 6" or ROD (%)	Sample Recovery/ Sample Length	Time	Lithology Change (Depth/Ft.) or Screened Level	Soil Density/ Consistency or Rock Hardness	Color	Material Classification	U S C S	Remarks	PID/FID Reading (ppm)				
											Sample	Sampler BZ	Borehole**	Driller BZ**	
SS ↓	25 27	6 15	11 15	6 6	6:18		tan	med- to coarse-grnd SAND, trace silt		moist	4	φ		→	
							white	silty, fine-grnd SAND, trace clay		moist	↓	↓			
SS ↓	30 32	8 15	11 16	6 2							φ			→	
SS ↓	35 37	7 14	12 17	8 7				same w/ pink fringe			φ			→	
SS ↓	40 42	10 14	13 15	6 1			tan	1/2 white med.-grnd SAND w/ silt, trace clay		v. moist	φ			→	
BORING TERMINATED AT 42 FT BGS															

* When rock coring, enter rock brokeness.
 ** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated response is read.

Remarks: _____

Drilling Area Background (ppm): 6

Converted to Well? Yes _____ No Well I.D. #: _____



Project Site Name: OLF Sampling
Project No.: 0401

Sample ID No.: OLFSP6S30L1517
Sample Location: Site 1401; SR01
Sampled By: Skip Barton
C.O.C. No.: 33356

- Surface Soil
- Subsurface Soil
- Sediment
- Other:
- QA Sample Type:

Type of Sample:
 Low Concentration
 High Concentration

GRAB SAMPLE DATA:

Date: <u>5-19-00</u>	Depth Interval: <u>15'-17'</u>	Color: <u>orange</u>	Description (Sand, Silt, Clay, Moisture, etc.): <u>orange silty sand</u>
Time: <u>0748</u>			
Method: <u>SS</u>			
Monitor Reading (ppm): <u>11</u>			<u>SB 5/30</u>

Head space

COMPOSITE SAMPLE DATA:

Date:	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

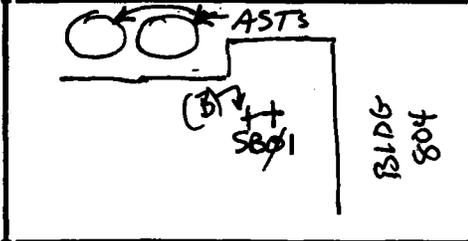
SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
<u>VOCs (8021)</u>	<u>35g ENCORE</u>	<u>3</u>	
<u>PAH (8310)</u>	<u>250ml amber</u>	<u>1</u>	
<u>TRPH (FL-PRO)</u>	<u>"</u>		

OBSERVATIONS / NOTES:

- resampled on 5-31-00 because of sample delivery problem
- PAH & TRPH analyses run from same container

MAP:



Circle if Applicable:

MS/MSD Duplicate ID No.:

Signature(s):

Skip Barton



BORING LOG

PROJECT NAME: OLF Sawley - Site 2406 BORING NUMBER: SB002
 PROJECT NUMBER: 0401 DATE: 5-19-00
 DRILLING COMPANY: Groundwater Protection Inc. GEOLOGIST: S. Barton
 DRILLING RIG: Diedrich D120 DRILLER: J. Ziegler

Sample No. and Type or ROD	Depth (Ft.) or Run No.	Blows/6" or ROD (%)	Sample Recovery/ Sample Length	Time	Lithology Change (Depth/Ft.) or Screened Level	MATERIAL DESCRIPTION			U S C S	Remarks	PID/FID Reading (ppm)								
						Soil Density/ Consistency or Rock Hardness	Color	Material Classification			Sample	Sampler BZ	Borehole**	Driller BZ**					
HA	0	/	/	0920															
		/	/																
	4	/	/																
SS	5	23	66	0923		loose	tan	silty fine-grnd SAND w/ black grns		damp									
	7	23	63			loose	orange	silty fine-to med-grnd SAND, trace clay		damp									
SS	10	47	66	0929				same as 0'-2" 5'-7'											
	12	54	61					same as 12"-21" 5'-7'											
SS	15	57	66	0934				fine-to med-grnd SAND, trace silt		moist									
	17	78	62																
SS	20	47	66	0939				same as above w/ white coarse-grnd sand											
	22	11	4																

* When rock coring, enter rock brokeness.
 ** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated response is read.

Remarks: _____

Drilling Area Background (ppm): 4

Converted to Well? Yes _____ No Well I.D. #: _____



BORING LOG

PROJECT NAME: _____ BORING NUMBER: SB02
 PROJECT NUMBER: _____ DATE: 5-19-00
 DRILLING COMPANY: _____ GEOLOGIST: S. Barten
 DRILLING RIG: _____ DRILLER: J. Ziegler

Sample No. and Type or ROD	Depth (Ft.) or Run No.	Blows/ 6" or ROD (%)	Sample Recovery/ Sample Length	Time	Lithology Change (Depth/Ft.) or Screened Level	MATERIAL DESCRIPTION			U S C S	Remarks	PID/FID Reading (ppm)					
						Soil Density/ Consistency or Rock Hardness	Color	Material Classification			Sample	Sampler BZ	Borehole**	Driller BZ**		
SS ↓	25 27	10 17 12 16	6 6 6 4	0945		Soft	white	fine- to med.- grad SAND w/ some clay		moist	Ø				→	
SS ↓	30 32	3 10 9 12	6 6 6 3	0950		v. loose		interlayered orange med-grad & white fine-grad SANDS		moist	Ø				→	
SS ↓	35 37	4 12 9 14	6 6 6 2	0955		loose	white	fine-grad SAND w/ trace clay		moist	Ø				→	
SS ↓	40 42	6 13 11 12	6 6 6 2			hom		white med.-grad SAND, trace clay & silt		v. moist	Ø				→	
BORING TERMINATED AT 42 FT BGS																

* When rock coring, enter rock brokenness.
 ** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated response is read.

Remarks: _____

Drilling Area Background (ppm): 4

Converted to Well? Yes _____ No Well I.D. #: _____



BORING LOG

PROJECT NAME: OLF Sampley - Site 2406 BORING NUMBER: SB03
 PROJECT NUMBER: 0461 DATE: 5-19-00
 DRILLING COMPANY: Groundwater Protection Inc. GEOLOGIST: S. Bartem
 DRILLING RIG: Diedrich D120 DRILLER: J. Ziegler

Sample No. and Type or ROD	Depth (Ft.) or Run No.	Blows/ 6" or ROD (%)	Sample Recovery/ Sample Length	Time	Lithology Change (Depth/FT.) or Screened Level	MATERIAL DESCRIPTION		USCS	Remarks	PID/FID Reading (ppm)				
						Soil Density/ Consistency or Rock Hardness	Color			Material Classification	Sample	Sampler BZ	Borehole**	Driller BZ**
HA	0			1220		loose	tan	silty, fine-grnd SAND	dry					
	4													
SS	5	2	6	1224		loose	tan	silty, fine-grnd SAND	dry					
	7	3	6											
SS	10	4	6	1231		loose	yellow/brown	silty, fine-grnd SAND	dry					
	12	5	6			loose	orange	white fine- to med-grnd SAND	damp					
SS	15	5	6	1236		mod loose	dark	red-orange, fine-grnd SAND	damp					
	17	7	6					same silt						
SS	20	4	6	1240			off white	white med.-grnd SAND	moist					
	22	10	6											

* When rock coring, enter rock brokenness.
 ** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated response is read.

Remarks: _____

Drilling Area
 Background (ppm): 2

Converted to Well? Yes _____ No Well I.D. #: _____



BORING LOG

PROJECT NAME: _____ BORING NUMBER: SB03
 PROJECT NUMBER: _____ DATE: 5-19-00
 DRILLING COMPANY: _____ GEOLOGIST: S. BARKER
 DRILLING RIG: _____ DRILLER: J. Ziegler

Sample No. and Type or ROD	Depth (Ft.) or Run No.	Blows/ 6" or ROD (%)	Sample Recovery/ Sample Length	Time	Lithology Change (Depth/Ft.) or Screened Level	MATERIAL DESCRIPTION			U S C S	Remarks	PID/FID Reading (ppm)				
						Soil Density/ Consistency or Rock Hardness	Color	Material Classification			Sample	Sampler BZ	Borehole**	Driller BZ**	
SS ↓	25 27	12/12 16/16	6/6 6/6	12:44		loose	dk	moist med-to coarse-grnd SAND		moist	Ø				
						mod loose	white	1/2 pink fine-to med-grnd SAND, trace silt & clay		moist	↓				
SS ↓	30 32	6/10 13/15	6/6 6/6	12:48			white	very fine-grnd SAND, trace silt		moist	Ø				
SS ↓	35 37	10/12 16/16	6/6 6/6	12:54		loose					Ø				
SS ↓	40 42	6/9 14/13	6/6 6/6	12:55				fine-to med-grnd SAND, trace silt			Ø				
BORING TERMINATED AT 42 FT BGS															

* When rock coring, enter rock brokenness.
 ** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated response is read.

Remarks: _____
 Drilling Area Background (ppm): 2

Converted to Well? Yes _____ No _____ Well I.D. #: _____



BORING LOG

PROJECT NAME: OLF Saufly - Site 2406
 PROJECT NUMBER: 0401
 DRILLING COMPANY: Groundwater Protection Inc.
 DRILLING RIG: Dredrich D120

BORING No.: SB04
 DATE: 5-19-00
 GEOLOGIST: S. Barton
 DRILLER: J. Ziegler

Sample No. and Type or RQD	Depth (FT) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION		U S C S *	Remarks	PID/FID Reading (ppm)									
					Soil Density/ Consistency or Rock Hardness	Color			Material Classification	Sample	Sampler BZ	Borehole**	Drifter BZ**					
HA	1																	
	↓																	
	↓																	
SS	5	3/2	6/6		loose	orange brown		silty fine sand	dry, no odor	∅								
	↓																	
	↓																	
SS	10	4/5	6/6					0"-10" → same as above		∅								
	↓				fairly loose	orange		10"-18" → silty fine to med. sand	dry, no odor									
	↓																	
SS	15	5/7	6/6					0"-17" → same as above w/trace clay	moist, no odor	∅								
	↓																	
	↓																	
SS	20	4/8	6/6		loose	orange white		0"-14" → med to coarse sand	damp, no odor	∅								
	↓							same as above	sample collected	∅								
	↓								collected									
	↓																	
SS	25	7/9	6/6					0"-6" same as above		2224	∅							

* When rock coring, enter rock brokenness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated response read.

Remarks: _____

Drilling Area 4
 Background (ppm): 2224

Converted to Well: Yes _____ No Well I.D. #: _____



BORING LOG

PROJECT NAME: OLFSavfly - Site 2406
 PROJECT NUMBER: 0401
 DRILLING COMPANY: Groundwater Protection Inc
 DRILLING RIG: Diedrich D120

BORING No.: SB-04
 DATE: 5-19-00
 GEOLOGIST: S. Barton
 DRILLER: J. Ziegler

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION			U S C S	Remarks	PID/FID Reading (ppm)			
					Soil Density/ Consistency or Rock Hardness	Color	Material Classification			Sample	Sampler BZ	Borehole**	Driller BZ**
	27	14/14	5		lightly packed	white pink	6-17 → fine silty sand, trace clay		moist, no odor	Ø			
SS	30	8/13	6/6			white	very fine sand, trace silt		moist, no odor	Ø			
	32	14/15	6										
SS	35	5/11	6/6		loose	light gray white	fine to med. sand		moist, no odor	Ø			
	37	13/15	6/2										
SS	40	9/12	6/6			white	fine sand, trace silt, some dark grains		moist, no odor	Ø			
	42	15/14	4				end of boring						

* When rock coring, enter rock brokenness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated response read.

Remarks: _____

Drilling Area 4
 Background (ppm): Ø

Converted to Well: Yes No Well I.D. #: _____



Project Site Name: OLF Sanfley
Project No.: 0401

Sample ID No.: OLF06SB042224
Sample Location: Site 2406, SB04
Sampled By: SB
C.O.C. No.: 33356

- Surface Soil
- Subsurface Soil
- Sediment
- Other:
- QA Sample Type:

- Type of Sample:
- Low Concentration
 - High Concentration

GRAB SAMPLE DATA:

Date: <u>5-19-00</u>	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time: <u>1438</u>	<u>22'-24'</u>	<u>orange & white</u>	<u>layered med. - to coarse-grnd sand</u>
Method: <u>SS</u>			
Monitor-Reading (ppm): <u>0</u>			

Head space

COMPOSITE SAMPLE DATA:

Date:	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

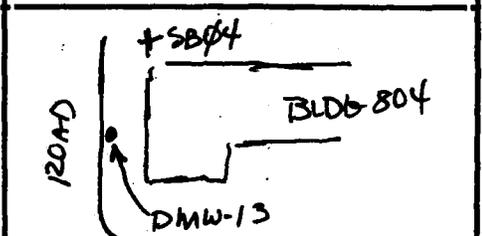
SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
<u>VOCs (8021)</u>	<u>3 5g ENCORES</u>	<u>3</u>	
<u>PAH (8310)</u>	<u>250 ml amber</u>	<u>1</u>	
<u>TRPH (FL-PRD)</u>	<u>"</u>		

OBSERVATIONS / NOTES:

• sample not analyzed due to shipment problem

MAP:



Circle if Applicable:

MS/MSD Duplicate ID No.:

Signature(s):

Sup Bantm



Project Site Name: OLF Sanjley
Project No.: 0401

Sample ID No.: OLFS06SB042022
Sample Location: Site 2406, SB04(B)
Sampled By: SB
C.O.C. No.: 33351

- Surface Soil
- Subsurface Soil
- Sediment
- Other:
- QA Sample Type:

- Type of Sample:
- Low Concentration
 - High Concentration

GRAB SAMPLE DATA:

Date: <u>5-31-00</u>	Depth Interval: <u>20'-22'</u>	Color: <u>lt orange</u>	Description (Sand, Silt, Clay, Moisture, etc.): <u>med.-grnd sand</u>
Time: <u>1003</u>			
Method: <u>SS</u>			
Monitor Reading (ppm): <u>Ø</u>			

Head space

COMPOSITE SAMPLE DATA:

Date:	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

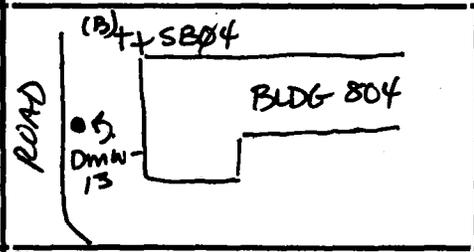
SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
<u>VOL5 (8021)</u>	<u>35g ENCORE</u>	<u>3</u>	
<u>PAH (8310)</u>	<u>250 mL amber</u>	<u>1</u>	
<u>TRPH (FL-PRO)</u>	<u>"</u>	<u>1</u>	

OBSERVATIONS / NOTES:

- Collected as replacement for OLFSD6SB042024
- PAH & TRPH taken from same 250 mL container

MAP:



Circle if Applicable:

MS/MSD	Duplicate ID No.:
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Signature(s):



BORING LOG

PROJECT NAME: OLF Sanjley - Site 2406 BORING NUMBER: SB05
 PROJECT NUMBER: 0401 DATE: 5-31-00
 DRILLING COMPANY: Groundwater Protection Inc. GEOLOGIST: S. Barton
 DRILLING RIG: Diedrich D120 DRILLER: J. Ziegler

Sample No. and Type or ROD	Depth (Ft.) or Run No.	Blows/ 6" or ROD (%)	Sample Recovery/ Sample Length	Time	Lithology Change (Depth/Ft.) or Screened Level	MATERIAL DESCRIPTION		U S C S	Remarks	PID/FID Reading (ppm)				
						Soil Density/ Consistency or Rock Hardness	Color			Material Classification	Sample	Sampler BZ	Borehole*	Driller BZ**
HA ↓	0			1043		loose	lt tan	silty fine-grnd SAND	damp, no odor	Ø				→
	4													
SS ↓	5	1/1	6/6	1046		loose	lt tan	same as above		Ø				→
	7	2/2	6/6			loose	orange	fine-grnd SAND, some silt, trace black staining	damp no odor	Ø				→
SS ↓	10	6/4	6/6	1053				same as orange above		Ø				→
	12	3/3												
SS ↓	15	6/7	6/6	1107		loose		interlayered orange & white fine-to med-grnd SAND	moist no odor <u>LAB SAMPLE</u>	Ø				→
	17	5/10	2/6											
SS ↓	20	3/12	6/6	1118		loose		same as above w/ some coarser-grnd zones	moist no odor	Ø				→
	22	15/20	4/6											

* When rock coring, enter rock brokenness.
 ** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated response is read.

Remarks: _____

 Drilling Area Background (ppm):

Converted to Well? Yes _____ No Well I.D. #: _____



BORING LOG

PROJECT NAME: _____ BORING NUMBER: SB05
 PROJECT NUMBER: _____ DATE: 5-31-08
 DRILLING COMPANY: _____ GEOLOGIST: S. Ronen
 DRILLING RIG: _____ DRILLER: J. Ziegler

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows/ 6" or ROD (%)	Sample Rcovery/ Sample Length	Time	Lithology Change (Depth/Ft.) or Screened Level	MATERIAL DESCRIPTION			U S C S *	Remarks	PID/FID Reading (ppm)					
						Soil Density/ Consistency or Rock Hardness	Color	Material Classification			Sample	Sampler BZ	Borehole**	Driller BZ**		
SS	25	7 15	6 6	11:28		mod dense	orange	med to fine SAND, trace clay		v. moist, no odor	Ø				→	
↓	27	15 13	4			dense	white	silty fine SAND w/ clay		as above	Ø				→	
								same as 0-5" above		as above	Ø				→	
								same as 5-10" above		as above	Ø				→	
SS	30	9 15	6 6	12:31		mod dense	wh. pink	fine-grnd SAND		trace dark grns v. moist, no odor	Ø				→	
↓	32	15 15	6 2													
SS	35	9 12	6 6	12:42				same as above			Ø				→	
↓	37	14 21	6 4													
SS	40	11 12	6 6					same as above			Ø				→	
↓	42	13 12	6 2			mod dense	yellow	fine-grnd SAND, trace silt		v. moist, no odor	Ø				→	
BORING TERMINATED @ 42 ft BGS																

* When rock conng, enter rock brokeness.
 ** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated response is read.

Remarks: _____

Drilling Area Background (ppm):

Converted to Well? Yes _____ No Well I.D. #: _____



Project Site Name: OLF Sawfley
Project No.: 0401

Sample ID No.: OLFSD6SB051517
Sample Location: Site 2401, SB05
Sampled By: SB
C.O.C. No.: 333515

- Surface Soil
- Subsurface Soil
- Sediment
- Other:
- QA Sample Type:

Type of Sample:
 Low Concentration
 High Concentration

GRAB SAMPLE DATA:

Date: <u>5-31-00</u>	Depth Interval: <u>15'-17'</u>	Color: <u>orange & white</u>	Description (Sand, Silt, Clay, Moisture, etc.): <u>interlayered, fine- to med-grained sand</u>
Time: <u>1107</u>			
Method: <u>SS</u>			
Monitor Reading (ppm): <u>∅</u>			

Head Space

COMPOSITE SAMPLE DATA:

Date:	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

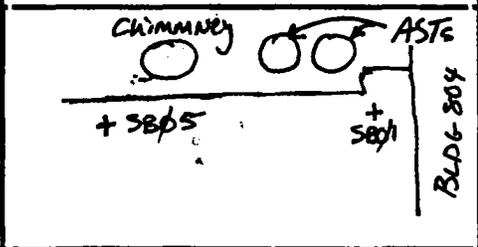
SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
<u>VOCs (822A)(8021)</u>	<u>3 5g Encore</u>	<u>3</u>	
<u>PAH (8310)</u>	<u>250 ml Amber</u>	<u>1</u>	
<u>TRPH (FL-PRO)</u>	<u>"</u>		

OBSERVATIONS / NOTES:

• PAH & TRPH run from single 250 ml container

MAP:



Circle if Applicable:

MS/MSD	Duplicate ID No.:
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Signature(s):

Shirley Panting



BORING LOG

PROJECT NAME: OLF Sawley - Site 2406 BORING NUMBER: SR06
 PROJECT NUMBER: 0401 DATE: 5-31-00
 DRILLING COMPANY: Groundwater Protection Inc. GEOLOGIST: S. Barten
 DRILLING RIG: Diedrich D120 DRILLER: J. Ziegler

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows/6" or ROD (%)	Sample Recovery/ Sample Length	Time	Lithology Change (Depth/Ft.) or Screened Level	MATERIAL DESCRIPTION			U S C S	Remarks	PID/FID Reading (ppm)				
						Soil Density/ Consistency or Rock Hardness	Color	Material Classification			Sample	Sampler BZ	Borehole**	Driller BZ**	
HA ↓	0	/	/	093		loose	brn	silty fine-grnd SAND		damp	Ø				→
	4	/	/												
SS ↓	5	2	6	1350		loose	off white	fine-grnd SAND w/ silt		damp	Ø				→
	7	2	6												
SS ↓	10	4	6	1353											
	12	4	6			loose	brn	silty, fine-grnd SAND		damp	Ø				→
SS ↓	15	2	6	1402		loose	sample	fine-to med-grnd SAND		moist	Ø				→
	17	7	4					trace white sand							
SS ↓	20	3	6	1401				orange & white layered med-grnd SAND w/ some coarse grns		moist	Ø				→
	22	6	2												

* When rock coring, enter rock brokenness.
 ** Include monitor reading in 5 foot intervals @ borehole. Increase reading frequency if elevated response is read.

Remarks: _____

Drilling Area Background (ppm):

Converted to Well? Yes _____ No Well I.D. #: _____



BORING LOG

PROJECT NAME: _____
 PROJECT NUMBER: _____
 DRILLING COMPANY: _____
 DRILLING RIG: _____

BORING NUMBER: SBD6
 DATE: 5-31-00
 GEOLOGIST: S. Zarten
 DRILLER: J. Ziegler

Sample No. and Type or ROD	Depth (Ft.) or Run No.	Blows/ 6" or ROD (%)	Sample Recovery/ Sample Length	Time	Lithology Change (Depth/Ft.) or Screened Level	MATERIAL DESCRIPTION		U S C S	Remarks	PID/FID Reading (ppm)			
						Soil Density/ Consistency or Rock Hardness	Color			Material Classification	Sample	Sampler BZ	Borehole**
SS ↓	25 27	7/11 14/18	6/6 6/2	11/12		mod-dense mod-dense	orange white	coarse-grnd SAND fine-grnd SAND w/silt, trace clay	moist LAB SAMPLE COLLECTED	2	∅	→	
SS ↓	30 32	8/9 8/10	6/6 6/5							∅	↓	→	
SS ↓	35 37	10/9 10/11	6/6 5					white & pink fine-grnd SAND, trace drk grns	v. moist	∅	↓	→	
SS ↓	40 42	11/12 10/13	6/6 6/2					BORING TERMINATED AT 42 FT BGS					

* When rock coring, enter rock brokenness.
 ** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated response is read.

Remarks: _____

Drilling Area 9/2/01
 Background (ppm): 3

Converted to Well? Yes _____ No ✓ Well I.D. #: _____



Project Site Name: OLF Saubley
Project No.: 0401

Sample ID No.: DLFS 06SB 062527
Sample Location: Site 2406, S2406
Sampled By: SB
C.O.C. No.: 33351

- Surface Soil
- Subsurface Soil
- Sediment
- Other:
- QA Sample Type:

- Type of Sample:
- Low Concentration
 - High Concentration

GRAB SAMPLE DATA:

Date:	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
<u>5-31-00</u>	<u>25'-27'</u>	<u>orange</u>	<u>coarse-grnd sand</u>
<u>Time: 1412</u>		<u>white</u>	<u>silty, fine-grnd sand</u>
<u>Method: SS</u>			
<u>Monitor-Reading (ppm): 2</u>			

Head
Space

COMPOSITE SAMPLE DATA:

Date:	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

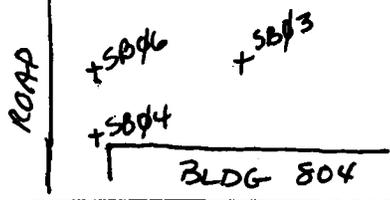
SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
<u>VOCs (8021)</u>	<u>3.5g ENCORE</u>	<u>3</u>	
<u>PAH (8310)</u>	<u>250 ml amber</u>	<u>1</u>	
<u>TRPH (FL-PRO)</u>	<u>"</u>		

OBSERVATIONS / NOTES:

• PAH & TRPH run from single 250 mL container

MAP:



Circle If Applicable:

<input type="checkbox"/> MS/MSD	Duplicate ID No.:
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Signature(s):

[Handwritten Signature]



BORING LOG

PROJECT NAME: OLE Sawley - Site 2404 BORING NUMBER: SB07
 PROJECT NUMBER: 0404 DATE: 5-31-00
 DRILLING COMPANY: Groundwater Protection Inc. GEOLOGIST: S. Barten
 DRILLING RIG: Diedrich D120 DRILLER: J. Ziegler

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows/6" or ROD (%)	Sample Recovery/ Sample Length	Time	Lithology Change (Depth/Ft.) or Screened Level	MATERIAL DESCRIPTION		U S C S	Remarks	PID/FID Reading (ppm)				
						Soil Density/ Consistency or Rock Hardness	Color			Material Classification	Sample	Sampler BZ	Borehole**	Driller BZ**
HA ↓	0	/	/	1537		loose	lt tan	silty, fine-grnd SAND	damp	Ø				→
↓	4	/	/											
SS ↓	5	1 1	6 6	1535				brown & orange fine to med-grnd SAND, some silt, trace clay & black stain	moist	Ø				→
↓	7	1 1	6 2											
SS ↓	10	6 6	6 6	1534		loose	lt tan	silty, fine-grnd SAND	moist	Ø				→
↓	12	5 5	6 4											
SS ↓	15	5 8	6 6	1544		loose		interlayered orange & white fine to med-grnd SAND	moist	1	Ø			→
↓	17	9 10	6 5											
SS ↓	20	8 8	6 6	1551				same, orange is coarse-grnd, white is med-grnd	moist	1	Ø			→
↓	22	12 8							LAB SAMPLE COLLECTED					

* When rock coring, enter rock brokenness.
 ** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated response is read.

