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LETTER REPORT FOR STATUS OF GROUNDWATER REMEDIATION NTC ORLANDO FL  
7/1/2004  
TETRA TECH

**Letter Report  
Status of Groundwater Remediation**

for

**Former Naval Research Laboratory  
Underwater Sound Reference  
Detachment  
Orlando, Florida**



**Southern Division  
Naval Facilities Engineering Command  
Contract Number N62467-94-D-0888  
Contract Task Order 0323**

July 2004

**LETTER REPORT**  
**STATUS OF GROUNDWATER REMEDIATION**  
**FORMER NAVAL RESEARCH LABORATORY ORLANDO, FLORIDA**

**1.0 INTRODUCTION**

Groundwater contamination was discovered in 1996 at the former Naval Research Laboratory in Orlando Florida (NRL Orlando) during environmental investigations associated with base closure. Since then, various environmental investigations have been conducted and reports prepared that present the results of ongoing groundwater investigations and remediation activities.

In 2003, the Florida Department of Environmental Protection (FDEP) notified the Navy regarding concern from a local resident that groundwater contamination from the former NRL Orlando could be present under their property. At the request of the resident, and supported by the FDEP, the Navy agreed to install two groundwater monitoring wells on their property to determine if groundwater contamination existed under their property.

This Letter Report which summarizes the status of groundwater remediation is the third of a three-part presentation of the activities associated with this monitoring well installation, sampling, and the presentation of results. The first was a Fact Sheet (TtNUS, 2004c) that was prepared as a non-technical, reader friendly, one page (double sided) summary of the status of remediation of contaminants in groundwater under and adjacent to the site. The Fact Sheet was prepared immediately following the above-mentioned monitoring well installation and sampling. It was distributed door-to-door to residents in the immediate vicinity of the site on April 8 and 9, 2004. The second was a Point Paper (TtNUS, 2004d) that was prepared in non-technical language to inform the local residents of ongoing activities relative to the groundwater investigations at the facility including a summary of the history behind the groundwater investigations and treatability study, and the status of the ongoing field activities on the residential property. The current Letter Report expands on the information contained in the Fact Sheet and Point Paper and also includes field notes, photographs, boring logs, groundwater monitoring well construction diagrams, laboratory data, discussion of the enhanced Air Sparging/Soil Vapor Extraction System (AS/SVE), discussion of results and an update on the Human Health Risk Assessment.

**2.0 HISTORICAL INFORMATION**

Presumably as a result of waste disposal practices during the time of base operations (from 1951 to 1996), chlorinated solvents were discharged into an on-base septic system, laboratory drains and possibly stormwater drains, which through time, seeped into the underlying groundwater. The nature and

extent of the resulting groundwater plume was determined to extend under the southern edge of the base and offsite onto a Gatlin Avenue residential property. A groundwater remediation system consisting of an air sparging/soil vapor extraction system (AS/SVE) was designed and installed in January 1999 to clean up the impacted soil and groundwater. Within four months of system operation, contaminant concentrations in groundwater were reduced to levels below regulatory action levels at the monitoring wells closest to the residential property. The system continued to operate so that regulatory action levels could also be achieved at the source area (on the Navy property). During the time the groundwater concentrations were found to be below action levels on the residential property and throughout the period of system operation (a period of over 5 years), groundwater samples were collected and analyzed on a periodic basis. Throughout this period, the concentrations of chlorinated solvents, primarily tetrachloroethene (PCE), did not rebound on the residential property to levels above state or federal action levels.

To date, all areas of the former NRL Orlando with the exception of a limited area associated with the remaining groundwater plume has been transferred by deed to the Orange County Public School District. The AS/SVE system continues to operate properly and successfully. The system has recently been shut off, and regularly scheduled groundwater monitoring is being conducted to determine if rebound will occur. A Navy-issued document entitled Operating Properly and Successfully (OPS) Demonstration Report for Air Sparging/Soil Vapor Extraction (AS/SVE) Treatability Study (TtNUS, March 2004e) is currently being reviewed by the USEPA. Providing the document is acceptable to the USEPA, this remaining parcel of the former NRL Orlando property will be transferred by deed to the Orange County Public School System.

### **3.0 RESIDENTIAL CONCERN**

In September 2003, the Florida Department of Environmental Protection (FDEP) forwarded a request from Mr. & Ms. Greg and Debbie Swartwood of 754 Gatlin Avenue for environmental information regarding the former NRL Orlando to the Navy RPM (Ms. Barbara Nwokike). The Swartwoods had recently purchased the property (in 2003) across the street from the former NRL without knowledge of the ongoing clean up activities. The Swartwoods became aware of possible environmental issues when they discovered a monitoring well (MW14) in the municipal right-of-way in front of their property.