Remarks: _____

Drilling Area Background (ppm): 6

Converted to Well? Yes _____ No Well I.D. #: _____



BORING LOG

PROJECT NAME: _____ BORING NUMBER: SBO7
 PROJECT NUMBER: _____ DATE: 5-31-00
 DRILLING COMPANY: _____ GEOLOGIST: S. Barton
 DRILLING RIG: _____ DRILLER: J. Ziegler

Sample No. and Type or ROD	Depth (Ft.) or Run No.	Blows/ 6" or ROD (%)	Sample Recovery/ Sample Length	Time	Lithology Change (Depth/Ft.) or Screened Level	MATERIAL DESCRIPTION		U S C S	Remarks	PID/FID Reading (ppm)			
						Soil Density/ Consistency or Rock Hardness	Color			Material Classification	Sample	Sampler BZ	Borehole**
SS ↓	25 27	8/10 12/15	6/6 6/6	1402 1557					moist	Ø			
SS ↓	30 32	10/9 13/14	6/6 6/2	1602			white & pink silty fine-grnd SAND same lithology, color changes to yellow		v. moist	Ø			
SS ↓	35 37	8/12 13/15	6/6 6/3	1608			layered orange coarse-grnd & white medi.-grnd SAND		v. moist	Ø			
SS ↓	40 42	5/12 16/12	6/6 6/2	1616		white	silty fine-grnd SAND, trace clay		v. moist	Ø			
						yellow	silty fine-grnd SAND						
BORING TERMINATED AT 42 FT BGS													

* When rock coring, enter rock brokenness.
 ** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated response is read.

Remarks: _____

Drilling Area Background (ppm):

Converted to Well? Yes _____ No Well I.D. #: _____



Project Site Name: OLF Sanjley
Project No.: 0401

Sample ID No.: OLF506SB072022
Sample Location: Site 2406, SB07
Sampled By: SB
C.O.C. No.: 33351

- Surface Soil
- Subsurface Soil
- Sediment
- Other:
- QA Sample Type:

- Type of Sample:
- Low Concentration
 - High Concentration

GRAB SAMPLE DATA:

Date:	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
<u>5-31-00</u>	<u>20'-22'</u>	<u>Orange & White</u>	<u>coarse-grnd sand</u> <u>med-grnd sand</u>
Time: <u>1551</u>			
Method:			
Monitor Reading (ppm): <u>1</u>			

Head space

COMPOSITE SAMPLE DATA:

Date:	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

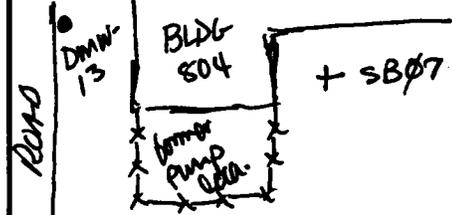
SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other
<u>VOCs (8021)</u>	<u>3.5G ENCORE</u>	<u>3</u>	
<u>PAH (8310)</u>	<u>250 mL Amber</u>	<u>1</u>	
<u>TRPH (FL-PRO)</u>	<u>11</u>		

OBSERVATIONS / NOTES:

• PAH & TRPH from same 250ml container

MAP:



Circle if Applicable:

MS/MSD	Duplicate ID No.:
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Signature(s):

[Handwritten Signature]



WELL COMPLETION FORM

JOB NAME: OLF Saunley - Site 240b
 JOB NUMBER: 0401 PROJECT MANAGER: Gerry Walker
 LOGGED BY: Skip Barten EDITED BY:
 WELL NAME: MLW-11 DATE: 5-17-00
 DRILLING COMPANY: Groundwater Protection Inc.
 EQUIPMENT: 4.25 INCH HOLLOW STEM AUGER DRILLER: Jeff Ziegler
 INCH ROTARY WASH HOURS DRILLED: 1

GALLONS OF WATER USED DURING DRILLING: NA
 METHOD OF DECONTAMINATION PRIOR TO DRILLING: Pressure Steam Wash

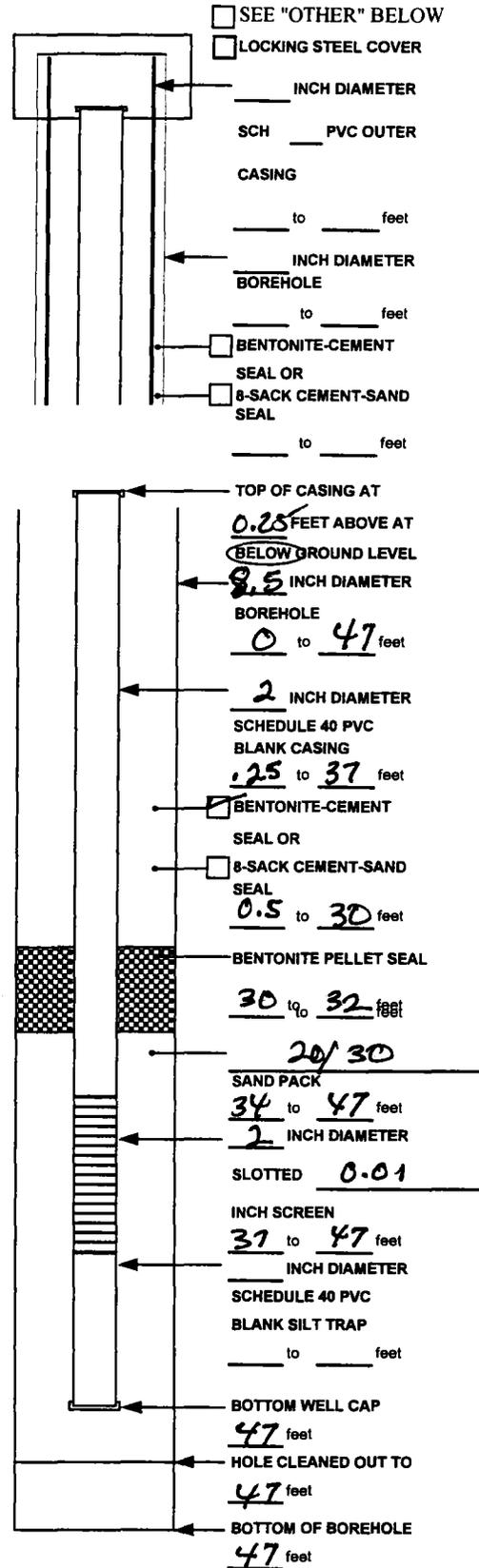
DEVELOPMENT METHOD OF DEVELOPMENT: none, low water volume

YEILD:	TIME:	DATE:
GPM	FROM TO	

TOTAL WATER REMOVED DURING DEVELOPMENT: _____ GALLONS
 DESCRIPTION OF TURBIDITY AT END OF DEVELOPMENT: CLEAR SLIGHTLY CLOUDY
 MOD. TURBID VERY MUDDY
 ODOR OF WATER: none
 WATER DISCHARGED TO: GROUND SURFACE TANK TRUCK
 STORM SEWERS STORAGE TANK
 DRUMS OTHER

MATERIALS USED
8 50 lb SACKS OF 20/30 SAND
4 SACKS OF #1 portland CEMENT
110 GALLONS OF GROUT USED
1/4 50 lb SACKS POWDERED BENTONITE
23 POUNDS OF BENTONITE PELLETS
37 FEET OF 2 INCH PVC BLANK CASING
10 FEET OF 2 INCH PVC SLOTTED SCREEN
NA YARD3 CEMENT-SAND (REDI-MIX) ORDERED
NA YARDS3 CEMENT-SAND (REDI-MIX) USED
1 50 lb sack 30/60 sand
 CONCRETE PUMPER USED? NO YES
 NAME _____

WELL COVER USED: LOCKING STEEL COVER
 CHRISTY BOX
 OTHER 8-inch, bolt-down, drive-over man hole cover



NOT TO SCALE
 ADDITIONAL INFORMATION:
2 ft seal of 30/60 sand below bentonite



BORING LOG

PROJECT NAME: OLF Sanfley - Site 240b BORING NUMBER: MW-11
 PROJECT NUMBER: 040+ CPO 112 Job 0401 DATE: 5-17-00
 DRILLING COMPANY: Groundwater Protection Inc. (GPI) GEOLOGIST: S. Barton
 DRILLING RIG: Diedrich D-120 DRILLER: Jeff Ziegler

Sample No. and Type or RQD	Depth (Fl.) or Run No.	Blows/ 6" or ROD (%)	Sample Rcovery/ Sample Length	Time	Lithology Change (Depth/Ft.) or Screened Level	MATERIAL DESCRIPTION			U S C S *	Remarks	PID/FID Reading (ppm)			
						Soil Density/ Consistency or Rock Hardness	Color	Material Classification			Sample	Sampler BZ	Borehole**	Driller BZ**
HA	0		6	fill		loose	brn	silty med-to fine-grained sand		moist, no odor				
			6											
			6											
			6											
	4		6											
SS	5	2	6	0933		loose	orange	same as 0-4'			∅			
		3	6											
		4	6											
	7	3	6											
		4	2											
SS	10	3	6	0930		loose					∅			
		4	6											
	12	5	2			H dense	orange	silty sand, trace clay fine-to med.-grnd.		moist, no odor				
		7												
SS	15	5	6	0935		loose	orange	same as above			∅			
		5	6											
		6	6											
	17	7	6											
		6												
SS	20	5	6	0940		loose	pink	med.-grained sand, mod. sorted		damp, no odor	∅			
		9	6											
	22	13	6											
		15												

* When rock coring, enter rock brokenness.
 ** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated response is read.

Remarks: _____

Drilling Area Background (ppm):

Converted to Well? Yes No _____ Well I.D. #: MW-11



BORING LOG

PROJECT NAME: _____ BORING NUMBER: MW-11
 PROJECT NUMBER: _____ DATE: 5-17-00
 DRILLING COMPANY: _____ GEOLOGIST: S. Barton
 DRILLING RIG: _____ DRILLER: J. Ziegler

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows/6" or ROD (%)	Sample Recovery/ Sample Length	Time	Lithology Change (Depth/Ft.) or Screened Level	MATERIAL DESCRIPTION			U S C S *	Remarks	PID/FID Reading (ppm)			
						Soil Density/ Consistency or Rock Hardness	Color	Material Classification			Sample	Sampler BZ	Borehole**	Driller BZ**
SS ↓	25 27	6 14	9 13	6 4	6 6	0.45	soft loose	lt wh	clayey sand, trace silt same as 20'-22' above	moist moist	Ø	Ø	Ø	Ø
								org	medi- to coarse-grained sand, trace silt	moist mo	Ø			
SS ↓	30 32	6 12	10 12	6 7	6 6	0.50	mod. loose		interlayered white fine and orange coarse sands	white was act + trace clay orange no silt or clay	Ø			
SS ↓	35 37	9 13	13 14	6 2	6 6	0.55	loose	white	fine-grained sand, trace silt	v. moist	Ø			
SS ↓	40 42	10 13	12 13	6 6	6 6	1.00			same as above w/ orange clay-rich sand lenses	v. moist no odor	Ø			
SS ↓	45 47	5 7	7 7	6 4	6 3	1.00		white	same as 35'-37', trace clay	sat. w/ water no odor	Ø			

* When rock coring, enter rock brokenness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated response is read.

Remarks: _____

Drilling Area Background (ppm):

Converted to Well? Yes No _____ Well I.D. #: MW-11



Tetra Tech NUS, Inc.

WELL COMPLETION FORM

JOB NAME: OLF Sampley - Site 2406
 JOB NUMBER: 0401 PROJECT MANAGER: Gerry Walker
 LOGGED BY: Slip Barten EDITED BY:
 WELL NAME: MW-12 DATE: 5-17-00
 DRILLING COMPANY: Groundwater Protection Inc.
 EQUIPMENT: 4.25 INCH HOLLOW STEM AUGER DRILLER: Jeff Ziegler
 INCH ROTARY WASH HOURS DRILLED: 1.5

GALLONS OF WATER USED DURING DRILLING: NA
 METHOD OF DECONTAMINATION PRIOR TO DRILLING: Pressure Steam wash

DEVELOPMENT METHOD OF DEVELOPMENT: Submersible

DEVELOPMENT BEGAN DATE: 5-20-00 TIME: 0806

YIELD:	TIME:	DATE:
GPM	FROM TO	

TOTAL WATER REMOVED DURING DEVELOPMENT: GALLONS 55

DESCRIPTION OF TURBIDITY AT END OF DEVELOPMENT: CLEAR SLIGHTLY CLOUDY
 MOD. TURBID VERY MUDDY

ODOR OF WATER: GROUND SURFACE TANK TRUCK
 DISCHARGED TO: STORM SEWERS STORAGE TANK
 DRUMS OTHER

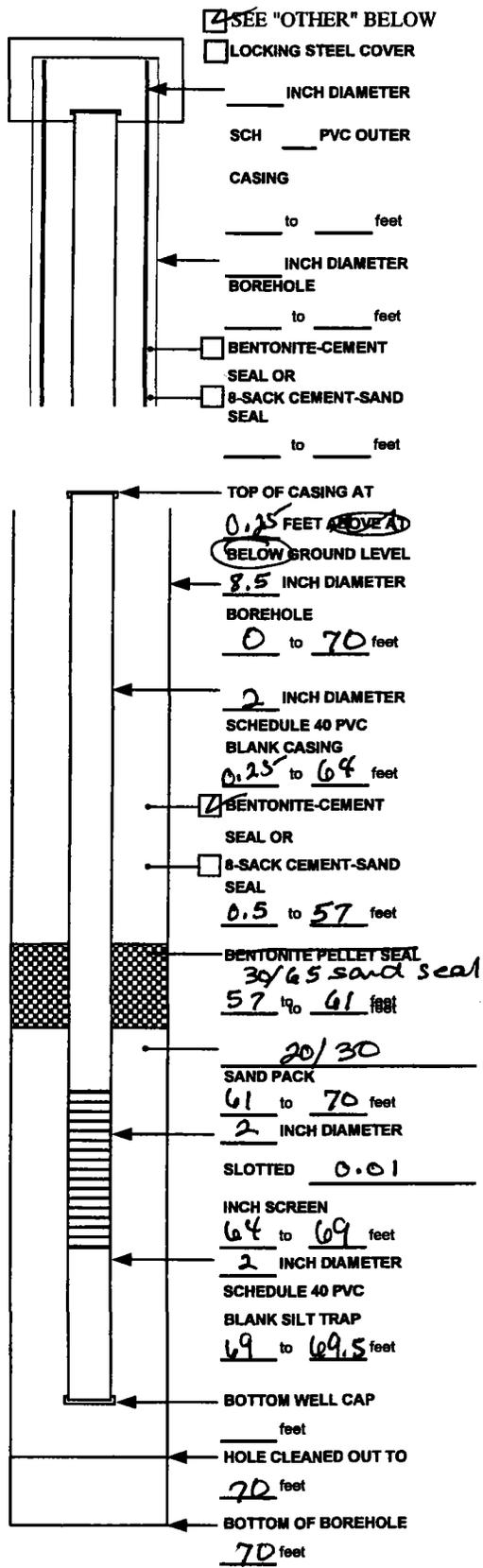
MATERIALS USED

5 50 lb SACKS OF 20/30 SAND
8 96 lb SACKS OF Type #1 Portland CEMENT
320 GALLONS OF GROUT USED
12 50 lb SACKS POWDERED BENTONITE
- POUNDS OF BENTONITE PELLETS
64 FEET OF 2 INCH PVC BLANK CASING
2 FEET OF 2 INCH PVC SLOTTED SCREEN

NA YARD3 CEMENT-SAND (REDI-MIX) ORDERED
NA YARD3 CEMENT-SAND (REDI-MIX) USED

CONCRETE PUMPER USED? NO YES
 NAME NA

WELL COVER USED: LOCKING STEEL COVER
 CHRISTY BOX
 OTHER 8" bolt-down manhole



NOT TO SCALE
 ADDITIONAL INFORMATION:



BORING LOG

PROJECT NAME: _____ BORING NUMBER: MW12
 PROJECT NUMBER: _____ DATE: 5-17-00
 DRILLING COMPANY: _____ GEOLOGIST: Skip Barton
 DRILLING RIG: _____ DRILLER: Jeff Ziegler

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows/ 6" or ROD (%)	Sample Recovery/ Sample Length	Time	Lithology Change (Depth/Ft.) or Screened Level	MATERIAL DESCRIPTION		U S C S *	Remarks	PID/FID Reading (ppm)					
						Soil Density/ Consistency or Rock Hardness	Color			Material Classification	Sample	Sampler BZ	Borehole**	Driller BZ**	
SS ↓	50 52	14 69	6 0.5	6 6	1325	mod. dense	tan	v. silty, v. fine-grained SAND w/ buff mottles	trace dark grns. saturated, no odor	Ø	↓	Ø	Ø	Ø	Ø
SS ↓	55 57	9 2	4 2	6 6	1330		tan	silty fine SAND w/ red orange mottles & lineations	saturated, no odor	Ø	↓	Ø	Ø	Ø	Ø
							orange at top	medium-grained SAND	trace clay	Ø	↓	Ø	Ø	Ø	Ø
								silty, fine SAND w/ clear, angular coarse SAND	trace silt & clay	Ø	↓	Ø	Ø	Ø	Ø
SS ↓	60 62	10 6	2 8	6 4	1339	v. soft	buff	sandy CLAY w/ dk orange sandy mottles	some plasticity	Ø	↓	Ø	Ø	Ø	Ø
								banded tan & orange medium SAND	trace silt, no odor, saturated	Ø	↓	Ø	Ø	Ø	Ø
SS ↓	65 67	14 14	15 11	6 6	1345		pink purple	fine- to coarse-grained SAND w/ white clay lenses, poorly sorted	saturated, no odor	Ø	↓	Ø	Ø	Ø	Ø
								same as pink/purple above	saturated, no odor	Ø	↓	Ø	Ø	Ø	Ø
							yellow	silty, fine SAND, trace clay		Ø	↓	Ø	Ø	Ø	Ø

* When rock coring, enter rock brokenness.
 ** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated response is read.

Remarks: well set @ 70' BGS w/ 5ft screen Drilling Area Background (ppm): Ø

Converted to Well? Yes No _____ Well I.D. #: MW-12



WELL COMPLETION FORM

JOB NAME: OLF Sampley - Site 240b

JOB NUMBER: 0401 PROJECT MANAGER: Gerry Walker

LOGGED BY: Slip Barton EDITED BY:

WELL NAME: MW-13 DATE: 5-18-00

DRILLING COMPANY: Groundwater Protection Inc.

EQUIPMENT: 4.25 INCH HOLLOW STEM AUGER
 6 INCH ROTARY WASH

DRILLER: Jeff Ziegler
HOURS DRILLED: 3.5

GALLONS OF WATER USED DURING DRILLING: 165

METHOD OF DECONTAMINATION PRIOR TO DRILLING: steam pressure wash

DEVELOPMENT METHOD OF DEVELOPMENT: Water Pump

BEGAN DATE: 5/31/00 TIME: 0850

YEILD:	GPM	TIME:	FROM	TO	DATE:

TOTAL WATER REMOVED DURING DEVELOPMENT: 55 GALLONS

DESCRIPTION OF TURBIDITY AT END OF DEVELOPMENT: CLEAR SLIGHTLY CLOUDY

ODOR OF WATER: none

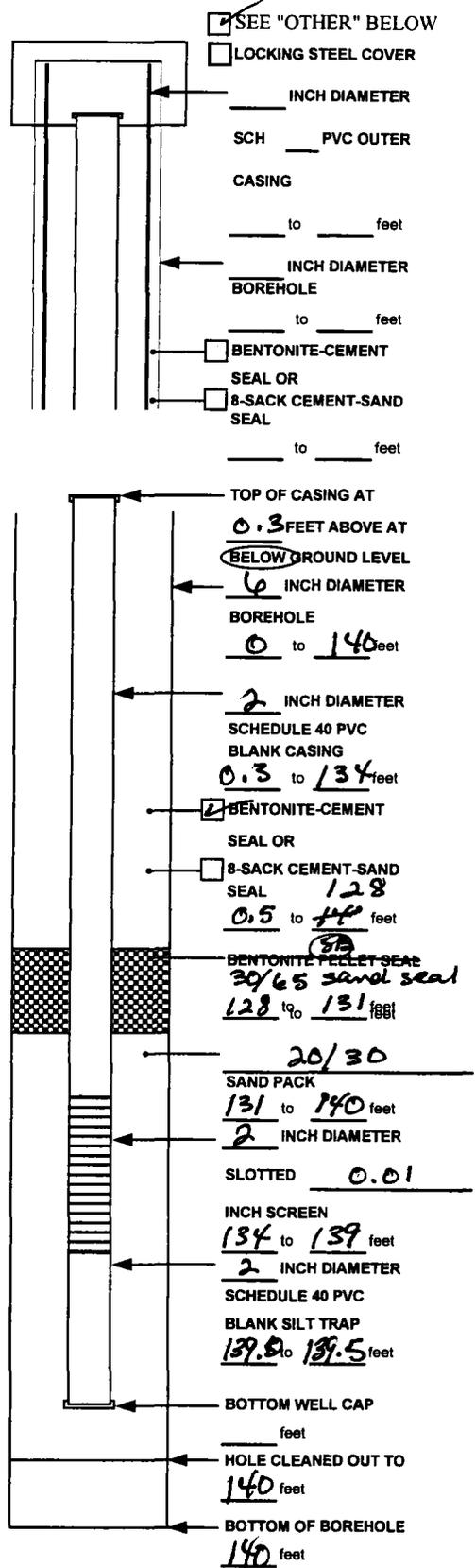
WATER DISCHARGED TO: GROUND SURFACE TANK TRUCK DRUMS

MATERIALS USED

<u>4</u> <u>50 lb</u>	SACKS OF	<u>20/30</u>	SAND
<u>14</u> <u>96 lb</u>	SACKS OF	<u>#1 portland</u>	CEMENT
<u>180</u>	GALLONS OF GROUT USED		
<u>3/3</u> <u>50 lb</u>	SACKS POWDERED BENTONITE		
<u>-</u>	POUNDS OF BENTONITE PELLETS		
<u>134</u>	FEET OF	<u>2</u> INCH PVC BLANK CASING	
<u>5</u>	FEET OF	<u>2</u> INCH PVC SLOTTED SCREEN <u>0.01"</u>	
<u>1</u> <u>50 lb sack</u>		<u>30/65 sand for seal</u>	

CONCRETE PUMPER USED? NO YES

WELL COVER USED: LOCKING STEEL COVER
 CHRISTY BOX
 OTHER 8-inch, bolt-down, drive-over man hole cover



NOT TO SCALE
ADDITIONAL INFORMATION:



BORING LOG

PROJECT NAME: OLF Sawfly - Site 2406
 PROJECT NUMBER: 0401
 DRILLING COMPANY: Groundwater Protection Inc
 DRILLING RIG: Diedrich D-120

BORING No.: DMW-13
 DATE: 5-18-00
 GEOLOGIST: S. Barton
 DRILLER: J. Ziegler

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 8" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION			U S C S *	Remarks	PID/FID Reading (ppm)								
					Soil Density/ Consistency or Rock Hardness	Color	Material Classification			Sample	Sampler BZ	Borehole**	Driller BZ**					
	0																	
	10						Did not spoon 0-50ft due to proximity to MW-11, See MW-11 log for lithology											
	20																	
	30																	
	40																	
	50																	

* When rock coring, enter rock brokenness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated response read.

Remarks: _____

Drilling Area Background (ppm): 0

Converted to Well: Yes No Well I.D. #: DMW-13

ATTACHMENT D
Tables

TABLE 2
SUMMARY OF DETECTED ANALYTES IN GROUNDWATER-SITE 2406
SAUFLY FIELD, PENSACOLA, FLORIDA

Sample No.	OLFS06MW10GW	OLFS06MW12GW	OLFS06MW13GW
Sample Location	DMW-10	DMW-12	DMW-13
Collect Date	7/19/00	7/13/00	7/13/00
Groundwater Clean-up Criteria ¹ (µg/L)			
Volatile ² (µg/L)			
1,2-Dibromoethane	0.02	--	0.024
Benzene	1	--	400
Xylenes, total	20	--	7.8
Polycyclic Aromatic Hydrocarbons ³ (µg/L)			
1-Methylnaphthalene	20	--	--
2-Methylnaphthalene	20	--	--
Naphthalene	20	--	--
Total Petroleum Hydrocarbons ⁴ (µg/L)			
	5000	--	410
Metals ⁵ (µg/L)			
Lead	15	--	--

¹ Groundwater Clean-up Criteria as provided in Chapter 62-777, F.A.C.