The RPM contacted the Swartwoods by phone to discuss their concerns and stated that historically, there was groundwater contamination underlying their property but assured them that their property was not currently impacted by contamination from the former NRL Orlando facility. Relevant project documentation was also delivered to them in person. A follow-up meeting with the Navy's RPM, Navy's Base Environmental Coordinator (BEC), the Navy's environmental consultant- Tetra Tech NUS, FDEP, and the Swartwoods was held on October 14, 2003. At that meeting, the Swartwoods were provided with

the former NRL Orlando administrative record on a CD. It was explained that although the groundwater plume did extend onto their property at one time, quarterly monitoring has not shown an exceedance on their side of the street since February 22, 1999. Contamination on their property was confirmed during the January 14, 1999 sampling event when PCE was detected at 3.8 µg/L in a temporary well (refer to Table 4-1, well number TW2) located at the edge of a downgradient lake. The Swartwood property is located between the PCE source area and this downgradient lake. Remedial actions at NRL Orlando have reduced the size of the plume and it is currently not beyond the Navy property line in any direction. The Swartwoods then expressed concern that the data were not conclusive and that groundwater contamination may be underlying their property. They wanted to have a well(s) installed on their property and analyzed for PCE, followed by a letter stating that their property was not impacted. On October 31, 2003 FDEP issued a letter to the Navy, also copied to the Swartwoods, stating that based on past data and the fact that the Swartwood property is located hydraulically downgradient from the former NRL Orlando, they believed the Swartwoods' concerns were not unreasonable and requested that a well be installed on their property and sampled for PCE.

In response to these requests, the Navy agreed to install two monitoring wells on the Swartwood property. FDEP indicated that if the resulting groundwater data showed that there were no PCE exceedances on the Swartwood property, they would issue a letter stating that the Swartwoods' property was not impacted. Both wells were to be screened in the shallow zone, which is the only zone of concern at the former NRL Orlando.

The Navy's legal counsel prepared a formal request to install the two wells on the Swartwood's property which was provided to the resident. Mr. Greg Swartwood signed the agreement January 7, 2004 entitled CONSENT TO ENTER PROPERTY. A copy of this executed form can be found in Appendix C. A subsequent letter dated January 15, 2004 from the Navy RPM to the Swartwoods alerting them to the planned activities and anticipated schedule of events is also provided in Appendix C.

Well installation occurred during field activities on January 20-22, 2004. During the fieldwork, the Swartwoods requested that one of the wells be installed in the intermediate zone, as they were also now concerned about a possible presence of a dense, nonaqueous-phase liquid (DNAPL) being present at this site. Based on the data collected in the past, including an integrated depth study showing that there was no DNAPL issue at this site, and that the proper equipment and materials to install a deeper well were not onsite, their request was denied. The Swartwoods are disputing this decision and refused the second shallow well until this issue was resolved. The single well installed on the Swartwood property was sampled during the quarterly sampling event during the week of February 2, 2004. The following sections of this letter report summarize the activities associated with this field effort and discuss the resulting data.

## **4.0 CURRENT STATUS**

The current status of the investigation is described below including field activities associated with ongoing groundwater monitoring activities and the enhancements made to the AS/SVE treatability system. Specific field activities consisted of traffic control, monitoring well abandonment and reinstallation of municipal right-of-way wells, installation of one monitoring well on the residential property, groundwater sampling and analysis, landscape restoration, and AS/SVE design enhancement implementation. The following sections describe the field activities associated with each of these tasks. A photographic log of the field activities is found in Appendix A. A copy of the field notes including boring logs and well construction diagrams is found in Appendix B.

### **4.1 Traffic Control**

Traffic control was a primary concern because of safety hazards associated with the drilling operations along the municipal right-of-way of Gatlin Avenue, which is a heavily traveled thoroughfare adjacent to the drilling operations. A site-specific work plan was prepared prior to the field activities that describe the procedures used for traffic and pedestrian control during the drilling operations. This information can be found in the Monitoring Well Installation and Groundwater Sampling Work Plan Addendum for Residential Property (TtNUS, January 2004a). A series of traffic control signs were placed approximately 800 and 500 feet on either side of the location of the active drilling operations. A minimum of two flagmen controlled the flow of traffic during periods of drilling operations. Fluorescent, orange-colored traffic control cones were placed around the area of the drill rig, which reduced the flow of traffic along Gatlin Avenue to a single lane. The sidewalk in front of the Swartwood residence was blocked off, and no pedestrians were allowed to walk within the immediate area of the drilling operations. The project was conducted without a safety incident. Photographs of the traffic control measures can be found in Appendix A.