² SW-846 8021B and EPA 504.1, ³ SW-846 8310, ⁴ FDEP FL-PRO, ⁵ SW-846 6010B

Bold indicates an exceedance of limits.

-- = not detected

TABLE 3
GROUNDWATER AND FREE PRODUCT LEVEL DATA ON FEBRUARY 17, 2001-SITE 2406
SAUFLY FIELD, PENSACOLA, FLORIDA

Well Number	Top of Casing Elevation ⁽¹⁾ (ft)	Total Depth of Well (ft)	Depth to Product BTOC (ft)	Depth to Water BTOC (ft)	Free Product Thickness (ft)	Groundwater Elevation ⁽¹⁾ (ft)
MW-1	27.71	47.00	NA	45.67	NA	-17.96
MW-2	28.54	47.00	NA	46.32	NA	-17.78
MW-3	28.45	47.00	NA	Dry	NA	NA
MW-4	27.94	47.00	NA	45.73	NA	-17.79
MW-5	27.69	47.00	NA	45.35	NA	-17.66
MW-6	28.68	47.00	NA	Dry	NA	NA
MW-7	28.67	47.00	NA	Dry	NA	NA
MW-8	28.12	47.00	NA	Dry	NA	NA
MW-9	28.79	47.00	NMI	NMI	NMI	NMI
DMW-10	28.54	67.00	NA	46.85	NA	-18.31
MW-11	28.70	47.00	NA	46.95	NA	-18.25
DMW-12	28.71	69.00	NA	46.95	NA	-18.24
DMW-13	28.28	139.00	NA	47.85	NA	-19.57

Notes:

BTOC - Below Top of Casing

MSL - Mean Sea Level Datum

⁽¹⁾ Elevations based upon arbitrary elevation of 30 ft. above MSL assigned to the NW flange hex-nut on fire hydrant C4-5 located 75 ft. to the NW from the intersection of Raby Ave. and Pou St.

MW-1 through DMW-10 measurements taken from Table 2-1 of the SAR.

NMI - not measured due to inaccessibility

Dry - Depth to water not available because water table is below the total depth of the well.

NA - not applicable

ATTACHMENT E
Soil and Groundwater Validated Laboratory Reports



Tetra Tech NUS, Inc.

Internal Correspondence

TO: Mr. Gerald Walker [REDACTED] **DATE:** July 18, 2000
FROM: William Howard Engle **CC:** File
SUBJECT: Organic Data Validation – VOA, PAH, and TRPH
CTO112 – NAS Pensacola
SDG F6662
SAMPLES: 5/Soils
OLFS06SB011517 OLFS06SB062527
OLFS06SB042022 OLFS06SB072022
OLFS06SB051517

OVERVIEW

The sample set for CTO112, SDG F6662; Naval Air Station Pensacola, Pensacola, Florida, consists of five (5) soil environmental samples. The environmental samples were analyzed for TCL volatile organics (VOAs), polycyclic aromatic hydrocarbons (PAHs), and total recoverable petroleum hydrocarbons (TRPHs) organic compounds.

The samples were collected by Tetra Tech NUS on May 31, 2000 and analyzed by Accutest Laboratories. All analyses were performed in accordance with Naval Facilities Engineering Service Center (NFESC) Quality Assurance/Quality Control (QA/QC) criteria and analyzed according to SW-846 Method 8260B (VOAs), 8310 (PAHs) and FL-PRO (TRPHs) analytical and reporting protocols. The data in this SDG was validated with regard to the following parameters:

- *• Data Completeness
- *• Holding Times
- *• Initial/continuing calibrations
- *• Laboratory method/field quality control blank results
- *• Detection Limits

The symbol (*) indicates that all quality control criteria were met for this parameter. Supporting documentation is presented in Appendix C. Qualified analytical results are presented in Appendix A. The original laboratory data is contained in Appendix B.

Volatile Fraction

All quality control parameters were met for this fraction.

Polynuclear Aromatic Hydrocarbon Fraction

All quality control parameters were met for this fraction.

Total Recoverable Petroleum Hydrocarbon Fraction

All quality control parameters were met for this fraction.

Executive Summary

Laboratory performance: All quality control parameters were met.

Other factors affecting data quality: None.

The data for these analyses were reviewed with reference to the EPA Functional Guidelines for Organic Data Validation (October, 1999), and the NFESC guidelines "Navy Installation Restoration Chemical Data Quality Manual" (September, 1999). The text of the report has been formulated to address only those problems affecting data quality.

"I attest that the data referenced herein was validated according to the agreed upon validation criteria as specified in the NFESC Guidelines and the Quality Assurance Project Plan (QAPP)."



William Howard Engle

Project Chemist
Tetra Tech NUS, Inc.



Joseph A. Samchuck

Data Validation Quality Assurance Officer
Tetra Tech NUS, Inc.

Attachments:

1. Appendix A - Qualified Analytical Results
2. Appendix B - Results as reported by the laboratory
3. Appendix C - Supporting Documentation

APPENDIX A
Qualified Analytical Results

Qualifier Codes:

- A = Lab Blank Contamination
- B = Field Blank Contamination
- C = Calibration (i.e., % RSDs, %Ds, ICVs, CCVs, RPDs, RRFs, etc.) Noncompliance
- D = MS/MSD Noncompliance
- E = LCS/LCSD Noncompliance
- F = Lab Duplicate Imprecision
- G = Field Duplicate Imprecision
- H = Holding Time Exceedance
- I = ICP Serial Dilution Noncompliance
- J = GFAA PDS - GFAA MSA's $r < 0.995$
- K = ICP Interference - include ICSAB % R's
- L = Instrument Calibration Range Exceedance
- M = Sample Preservation
- N = Internal Standard Noncompliance
- O = Poor Instrument Performance (i.e., base-time drifting)
- P = Uncertainty near detection limit ($< 2 \times$ IDL for inorganics and $<$ CRQL for organics)
- Q = Other problems (can encompass a number of issues)
- R = Surrogates Recovery Noncompliance
- S = Pesticide/PCB Resolution
- T = % Breakdown Noncompliance for DDT and Endrin
- U = Pest/PCB D% between columns for positive results
- V = Non-linear calibrations, tuning $r < 0.995$ (correlation coefficient)
- W = EMPC result
- X = Signal to noise response drop
- Y = % Solid content is less than 30%

CTO112-NAS PENSACOLA

SOIL DATA

Accutest, NJ

SDG: F6662

SAMPLE NUMBER:	OLFS06SB011517	OLFS06SB042022	OLFS06SB051517	OLFS06SB062527
SAMPLE DATE:	05/31/00	05/31/00	05/31/00	05/31/00
LABORATORY ID:	F6662-1	F6662-2	F6662-3	F6662-4
QC_TYPE:	NORMAL	NORMAL	NORMAL	NORMAL
% SOLIDS:	94.0 %	94.3 %	94.3 %	91.8 %
UNITS:	UG/KG	UG/KG	UG/KG	UG/KG
FIELD DUPLICATE OF:				

	RESULT	QUAL	CODE									
VOLATILES												
1,1,1-TRICHLOROETHANE	5.6	U		5.4	U		5.3	U		5	U	
1,1,2,2-TETRACHLOROETHANE	5.6	U		5.4	U		5.3	U		5	U	
1,1,2-TRICHLOROETHANE	5.6	U		5.4	U		5.3	U		5	U	
1,1-DICHLOROETHANE	5.6	U		5.4	U		5.3	U		5	U	
1,1-DICHLOROETHENE	5.6	U		5.4	U		5.3	U		5	U	
1,2 DICHLOROENZENE	5.6	U		5.4	U		5.3	U		5	U	
1,2-DIBROMOETHANE	5.6	U		5.4	U		5.3	U		5	U	
1,2-DICHLOROETHANE	5.6	U		5.4	U		5.3	U		5	U	
1,2-DICHLOROPROPANE	5.6	U		5.4	U		5.3	U		5	U	
1,3-DICHLOROENZENE	5.6	U		5.4	U		5.3	U		5	U	
1,4 DICHLOROENZENE	5.6	U		5.4	U		5.3	U		5	U	
2-CHLOROETHYL VINYL ETHER	11	U		11	U		11	U		10	U	
BENZENE	5.6	U		5.4	U		5.3	U		5	U	
BROMODICHLOROMETHANE	5.6	U		5.4	U		5.3	U		5	U	
BROMOFORM	5.6	U		5.4	U		5.3	U		5	U	
BROMOMETHANE	5.6	U		5.4	U		5.3	U		5	U	
CARBON TETRACHLORIDE	5.6	U		5.4	U		5.3	U		5	U	
CHLOROENZENE	5.6	U		5.4	U		5.3	U		5	U	
CHLOROETHANE	5.6	U		5.4	U		5.3	U		5	U	
CHLOROFORM	5.6	U		5.4	U		5.3	U		5	U	
CHLOROMETHANE	5.6	U		5.4	U		5.3	U		5	U	
CIS-1,2-DICHLOROETHENE	5.6	U		5.4	U		5.3	U		5	U	
CIS-1,3-DICHLOROPROPENE	5.6	U		5.4	U		5.3	U		5	U	
DIBROMOCHLOROMETHANE	5.6	U		5.4	U		5.3	U		5	U	
DICHLORODIFLUOROMETHANE	5.6	U		5.4	U		5.3	U		5	U	
ETHYLBENZENE	5.6	U		5.4	U		5.3	U		5	U	
METHYL TERT-BUTYL ETHER	5.6	U		5.4	U		5.3	U		5	U	
METHYLENE CHLORIDE	11	U		11	U		11	U		10	U	
TETRACHLOROETHENE	5.6	U		5.4	U		5.3	U		5	U	
TOLUENE	5.6	U		5.4	U		5.3	U		5	U	
TRANS-1,2-DICHLOROETHENE	5.6	U		5.4	U		5.3	U		5	U	
TRANS-1,3-DICHLOROPROPENE	5.6	U		5.4	U		5.3	U		5	U	
TRICHLOROETHENE	5.6	U		5.4	U		5.3	U		5	U	
TRICHLOROFLUOROMETHANE	5.6	U		5.4	U		5.3	U		5	U	

CTO112-NAS PENSACOLA

SOIL DATA

Accutest, NJ

SDG: F6662

SAMPLE NUMBER:	OLFS06SB011517	OLFS06SB042022	OLFS06SB051517	OLFS06SB062527
SAMPLE DATE:	05/31/00	05/31/00	05/31/00	05/31/00
LABORATORY ID:	F6662-1	F6662-2	F6662-3	F6662-4
QC_TYPE:	NORMAL	NORMAL	NORMAL	NORMAL
% SOLIDS:	94.0 %	94.3 %	94.3 %	91.8 %
UNITS:	UG/KG	UG/KG	UG/KG	UG/KG
FIELD DUPLICATE OF:				

	RESULT	QUAL	CODE									
VOLATILES												
VINYL CHLORIDE	5.6	U		5.4	U		5.3	U		5	U	
XYLENES, TOTAL	17	U		16	U		16	U		15	U	

CTO112-NAS PENSACOLA
SOIL DATA
Accutest, NJ
SDG: F6662

SAMPLE NUMBER:	OLFS06SB011517	OLFS06SB042022	OLFS06SB051517	OLFS06SB062527
SAMPLE DATE:	05/31/00	05/31/00	05/31/00	05/31/00
LABORATORY ID:	F6662-1	F6662-2	F6662-3	F6662-4
QC_TYPE:	NORMAL	NORMAL	NORMAL	NORMAL
% SOLIDS:	94.0 %	94.3 %	94.3 %	91.8 %
UNITS:	UG/KG	UG/KG	UG/KG	UG/KG
FIELD DUPLICATE OF:				

	RESULT	QUAL	CODE									
POLYNUCLEAR AROMATIC HYDROCARBONS												
1-METHYLNAPHTHALENE	350	U		350	U		350	U		360	U	
2-METHYLNAPHTHALENE	350	U		350	U		350	U		360	U	
ACENAPHTHENE	350	U		350	U		350	U		360	U	
ACENAPHTHYLENE	710	U		710	U		710	U		730	U	
ANTHRACENE	350	U		350	U		350	U		360	U	
BENZO(A)ANTHRACENE	71	U		71	U		71	U		73	U	
BENZO(A)PYRENE	71	U		71	U		71	U		73	U	
BENZO(B)FLUORANTHENE	71	U		71	U		71	U		73	U	
BENZO(G,H,I)PERYLENE	71	U		71	U		71	U		73	U	
BENZO(K)FLUORANTHENE	71	U		71	U		71	U		73	U	
CHRYSENE	71	U		71	U		71	U		73	U	
DIBENZO(A,H)ANTHRACENE	71	U		71	U		71	U		73	U	
FLUORANTHENE	350	U		350	U		350	U		360	U	
FLUORENE	350	U		350	U		350	U		360	U	
INDENO(1,2,3-CD)PYRENE	71	U		71	U		71	U		73	U	
NAPHTHALENE	350	U		350	U		350	U		360	U	
PHENANTHRENE	350	U		350	U		350	U		360	U	
PYRENE	350	U		350	U		350	U		360	U	

CTO112-NAS PENSACOLA
SOIL DATA
Accutest, NJ
SDG: F6662

SAMPLE NUMBER:	OLFS06SB011517	OLFS06SB042022	OLFS06SB051517	OLFS06SB062527
SAMPLE DATE:	05/31/00	05/31/00	05/31/00	05/31/00
LABORATORY ID:	F6662-1	F6662-2	F6662-3	F6662-4
QC_TYPE:	NORMAL	NORMAL	NORMAL	NORMAL
% SOLIDS:	94.0 %	94.3 %	94.3 %	91.8 %
UNITS:	MG/KG	MG/KG	MG/KG	MG/KG
FIELD DUPLICATE OF:				

	RESULT	QUAL	CODE									
PETROLEUM HYDROCARBONS												
TOTAL PETROLEUM HYDROCARBONS	8.9	U		8.8	U		8.8	U		9	U	

APPENDIX B

Results as Reported by the Laboratory

Report of Analysis

Client Sample ID: OLFS06SB011517

Lab Sample ID: F6662-1

Date Sampled: 05/31/00

Matrix: SO - Soil

Date Received: 06/01/00

Method: SW846 8260B

Percent Solids: 94.0

Project: NAS Pensacola

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	H007811.D	1	06/05/00	RAW	n/a	n/a	VH90
Run #2							

VOA 8021 List

CAS No.	Compound	Result	RL	Units	Q
71-43-2	Benzene	ND	5.6	ug/kg	
75-27-4	Bromodichloromethane	ND	5.6	ug/kg	
75-25-2	Bromoform	ND	5.6	ug/kg	
108-90-7	Chlorobenzene	ND	5.6	ug/kg	
75-00-3	Chloroethane	ND	5.6	ug/kg	
67-66-3	Chloroform	ND	5.6	ug/kg	
110-75-8	2-Chloroethyl vinyl ether	ND	11	ug/kg	
56-23-5	Carbon tetrachloride	ND	5.6	ug/kg	
75-34-3	1,1-Dichloroethane	ND	5.6	ug/kg	
75-35-4	1,1-Dichloroethylene	ND	5.6	ug/kg	
106-93-4	1,2-Dibromoethane	ND	5.6	ug/kg	
107-06-2	1,2-Dichloroethane	ND	5.6	ug/kg	
78-87-5	1,2-Dichloropropane	ND	5.6	ug/kg	
124-48-1	Dibromochloromethane	ND	5.6	ug/kg	
75-71-8	Dichlorodifluoromethane	ND	5.6	ug/kg	
156-59-2	cis-1,2-Dichloroethylene	ND	5.6	ug/kg	
10061-01-5	cis-1,3-Dichloropropene	ND	5.6	ug/kg	
541-73-1	m-Dichlorobenzene	ND	5.6	ug/kg	
95-50-1	o-Dichlorobenzene	ND	5.6	ug/kg	
106-46-7	p-Dichlorobenzene	ND	5.6	ug/kg	
156-60-5	trans-1,2-Dichloroethylene	ND	5.6	ug/kg	
10061-02-6	trans-1,3-Dichloropropene	ND	5.6	ug/kg	
100-41-4	Ethylbenzene	ND	5.6	ug/kg	
74-83-9	Methyl bromide	ND	5.6	ug/kg	
74-87-3	Methyl chloride	ND	5.6	ug/kg	
75-09-2	Methylene chloride	ND	11	ug/kg	
1634-04-4	Methyl Tert Butyl Ether	ND	5.6	ug/kg	
71-55-6	1,1,1-Trichloroethane	ND	5.6	ug/kg	
79-34-5	1,1,2,2-Tetrachloroethane	ND	5.6	ug/kg	
79-00-5	1,1,2-Trichloroethane	ND	5.6	ug/kg	
127-18-4	Tetrachloroethylene	ND	5.6	ug/kg	
108-88-3	Toluene	ND	5.6	ug/kg	
79-01-6	Trichloroethylene	ND	5.6	ug/kg	
75-69-4	Trichlorofluoromethane	ND	5.6	ug/kg	
75-01-4	Vinyl chloride	ND	5.6	ug/kg	
1330-20-7	Xylene (total)	ND	17	ug/kg	

ND = Not detected

RL = Reporting Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank

N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID: OLFS06SB011517	
Lab Sample ID: F6662-1	Date Sampled: 05/31/00
Matrix: SO - Soil	Date Received: 06/01/00
Method: SW846 8260B	Percent Solids: 94.0
Project: NAS Pensacola	

VOA 8021 List

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	85%		71-122%
2037-26-5	Toluene-D8	98%		73-128%
460-00-4	4-Bromofluorobenzene	107%		53-158%
17060-07-0	1,2-Dichloroethane-D4	86%		71-122%

ND = Not detected
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID: OLFS06SB011517	
Lab Sample ID: F6662-1	Date Sampled: 05/31/00
Matrix: SO - Soil	Date Received: 06/01/00
Method: EPA 8310	Percent Solids: 94.0
Project: NAS Pensacola	

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	AA001741.D	1	06/15/00	NF	06/06/00	OP1642	GAA74
Run #2							

CAS No.	Compound	Result	RL	Units	Q
83-32-9	Acenaphthene	ND	350	ug/kg	
208-96-8	Acenaphthylene	ND	710	ug/kg	
120-12-7	Anthracene	ND	350	ug/kg	
56-55-3	Benzo(a)anthracene	ND	71	ug/kg	
50-32-8	Benzo(a)pyrene	ND	71	ug/kg	
205-99-2	Benzo(b)fluoranthene	ND	71	ug/kg	
191-24-2	Benzo(g,h,i)perylene	ND	71	ug/kg	
207-08-9	Benzo(k)fluoranthene	ND	71	ug/kg	
218-01-9	Chrysene	ND	71	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	ND	71	ug/kg	
206-44-0	Fluoranthene	ND	350	ug/kg	
86-73-7	Fluorene	ND	350	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	71	ug/kg	
91-20-3	Naphthalene	ND	350	ug/kg	
90-12-0	1-Methylnaphthalene	ND	350	ug/kg	
91-57-6	2-Methylnaphthalene	ND	350	ug/kg	
85-01-8	Phenanthrene	ND	350	ug/kg	
129-00-0	Pyrene	ND	350	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
84-15-1	o-Terphenyl	65%		35-135%
92-94-4	p-Terphenyl	94%		50-150%

ND = Not detected
 RL = Reporting Limit
 E = Indicates value exceeds calibration range

J = Indicates an estimated value
 B = Indicates analyte found in associated method blank
 N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID: OLFS06SB011517	
Lab Sample ID: F6662-1	Date Sampled: 05/31/00
Matrix: SO - Soil	Date Received: 06/01/00
Method: FLORIDA-PRO	Percent Solids: 94.0
Project: NAS Pensacola	

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	OP08581.D	1	06/07/00	CCJ	06/06/00	OP1643	GOP389
Run #2							

CAS No.	Compound	Result	RL	Units	Q
	TPH (C8-C40)	ND	8.9	mg/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
84-15-1	o-Terphenyl	106%		40-140%

ND = Not detected
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID: OLFS06SB042022	
Lab Sample ID: F6662-2	Date Sampled: 05/31/00
Matrix: SO - Soil	Date Received: 06/01/00
Method: SW846 8260B	Percent Solids: 94.3
Project: NAS Pensacola	

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	H007812.D	1	06/05/00	RAW	n/a	n/a	VH90
Run #2							

VOA 8021 List

CAS No.	Compound	Result	RL	Units	Q
71-43-2	Benzene	ND	5.4	ug/kg	
75-27-4	Bromodichloromethane	ND	5.4	ug/kg	
75-25-2	Bromoform	ND	5.4	ug/kg	
108-90-7	Chlorobenzene	ND	5.4	ug/kg	
75-00-3	Chloroethane	ND	5.4	ug/kg	
67-66-3	Chloroform	ND	5.4	ug/kg	
110-75-8	2-Chloroethyl vinyl ether	ND	11	ug/kg	
56-23-5	Carbon tetrachloride	ND	5.4	ug/kg	
75-34-3	1,1-Dichloroethane	ND	5.4	ug/kg	
75-35-4	1,1-Dichloroethylene	ND	5.4	ug/kg	
106-93-4	1,2-Dibromoethane	ND	5.4	ug/kg	
107-06-2	1,2-Dichloroethane	ND	5.4	ug/kg	
78-87-5	1,2-Dichloropropane	ND	5.4	ug/kg	
124-48-1	Dibromochloromethane	ND	5.4	ug/kg	
75-71-8	Dichlorodifluoromethane	ND	5.4	ug/kg	
156-59-2	cis-1,2-Dichloroethylene	ND	5.4	ug/kg	
10061-01-5	cis-1,3-Dichloropropene	ND	5.4	ug/kg	
541-73-1	m-Dichlorobenzene	ND	5.4	ug/kg	
95-50-1	o-Dichlorobenzene	ND	5.4	ug/kg	
106-46-7	p-Dichlorobenzene	ND	5.4	ug/kg	
156-60-5	trans-1,2-Dichloroethylene	ND	5.4	ug/kg	
10061-02-6	trans-1,3-Dichloropropene	ND	5.4	ug/kg	
100-41-4	Ethylbenzene	ND	5.4	ug/kg	
74-83-9	Methyl bromide	ND	5.4	ug/kg	
74-87-3	Methyl chloride	ND	5.4	ug/kg	
75-09-2	Methylene chloride	ND	11	ug/kg	
1634-04-4	Methyl Tert Butyl Ether	ND	5.4	ug/kg	
71-55-6	1,1,1-Trichloroethane	ND	5.4	ug/kg	
79-34-5	1,1,2,2-Tetrachloroethane	ND	5.4	ug/kg	
79-00-5	1,1,2-Trichloroethane	ND	5.4	ug/kg	
127-18-4	Tetrachloroethylene	ND	5.4	ug/kg	
108-88-3	Toluene	ND	5.4	ug/kg	
79-01-6	Trichloroethylene	ND	5.4	ug/kg	
75-69-4	Trichlorofluoromethane	ND	5.4	ug/kg	
75-01-4	Vinyl chloride	ND	5.4	ug/kg	
1330-20-7	Xylene (total)	ND	16	ug/kg	

ND = Not detected
 RL = Reporting Limit
 E = Indicates value exceeds calibration range

J = Indicates an estimated value
 B = Indicates analyte found in associated method blank
 N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID: OLFS06SB042022	
Lab Sample ID: F6662-2	Date Sampled: 05/31/00
Matrix: SO - Soil	Date Received: 06/01/00
Method: SW846 8260B	Percent Solids: 94.3
Project: NAS Pensacola	

VOA 8021 List

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	86%		71-122%
2037-26-5	Toluene-D8	98%		73-128%
460-00-4	4-Bromofluorobenzene	106%		53-158%
17060-07-0	1,2-Dichloroethane-D4	91%		71-122%

ND = Not detected
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID: OLFS06SB042022	
Lab Sample ID: F6662-2	Date Sampled: 05/31/00
Matrix: SO - Soil	Date Received: 06/01/00
Method: EPA 8310	Percent Solids: 94.3
Project: NAS Pensacola	

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	AA001742.D	1	06/15/00	NF	06/06/00	OP1642	GAA74
Run #2							

CAS No.	Compound	Result	RL	Units	Q
83-32-9	Acenaphthene	ND	350	ug/kg	
208-96-8	Acenaphthylene	ND	710	ug/kg	
120-12-7	Anthracene	ND	350	ug/kg	
56-55-3	Benzo(a)anthracene	ND	71	ug/kg	
50-32-8	Benzo(a)pyrene	ND	71	ug/kg	
205-99-2	Benzo(b)fluoranthene	ND	71	ug/kg	
191-24-2	Benzo(g,h,i)perylene	ND	71	ug/kg	
207-08-9	Benzo(k)fluoranthene	ND	71	ug/kg	
218-01-9	Chrysene	ND	71	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	ND	71	ug/kg	
206-44-0	Fluoranthene	ND	350	ug/kg	
86-73-7	Fluorene	ND	350	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	71	ug/kg	
91-20-3	Naphthalene	ND	350	ug/kg	
90-12-0	1-Methylnaphthalene	ND	350	ug/kg	
91-57-6	2-Methylnaphthalene	ND	350	ug/kg	
85-01-8	Phenanthrene	ND	350	ug/kg	
129-00-0	Pyrene	ND	350	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
84-15-1	o-Terphenyl	65%		35-135%
92-94-4	p-Terphenyl	93%		50-150%

ND = Not detected
 RL = Reporting Limit
 E = Indicates value exceeds calibration range

J = Indicates an estimated value
 B = Indicates analyte found in associated method blank
 N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID: OLFS06SB042022	
Lab Sample ID: F6662-2	Date Sampled: 05/31/00
Matrix: SO - Soil	Date Received: 06/01/00
Method: FLORIDA-PRO	Percent Solids: 94.3
Project: NAS Pensacola	

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	OP08582.D	1	06/07/00	CCJ	06/06/00	OP1643	GOP389
Run #2							

CAS No.	Compound	Result	RL	Units Q
	TPH (C8-C40)	ND	8.8	mg/kg

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
84-15-1	o-Terphenyl	107%		40-140%

ND = Not detected
 RL = Reporting Limit
 E = Indicates value exceeds calibration range

J = Indicates an estimated value
 B = Indicates analyte found in associated method blank
 N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID: OLFS06SB051517	Date Sampled: 05/31/00
Lab Sample ID: F6662-3	Date Received: 06/01/00
Matrix: SO - Soil	Percent Solids: 94.3
Method: SW846 8260B	
Project: NAS Pensacola	

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	H007813.D	1	06/05/00	RAW	n/a	n/a	VH90
Run #2							

VOA 8021 List

CAS No.	Compound	Result	RL	Units	Q
71-43-2	Benzene	ND	5.3	ug/kg	
75-27-4	Bromodichloromethane	ND	5.3	ug/kg	
75-25-2	Bromoform	ND	5.3	ug/kg	
108-90-7	Chlorobenzene	ND	5.3	ug/kg	
75-00-3	Chloroethane	ND	5.3	ug/kg	
67-66-3	Chloroform	ND	5.3	ug/kg	
110-75-8	2-Chloroethyl vinyl ether	ND	11	ug/kg	
56-23-5	Carbon tetrachloride	ND	5.3	ug/kg	
75-34-3	1,1-Dichloroethane	ND	5.3	ug/kg	
75-35-4	1,1-Dichloroethylene	ND	5.3	ug/kg	
106-93-4	1,2-Dibromoethane	ND	5.3	ug/kg	
107-06-2	1,2-Dichloroethane	ND	5.3	ug/kg	
78-87-5	1,2-Dichloropropane	ND	5.3	ug/kg	
124-48-1	Dibromochloromethane	ND	5.3	ug/kg	
75-71-8	Dichlorodifluoromethane	ND	5.3	ug/kg	
156-59-2	cis-1,2-Dichloroethylene	ND	5.3	ug/kg	
10061-01-5	cis-1,3-Dichloropropene	ND	5.3	ug/kg	
541-73-1	m-Dichlorobenzene	ND	5.3	ug/kg	
95-50-1	o-Dichlorobenzene	ND	5.3	ug/kg	
106-46-7	p-Dichlorobenzene	ND	5.3	ug/kg	
156-60-5	trans-1,2-Dichloroethylene	ND	5.3	ug/kg	
10061-02-6	trans-1,3-Dichloropropene	ND	5.3	ug/kg	
100-41-4	Ethylbenzene	ND	5.3	ug/kg	
74-83-9	Methyl bromide	ND	5.3	ug/kg	
74-87-3	Methyl chloride	ND	5.3	ug/kg	
75-09-2	Methylene chloride	ND	11	ug/kg	
1634-04-4	Methyl Tert Butyl Ether	ND	5.3	ug/kg	
71-55-6	1,1,1-Trichloroethane	ND	5.3	ug/kg	
79-34-5	1,1,2,2-Tetrachloroethane	ND	5.3	ug/kg	
79-00-5	1,1,2-Trichloroethane	ND	5.3	ug/kg	
127-18-4	Tetrachloroethylene	ND	5.3	ug/kg	
108-88-3	Toluene	ND	5.3	ug/kg	
79-01-6	Trichloroethylene	ND	5.3	ug/kg	
75-69-4	Trichlorofluoromethane	ND	5.3	ug/kg	
75-01-4	Vinyl chloride	ND	5.3	ug/kg	
1330-20-7	Xylene (total)	ND	16	ug/kg	

ND = Not detected
 RL = Reporting Limit
 E = Indicates value exceeds calibration range

J = Indicates an estimated value
 B = Indicates analyte found in associated method blank
 N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID: OLFS06SB051517	
Lab Sample ID: F6662-3	Date Sampled: 05/31/00
Matrix: SO - Soil	Date Received: 06/01/00
Method: SW846 8260B	Percent Solids: 94.3
Project: NAS Pensacola	

VOA 8021 List

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	86%		71-122%
2037-26-5	Toluene-D8	98%		73-128%
460-00-4	4-Bromofluorobenzene	106%		53-158%
17060-07-0	1,2-Dichloroethane-D4	89%		71-122%

ND = Not detected
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID: OLFS06SB051517	
Lab Sample ID: F6662-3	Date Sampled: 05/31/00
Matrix: SO - Soil	Date Received: 06/01/00
Method: EPA 8310	Percent Solids: 94.3
Project: NAS Pensacola	

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	AA001743.D	1	06/15/00	NF	06/06/00	OP1642	GAA74
Run #2							

CAS No.	Compound	Result	RL	Units	Q
83-32-9	Acenaphthene	ND	350	ug/kg	
208-96-8	Acenaphthylene	ND	710	ug/kg	
120-12-7	Anthracene	ND	350	ug/kg	
56-55-3	Benzo(a)anthracene	ND	71	ug/kg	
50-32-8	Benzo(a)pyrene	ND	71	ug/kg	
205-99-2	Benzo(b)fluoranthene	ND	71	ug/kg	
191-24-2	Benzo(g,h,i)perylene	ND	71	ug/kg	
207-08-9	Benzo(k)fluoranthene	ND	71	ug/kg	
218-01-9	Chrysene	ND	71	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	ND	71	ug/kg	
206-44-0	Fluoranthene	ND	350	ug/kg	
86-73-7	Fluorene	ND	350	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	71	ug/kg	
91-20-3	Naphthalene	ND	350	ug/kg	
90-12-0	1-Methylnaphthalene	ND	350	ug/kg	
91-57-6	2-Methylnaphthalene	ND	350	ug/kg	
85-01-8	Phenanthrene	ND	350	ug/kg	
129-00-0	Pyrene	ND	350	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
84-15-1	o-Terphenyl	70%		35-135%
92-94-4	p-Terphenyl	98%		50-150%

ND = Not detected
 RL = Reporting Limit
 E = Indicates value exceeds calibration range

J = Indicates an estimated value
 B = Indicates analyte found in associated method blank
 N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID: OLFS06SB051517
Lab Sample ID: F6662-3
Matrix: SO - Soil
Method: FLORIDA-PRO
Project: NAS Pensacola

Date Sampled: 05/31/00
Date Received: 06/01/00
Percent Solids: 94.3

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	OP08583.D	1	06/07/00	CCJ	06/06/00	OP1643	GOP389
Run #2							

CAS No.	Compound	Result	RL	Units	Q
	TPH (C8-C40)	ND	8.8	mg/kg	
CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits	
84-15-1	o-Terphenyl	110%		40-140%	

ND = Not detected
 RL = Reporting Limit
 E = Indicates value exceeds calibration range

J = Indicates an estimated value
 B = Indicates analyte found in associated method blank
 N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID: OLFS06SB062527	Date Sampled: 05/31/00
Lab Sample ID: F6662-4	Date Received: 06/01/00
Matrix: SO - Soil	Percent Solids: 91.8
Method: SW846 8260B	
Project: NAS Pensacola	

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	H007814.D	1	06/05/00	RAW	n/a	n/a	VH90
Run #2							

VOA 8021 List

CAS No.	Compound	Result	RL	Units	Q
71-43-2	Benzene	ND	5.0	ug/kg	
75-27-4	Bromodichloromethane	ND	5.0	ug/kg	
75-25-2	Bromoform	ND	5.0	ug/kg	
108-90-7	Chlorobenzene	ND	5.0	ug/kg	
75-00-3	Chloroethane	ND	5.0	ug/kg	
67-66-3	Chloroform	ND	5.0	ug/kg	
110-75-8	2-Chloroethyl vinyl ether	ND	10	ug/kg	
56-23-5	Carbon tetrachloride	ND	5.0	ug/kg	
75-34-3	1,1-Dichloroethane	ND	5.0	ug/kg	
75-35-4	1,1-Dichloroethylene	ND	5.0	ug/kg	
106-93-4	1,2-Dibromoethane	ND	5.0	ug/kg	
107-06-2	1,2-Dichloroethane	ND	5.0	ug/kg	
78-87-5	1,2-Dichloropropane	ND	5.0	ug/kg	
124-48-1	Dibromochloromethane	ND	5.0	ug/kg	
75-71-8	Dichlorodifluoromethane	ND	5.0	ug/kg	
156-59-2	cis-1,2-Dichloroethylene	ND	5.0	ug/kg	
10061-01-5	cis-1,3-Dichloropropene	ND	5.0	ug/kg	
541-73-1	m-Dichlorobenzene	ND	5.0	ug/kg	
95-50-1	o-Dichlorobenzene	ND	5.0	ug/kg	
106-46-7	p-Dichlorobenzene	ND	5.0	ug/kg	
156-60-5	trans-1,2-Dichloroethylene	ND	5.0	ug/kg	
10061-02-6	trans-1,3-Dichloropropene	ND	5.0	ug/kg	
100-41-4	Ethylbenzene	ND	5.0	ug/kg	
74-83-9	Methyl bromide	ND	5.0	ug/kg	
74-87-3	Methyl chloride	ND	5.0	ug/kg	
75-09-2	Methylene chloride	ND	10	ug/kg	
1634-04-4	Methyl Tert Butyl Ether	ND	5.0	ug/kg	
71-55-6	1,1,1-Trichloroethane	ND	5.0	ug/kg	
79-34-5	1,1,2,2-Tetrachloroethane	ND	5.0	ug/kg	
79-00-5	1,1,2-Trichloroethane	ND	5.0	ug/kg	
127-18-4	Tetrachloroethylene	ND	5.0	ug/kg	
108-88-3	Toluene	ND	5.0	ug/kg	
79-01-6	Trichloroethylene	ND	5.0	ug/kg	
75-69-4	Trichlorofluoromethane	ND	5.0	ug/kg	
75-01-4	Vinyl chloride	ND	5.0	ug/kg	
1330-20-7	Xylene (total)	ND	15	ug/kg	

ND = Not detected
 RL = Reporting Limit
 E = Indicates value exceeds calibration range

J = Indicates an estimated value
 B = Indicates analyte found in associated method blank
 N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID: OLFS06SB062527	
Lab Sample ID: F6662-4	Date Sampled: 05/31/00
Matrix: SO - Soil	Date Received: 06/01/00
Method: SW846 8260B	Percent Solids: 91.8
Project: NAS Pensacola	

VOA 8021 List

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	85%		71-122%
2037-26-5	Toluene-D8	98%		73-128%
460-00-4	4-Bromofluorobenzene	106%		53-158%
17060-07-0	1,2-Dichloroethane-D4	88%		71-122%

ND = Not detected
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID: OLFS06SB062527	
Lab Sample ID: F6662-4	Date Sampled: 05/31/00
Matrix: SO - Soil	Date Received: 06/01/00
Method: EPA 8310	Percent Solids: 91.8
Project: NAS Pensacola	

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	AA001744.D	1	06/15/00	NF	06/06/00	OP1642	GAA74
Run #2							

CAS No.	Compound	Result	RL	Units	Q
83-32-9	Acenaphthene	ND	360	ug/kg	
208-96-8	Acenaphthylene	ND	730	ug/kg	
120-12-7	Anthracene	ND	360	ug/kg	
56-55-3	Benzo(a)anthracene	ND	73	ug/kg	
50-32-8	Benzo(a)pyrene	ND	73	ug/kg	
205-99-2	Benzo(b)fluoranthene	ND	73	ug/kg	
191-24-2	Benzo(g,h,i)perylene	ND	73	ug/kg	
207-08-9	Benzo(k)fluoranthene	ND	73	ug/kg	
218-01-9	Chrysene	ND	73	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	ND	73	ug/kg	
206-44-0	Fluoranthene	ND	360	ug/kg	
86-73-7	Fluorene	ND	360	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	73	ug/kg	
91-20-3	Naphthalene	ND	360	ug/kg	
90-12-0	1-Methylnaphthalene	ND	360	ug/kg	
91-57-6	2-Methylnaphthalene	ND	360	ug/kg	
85-01-8	Phenanthrene	ND	360	ug/kg	
129-00-0	Pyrene	ND	360	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
84-15-1	o-Terphenyl	65%		35-135%
92-94-4	p-Terphenyl	90%		50-150%

ND = Not detected
 RL = Reporting Limit
 E = Indicates value exceeds calibration range

J = Indicates an estimated value
 B = Indicates analyte found in associated method blank
 N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID: OLFS06SB062527	Date Sampled: 05/31/00
Lab Sample ID: F6662-4	Date Received: 06/01/00
Matrix: SO - Soil	Percent Solids: 91.8
Method: FLORIDA-PRO	
Project: NAS Pensacola	

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	OP08584.D	1	06/07/00	CCJ	06/06/00	OP1643	GOP389
Run #2							

CAS No.	Compound	Result	RL	Units	Q
	TPH (C8-C40)	ND	9.0	mg/kg	
CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits	
84-15-1	o-Terphenyl	118%		40-140%	

ND = Not detected
 RL = Reporting Limit
 E = Indicates value exceeds calibration range

J = Indicates an estimated value
 B = Indicates analyte found in associated method blank
 N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID: OLFS06SB072022	Date Sampled: 05/31/00
Lab Sample ID: F6662-5	Date Received: 06/01/00
Matrix: SO - Soil	Percent Solids: 94.4
Method: SW846 8260B	
Project: NAS Pensacola	

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	H007815.D	1	06/05/00	RAW	n/a	n/a	VH90
Run #2							

VOA 8021 List

CAS No.	Compound	Result	RL	Units	Q
71-43-2	Benzene	ND	5.3	ug/kg	
75-27-4	Bromodichloromethane	ND	5.3	ug/kg	
75-25-2	Bromoform	ND	5.3	ug/kg	
108-90-7	Chlorobenzene	ND	5.3	ug/kg	
75-00-3	Chloroethane	ND	5.3	ug/kg	
67-66-3	Chloroform	ND	5.3	ug/kg	
110-75-8	2-Chloroethyl vinyl ether	ND	11	ug/kg	
56-23-5	Carbon tetrachloride	ND	5.3	ug/kg	
75-34-3	1,1-Dichloroethane	ND	5.3	ug/kg	
75-35-4	1,1-Dichloroethylene	ND	5.3	ug/kg	
106-93-4	1,2-Dibromoethane	ND	5.3	ug/kg	
107-06-2	1,2-Dichloroethane	ND	5.3	ug/kg	
78-87-5	1,2-Dichloropropane	ND	5.3	ug/kg	
124-48-1	Dibromochloromethane	ND	5.3	ug/kg	
75-71-8	Dichlorodifluoromethane	ND	5.3	ug/kg	
156-59-2	cis-1,2-Dichloroethylene	ND	5.3	ug/kg	
10061-01-5	cis-1,3-Dichloropropene	ND	5.3	ug/kg	
541-73-1	m-Dichlorobenzene	ND	5.3	ug/kg	
95-50-1	o-Dichlorobenzene	ND	5.3	ug/kg	
106-46-7	p-Dichlorobenzene	ND	5.3	ug/kg	
156-60-5	trans-1,2-Dichloroethylene	ND	5.3	ug/kg	
10061-02-6	trans-1,3-Dichloropropene	ND	5.3	ug/kg	
100-41-4	Ethylbenzene	ND	5.3	ug/kg	
74-83-9	Methyl bromide	ND	5.3	ug/kg	
74-87-3	Methyl chloride	ND	5.3	ug/kg	
75-09-2	Methylene chloride	ND	11	ug/kg	
1634-04-4	Methyl Tert Butyl Ether	ND	5.3	ug/kg	
71-55-6	1,1,1-Trichloroethane	ND	5.3	ug/kg	
79-34-5	1,1,2,2-Tetrachloroethane	ND	5.3	ug/kg	
79-00-5	1,1,2-Trichloroethane	ND	5.3	ug/kg	
127-18-4	Tetrachloroethylene	ND	5.3	ug/kg	
108-88-3	Toluene	ND	5.3	ug/kg	
79-01-6	Trichloroethylene	ND	5.3	ug/kg	
75-69-4	Trichlorofluoromethane	ND	5.3	ug/kg	
75-01-4	Vinyl chloride	ND	5.3	ug/kg	
1330-20-7	Xylene (total)	ND	16	ug/kg	

ND = Not detected
 RL = Reporting Limit
 E = Indicates value exceeds calibration range

J = Indicates an estimated value
 B = Indicates analyte found in associated method blank
 N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID: OLFS06SB072022	
Lab Sample ID: F6662-5	Date Sampled: 05/31/00
Matrix: SO - Soil	Date Received: 06/01/00
Method: SW846 8260B	Percent Solids: 94.4
Project: NAS Pensacola	

VOA 8021 List

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	88%		71-122%
2037-26-5	Toluene-D8	98%		73-128%
460-00-4	4-Bromofluorobenzene	107%		53-158%
17060-07-0	1,2-Dichloroethane-D4	91%		71-122%

ND = Not detected
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID: OLFS06SB072022	
Lab Sample ID: F6662-5	Date Sampled: 05/31/00
Matrix: SO - Soil	Date Received: 06/01/00
Method: EPA 8310	Percent Solids: 94.4
Project: NAS Pensacola	

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	AA001745.D	1	06/15/00	NF	06/06/00	OP1642	GAA74
Run #2							

CAS No.	Compound	Result	RL	Units	Q
83-32-9	Acenaphthene	ND	350	ug/kg	
208-96-8	Acenaphthylene	ND	710	ug/kg	
120-12-7	Anthracene	ND	350	ug/kg	
56-55-3	Benzo(a)anthracene	ND	71	ug/kg	
50-32-8	Benzo(a)pyrene	ND	71	ug/kg	
205-99-2	Benzo(b)fluoranthene	ND	71	ug/kg	
191-24-2	Benzo(g,h,i)perylene	ND	71	ug/kg	
207-08-9	Benzo(k)fluoranthene	ND	71	ug/kg	
218-01-9	Chrysene	ND	71	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	ND	71	ug/kg	
206-44-0	Fluoranthene	ND	350	ug/kg	
86-73-7	Fluorene	ND	350	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	71	ug/kg	
91-20-3	Naphthalene	ND	350	ug/kg	
90-12-0	1-Methylnaphthalene	ND	350	ug/kg	
91-57-6	2-Methylnaphthalene	ND	350	ug/kg	
85-01-8	Phenanthrene	ND	350	ug/kg	
129-00-0	Pyrene	ND	350	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
84-15-1	o-Terphenyl	64%		35-135%
92-94-4	p-Terphenyl	97%		50-150%

ND = Not detected
 RL = Reporting Limit
 E = Indicates value exceeds calibration range

J = Indicates an estimated value
 B = Indicates analyte found in associated method blank
 N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID: OLFS06SB072022	Date Sampled: 05/31/00
Lab Sample ID: F6662-5	Date Received: 06/01/00
Matrix: SO - Soil	Percent Solids: 94.4
Method: FLORIDA-PRO	
Project: NAS Pensacola	

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	OP08585.D	1	06/07/00	CCJ	06/06/00	OP1643	GOP389
Run #2							

CAS No.	Compound	Result	RL	Units Q
	TPH (C8-C40)	ND	8.8	mg/kg

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
84-15-1	o-Terphenyl	103%		40-140%

ND = Not detected
 RL = Reporting Limit
 E = Indicates value exceeds calibration range

J = Indicates an estimated value
 B = Indicates analyte found in associated method blank
 N = Indicates presumptive evidence of a compound



Tetra Tech NUS, Inc.

Internal Correspondence

TO: Mr. Gerald Walker **DATE:** August 22, 2000
FROM: William Howard Engle **CC:** File
SUBJECT: Organic Data Validation – VOA, EDB, PAH, and TRPH
CTO112 – NAS Pensacola
SDG F7045
SAMPLES: 4/Aqueous
06TB0713 NASP19MW07GW OLF06MW12GW
OLF06MW13GW

OVERVIEW

The sample set for CTO112, SDG F7025; Naval Air Station Pensacola, Pensacola, Florida consists of three (3) aqueous environmental samples and one (1) trip blank. The environmental samples, with the exception of sample 06TB0713 and NASP19MW07GW, were analyzed for Benzene, Toluene, Ethylbenzene, Total Xylenes, and Methyl-tert-butyl ether (VOCs), ethylene dibromide (EDB), polycyclic aromatic hydrocarbons (PAHs), and total residual petroleum hydrocarbons (TRPHs). Sample 06TB0713 was analyzed for VOCs only and sample NASP19MW07GW was not analyzed for EDB.

The samples were collected by Tetra Tech NUS on July 13, 2000 and analyzed by Accutest Southeast Laboratory. All analyses were performed in accordance with Naval Facilities Engineering Service Center (NFESC) Quality Assurance/Quality Control (QA/QC) criteria and analyzed according to SW-846 Method 8021B (VOCs), EPA method 504.1 (EDB), SW-846 method 8310 (PAHs), and FL-PRO (TRPHs) analytical and reporting protocols. The data in this SDG was validated with regard to the following parameters:

- * • Data Completeness
- * • Holding Times
- * • Laboratory method/field quality control blank results
- * • Detection Limits

The symbol (*) indicates that all quality control criteria were met for this parameter. Supporting documentation is presented in Appendix C. Qualified analytical results are presented in Appendix A. The original laboratory data is contained in Appendix B.

X

Volatile Fraction

All quality control criteria were met for this fraction.

EDB

All quality control criteria were met for this fraction.

Polycyclic Aromatic Hydrocarbon Fraction

The MS/MSD %R for chrysene was below the lower control limit, but the LCS %R for chrysene was acceptable. Therefore, only the sample spiked, NASP19MW07GW, was qualified as estimated "J".

Total Residual Petroleum Fraction

The MSD %R for TRPH was below the lower control limit, but the LCS %R for TRPH was acceptable. Also, the MS/MSD %RPD was greater than the control limit. Therefore, only the sample spiked, NASP19MW07GW, was qualified as estimated "J".

Note

The matrix spike, OLFB59MS002, submitted with this SDG was analyzed as a field sample. This sample should not be considered as a field sample.

Executive Summary

Laboratory performance:

The MS/MSD %R for chrysene and TRPH was below the lower control limit. The TRPH MS/MSD %RPD was greater than the control limit. The sample spiked was qualified as estimated "J".

Other factors affecting data quality: None.

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Memo: Mr. G. Walker
August 22, 2000

X

The data for these analyses were reviewed with reference to the EPA Functional Guidelines for Organic Data Validation (February, 1996), and the NFESC guidelines "Navy Installation Restoration Chemical Data Quality Manual" (September, 1999). The text of the report has been formulated to address only those problems affecting data quality.

"I attest that the data referenced herein was validated according to the agreed upon validation criteria as specified in the NFESC Guidelines and the Quality Assurance Project Plan (QAPP)."



William Howard Engle

Project Chemist
Tetra Tech NUS, Inc.

Joseph A. Samchuck

Data Validation Quality Assurance Officer
Tetra Tech NUS, Inc.

Attachments:

1. Appendix A - Qualified Analytical Results
2. Appendix B - Results as reported by the laboratory
3. Appendix C - Supporting Documentation

Qualifier Codes:

- A = Lab Blank Contamination
- B = Field Blank Contamination
- C = Calibration (i.e., % RSDs, %Ds, ICVs, CCVs, RPDs, RRFs, etc.) Noncompliance
- D = MS/MSD Noncompliance
- E = LCS/LCSD Noncompliance
- F = Lab Duplicate Imprecision
- G = Field Duplicate Imprecision
- H = Holding Time Exceedance
- I = ICP Serial Dilution Noncompliance
- J = GFAA PDS - GFAA MSA's $r < 0.995$
- K = ICP Interference - include ICSAB % R's
- L = Instrument Calibration Range Exceedance
- M = Sample Preservation
- N = Internal Standard Noncompliance
- O = Poor Instrument Performance (i.e., base-time drifting)
- P = Uncertainty near detection limit ($< 2 \times$ IDL for inorganics and $<$ CRQL for organics)
- Q = Other problems (can encompass a number of issues)
- R = Surrogates Recovery Noncompliance
- S = Pesticide/PCB Resolution
- T = % Breakdown Noncompliance for DDT and Endrin
- U = Pest/PCB D% between columns for positive results
- V = Non-linear calibrations, tuning $r < 0.995$ (correlation coefficient)
- W = EMPC result
- X = Signal to noise response drop
- Y = % Solid content is less than 30%

DATA QUALIFIER DEFINITIONS:

- U - Value is a nondetected result as reported by the laboratory and should not be considered present.
- J - Positive result is estimated as a result of a value below the CRQL or a technical noncompliance.
- UJ - Nondetected result is considered to be estimated as a result of technical noncompliances.

APPENDIX A
Qualified Analytical Results

F7045

HOLDING TIME
08/17/00

Units	Nsample	Lab Id	Qc Type	Sdg	Sort	Samp Date	Extr Date	Anal Date	SAMP_DATE TO EXTR_DATE	EXTR_DATE TO ANAL_DATE	SAMP_DATE TO ANAL_DATE
UG/L	OLFB59MS002	F7045-1	NORMAL	F7045	M	07/13/00	07/20/00	07/28/00	7	8	15
UG/L	OLFS06MW12GW	F7045-4	NORMAL	F7045	M	07/13/00	07/20/00	07/28/00	7	8	15
UG/L	OLFS06MW13GW	F7045-3	NORMAL	F7045	M	07/13/00	07/20/00	07/28/00	7	8	15
UG/L	06TB0713	F7045-5	NORMAL	F7045	OV	07/13/00	//	07/26/00	0	0	13
UG/L	NASP19MW07GW	F7045-2	NORMAL	F7045	OV	07/13/00	//	07/27/00	0	0	14
UG/L	OLFB59MS002	F7045-1	NORMAL	F7045	OV	07/13/00	//	07/25/00	0	0	12
UG/L	OLFS06MW12GW	F7045-4	NORMAL	F7045	OV	07/13/00	//	07/22/00	0	0	9
UG/L	OLFS06MW13GW	F7045-3	NORMAL	F7045	OV	07/13/00	//	07/22/00	0	0	9
UG/L	NASP19MW07GW	F7045-2	NORMAL	F7045	PAH	07/13/00	07/19/00	07/20/00	6	1	7
UG/L	OLFS06MW12GW	F7045-4	NORMAL	F7045	PAH	07/13/00	07/19/00	07/20/00	6	1	7
UG/L	OLFS06MW13GW	F7045-3	NORMAL	F7045	PAH	07/13/00	07/19/00	07/20/00	6	1	7
MG/L	NASP19MW07GW	F7045-2	NORMAL	F7045	TPH	07/13/00	07/18/00	07/26/00	5	8	13
MG/L	OLFB59MS002	F7045-1	NORMAL	F7045	TPH	07/13/00	07/18/00	07/26/00	5	8	13
MG/L	OLFS06MW12GW	F7045-4	NORMAL	F7045	TPH	07/13/00	07/18/00	07/26/00	5	8	13
MG/L	OLFS06MW13GW	F7045-3	NORMAL	F7045	TPH	07/13/00	07/18/00	07/26/00	5	8	13

CTO112-NAS PENSACOLA

WATER DATA

Accutest, NJ

SDG: F7045

SAMPLE NUMBER:	06TB071300	NASP19MW07GW	OLFS06MW12GW	OLFS06MW13GW
SAMPLE DATE:	07/13/00	07/13/00	07/13/00	07/13/00
LABORATORY ID:	F7045-5	F7045-2	F7045-4	F7045-3
QC_TYPE:	NORMAL	NORMAL	NORMAL	NORMAL
% SOLIDS:	0.0 %	0.0 %	0.0 %	0.0 %
UNITS:	UG/L	UG/L	UG/L	UG/L
FIELD DUPLICATE OF:				

	RESULT	QUAL	CODE									
VOLATILES												
1,2-DIBROMOETHANE							0.024			0.02	U	
BENZENE	1	U		1	U		400			1	U	
ETHYLBENZENE	1	U		1	U		1	U		1	U	
METHYL TERT-BUTYL ETHER	1	U		1	U		1	U		1	U	
TOLUENE	1	U		1	U		1	U		1	U	
XYLENES, TOTAL	3	U		3	U		7.8			3	U	

CTO112-NAS PENSACOLA

WATER DATA

Accutest, NJ

SDG: F7045

SAMPLE NUMBER:	NASP19MW07GW	OLFS06MW12GW	OLFS06MW13GW	
SAMPLE DATE:	07/13/00	07/13/00	07/13/00	//
LABORATORY ID:	F7045-2	F7045-4	F7045-3	
QC_TYPE:	NORMAL	NORMAL	NORMAL	
% SOLIDS:	0.0 %	0.0 %	0.0 %	100.0 %
UNITS:	UG/L	UG/L	UG/L	
FIELD DUPLICATE OF:				

	RESULT	QUAL	CODE									
POLYNUCLEAR AROMATIC HYDROCARBONS												
1-METHYLNAPHTHALENE	2.4	U		2.2	U		2	U				
2-METHYLNAPHTHALENE	2.4	U		2.2	U		2	U				
ACENAPHTHENE	2.4	U		2.2	U		2	U				
ACENAPHTHYLENE	2.4	U		2.2	U		2	U				
ANTHRACENE	2.4	U		2.2	U		2	U				
BENZO(A)ANTHRACENE	0.24	U		0.22	U		0.2	U				
BENZO(A)PYRENE	0.24	U		0.22	U		0.2	U				
BENZO(B)FLUORANTHENE	0.24	U		0.22	U		0.2	U				
BENZO(G,H,I)PERYLENE	0.24	U		0.22	U		0.2	U				
BENZO(K)FLUORANTHENE	0.24	U		0.22	U		0.2	U				
CHRYSENE	4.8	UJ	D	2.2	U		2	U				
DIBENZO(A,H)ANTHRACENE	0.24	U		0.22	U		0.2	U				
FLUORANTHENE	2.4	U		2.2	U		2	U				
FLUORENE	2.4	U		2.2	U		2	U				
INDENO(1,2,3-CD)PYRENE	0.24	U		0.22	U		0.2	U				
NAPHTHALENE	2.4	U		2.2	U		2	U				
PHENANTHRENE	2.4	U		2.2	U		2	U				
PYRENE	2.4	U		2.2	U		2	U				

CTO112-NAS PENSACOLA

WATER DATA

Accutest, NJ

SDG: F7045

SAMPLE NUMBER:	NASP19MW07GW	OLFS06MW12GW	OLFS06MW13GW	
SAMPLE DATE:	07/13/00	07/13/00	07/13/00	//
LABORATORY ID:	F7045-2	F7045-4	F7045-3	
QC_TYPE:	NORMAL	NORMAL	NORMAL	
% SOLIDS:	0.0 %	0.0 %	0.0 %	100.0 %
UNITS:	MG/L	MG/L	MG/L	
FIELD DUPLICATE OF:				

	RESULT	QUAL	CODE									
PETROLEUM HYDROCARBONS												
TPH (C8-C40)	0.25	UJ	D	0.28	U		0.41					

APPENDIX B

Results as Reported by the Laboratory

Report of Analysis

Page 1 of 1

Client Sample ID: 06TB0713	Date Sampled: 07/13/00
Lab Sample ID: F7045-5	Date Received: 07/14/00
Matrix: AQ - Trip Blank Water	Percent Solids: n/a
Method: SW846 8021B	
Project: NAS Pensacola	

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	CD016677.D	1	07/26/00	RA	n/a	n/a	GCD589
Run #2							

Purgeable Aromatics, MTBE

CAS No.	Compound	Result	RL	Units Q
71-43-2	Benzene	ND	1.0	ug/l
108-88-3	Toluene	ND	1.0	ug/l
100-41-4	Ethylbenzene	ND	1.0	ug/l
1330-20-7	Xylenes (total)	ND	3.0	ug/l
1634-04-4	Methyl Tert Butyl Ether	ND	1.0	ug/l

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
460-00-4	4-Bromofluorobenzene	84%		69-125%
98-08-8	aaa-Trifluorotoluene	94%		72-125%

ND = Not detected
 RL = Reporting Limit
 E = Indicates value exceeds calibration range

J = Indicates an estimated value
 B = Indicates analyte found in associated method blank
 N = Indicates presumptive evidence of a compound

Report of Analysis

Page 1 of 1

Client Sample ID: OLFS06MW12GW	Date Sampled: 07/13/00
Lab Sample ID: F7045-4	Date Received: 07/14/00
Matrix: AQ - Ground Water	Percent Solids: n/a
Method: SW846 8021B	
Project: NAS Pensacola	

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 ^a	CD016676.D	1	07/26/00	RA	n/a	n/a	GCD589
Run #2 ^a	CD016689.D	5	07/26/00	RA	n/a	n/a	GCD589

Purgeable Aromatics, MTBE

CAS No.	Compound	Result	RL	Units Q
71-43-2	Benzene	400 ^b	5.0	ug/l
108-88-3	Toluene	ND	1.0	ug/l
100-41-4	Ethylbenzene	ND	1.0	ug/l
1330-20-7	Xylenes (total)	7.8	3.0	ug/l
1634-04-4	Methyl Tert Butyl Ether	ND	1.0	ug/l

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
460-00-4	4-Bromofluorobenzene	94%	92%	69-125%
98-08-8	aaa-Trifluorotoluene	107%	107%	72-125%

- (a) All hits confirmed by dual column analysis.
 (b) Result is from Run# 2

ND = Not detected
 RL = Reporting Limit
 E = Indicates value exceeds calibration range

J = Indicates an estimated value
 B = Indicates analyte found in associated method blank
 N = Indicates presumptive evidence of a compound

Report of Analysis

Page 1 of 1

Client Sample ID: OLFS06MW13GW	
Lab Sample ID: F7045-3	Date Sampled: 07/13/00
Matrix: AQ - Ground Water	Date Received: 07/14/00
Method: SW846 8021B	Percent Solids: n/a
Project: NAS Pensacola	

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	CD016675.D	1	07/26/00	RA	n/a	n/a	GCD589
Run #2							

Purgeable Aromatics, MTBE

CAS No.	Compound	Result	RL	Units Q
71-43-2	Benzene	ND	1.0	ug/l
108-88-3	Toluene	ND	1.0	ug/l
100-41-4	Ethylbenzene	ND	1.0	ug/l
1330-20-7	Xylenes (total)	ND	3.0	ug/l
1634-04-4	Methyl Tert Butyl Ether	ND	1.0	ug/l

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
460-00-4	4-Bromofluorobenzene	86%		69-125%
98-08-8	aaa-Trifluorotoluene	95%		72-125%

ND = Not detected
 RL = Reporting Limit
 E = Indicates value exceeds calibration range

J = Indicates an estimated value
 B = Indicates analyte found in associated method blank
 N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID: OLFS06MW12GW	Date Sampled: 07/13/00
Lab Sample ID: F7045-4	Date Received: 07/14/00
Matrix: AQ - Ground Water	Percent Solids: n/a
Method: EPA 504.1	
Project: NAS Pensacola	

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 ^a	AB15106.D	1	07/22/00	SKW	n/a	n/a	GAB549
Run #2							

CAS No.	Compound	Result	RL	Units	Q
106-93-4	1,2-Dibromoethane	0.024	0.020	ug/l	

(a) All hits confirmed by dual column analysis.

ND = Not detected
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Page 1 of 1

Client Sample ID: OLFS06MW13GW	
Lab Sample ID: F7045-3	Date Sampled: 07/13/00
Matrix: AQ - Ground Water	Date Received: 07/14/00
Method: EPA 504.1	Percent Solids: n/a
Project: NAS Pensacola	

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	AB15105.D	1	07/22/00	SKW	n/a	n/a	GAB549
Run #2							

CAS No.	Compound	Result	RL	Units	Q
106-93-4	1,2-Dibromoethane	ND	0.020	ug/l	

ND = Not detected
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Page 1 of 1

Client Sample ID: OLFS06MW12GW	
Lab Sample ID: F7045-4	Date Sampled: 07/13/00
Matrix: AQ - Ground Water	Date Received: 07/14/00
Method: EPA 8310	Percent Solids: n/a
Project: NAS Pensacola	

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	AA003109.D	1	07/20/00	CCJ	07/19/00	OP1844	GAA102
Run #2							

CAS No.	Compound	Result	RL	Units	Q
83-32-9	Acenaphthene	ND	2.2	ug/l	
208-96-8	Acenaphthylene	ND	2.2	ug/l	
120-12-7	Anthracene	ND	2.2	ug/l	
56-55-3	Benzo(a)anthracene	ND	0.22	ug/l	
50-32-8	Benzo(a)pyrene	ND	0.22	ug/l	
205-99-2	Benzo(b)fluoranthene	ND	0.22	ug/l	
191-24-2	Benzo(g,h,i)perylene	ND	0.22	ug/l	
207-08-9	Benzo(k)fluoranthene	ND	0.22	ug/l	
218-01-9	Chrysene	ND	2.2	ug/l	
53-70-3	Dibenzo(a,h)anthracene	ND	0.22	ug/l	
206-44-0	Fluoranthene	ND	2.2	ug/l	
86-73-7	Fluorene	ND	2.2	ug/l	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	0.22	ug/l	
91-20-3	Naphthalene	ND	2.2	ug/l	
90-12-0	1-Methylnaphthalene	ND	2.2	ug/l	
91-57-6	2-Methylnaphthalene	ND	2.2	ug/l	
85-01-8	Phenanthrene	ND	2.2	ug/l	
129-00-0	Pyrene	ND	2.2	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
84-15-1	o-Terphenyl	59%		29-133%
92-94-4	p-Terphenyl	76%		33-133%

ND = Not detected
 RL = Reporting Limit
 E = Indicates value exceeds calibration range

J = Indicates an estimated value
 B = Indicates analyte found in associated method blank
 N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID: OLFS06MW13GW	Date Sampled: 07/13/00
Lab Sample ID: F7045-3	Date Received: 07/14/00
Matrix: AQ - Ground Water	Percent Solids: n/a
Method: EPA 8310	
Project: NAS Pensacola	

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	AA003108.D	1	07/20/00	CCJ	07/19/00	OP1844	GAA102
Run #2							

CAS No.	Compound	Result	RL	Units	Q
83-32-9	Acenaphthene	ND	2.0	ug/l	
208-96-8	Acenaphthylene	ND	2.0	ug/l	
120-12-7	Anthracene	ND	2.0	ug/l	
56-55-3	Benzo(a)anthracene	ND	0.20	ug/l	
50-32-8	Benzo(a)pyrene	ND	0.20	ug/l	
205-99-2	Benzo(b)fluoranthene	ND	0.20	ug/l	
191-24-2	Benzo(g,h,i)perylene	ND	0.20	ug/l	
207-08-9	Benzo(k)fluoranthene	ND	0.20	ug/l	
218-01-9	Chrysene	ND	2.0	ug/l	
53-70-3	Dibenzo(a,h)anthracene	ND	0.20	ug/l	
206-44-0	Fluoranthene	ND	2.0	ug/l	
86-73-7	Fluorene	ND	2.0	ug/l	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	0.20	ug/l	
91-20-3	Naphthalene	ND	2.0	ug/l	
90-12-0	1-Methylnaphthalene	ND	2.0	ug/l	
91-57-6	2-Methylnaphthalene	ND	2.0	ug/l	
85-01-8	Phenanthrene	ND	2.0	ug/l	
129-00-0	Pyrene	ND	2.0	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
84-15-1	o-Terphenyl	64 %		29-133 %
92-94-4	p-Terphenyl	78 %		33-133 %

ND = Not detected
 RL = Reporting Limit
 E = Indicates value exceeds calibration range

J = Indicates an estimated value
 B = Indicates analyte found in associated method blank
 N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID: OLFS06MW12GW	
Lab Sample ID: F7045-4	Date Sampled: 07/13/00
Matrix: AQ - Ground Water	Date Received: 07/14/00
Method: FLORIDA-PRO	Percent Solids: n/a
Project: NAS Pensacola	

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	OP09769.D	1	07/26/00	CCJ	07/18/00	OP1843	GOP414
Run #2							

CAS No.	Compound	Result	RL	Units	Q
	TPH (C8-C40)	ND	0.28	mg/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
84-15-1	o-Terphenyl	78%		40-140%

ND = Not detected
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID: OLFS06MW13GW	Date Sampled: 07/13/00
Lab Sample ID: F7045-3	Date Received: 07/14/00
Matrix: AQ - Ground Water	Percent Solids: n/a
Method: FLORIDA-PRO	
Project: NAS Pensacola	

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	OP09768.D	1	07/26/00	CCJ	07/18/00	OP1843	GOP414
Run #2							

CAS No.	Compound	Result	RL	Units Q
	TPH (C8-C40)	0.410	0.28	mg/l

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
84-15-1	o-Terphenyl	62%		40-140%

ND = Not detected
 RL = Reporting Limit
 E = Indicates value exceeds calibration range

J = Indicates an estimated value
 B = Indicates analyte found in associated method blank
 N = Indicates presumptive evidence of a compound



Tetra Tech NUS, Inc.

Internal Correspondence

TO: Mr. Gerald Walker **DATE: August 22, 2000**

FROM: William Howard Engle **CC: File**

SUBJECT: Inorganic Data Validation – Total Lead
CTO112 – NAS Pensacola
SDG F7045

SAMPLES: 2/Aqueous

OLFS06MW12GW **OLFB06MW13GW**

OVERVIEW

The sample set for CTO112, SDG F7045; Naval Air Station Pensacola, Pensacola, Florida consists of two (2) aqueous environmental samples. The environmental samples were analyzed for Total Lead.

The samples were collected by Tetra Tech NUS on July 13, 2000 and analyzed by Accutest Southeast Laboratories. All analyses were performed in accordance with Naval Facilities Engineering Service Center (NFESC) Quality Assurance/Quality Control (QA/QC) criteria and analyzed according to SW-846 Method 6010A analytical and reporting protocols. The data in this SDG was validated with regard to the following parameters:

- * ● Data Completeness
- * ● Holding Times
- * ● Initial/continuing calibrations
- Laboratory method/field quality control blank results
- * ● Detection Limits

The symbol (*) indicates that all quality control criteria were met for this parameter. Supporting documentation is presented in Appendix C. Qualified analytical results are presented in Appendix A. The original laboratory data is contained in Appendix B.

Laboratory Blank Analysis

Lead was detected in the laboratory method / preparation blanks at the following maximum concentration:

Affected samples: OLFS06MW12GW

<u>Analyte</u>	<u>Maximum Concentration (ug/L)</u>	<u>Action Level (ug/L)</u>
Lead	2.8	14

An action level of 5x the maximum concentration has been used to evaluate the sample for contamination in continuing calibration blank. Dilution factors and sample aliquots were taken into consideration when evaluating for blank contamination. Positive results < the action level for lead were qualified as nondetects (U) as a result of blank contamination.

All other quality control criteria were met for this fraction.

Note

The matrix spike, OLFB59MS002, submitted with this SDG was analyzed as a field sample. This sample should not be considered as a field sample.

Executive Summary

Laboratory performance: Lead was detected in the calibration blanks. Several samples were qualified for blank contamination.

Other factors affecting data quality: None.

•Page - 3
Memo: Mr. G. Walker
August 22, 2000

The data for these analyses were reviewed with reference to the EPA Functional Guidelines for Inorganic Data Validation (February, 1994), and the NFESC guidelines "Navy Installation Restoration Chemical Data Quality Manual" (September, 1999). The text of the report has been formulated to address only those problems affecting data quality.

"I attest that the data referenced herein was validated according to the agreed upon validation criteria as specified in the NFESC Guidelines and the Quality Assurance Project Plan (QAPP)."



William Howard Engle

Project Chemist
Tetra Tech NUS, Inc.

Joseph A. Samchuck

Data Validation Quality Assurance Officer
Tetra Tech NUS, Inc.

Attachments:

1. Appendix A - Qualified Analytical Results
2. Appendix B - Results as reported by the laboratory
3. Appendix C - Supporting Documentation

Qualifier Codes:

- A = Lab Blank Contamination
- B = Field Blank Contamination
- C = Calibration (i.e., % RSDs, %Ds, ICVs, CCVs, RPDs, RRFs, etc.) Noncompliance
- D = MS/MSD Noncompliance
- E = LCS/LCSD Noncompliance
- F = Lab Duplicate Imprecision
- G = Field Duplicate Imprecision
- H = Holding Time Exceedance
- I = ICP Serial Dilution Noncompliance
- J = GFAA PDS - GFAA MSA's $r < 0.995$
- K = ICP Interference - include ICSAB % R's
- L = Instrument Calibration Range Exceedance
- M = Sample Preservation
- N = Internal Standard Noncompliance
- O = Poor Instrument Performance (i.e., base-time drifting)
- P = Uncertainty near detection limit ($< 2 \times$ IDL for inorganics and $<$ CRQL for organics)
- Q = Other problems (can encompass a number of issues)
- R = Surrogates Recovery Noncompliance
- S = Pesticide/PCB Resolution
- T = % Breakdown Noncompliance for DDT and Endrin
- U = Pest/PCB D% between columns for positive results
- V = Non-linear calibrations, tuning $r < 0.995$ (correlation coefficient)
- W = EMPC result
- X = Signal to noise response drop
- Y = % Solid content is less than 30%

DATA QUALIFIER DEFINITIONS:

- U - Value is a nondetected result as reported by the laboratory and should not be considered present.
- J - Positive result is estimated as a result of a value below the CRQL or a technical noncompliance.
- UJ - Nondetected result is considered to be estimated as a result of technical noncompliances.

APPENDIX A
Qualified Analytical Results

F7045HOLDING TIME
08/17/00

Units	Nsample	Lab Id	Qc Type	Sdg	Sort	Samp Date	Extr Date	Anal Date	SAMP_DATE TO EXTR_DATE	EXTR_DATE TO ANAL_DATE	SAMP_DATE TO ANAL_DATE
UG/L	OLFB59MS002	F7045-1	NORMAL	F7045	M	07/13/00	07/20/00	07/28/00	7	8	15
UG/L	OLFS06MW12GW	F7045-4	NORMAL	F7045	M	07/13/00	07/20/00	07/28/00	7	8	15
UG/L	OLFS06MW13GW	F7045-3	NORMAL	F7045	M	07/13/00	07/20/00	07/28/00	7	8	15
UG/L	06TB0713	F7045-5	NORMAL	F7045	OV	07/13/00	//	07/26/00	0	0	13
UG/L	NASP19MW07GW	F7045-2	NORMAL	F7045	OV	07/13/00	//	07/27/00	0	0	14
UG/L	OLFB59MS002	F7045-1	NORMAL	F7045	OV	07/13/00	//	07/25/00	0	0	12
UG/L	OLFS06MW12GW	F7045-4	NORMAL	F7045	OV	07/13/00	//	07/22/00	0	0	9
UG/L	OLFS06MW13GW	F7045-3	NORMAL	F7045	OV	07/13/00	//	07/22/00	0	0	9
UG/L	NASP19MW07GW	F7045-2	NORMAL	F7045	PAH	07/13/00	07/19/00	07/20/00	6	1	7
UG/L	OLFS06MW12GW	F7045-4	NORMAL	F7045	PAH	07/13/00	07/19/00	07/20/00	6	1	7
UG/L	OLFS06MW13GW	F7045-3	NORMAL	F7045	PAH	07/13/00	07/19/00	07/20/00	6	1	7
MG/L	NASP19MW07GW	F7045-2	NORMAL	F7045	TPH	07/13/00	07/18/00	07/26/00	5	8	13
MG/L	OLFB59MS002	F7045-1	NORMAL	F7045	TPH	07/13/00	07/18/00	07/26/00	5	8	13
MG/L	OLFS06MW12GW	F7045-4	NORMAL	F7045	TPH	07/13/00	07/18/00	07/26/00	5	8	13
MG/L	OLFS06MW13GW	F7045-3	NORMAL	F7045	TPH	07/13/00	07/18/00	07/26/00	5	8	13

CTO112-NAS PENSACOLA

WATER DATA

Accutest, NJ

SDG: F7045

SAMPLE NUMBER:	OLFS06MW12GW	OLFS06MW13GW		
SAMPLE DATE:	07/13/00	07/13/00	//	//
LABORATORY ID:	F7045-4	F7045-3		
QC_TYPE:	NORMAL	NORMAL		
% SOLIDS:	0.0 %	0.0 %	100.0 %	100.0 %
UNITS:	UG/L	UG/L		
FIELD DUPLICATE OF:				

	RESULT	QUAL	CODE									
INORGANICS												
LEAD	1.7	U	J	1.6	U							

APPENDIX B

Results as Reported by the Laboratory

Report of Analysis

Client Sample ID: OLFS06MW12GW	Date Sampled: 07/13/00
Lab Sample ID: F7045-4	Date Received: 07/14/00
Matrix: AQ - Ground Water	Percent Solids: n/a
Project: NAS Pensacola	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method
Lead	1.7 B	5.0	ug/l	1	07/20/00	07/28/00 JK	SW846 6010A

Report of Analysis

Client Sample ID: OLFS06MW13GW

Lab Sample ID: F7045-3

Matrix: AQ - Ground Water

Project: NAS Pensacola

Date Sampled: 07/13/00

Date Received: 07/14/00

Percent Solids: n/a

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method
Lead	1.6 U	5.0	ug/l	1	07/20/00	07/28/00 JK	SW846 6010A

RL = Reporting Limit



Tetra Tech NUS, Inc.

Internal Correspondence

TO: Mr. Gerald Walker **DATE: August 22, 2000**

FROM: William Howard Engle **CC: File**

SUBJECT: Organic Data Validation – VOA, EDB, PAH, and TRPH
CTO112 – NAS Pensacola
SDG F7106

SAMPLES: 7/Aqueous

06TB071900	NASP20MW27GW	NASP20MW28GW
NASP20MW38GW	NASP20MW46GW	NASP20MW55GW
OLFS06MW10GW		

OVERVIEW

The sample set for CTO112, SDG F7106; Naval Air Station Pensacola, Pensacola, Florida consists of six (6) aqueous environmental samples and one (1) trip blank. The environmental samples, with the exception of sample 06TB071900, was analyzed for Benzene, Toluene, Ethylbenzene, Total Xylenes, and Methyl-tert-butyl ether (VOCs), ethylene dibromide (EDB), polycyclic aromatic hydrocarbons (PAHs), and total residual petroleum hydrocarbons (TRPHs). Sample 06TB071900 was analyzed for VOCs only.

The samples were collected by Tetra Tech NUS on July 19, 2000 and analyzed by Accutest Southeast Laboratory. All analyses were performed in accordance with Naval Facilities Engineering Service Center (NFESC) Quality Assurance/Quality Control (QA/QC) criteria and analyzed according to SW-846 Method 8021B (VOCs), EPA method 504.1 (EDB), SW-846 method 8310 (PAHs), and FL-PRO (TRPHs) analytical and reporting protocols. The data in this SDG was validated with regard to the following parameters:

- * • Data Completeness
- * • Holding Times
- * • Laboratory method/field quality control blank results
- * • Detection Limits

The symbol (*) indicates that all quality control criteria were met for this parameter. Supporting documentation is presented in Appendix C. Qualified analytical results are presented in Appendix A. The original laboratory data is contained in Appendix B.

•Page - 2
Memo: Mr. G. Walker
August 22, 2000

Volatile Fraction

All quality control criteria were met for this fraction.

EDB

All quality control criteria were met for this fraction.

Polycyclic Aromatic Hydrocarbon Fraction

The MS/MSD %R for chrysene was below the lower control limit, but the LCS %R for chrysene was acceptable. Therefore, only the sample spiked, NASP20MW38GW, was qualified as estimated "J".

Total Residual Petroleum Fraction

All quality control criteria were met for this fraction.

Executive Summary

Laboratory performance: The MS/MSD %R for chrysene was below the lower control limit. The sample spiked was qualified as estimated "J".

Other factors affecting data quality: None.

•Page - 3
Memo: Mr. G. Walker
August 22, 2000

The data for these analyses were reviewed with reference to the EPA Functional Guidelines for Organic Data Validation (February, 1996), and the NFESC guidelines "Navy Installation Restoration Chemical Data Quality Manual" (September, 1999). The text of the report has been formulated to address only those problems affecting data quality.

"I attest that the data referenced herein was validated according to the agreed upon validation criteria as specified in the NFESC Guidelines and the Quality Assurance Project Plan (QAPP)."



William Howard Engle

Project Chemist
Tetra Tech NUS, Inc.

Attachments:

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Qualifier Codes:

- A = Lab Blank Contamination
- B = Field Blank Contamination
- C = Calibration (i.e., % RSDs, %Ds, ICVs, CCVs, RPDs, RRFs, etc.) Noncompliance
- D = MS/MSD Noncompliance
- E = LCS/LCSD Noncompliance
- F = Lab Duplicate Imprecision
- G = Field Duplicate Imprecision
- H = Holding Time Exceedance
- I = ICP Serial Dilution Noncompliance
- J = GFAA PDS - GFAA MSA's $r < 0.995$
- K = ICP Interference - include ICSAB % R's
- L = Instrument Calibration Range Exceedance
- M = Sample Preservation
- N = Internal Standard Noncompliance
- O = Poor Instrument Performance (i.e., base-time drifting)
- P = Uncertainty near detection limit ($< 2 \times$ IDL for inorganics and $<$ CRQL for organics)
- Q = Other problems (can encompass a number of issues)
- R = Surrogates Recovery Noncompliance
- S = Pesticide/PCB Resolution
- T = % Breakdown Noncompliance for DDT and Endrin
- U = Pest/PCB D% between columns for positive results
- V = Non-linear calibrations, tuning $r < 0.995$ (correlation coefficient)
- W = EMPC result
- X = Signal to noise response drop
- Y = % Solid content is less than 30%

DATA QUALIFIER DEFINITIONS:

- U - Value is a nondetected result as reported by the laboratory and should not be considered present.
- J - Positive result is estimated as a result of a value below the CRQL or a technical noncompliance.
- UJ - Nondetected result is considered to be estimated as a result of technical noncompliances.

APPENDIX A
Qualified Analytical Results

F7106

HOLDING TIME
08/17/00

Units	Nsample	Lab Id	Qc Type	Sdg	Sort	Samp Date	Extr Date	Anal Date	SAMP_DATE TO EXTR_DATE	EXTR_DATE TO ANAL_DATE	SAMP_DATE TO ANAL_DATE
UG/L	NASP20MW27GW	F7106-2	NORMAL	F7106	M	07/19/00	07/24/00	08/07/00	5	14	19
UG/L	NASP20MW28GW	F7106-4	NORMAL	F7106	M	07/19/00	07/24/00	08/07/00	5	14	19
UG/L	NASP20MW38GW	F7106-5	NORMAL	F7106	M	07/19/00	07/24/00	08/07/00	5	14	19
UG/L	NASP20MW46GW	F7106-6	NORMAL	F7106	M	07/19/00	07/24/00	08/07/00	5	14	19
UG/L	NASP20MW55GW	F7106-3	NORMAL	F7106	M	07/19/00	07/24/00	08/07/00	5	14	19
UG/L	OLFS06MW10GW	F7106-1	NORMAL	F7106	M	07/19/00	07/24/00	08/07/00	5	14	19
UG/L	06TB071900	F7106-7	NORMAL	F7106	OV	07/19/00	//	07/29/00	0	0	10
UG/L	NASP20MW27GW	F7106-2	NORMAL	F7106	OV	07/19/00	//	07/26/00	0	0	7
UG/L	NASP20MW28GW	F7106-4	NORMAL	F7106	OV	07/19/00	//	07/26/00	0	0	7
UG/L	NASP20MW38GW	F7106-5	NORMAL	F7106	OV	07/19/00	//	07/26/00	0	0	7
UG/L	NASP20MW46GW	F7106-6	NORMAL	F7106	OV	07/19/00	//	07/26/00	0	0	7
UG/L	NASP20MW55GW	F7106-3	NORMAL	F7106	OV	07/19/00	//	07/26/00	0	0	7
UG/L	OLFS06MW10GW	F7106-1	NORMAL	F7106	OV	07/19/00	//	07/26/00	0	0	7
UG/L	NASP20MW27GW	F7106-2	NORMAL	F7106	PAH	07/19/00	07/25/00	07/26/00	6	1	7
UG/L	NASP20MW28GW	F7106-4	NORMAL	F7106	PAH	07/19/00	07/25/00	07/26/00	6	1	7
UG/L	NASP20MW38GW	F7106-5	NORMAL	F7106	PAH	07/19/00	07/25/00	07/26/00	6	1	7
UG/L	NASP20MW46GW	F7106-6	NORMAL	F7106	PAH	07/19/00	07/25/00	07/26/00	6	1	7
UG/L	NASP20MW55GW	F7106-3	NORMAL	F7106	PAH	07/19/00	07/25/00	07/26/00	6	1	7
UG/L	OLFS06MW10GW	F7106-1	NORMAL	F7106	PAH	07/19/00	07/25/00	07/26/00	6	1	7
MG/L	NASP20MW27GW	F7106-2	NORMAL	F7106	TPH	07/19/00	07/24/00	07/28/00	5	4	9
MG/L	NASP20MW28GW	F7106-4	NORMAL	F7106	TPH	07/19/00	07/24/00	07/28/00	5	4	9
MG/L	NASP20MW38GW	F7106-5	NORMAL	F7106	TPH	07/19/00	07/24/00	07/28/00	5	4	9
MG/L	NASP20MW46GW	F7106-6	NORMAL	F7106	TPH	07/19/00	07/24/00	07/28/00	5	4	9
MG/L	NASP20MW55GW	F7106-3	NORMAL	F7106	TPH	07/19/00	07/24/00	07/28/00	5	4	9
MG/L	OLFS06MW10GW	F7106-1	NORMAL	F7106	TPH	07/19/00	07/24/00	07/28/00	5	4	9

CT0112-NAS PENSACOLA

WATER DATA

Accutest, NJ

SDG: F7106

SAMPLE NUMBER:	06TB071900	NASP20MW27GW	NASP20MW28GW	NASP20MW38GW
SAMPLE DATE:	07/19/00	07/19/00	07/19/00	07/19/00
LABORATORY ID:	F7106-7	F7106-2	F7106-4	F7106-5
QC_TYPE:	NORMAL	NORMAL	NORMAL	NORMAL
% SOLIDS:	0.0 %	0.0 %	0.0 %	0.0 %
UNITS:	UG/L	UG/L	UG/L	UG/L
FIELD DUPLICATE OF:				

	RESULT	QUAL	CODE									
VOLATILES												
1,2-DIBROMOETHANE				0.02	U		0.02	U		0.02	U	
BENZENE	1	U		1	U		1	U		1	U	
ETHYLBENZENE	1	U		1	U		1	U		1	U	
METHYL TERT-BUTYL ETHER	1	U		1	U		1	U		1	U	
TOLUENE	1	U		1	U		1	U		1	U	
XYLENES, TOTAL	3	U		3	U		3	U		3	U	

CTO112-NAS PENSACOLA

WATER DATA

Accutest, NJ

SDG: F7106

SAMPLE NUMBER:	NASP20MW46GW	NASP20MW55GW	OLFS06MW10GW	
SAMPLE DATE:	07/19/00	07/19/00	07/19/00	//
LABORATORY ID:	F7106-6	F7106-3	F7106-1	
QC_TYPE:	NORMAL	NORMAL	NORMAL	
% SOLIDS:	0.0 %	0.0 %	0.0 %	100.0 %
UNITS:	UG/L	UG/L	UG/L	
FIELD DUPLICATE OF:				

	RESULT	QUAL	CODE									
VOLATILES												
1,2-DIBROMOETHANE	0.02	U		0.02	U		0.02	U				
BENZENE	1	U		1	U		1	U				
ETHYLBENZENE	1	U		1	U		1	U				
METHYL TERT-BUTYL ETHER	1	U		1	U		1	U				
TOLUENE	1	U		1	U		1	U				
XYLENES, TOTAL	3	U		3	U		3	U				

CTO112-NAS PENSACOLA

WATER DATA

Accutest, NJ

SDG: F7106

SAMPLE NUMBER:	NASP20MW55GW	OLFS06MW10GW		
SAMPLE DATE:	07/19/00	07/19/00	//	//
LABORATORY ID:	F7106-3	F7106-1		
QC_TYPE:	NORMAL	NORMAL		
% SOLIDS:	0.0 %	0.0 %	100.0 %	100.0 %
UNITS:	UG/L	UG/L		
FIELD DUPLICATE OF:				

	RESULT	QUAL	CODE									
POLYNUCLEAR AROMATIC HYDROCARBONS												
1-METHYLNAPHTHALENE	2.2	U		2.2	U							
2-METHYLNAPHTHALENE	2.2	U		2.2	U							
ACENAPHTHENE	2.2	U		2.2	U							
ACENAPHTHYLENE	2.2	U		2.2	U							
ANTHRACENE	2.2	U		2.2	U							
BENZO(A)ANTHRACENE	0.22	U		0.22	U							
BENZO(A)PYRENE	0.22	U		0.22	U							
BENZO(B)FLUORANTHENE	0.22	U		0.22	U							
BENZO(G,H,I)PERYLENE	0.22	U		0.22	U							
BENZO(K)FLUORANTHENE	0.22	U		0.22	U							
CHRYSENE	2.2	U		2.2	U							
DIBENZO(A,H)ANTHRACENE	0.22	U		0.22	U							
FLUORANTHENE	2.2	U		2.2	U							
FLUORENE	2.2	U		2.2	U							
INDENO(1,2,3-CD)PYRENE	0.22	U		0.22	U							
NAPHTHALENE	2.2	U		2.2	U							
PHENANTHRENE	2.2	U		2.2	U							
PYRENE	2.2	U		2.2	U							

CTP112-NAS PENSACOLA

WATER DATA

Accutest, NJ

SDG: F7106

SAMPLE NUMBER:	NASP20MW55GW	OLFS06MW10GW		
SAMPLE DATE:	07/19/00	07/19/00	//	//
LABORATORY ID:	F7106-3	F7106-1		
QC_TYPE:	NORMAL	NORMAL		
% SOLIDS:	0.0 %	0.0 %	100.0 %	100.0 %
UNITS:	MG/L	MG/L		
FIELD DUPLICATE OF:				

	RESULT	QUAL	CODE									
PETROLEUM HYDROCARBONS												
TPH (C8-C40)	1.6			0.28	U							

APPENDIX B

Results as Reported by the Laboratory

Report of Analysis

Client Sample ID: 06TB071900	Date Sampled: 07/19/00
Lab Sample ID: F7106-7	Date Received: 07/20/00
Matrix: AQ - Trip Blank Water	Percent Solids: n/a
Method: SW846 8021B	
Project: NAS Pensacola	

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	CD016773.D	1	07/29/00	RA	n/a	n/a	GCD592
Run #2							

Purgeable Aromatics, MTBE

CAS No.	Compound	Result	RL	Units	Q
71-43-2	Benzene	ND	1.0	ug/l	
108-88-3	Toluene	ND	1.0	ug/l	
100-41-4	Ethylbenzene	ND	1.0	ug/l	
1330-20-7	Xylenes (total)	ND	3.0	ug/l	
1634-04-4	Methyl Tert Butyl Ether	ND	1.0	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
460-00-4	4-Bromofluorobenzene	88%		69-125%
98-08-8	aaa-Trifluorotoluene	100%		72-125%

ND = Not detected
 RL = Reporting Limit
 E = Indicates value exceeds calibration range

J = Indicates an estimated value
 B = Indicates analyte found in associated method blank
 N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID: OLFS06MW10GW	Date Sampled: 07/19/00
Lab Sample ID: F7106-1	Date Received: 07/20/00
Matrix: AQ - Ground Water	Percent Solids: n/a
Method: SW846 8021B	
Project: NAS Pensacola	

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	CD016766.D	1	07/28/00	RA	n/a	n/a	GCD592
Run #2							

Purgeable Aromatics, MTBE

CAS No.	Compound	Result	RL	Units	Q
71-43-2	Benzene	ND	1.0	ug/l	
108-88-3	Toluene	ND	1.0	ug/l	
100-41-4	Ethylbenzene	ND	1.0	ug/l	
1330-20-7	Xylenes (total)	ND	3.0	ug/l	
1634-04-4	Methyl Tert Butyl Ether	ND	1.0	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
460-00-4	4-Bromofluorobenzene	84%		69-125%
98-08-8	aaa-Trifluorotoluene	96%		72-125%

ND = Not detected
 RL = Reporting Limit
 E = Indicates value exceeds calibration range

J = Indicates an estimated value
 B = Indicates analyte found in associated method blank
 N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID: OLFS06MW10GW	
Lab Sample ID: F7106-1	Date Sampled: 07/19/00
Matrix: AQ - Ground Water	Date Received: 07/20/00
Method: EPA 504.1	Percent Solids: n/a
Project: NAS Pensacola	

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	AB15157.D	1	07/26/00	SKW	n/a	n/a	GAB552
Run #2							

CAS No.	Compound	Result	RL	Units	Q
106-93-4	1,2-Dibromoethane	ND	0.020	ug/l	

ND = Not detected
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID: OLFS06MW10GW	
Lab Sample ID: F7106-1	Date Sampled: 07/19/00
Matrix: AQ - Ground Water	Date Received: 07/20/00
Method: EPA 8310	Percent Solids: n/a
Project: NAS Pensacola	

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	AA003226.D	1	07/26/00	CCJ	07/25/00	OP1865	GAA106
Run #2							

CAS No.	Compound	Result	RL	Units	Q
83-32-9	Acenaphthene	ND	2.2	ug/l	
208-96-8	Acenaphthylene	ND	2.2	ug/l	
120-12-7	Anthracene	ND	2.2	ug/l	
56-55-3	Benzo(a)anthracene	ND	0.22	ug/l	
50-32-8	Benzo(a)pyrene	ND	0.22	ug/l	
205-99-2	Benzo(b)fluoranthene	ND	0.22	ug/l	
191-24-2	Benzo(g,h,i)perylene	ND	0.22	ug/l	
207-08-9	Benzo(k)fluoranthene	ND	0.22	ug/l	
218-01-9	Chrysene	ND	2.2	ug/l	
53-70-3	Dibenzo(a,h)anthracene	ND	0.22	ug/l	
206-44-0	Fluoranthene	ND	2.2	ug/l	
86-73-7	Fluorene	ND	2.2	ug/l	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	0.22	ug/l	
91-20-3	Naphthalene	ND	2.2	ug/l	
90-12-0	1-Methylnaphthalene	ND	2.2	ug/l	
91-57-6	2-Methylnaphthalene	ND	2.2	ug/l	
85-01-8	Phenanthrene	ND	2.2	ug/l	
129-00-0	Pyrene	ND	2.2	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
84-15-1	o-Terphenyl	57%		29-133%
92-94-4	p-Terphenyl	69%		33-133%

ND = Not detected
 RL = Reporting Limit
 E = Indicates value exceeds calibration range

J = Indicates an estimated value
 B = Indicates analyte found in associated method blank
 N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID: OLFS06MW10GW	Date Sampled: 07/19/00
Lab Sample ID: F7106-1	Date Received: 07/20/00
Matrix: AQ - Ground Water	Percent Solids: n/a
Method: FLORIDA-PRO	
Project: NAS Pensacola	

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	OP09812.D	1	07/28/00	CCJ	07/24/00	OP1864	GOP416
Run #2							

CAS No.	Compound	Result	RL	Units Q
	TPH (C8-C40)	ND	0.28	mg/l

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
84-15-1	o-Terphenyl	95%		40-140%

ND = Not detected
 RL = Reporting Limit
 E = Indicates value exceeds calibration range

J = Indicates an estimated value
 B = Indicates analyte found in associated method blank
 N = Indicates presumptive evidence of a compound



Tetra Tech NUS, Inc.

Internal Correspondence

TO: Mr. Gerald Walker **DATE:** August 22, 2000
FROM: William Howard Engle **CC:** File
SUBJECT: Inorganic Data Validation – Total Lead
CTO112 – NAS Pensacola
SDG F7106
SAMPLES: 6/Aqueous
NASP20MW27GW NASP20MW28GW NASP29MW38GW
NASP20MW46GW NASP20MW55GW OLFS06MW10GW

OVERVIEW

The sample set for CTO112, SDG F7106; Naval Air Station Pensacola, Pensacola, Florida consists of six (6) aqueous environmental samples. The environmental samples were analyzed for Total Lead.

The samples were collected by Tetra Tech NUS on July 19, 2000 and analyzed by Accutest Southeast Laboratories. All analyses were performed in accordance with Naval Facilities Engineering Service Center (NFESC) Quality Assurance/Quality Control (QA/QC) criteria and analyzed according to SW-846 Method 6010A analytical and reporting protocols. The data in this SDG was validated with regard to the following parameters:

- * ● Data Completeness
- * ● Holding Times
- * ● Initial/continuing calibrations
- Laboratory method/field quality control blank results
- * ● Detection Limits

The symbol (*) indicates that all quality control criteria were met for this parameter. Supporting documentation is presented in Appendix C. Qualified analytical results are presented in Appendix A. The original laboratory data is contained in Appendix B.

Laboratory Blank Analysis

Lead was detected in the laboratory method / preparation blanks at the following maximum concentration:

Affected samples: OLFS06MW10GW

<u>Analyte</u>	<u>Maximum Concentration (ug/L)</u>	<u>Action Level (ug/L)</u>
Lead	2.3	11.5

An action level of 5x the maximum concentration has been used to evaluate the sample for contamination in continuing calibration blank. Dilution factors and sample aliquots were taken into consideration when evaluating for blank contamination. Positive results < the action level for lead were qualified as nondetects (U) as a result of blank contamination.

All other quality control criteria were met for this fraction.

Executive Summary

Laboratory performance: Lead was detected in the calibration blanks. One sample was qualified for blank contamination.

Other factors affecting data quality: None.

•Page - 3
Memo: Mr. G. Walker
August 22, 2000

The data for these analyses were reviewed with reference to the EPA Functional Guidelines for Organic Data Validation (February, 1996), and the NFESC guidelines "Navy Installation Restoration Chemical Data Quality Manual" (September, 1999). The text of the report has been formulated to address only those problems affecting data quality.

"I attest that the data referenced herein was validated according to the agreed upon validation criteria as specified in the NFESC Guidelines and the Quality Assurance Project Plan (QAPP)."

A handwritten signature in black ink, appearing to read "William Howard Engle", written over a horizontal line.

William Howard Engle

Project Chemist
Tetra Tech NUS, Inc.

Attachments:

1. Appendix A - Qualified Analytical Results
2. Appendix B - Results as reported by the laboratory
3. Appendix C - Supporting Documentation

Qualifier Codes:

- A = Lab Blank Contamination
- B = Field Blank Contamination
- C = Calibration (i.e., % RSDs, %Ds, ICVs, CCVs, RPDs, RRFs, etc.) Noncompliance
- D = MS/MSD Noncompliance
- E = LCS/LCSD Noncompliance
- F = Lab Duplicate Imprecision
- G = Field Duplicate Imprecision
- H = Holding Time Exceedance
- I = ICP Serial Dilution Noncompliance
- J = GFAA PDS - GFAA MSA's $r < 0.995$
- K = ICP Interference - include ICSAB % R's
- L = Instrument Calibration Range Exceedance
- M = Sample Preservation
- N = Internal Standard Noncompliance
- O = Poor Instrument Performance (i.e., base-time drifting)
- P = Uncertainty near detection limit ($< 2 \times$ IDL for inorganics and $<$ CRQL for organics)
- Q = Other problems (can encompass a number of issues)
- R = Surrogates Recovery Noncompliance
- S = Pesticide/PCB Resolution
- T = % Breakdown Noncompliance for DDT and Endrin
- U = Pest/PCB D% between columns for positive results
- V = Non-linear calibrations, tuning $r < 0.995$ (correlation coefficient)
- W = EMPC result
- X = Signal to noise response drop
- Y = % Solid content is less than 30%

DATA QUALIFIER DEFINITIONS:

- U** - Value is a nondetected result as reported by the laboratory and should not be considered present.
- J** - Positive result is estimated as a result of a value below the CRQL or a technical noncompliance.
- UJ** - Nondetected result is considered to be estimated as a result of technical noncompliances.

APPENDIX A
Qualified Analytical Results

F7106

HOLDING TIME
08/17/00

Units	Nsample	Lab Id	Qc Type	Sdg	Sort	Samp Date	Extr Date	Anal Date	SAMP_DATE TO EXTR_DATE	EXTR_DATE TO ANAL_DATE	SAMP_DATE TO ANAL_DATE
UG/L	NASP20MW27GW	F7106-2	NORMAL	F7106	M	07/19/00	07/24/00	08/07/00	5	14	19
UG/L	NASP20MW28GW	F7106-4	NORMAL	F7106	M	07/19/00	07/24/00	08/07/00	5	14	19
UG/L	NASP20MW38GW	F7106-5	NORMAL	F7106	M	07/19/00	07/24/00	08/07/00	5	14	19
UG/L	NASP20MW46GW	F7106-6	NORMAL	F7106	M	07/19/00	07/24/00	08/07/00	5	14	19
UG/L	NASP20MW55GW	F7106-3	NORMAL	F7106	M	07/19/00	07/24/00	08/07/00	5	14	19
UG/L	OLFS06MW10GW	F7106-1	NORMAL	F7106	M	07/19/00	07/24/00	08/07/00	5	14	19
UG/L	06TB071900	F7106-7	NORMAL	F7106	OV	07/19/00	//	07/29/00	0	0	10
UG/L	NASP20MW27GW	F7106-2	NORMAL	F7106	OV	07/19/00	//	07/26/00	0	0	7
UG/L	NASP20MW28GW	F7106-4	NORMAL	F7106	OV	07/19/00	//	07/26/00	0	0	7
UG/L	NASP20MW38GW	F7106-5	NORMAL	F7106	OV	07/19/00	//	07/26/00	0	0	7
UG/L	NASP20MW46GW	F7106-6	NORMAL	F7106	OV	07/19/00	//	07/26/00	0	0	7
UG/L	NASP20MW55GW	F7106-3	NORMAL	F7106	OV	07/19/00	//	07/26/00	0	0	7
UG/L	OLFS06MW10GW	F7106-1	NORMAL	F7106	OV	07/19/00	//	07/26/00	0	0	7
UG/L	NASP20MW27GW	F7106-2	NORMAL	F7106	PAH	07/19/00	07/25/00	07/26/00	6	1	7
UG/L	NASP20MW28GW	F7106-4	NORMAL	F7106	PAH	07/19/00	07/25/00	07/26/00	6	1	7
UG/L	NASP20MW38GW	F7106-5	NORMAL	F7106	PAH	07/19/00	07/25/00	07/26/00	6	1	7
UG/L	NASP20MW46GW	F7106-6	NORMAL	F7106	PAH	07/19/00	07/25/00	07/26/00	6	1	7
UG/L	NASP20MW55GW	F7106-3	NORMAL	F7106	PAH	07/19/00	07/25/00	07/26/00	6	1	7
UG/L	OLFS06MW10GW	F7106-1	NORMAL	F7106	PAH	07/19/00	07/25/00	07/26/00	6	1	7
MG/L	NASP20MW27GW	F7106-2	NORMAL	F7106	TPH	07/19/00	07/24/00	07/28/00	5	4	9
MG/L	NASP20MW28GW	F7106-4	NORMAL	F7106	TPH	07/19/00	07/24/00	07/28/00	5	4	9
MG/L	NASP20MW38GW	F7106-5	NORMAL	F7106	TPH	07/19/00	07/24/00	07/28/00	5	4	9
MG/L	NASP20MW46GW	F7106-6	NORMAL	F7106	TPH	07/19/00	07/24/00	07/28/00	5	4	9
MG/L	NASP20MW55GW	F7106-3	NORMAL	F7106	TPH	07/19/00	07/24/00	07/28/00	5	4	9
MG/L	OLFS06MW10GW	F7106-1	NORMAL	F7106	TPH	07/19/00	07/24/00	07/28/00	5	4	9

CTO112-NAS PENSACOLA

WATER DATA

Accutest, NJ

SDG: F7106

SAMPLE NUMBER:	NASP20MW55GW	OLFS06MW10GW		
SAMPLE DATE:	07/19/00	07/19/00	//	//
LABORATORY ID:	F7106-3	F7106-1		
QC_TYPE:	NORMAL	NORMAL		
% SOLIDS:	0.0 %	0.0 %	100.0 %	100.0 %
UNITS:	UG/L	UG/L		
FIELD DUPLICATE OF:				

	RESULT	QUAL	CODE									
INORGANICS												
LEAD	1.6	U		2.4	U	A						

APPENDIX B

Results as Reported by the Laboratory

Report of Analysis

Client Sample ID: OLFS06MW10GW	
Lab Sample ID: F7106-1	Date Sampled: 07/19/00
Matrix: AQ - Ground Water	Date Received: 07/20/00
	Percent Solids: n/a
Project: NAS Pensacola	

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method
Lead	2.4 B	5.0	ug/l	1	07/24/00	08/07/00 JK	SW846 6010A

ATTACHMENT F
Groundwater Sampling Logs



GROUNDWATER SAMPLE LOG SHEET

Project Site Name: OLF Southley
Project No.: 0401

Sample ID No.: OLF506MW106
Sample Location: Site 2406 MW10

- Domestic Well Data
- Monitoring Well Data
- Other Well Type: _____
- QA Sample Type: _____

Sampled By: JL
C.O.C. No.: _____
Type of Sample:
 Low Concentration
 High Concentration

SAMPLING DATA:

Date:	Color (Visual)	pH (S.U.)	S.C. (mS/cm)	Temp. (°C)	Turbidity (NTU)	DO (mg/l)	Salinity (%)	Other
7-19-00	Clear	4.86	0.38	24.9	999	7.20	0.00	

PURGE DATA:

Date:	Volume	pH	S.C.	Temp.	Turbidity	DO	Salinity	Other
7-19-00	Initial	4.65	1.08	25.5	694	8.18	0.00	
	1st	4.61	0.40	24.7	999	7.09	0.00	
	2nd	4.72	0.40	24.7	999	7.58	0.00	
	3rd	4.65	0.39	25.0	999	7.02	0.00	
	4th	4.64	0.38	25.0	999	7.05	0.00	
	5th	4.86	0.38	24.9	999	7.20	0.00	
Method: <u>water</u>								
Monitor Reading (ppm): _____								
Well Casing Diameter & Material: <u>2" PVC</u>								
Type: <u>2" PVC</u>								
Total Well Depth (TD): <u>66.90</u>								
Static Water Level (WL): <u>47.30</u>								
One Casing Volume (gal/L): <u>3.33</u>								
Start Purge (hrs): <u>0837</u>								
End Purge (hrs): <u>0955</u>								
Total Purge Time (min): <u>78 min</u>								
Total Vol. Purged (gal/L): <u>16.5g</u>								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
VOC	HCl	40 mL Vial	2
TRPH	H ₂ SO ₄	1 L Amber	2
PAH	-	1 L Amber	2
Lead	HNO ₃	.5 L Plastic	1
EDIS	-	40 mL Vial	3

OBSERVATIONS / NOTES:

DO = 8.4 mg/L ORP = 221.4 mV
Fe = 0.13 mg/L HS = 0.00 mg/L

Circle if Applicable:

MS/MSD Duplicate ID No.: _____

Signature(s):



Project Site Name: OLF Seaflo
Project No.: 0401

Sample ID No.: OLF506 MW 120 W

Sample Location: Site 2406 MW 12

Sampled By: _____

C.O.C. No.: _____

Type of Sample: _____

- Domestic Well Data
- Monitoring Well Data
- Other Well Type: _____
- QA Sample Type: _____

- Low Concentration
- High Concentration

SAMPLING DATA:

Date: <u>7/13/00</u> →	Color (Visual)	pH (S.U.)	S.C. (mS/cm)	Temp. (°C)	Turbidity (NTU)	DO (mg/l)	Salinity (%)	Other
Time: <u>1456</u>	<u>clear</u>	<u>5.41</u>	<u>.036</u>	<u>27.6</u>	<u>7</u>	<u>2.72</u>	<u>0.00</u>	
Method: <u>water</u>								

PURGE DATA:

Date: <u>7/12/00</u> →	Volume	pH	S.C.	Temp.	Turbidity	DO	Salinity	Other
Method: <u>water</u>	<u>Initial</u>	<u>5.82</u>	<u>.046</u>	<u>28.5</u>	<u>237</u>	<u>3.29</u>	<u>0.00</u>	
Monitor Reading (ppm): <u>—</u>	<u>1st</u>	<u>5.33</u>	<u>.038</u>	<u>27.3</u>	<u>312</u>	<u>2.23</u>	<u>0.00</u>	
Well Casing Diameter & Material	<u>2nd</u>	<u>5.50</u>	<u>.036</u>	<u>27.2</u>	<u>90</u>	<u>2.71</u>	<u>0.00</u>	
Type: <u>2" PVC</u>	<u>3rd</u>	<u>5.43</u>	<u>.036</u>	<u>27.4</u>	<u>23</u>	<u>2.19</u>	<u>0.00</u>	
Total Well Depth (TD): <u>70.00</u>	<u>4th</u>	<u>5.41</u>	<u>.036</u>	<u>27.6</u>	<u>7</u>	<u>2.72</u>	<u>0.00</u>	
Static Water Level (WL): <u>47.28</u>								
One Casing Volume (gal/L): <u>3.9g</u>								
Start Purge (hrs): <u>1318</u>								
End Purge (hrs): <u>1456</u>								
Total Purge Time (min): <u>98 min</u>								
Total Vol. Purged (gal/L): <u>13.6g</u>								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
<u>VOC</u>	<u>HCl</u>	<u>40 mL Vial</u>	<u>2</u>
<u>ED13</u>	<u>—</u>	<u>40 mL Vial</u>	<u>3</u>
<u>PAH</u>	<u>—</u>	<u>1 L Amber</u>	<u>2</u>
<u>TRPH</u>	<u>H2SO4</u>	<u>1 L Amber</u>	<u>2</u>
<u>Lead</u>	<u>HNO3</u>	<u>.5 L Plastic</u>	<u>1</u>

OBSERVATIONS / NOTES:

DO = 4.3 mg/L ORP = 271.5
Fe = 0.09 mg/L HS = 0.00

Circle if Applicable:

<input type="checkbox"/> MS/MSD	<input type="checkbox"/> Duplicate ID No.:
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Signature(s):



Project Site Name: OLF Scutley
Project No.: 0401

Sample ID No.: OLFS06MW136W
Sample Location: Site 2406 MW 13

- Domestic Well Data
- Monitoring Well Data
- Other Well Type: _____
- QA Sample Type: _____

Sampled By: _____
 C.O.C. No.: _____
 Type of Sample:
 Low Concentration
 High Concentration

SAMPLING DATA:

Date:	Color (Visual)	pH (S.U.)	S.C. (mS/cm)	Temp. (°C)	Turbidity (NTU)	DO (mg/l)	Salinity (%)	Other
7-13-00	Clean	5.97	.066	25.3	0	6.53	0.00	
Time: 1100								
Method: <u>waterra</u>								

PURGE DATA:

Date:	Volume	pH	S.C.	Temp.	Turbidity	DO	Salinity	Other
7-13-00	Initial	6.00	.170	25.2	11	6.73	0.00	
Method: <u>waterra</u>	1 st	6.41	.112	24.9	635	4.38	0.00	
Monitor Reading (ppm): <u>—</u>	2 nd	6.56	.099	25.8	121	4.38	0.00	
Well Casing Diameter & Material	3 rd	6.30	.071	25.4	12	6.52	0.00	
Type: <u>2" PVC</u>	4 th	5.97	.066	25.3	0	6.53	0.00	
Total Well Depth (TD): <u>140.30</u>								
Static Water Level (WL): <u>44.41</u>								
One Casing Volume(gal/L): <u>16.3</u>								
Start Purge (hrs): <u>0938</u>								
End Purge (hrs): <u>1059</u>								
Total Purge Time (min): <u>81 min</u>								
Total Vol. Purged (gal/L): <u>65.2g</u>								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
VOC	HCl	40ml Vial	2
EDB	—	40ml Vial	2
PAH	—	1L Amber	2
TRPH	H ₂ SO ₄	1L Amber	2
Lead	HNO ₃	.5L Plastic	1

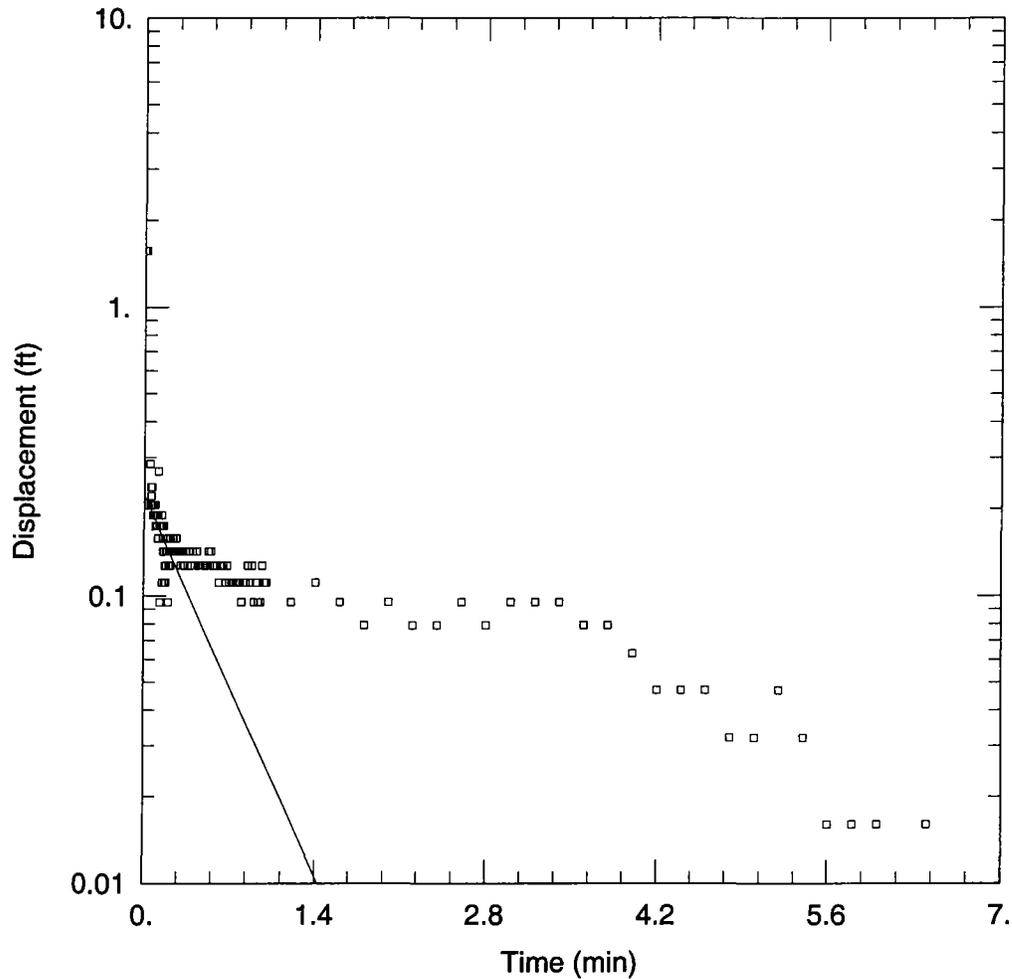
OBSERVATIONS / NOTES:

DO = 8.2 mg/L ORP = 2739 mV
 Fe = 0.00 mg/L HS = 0.00 mg/L

Circle if Applicable: MS/MSD Duplicate ID No.: _____

Signature(s):

ATTACHMENT G
Slug Test Data and Calculations



WELL TEST ANALYSIS

Data Set:
Date: 02/26/01

Time: 12:01:47

PROJECT INFORMATION

Company: TtNUS
 Client: SouthDiv
 Project: N0401
 Test Location: OLF Saufley Field
 Test Well: 2406 MW10
 Test Date: July, 2000

AQUIFER DATA

Saturated Thickness: 100. ft

Anisotropy Ratio (Kz/Kr): 0.1

WELL DATA

Initial Displacement: 1.566 ft
 Casing Radius: 0.0833 ft
 Screen Length: 5. ft

Water Column Height: 19.6 ft
 Wellbore Radius: 0.3333 ft
 Gravel Pack Porosity: 0.3

SOLUTION

Aquifer Model: Unconfined
 Solution Method: Bower-Rice

K = 0.02487 ft/min
 y0 = 0.2219 ft

SE1000C
Environme Logger
31-Jul 22:17

Unit# 145 Test 11

Setups: INPUT 1

Type Level (F)
Mode Surface
I.D. 2406MW10

Reference 0
Linearity 0.11
Scale factor 50.15
Offset 0.25
Delay mSEC 50

Step 0 27-Jul 14:33:03

Elapsed Time INPUT 1

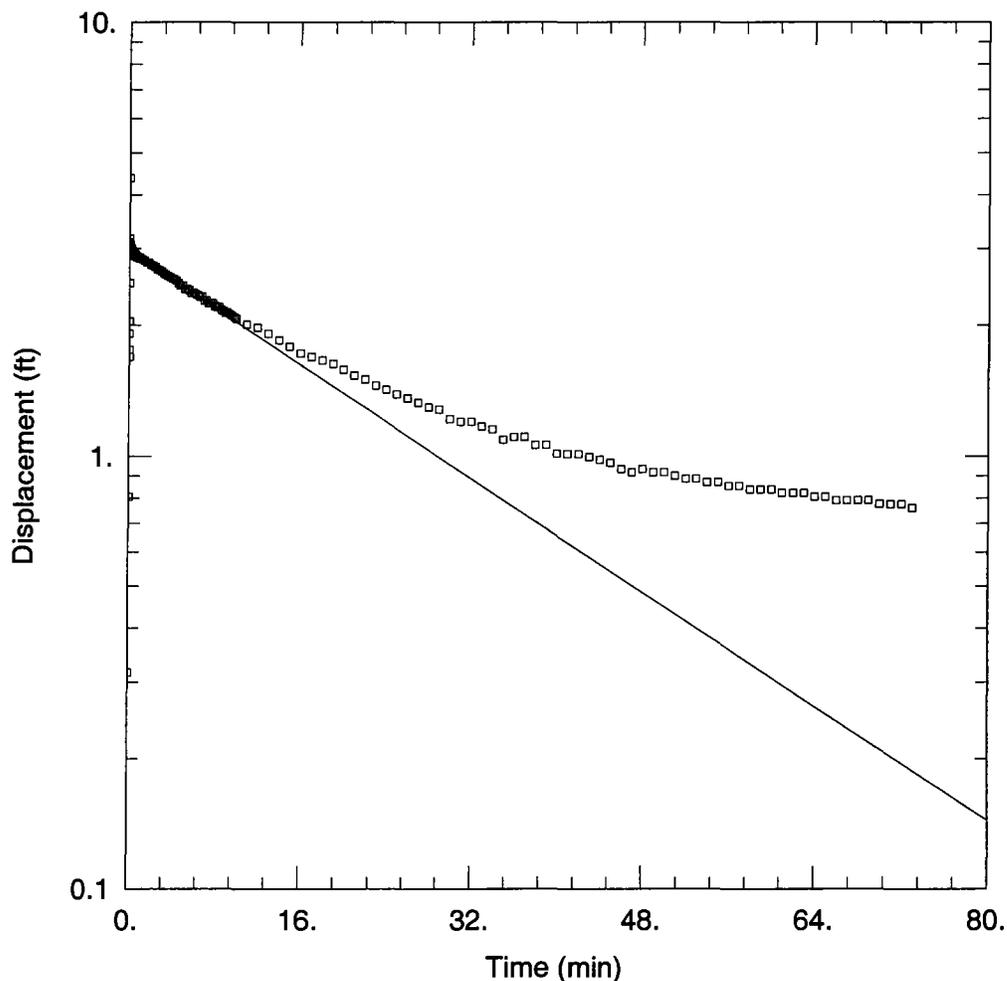
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0.0033 0.016
0.0066 0.047
0.01 1.151
0.0133 3.476
0.0166 1.578
0.02 1.024
0.0233 0.724
0.0266 -0.193
0.03 0.249
0.0333 -0.02
0.0366 1.404
0.04 1.23
0.0433 1.704
0.0466 2.195
0.05 2.116
0.0533 2.147
0.0566 2.131
0.06 2.147
0.0633 2.116
0.0666 2.116
0.07 2.1
0.0733 2.116
0.0766 2.1
0.08 2.1
0.0833 2.116
0.0866 2.116
0.09 2.084
0.0933 2.1

0.0966	2.084
0.1	2.084
0.1033	2.084
0.1066	2.1
0.11	2.1
0.1133	2.179
0.1166	2.068
0.12	2.084
0.1233	1.91
0.1266	2.084
0.13	2.005
0.1333	2.084
0.1366	2.084
0.14	2.1
0.1433	2.084
0.1466	2.084
0.15	2.021
0.1533	2.068
0.1566	2.052
0.16	2.084
0.1633	2.052
0.1666	2.021
0.17	2.037
0.1733	2.037
0.1766	2.021
0.18	2.037
0.1833	2.052
0.1866	2.068
0.19	2.052
0.1933	2.068
0.1966	2.068
0.2	2.005
0.2033	2.037
0.2066	2.037
0.21	2.052
0.2133	2.052
0.2166	2.037
0.22	2.068
0.2233	2.052
0.2266	2.052
0.23	2.052
0.2333	2.052
0.2366	2.052
0.24	2.068
0.2433	2.052
0.2466	2.052
0.25	2.052
0.2533	2.052
0.2566	2.052
0.26	2.052
0.2633	2.068
0.2666	2.068

0.27	2.052
0.2733	2.052
0.2766	2.052
0.28	2.052
0.2833	2.052
0.2866	2.052
0.29	2.052
0.2933	2.052
0.2966	2.052
0.3	2.052
0.3033	2.037
0.3066	2.052
0.31	2.052
0.3133	2.052
0.3166	2.052
0.32	2.037
0.3233	2.052
0.3266	2.037
0.33	2.037
0.3333	2.037
0.35	2.052
0.3666	2.052
0.3833	2.037
0.4	2.052
0.4166	2.037
0.4333	2.052
0.45	2.037
0.4666	2.037
0.4833	2.037
0.5	2.037
0.5166	2.037
0.5333	2.052
0.55	2.052
0.5666	2.037
0.5833	2.037
0.6	2.037
0.6166	2.021
0.6333	2.037
0.65	2.037
0.6666	2.021
0.6833	2.037
0.7	2.021
0.7166	2.021
0.7333	2.021
0.75	2.021
0.7666	2.021
0.7833	2.021
0.8	2.005
0.8166	2.021
0.8333	2.021
0.85	2.037
0.8666	2.021

0.8833	2.037
0.9	2.005
0.9166	2.021
0.9333	2.005
0.95	2.005
0.9666	2.037
0.9833	2.021
1	2.021
1.2	2.005
1.4	2.021
1.6	2.005
1.8	1.989
2	2.005
2.2	1.989
2.4	1.989
2.6	2.005
2.8	1.989
3	2.005
3.2	2.005
3.4	2.005
3.6	1.989
3.8	1.989
4	1.973
4.2	1.957
4.4	1.957
4.6	1.957
4.8	1.942
5	1.942
5.2	1.957
5.4	1.942
5.6	1.926
5.8	1.926
6	1.926
6.2	1.91
6.4	1.926

END



WELL TEST ANALYSIS

Data Set:
Date: 02/26/01

Time: 11:54:18

PROJECT INFORMATION

Company: TtNUS
 Client: SouthDiv
 Project: N0401
 Test Location: OLF Saufley Field
 Test Well: 2406 MW13
 Test Date: July, 2000

AQUIFER DATA

Saturated Thickness: 100. ft

Anisotropy Ratio (Kz/Kr): 0.1

WELL DATA

Initial Displacement: 4.366 ft
 Casing Radius: 0.0833 ft
 Screen Length: 5. ft

Water Column Height: 95.89 ft
 Wellbore Radius: 0.25 ft
 Gravel Pack Porosity: 0.3

SOLUTION

Aquifer Model: Unconfined
 Solution Method: Bouwer-Rice

K = 0.0003655 ft/min
 y0 = 2.977 ft

SE1000C
Environme Logger
31-Jul 22:20

Unit# 145 Test 12

Setups: INPUT 1

Type Level (F)
Mode Surface
I.D. 2406MW13

Reference 0
Linearity 0.11
Scale factor 50.15
Offset 0.25
Delay mSEC 50

Step 0 27-Jul 15:09:06

Elapsed Time INPUT 1

0 0.047
0.0033 0.063
0.0066 0.047
0.01 0.015
0.0133 1.566
0.0166 3.701
0.02 4.366
0.0233 1.914
0.0266 1.756
0.03 0.806
0.0333 0.316
0.0366 1.692
0.04 2.04
0.0433 2.499
0.0466 3.069
0.05 3.163
0.0533 3.1
0.0566 3.021
0.06 3.084
0.0633 3.069
0.0666 3.084
0.07 3.069
0.0733 3.053
0.0766 3.069
0.08 3.053
0.0833 3.021
0.0866 3.053
0.09 3.037
0.0933 3.021

0.0966	3.037
0.1	3.037
0.1033	3.021
0.1066	3.021
0.11	3.005
0.1133	3.005
0.1166	3.005
0.12	3.021
0.1233	3.005
0.1266	3.005
0.13	2.989
0.1333	3.005
0.1366	3.005
0.14	3.005
0.1433	2.989
0.1466	3.005
0.15	2.989
0.1533	2.989
0.1566	2.989
0.16	2.989
0.1633	3.005
0.1666	2.989
0.17	2.989
0.1733	2.989
0.1766	2.974
0.18	2.989
0.1833	2.974
0.1866	2.989
0.19	2.974
0.1933	2.974
0.1966	2.974
0.2	2.974
0.2033	2.974
0.2066	2.974
0.21	2.989
0.2133	2.989
0.2166	2.989
0.22	2.958
0.2233	2.974
0.2266	2.958
0.23	2.974
0.2333	2.958
0.2366	2.958
0.24	2.958
0.2433	2.958
0.2466	2.958
0.25	2.958
0.2533	2.974
0.2566	2.958
0.26	2.942
0.2633	2.974
0.2666	2.958

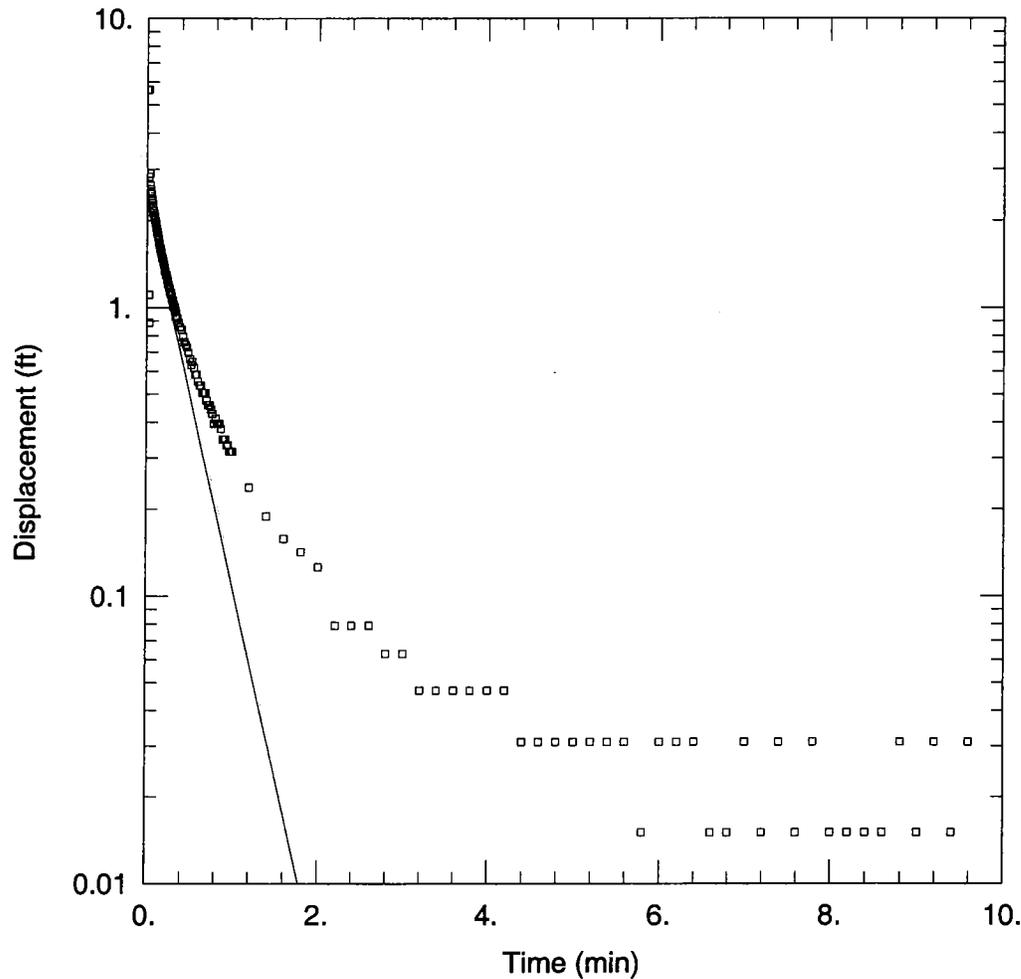
0.27	2.958
0.2733	2.958
0.2766	2.958
0.28	2.958
0.2833	2.958
0.2866	2.958
0.29	2.942
0.2933	2.958
0.2966	2.942
0.3	2.958
0.3033	2.958
0.3066	2.942
0.31	2.958
0.3133	2.942
0.3166	2.942
0.32	2.942
0.3233	2.942
0.3266	2.942
0.33	2.942
0.3333	2.942
0.35	2.942
0.3666	2.926
0.3833	2.926
0.4	2.91
0.4166	2.926
0.4333	2.895
0.45	2.926
0.4666	2.91
0.4833	2.895
0.5	2.895
0.5166	2.91
0.5333	2.895
0.55	2.879
0.5666	2.879
0.5833	2.895
0.6	2.879
0.6166	2.895
0.6333	2.863
0.65	2.879
0.6666	2.879
0.6833	2.863
0.7	2.863
0.7166	2.863
0.7333	2.863
0.75	2.879
0.7666	2.879
0.7833	2.863
0.8	2.863
0.8166	2.863
0.8333	2.863
0.85	2.863
0.8666	2.847

0.8833	2.863
0.9	2.863
0.9166	2.847
0.9333	2.847
0.95	2.847
0.9666	2.863
0.9833	2.847
1	2.847
1.2	2.831
1.4	2.815
1.6	2.784
1.8	2.784
2	2.752
2.2	2.736
2.4	2.721
2.6	2.689
2.8	2.673
3	2.657
3.2	2.626
3.4	2.61
3.6	2.594
3.8	2.578
4	2.562
4.2	2.547
4.4	2.531
4.6	2.499
4.8	2.467
5	2.467
5.2	2.42
5.4	2.42
5.6	2.404
5.8	2.373
6	2.373
6.2	2.357
6.4	2.341
6.6	2.325
6.8	2.325
7	2.278
7.2	2.278
7.4	2.246
7.6	2.246
7.8	2.246
8	2.214
8.2	2.199
8.4	2.199
8.6	2.167
8.8	2.151
9	2.135
9.2	2.135
9.4	2.119
9.6	2.104
9.8	2.088

10	2.072
11	2.009
12	1.977
13	1.914
14	1.851
15	1.787
16	1.724
17	1.692
18	1.661
19	1.629
20	1.581
21	1.534
22	1.502
23	1.455
24	1.423
25	1.392
26	1.36
27	1.328
28	1.297
29	1.281
30	1.218
31	1.202
32	1.202
33	1.17
34	1.154
35	1.091
36	1.107
37	1.107
38	1.06
39	1.06
40	1.012
41	1.012
42	1.012
43	0.996
44	0.98
45	0.965
46	0.933
47	0.917
48	0.933
49	0.917
50	0.917
51	0.901
52	0.886
53	0.886
54	0.87
55	0.87
56	0.854
57	0.854
58	0.838
59	0.838
60	0.838
61	0.822

62	0.822
63	0.822
64	0.806
65	0.806
66	0.791
67	0.791
68	0.791
69	0.791
70	0.775
71	0.775
72	0.775
73	0.759

END



WELL TEST ANALYSIS

Data Set:
Date: 02/26/01

Time: 11:39:03

PROJECT INFORMATION

Company: TtNUS
 Client: SouthDiv
 Project: N0401
 Test Location: OLF Saufley Field
 Test Well: 2406 MW12
 Test Date: July, 2000

AQUIFER DATA

Saturated Thickness: 100. ft

Anisotropy Ratio (Kz/Kr): 0.1

WELL DATA

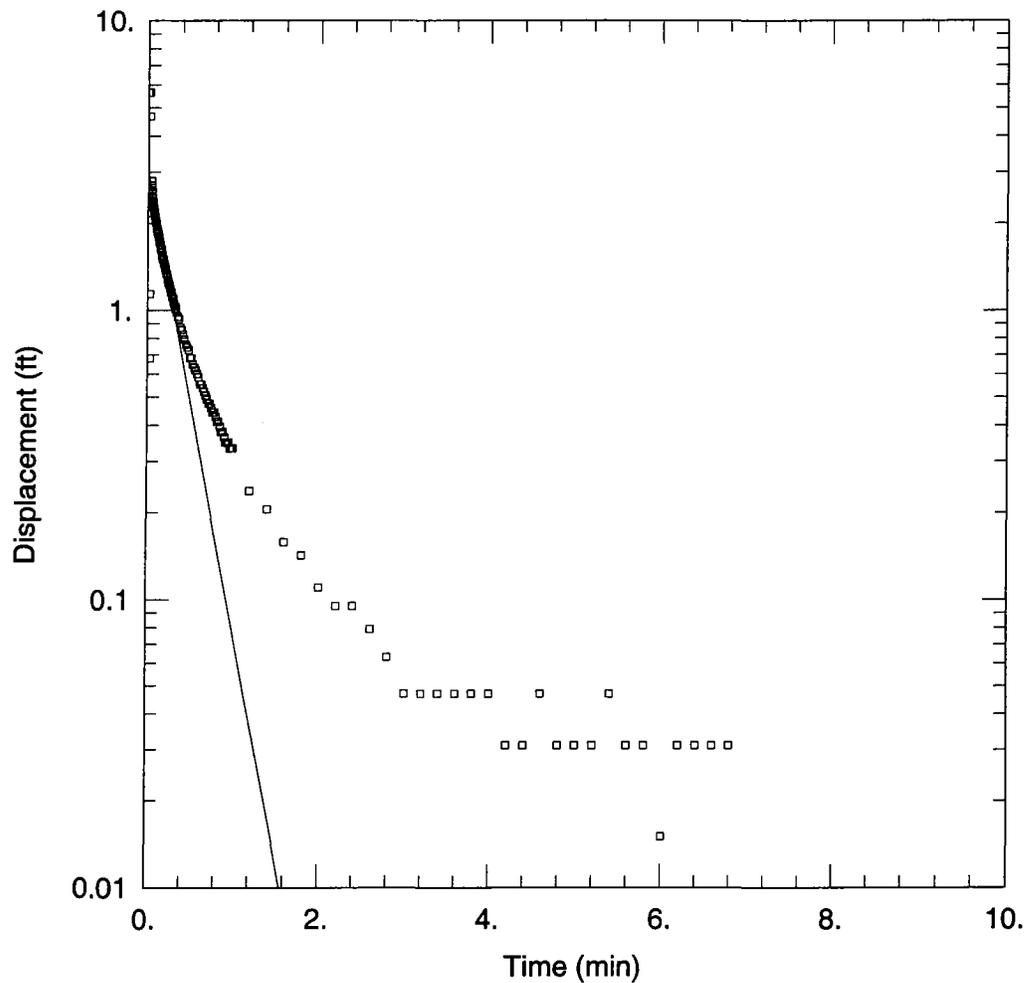
Initial Displacement: 5.647 ft
 Casing Radius: 0.0833 ft
 Screen Length: 5. ft

Water Column Height: 22.72 ft
 Wellbore Radius: 0.333 ft
 Gravel Pack Porosity: 0.3

SOLUTION

Aquifer Model: Unconfined
 Solution Method: Bouwer-Rice

K = 0.03529 ft/min
 y0 = 2.275 ft



WELL TEST ANALYSIS

Data Set: F:\PROGRAM\NAVY\NASPEN~1\CTO112~1\2406SL~1\MW12AG.AQT
 Date: 02/26/01 Time: 11:46:16

PROJECT INFORMATION

Company: TtNUS
 Client: SouthDiv
 Project: N0401
 Test Location: OLF Saufley Field
 Test Well: 2406 MW12
 Test Date: July, 2000

AQUIFER DATA

Saturated Thickness: 100. ft Anisotropy Ratio (Kz/Kr): 0.1

WELL DATA

Initial Displacement: 5.647 ft Water Column Height: 22.72 ft
 Casing Radius: 0.0833 ft Wellbore Radius: 0.333 ft
 Screen Length: 5. ft Gravel Pack Porosity: 0.3

SOLUTION

Aquifer Model: Unconfined K = 0.04209 ft/min
 Solution Method: Bower-Rice y0 = 2.974 ft

SE1000C
Environment Logger
31-Jul 22:00

Unit# 145 Test 7

Setups: INPUT 1

Type Level (F)
Mode Surface
I.D. 2406MW12

Reference 0
Linearity 0.11
Scale factor 50.15
Offset 0.25
Delay mSEC 50

Step 0 27-Jul 13:09:03

Elapsed Time INPUT 1

0 0.031
0.0033 0.015
0.0066 0.015
0.01 0.474
0.0133 4.951
0.0166 5.647
0.02 2.831
0.0233 1.107
0.0266 0.886
0.03 2.135
0.0333 2.895
0.0366 2.642
0.04 2.562
0.0433 2.515
0.0466 2.468
0.05 2.42
0.0533 2.373
0.0566 2.341
0.06 2.294
0.0633 2.246
0.0666 2.199
0.07 2.167
0.0733 2.151
0.0766 2.119
0.08 2.088
0.0833 2.072
0.0866 2.025
0.09 2.009
0.0933 1.977

0.0966	1.961
0.1	1.93
0.1033	1.898
0.1066	1.882
0.11	1.866
0.1133	1.835
0.1166	1.819
0.12	1.803
0.1233	1.771
0.1266	1.756
0.13	1.724
0.1333	1.708
0.1366	1.677
0.14	1.661
0.1433	1.645
0.1466	1.613
0.15	1.597
0.1533	1.597
0.1566	1.566
0.16	1.566
0.1633	1.534
0.1666	1.534
0.17	1.503
0.1733	1.487
0.1766	1.487
0.18	1.471
0.1833	1.455
0.1866	1.439
0.19	1.423
0.1933	1.408
0.1966	1.392
0.2	1.36
0.2033	1.344
0.2066	1.344
0.21	1.329
0.2133	1.313
0.2166	1.297
0.22	1.297
0.2233	1.297
0.2266	1.281
0.23	1.249
0.2333	1.265
0.2366	1.249
0.24	1.234
0.2433	1.202
0.2466	1.202
0.25	1.186
0.2533	1.17
0.2566	1.17
0.26	1.155
0.2633	1.155
0.2666	1.139

0.27	1.123
0.2733	1.123
0.2766	1.123
0.28	1.107
0.2833	1.091
0.2866	1.075
0.29	1.06
0.2933	1.06
0.2966	1.06
0.3	1.044
0.3033	1.012
0.3066	1.028
0.31	1.012
0.3133	1.012
0.3166	0.996
0.32	0.996
0.3233	0.981
0.3266	0.965
0.33	0.965
0.3333	0.933
0.35	0.917
0.3666	0.886
0.3833	0.854
0.4	0.838
0.4166	0.791
0.4333	0.759
0.45	0.743
0.4666	0.727
0.4833	0.696
0.5	0.664
0.5166	0.632
0.5333	0.648
0.55	0.617
0.5666	0.585
0.5833	0.585
0.6	0.553
0.6166	0.537
0.6333	0.537
0.65	0.506
0.6666	0.506
0.6833	0.506
0.7	0.474
0.7166	0.458
0.7333	0.458
0.75	0.443
0.7666	0.427
0.7833	0.395
0.8	0.411
0.8166	0.395
0.8333	0.395
0.85	0.395
0.8666	0.379

0.8833	0.348
0.9	0.348
0.9166	0.348
0.9333	0.332
0.95	0.332
0.9666	0.316
0.9833	0.316
1	0.316
1.2	0.237
1.4	0.189
1.6	0.158
1.8	0.142
2	0.126
2.2	0.079
2.4	0.079
2.6	0.079
2.8	0.063
3	0.063
3.2	0.047
3.4	0.047
3.6	0.047
3.8	0.047
4	0.047
4.2	0.047
4.4	0.031
4.6	0.031
4.8	0.031
5	0.031
5.2	0.031
5.4	0.031
5.6	0.031
5.8	0.015
6	0.031
6.2	0.031
6.4	0.031
6.6	0.015
6.8	0.015
7	0.031
7.2	0.015
7.4	0.031
7.6	0.015
7.8	0.031
8	0.015
8.2	0.015
8.4	0.015
8.6	0.015
8.8	0.031
9	0.015
9.2	0.031
9.4	0.015
9.6	0.031

END

SE1000C
Environme Logger
31-Jul 22:03

Unit# 145 Test 8

Setups: INPUT 1

Type Level (F)
Mode Surface
I.D. 2406MW12

Reference 0
Linearity 0.11
Scale factor 50.15
Offset 0.25
Delay mSEC 50

Step 0 27-Jul 13:33:25

Elapsed Time INPUT 1

0 0
0.0033 0.015
0.0066 0
0.01 0.015
0.0133 0.553
0.0166 5.647
0.02 4.666
0.0233 2.404
0.0266 1.139
0.03 0.68
0.0333 2.167
0.0366 2.8
0.04 2.705
0.0433 2.594
0.0466 2.531
0.05 2.483
0.0533 2.436
0.0566 2.388
0.06 2.357
0.0633 2.309
0.0666 2.278
0.07 2.23
0.0733 2.199
0.0766 2.183
0.08 2.119
0.0833 2.104
0.0866 2.072
0.09 2.04
0.0933 2.025

0.0966	1.993
0.1	1.977
0.1033	1.961
0.1066	1.914
0.11	1.898
0.1133	1.866
0.1166	1.85
0.12	1.835
0.1233	1.803
0.1266	1.787
0.13	1.756
0.1333	1.724
0.1366	1.724
0.14	1.708
0.1433	1.677
0.1466	1.645
0.15	1.629
0.1533	1.629
0.1566	1.613
0.16	1.582
0.1633	1.55
0.1666	1.534
0.17	1.534
0.1733	1.503
0.1766	1.503
0.18	1.487
0.1833	1.455
0.1866	1.455
0.19	1.439
0.1933	1.423
0.1966	1.408
0.2	1.392
0.2033	1.376
0.2066	1.376
0.21	1.344
0.2133	1.344
0.2166	1.329
0.22	1.329
0.2233	1.313
0.2266	1.281
0.23	1.281
0.2333	1.265
0.2366	1.249
0.24	1.234
0.2433	1.234
0.2466	1.218
0.25	1.218
0.2533	1.202
0.2566	1.186
0.26	1.186
0.2633	1.17
0.2666	1.155

0.27	1.155
0.2733	1.155
0.2766	1.139
0.28	1.123
0.2833	1.107
0.2866	1.107
0.29	1.091
0.2933	1.075
0.2966	1.091
0.3	1.06
0.3033	1.06
0.3066	1.044
0.31	1.044
0.3133	1.028
0.3166	1.012
0.32	1.028
0.3233	1.012
0.3266	1.012
0.33	0.981
0.3333	0.996
0.35	0.949
0.3666	0.933
0.3833	0.87
0.4	0.854
0.4166	0.822
0.4333	0.791
0.45	0.759
0.4666	0.743
0.4833	0.727
0.5	0.68
0.5166	0.68
0.5333	0.648
0.55	0.632
0.5666	0.617
0.5833	0.601
0.6	0.585
0.6166	0.553
0.6333	0.553
0.65	0.537
0.6666	0.522
0.6833	0.506
0.7	0.49
0.7166	0.474
0.7333	0.474
0.75	0.458
0.7666	0.443
0.7833	0.443
0.8	0.427
0.8166	0.411
0.8333	0.411
0.85	0.395
0.8666	0.379

0.8833	0.379
0.9	0.363
0.9166	0.348
0.9333	0.348
0.95	0.348
0.9666	0.332
0.9833	0.332
1	0.332
1.2	0.237
1.4	0.205
1.6	0.158
1.8	0.142
2	0.11
2.2	0.095
2.4	0.095
2.6	0.079
2.8	0.063
3	0.047
3.2	0.047
3.4	0.047
3.6	0.047
3.8	0.047
4	0.047
4.2	0.031
4.4	0.031
4.6	0.047
4.8	0.031
5	0.031
5.2	0.031
5.4	0.047
5.6	0.031
5.8	0.031
6	0.015
6.2	0.031
6.4	0.031
6.6	0.031
6.8	0.031

END

CALCULATION OF HORIZONTAL HYDRAULIC GRADIENT

Based On: Darcy Flow Equation

Reference: *Groundwater*, by Freeze and Cherry, pages 17, 71, and 72

EQUATION: $i = \Delta H / \Delta L = dh/dl$

WHERE:

i = the hydraulic gradient

dh = the difference in hydraulic head

dl = the linear distance over which the change in head is observed

CALCULATIONS - JULY 2000 DATA:

$$i_{\text{MW-2/DMW-13}} = \frac{19.57 - 17.78}{102} = \frac{1.79}{102} = 0.0175$$

$$i_{\text{MW-4/MW-11}} = \frac{18.25 - 17.79}{40} = \frac{0.46}{40} = 0.0115$$

$$i_{\text{MW-1/MW-5}} = \frac{17.96 - 17.66}{78} = \frac{0.3}{78} = 0.00385$$

CALCULATION OF THE AVERAGE (ARITHMETIC MEAN) GRADIENT:

$$i_{\text{av}} = \frac{0.0175 + 0.0115 + 0.00385}{3} = \underline{0.0110}$$

Prepared By: _____

Date: _____

Checked By: _____

Date: _____

CALCULATION OF VERTICAL HYDRAULIC GRADIENT

Based On: Darcy Flow Equation

Reference: *Groundwater*, by Freeze and Cherry, pages 17, 71, and 72

EQUATION: $i = \Delta H / \Delta L = \frac{dh}{dl}$

WHERE:

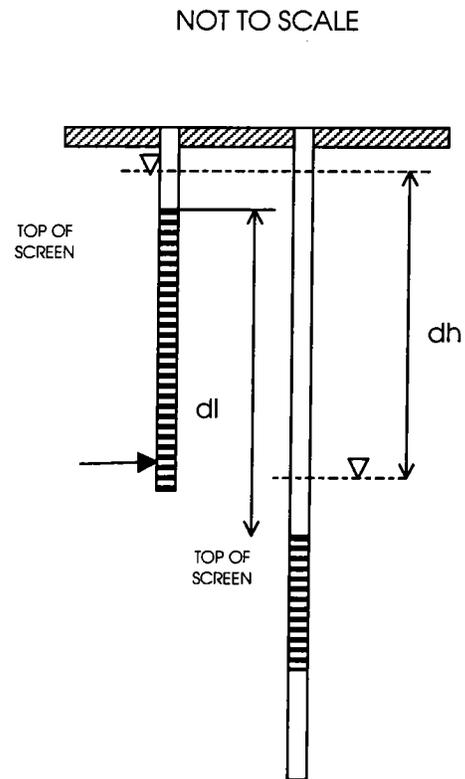
i = the hydraulic gradient

dh = the difference in hydraulic head

dl = the linear distance over which the change in head is observed, in this case the distance between tops of the well screens.

CALCULATIONS - July 2000 DATA:

$$i_{DMW-10/MW-11} = \frac{18.31 - 18.25}{25} = \frac{0.06}{25} = 0.0024$$



Prepared By: _____

Date: _____

Checked By: _____

Date: _____

CALCULATION OF HYDRAULIC GRADIENT

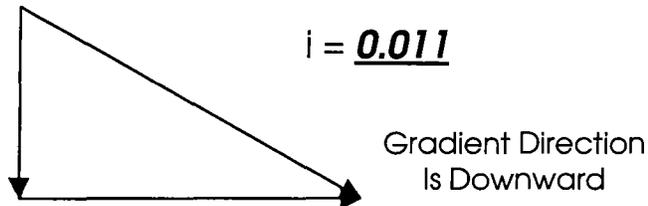
$$i_{av} \text{ HORIZONTAL} = 0.0110$$

$$i_{av} \text{ VERTICAL} = 0.0024$$

Note that the vertical hydraulic gradient is an order of magnitude smaller than the horizontal gradient, and is not the driving force for groundwater movement. This can be shown by representing the different gradient components as vectors which form the sides of a right triangle and then solving for the length of the hypotenuse using the Pythagorean theorem. The length of the hypotenuse equals i , the hydraulic gradient, and shows the direction of potential flow

NOT TO SCALE

$$i_{\text{vertical}} = 0.0024$$



$$i_{\text{horizontal}} = 0.0110$$

$$\text{EQUATION: } A^2 + B^2 = C^2 \text{ or } i_{\text{vertical}}^2 + i_{\text{horizontal}}^2 = i^2$$

$$\text{Rewritten: } i = \sqrt{i_{\text{vertical}}^2 + i_{\text{horizontal}}^2}$$

$$\sqrt{0.0024^2 + 0.0110^2} = \sqrt{0.00000576 + 0.000121} = \sqrt{0.00012676} = 0.011$$

Prepared By: _____

Checked By: _____

Date: _____

Date: _____

CALCULATION OF SEEPAGE VELOCITY CONSIDERING RETARDATION

Reference: ASTM Standard Guide for Risk-Based Corrective Action at Petroleum Release Sites

EQUATION: $V_R = K_{av} i / \eta_e \times 1/R$

WHERE:

$$R = \text{the retardation factor} = \left[1 + \frac{k_s \rho_s}{\theta_s} \right]$$

$$k_s = \text{sorption coefficient} = 0.13363 \text{ cm}^3/\text{g}$$

$$\rho_s = \text{soil bulk density} = 1.21 \text{ g/cm}^3$$

$$\theta_s = \text{volumetric water content of saturated zone} = 0.2$$

$$R = 1 + \frac{0.13363 \times 1.21}{0.2} = \underline{1.80846}$$

CALCULATION C: Average Retarded Velocity

$$V_R = \frac{(5.610 \times 10^{-4} \text{ ft/sec})(0.011)}{(0.15)(1.80846)} = 2.275 \times 10^{-5} \text{ ft/sec}$$

Converting to feet per year (ft/yr):

$$2.275 \times 10^{-5} \text{ ft/sec} \times 31,536,000 \text{ sec/yr} = 717 \text{ ft/yr}$$

Prepared By: _____

Date: _____

Checked By: _____

Date: _____

CALCULATION OF GROUNDWATER SEEPAGE VELOCITY (CONTINUED)

EQUATION: $V = K_{av} i / \eta_e$

$K_{av} = 5.610 \times 10^{-4} \text{ ft/sec}$

$i = 0.011$

$\eta_e = 0.15$ – for silty sand/sandy silt (from Fetter, page 69)

CALCULATION B: Groundwater Seepage (Average Linear) Velocity

$V = (5.610 \times 10^{-4} \text{ ft/sec})(0.011) / 0.15 = 4.114 \times 10^{-5} \text{ ft/sec}$

Converting to feet per year (ft/yr):

$4.114 \times 10^{-5} \text{ ft/sec} \times 31,536,000 \text{ sec/yr} = 1297 \text{ ft/yr}$

Prepared By: _____

Date: _____

Checked By: _____

Date: _____

CALCULATION OF GROUNDWATER SEEPAGE VELOCITY

Based On: Darcy Flow Equation

References: *GROUNDWATER*, by Freeze and Cherry and *APPLIED HYDROGEOLOGY* by C. W. Fetter

Note: See accompanying Aqtesolv[®] data sheets in this Attachment for K values.

$$\text{EQUATION: } V = K_{av} i / \eta_e$$

WHERE:

V= the groundwater seepage velocity (average linear velocity)

K_{av} = the average hydraulic conductivity

i= the hydraulic gradient

η_e = the effective porosity

CALCULATION A: Average (Arithmetic Mean) Hydraulic Conductivity,

$$K_{DMW-10} = 4.145 \times 10^{-4} \text{ ft/sec}$$

$$K_{DMW-13} = 6.092 \times 10^{-6} \text{ ft/sec}$$

$$K_{DMW-12ave} = \frac{(7.015 \times 10^{-4} + 5.882 \times 10^{-4}) \text{ ft/sec}}{2} = 6.448 \times 10^{-4}$$

$$K_{av} = \frac{K_{DMW-10} + K_{DMW-13} + K_{DMW-12ave}}{3} = \underline{3.551 \times 10^{-4} \text{ ft/sec}}$$

Prepared By: _____

Date: _____

Checked By: _____

Date: _____