### **4.2 Abandonment and Reinstallation of Right-of-Way Wells**

As early as 1996, permanent groundwater monitoring wells were installed on the Navy property within and surrounding the plume, and downgradient of the source area primarily along the right-of-way of Gatlin Avenue. In order not to impede the flow of vehicular traffic along Gatlin Avenue, a small, direct push technology (DPT) drilling rig was used for installing these wells. Because of the small size of the resulting boring, the wells along Gatlin Avenue were constructed of 3/4-inch PVC risers and screens. These are typically referred to as microwells. Over the years, the heavy volume of traffic along Gatlin Avenue caused some of these microwells to collapse. On the southern right-of-way of Gatlin Avenue (close to the Swartwood property), three wells including MW14, MW15 & MW16 were installed in May 1998 as

microwells. MW16 collapsed shortly after installation and was abandoned and reinstalled in May 1999 as a 2"-diameter well. As demonstrated in subsequent years, these 2"-monitoring wells proved to be a more sturdy design. In April 2002, MW14 which is the well closest to the Swartwood property could not be sampled because of collapsed casing. Therefore, during the next eight groundwater sampling events, MW14 was not sampled. Because of the renewed interest in reinstalling some wells along the right-of-way, the Navy decided to replace this well and MW15 with 2"-diameter wells. Both of these wells were installed, developed, and sampled in January and February 2004. The boring logs and the well construction diagrams for these monitoring wells along the southern side of Gatlin Avenue can be found in Attachment B.

#### **4.3 Residential Well Installation**

The single well installed on the Swartwood property was sampled during the quarterly sampling event that occurred the week of February 2, 2004. This well was identified as MWPRIV01. The well was screened at essentially the same depth interval as the other wells along Gatlin Avenue (between 12.5 and 22.5 feet bgs). The boring log and the well construction diagram for this monitoring well as well as other pertinent wells discussed in this report, can be found in Attachment B.

#### **4.4 Groundwater Sampling and Analysis**

The quarterly groundwater monitoring event conducted February 2004 coincided with the reinstallation of the right-of-way wells along Gatlin Avenue and the newly installed well on the residential property. Therefore all of the primary wells that are routinely sampled during the quarterly groundwater monitoring events plus the newly installed wells, were sampled in February 2004. The sampling was conducted in accordance with TtNUS SOP Number SA-1.1 and the U.S. EPA Region 4 Environmental Investigation Standard Operating Procedures and Quality Assurance Manual (EISOPQAM). A total of ten wells were sampled during this groundwater monitoring event. The following groundwater samples were analyzed for volatile organic compounds (VOCs) and labeled as identified in the following table.

<b>Sample ID</b>	<b>Location</b>	<b>VOCs Analysis</b>
NRL-GW-MW02-00-17	On former NRL property <sup>(1)</sup>	8260B
NRL-GW-MW04-00-17	On former NRL property <sup>(1)</sup>	8260B
NRL-GW-MW07-00-17	On former NRL property <sup>(1)</sup>	8260B
NRL-GW-MW08-00-17	On former NRL property <sup>(1)</sup>	8260B
NRL-GW-MW12-00-17	On former NRL property <sup>(1)</sup>	8260B
NRL-GW-MW13-00-17	On former NRL property <sup>(1)</sup>	8260B
NRL-GW-MW14A-00-17	Gatlin Ave. ROW	8260B
NRL-GW-MW15A-00-17	Gatlin Ave. ROW <sup>(1)</sup>	8260B

Sample ID	Location	VOCs Analysis
NRL-GW-MW16-00-17	Gatlin Ave. ROW <sup>(1)</sup>	8260B
NRL-GW-MWPRIV01-00-17	Swartwood Property	8260B

- 1 Primary well that is routinely sampled during quarterly groundwater sampling events.

All field sampling procedures were conducted in accordance with the Monitoring Well Installation Groundwater Sampling Work Plan Addendum for Residential Property (TtNUS, January 2004a). Groundwater purging and sampling logs, chain-of-custody forms and geologist field notes are found in Appendix B.

The intent of the AS/SVE system treatability study is to determine if the system is capable of reducing PCE concentrations in groundwater at all sampling locations to the FDEP Primary Drinking Water Standard of 3 µg/L. As noted in Table 1, the concentrations of PCE have continued to decrease from the original sampling in 1998 to 2004. For instance, the concentration of PCE at MW8 which is a well within the source area, decreased from 12.2 to 2.3 µg/L over this time period. During the current round (February 2004), five monitoring wells have detectable concentrations of PCE, although only one on-site monitoring well (MW07) has a PCE concentration exceeding regulatory criteria. The current plan is to monitor PCE concentrations for four consecutive quarters that show levels in all primary wells to be less than the FDEP Primary Drinking Water Standard of 3 µg/L, followed by formal application to the FDEP for No Further Action.

#### 4.5 AS/SVE Design Enhancement

The evaluation of AS/SVE to remove the low level contamination has been conducted in several phases. The following table identifies these phases.

Phase	AS/SVE Activity	Dates
Phase 1	AS/SVE Pilot-test Radius of Influence Study	Through Fall 1998
Phase 2	AS/SVE Technology Effectiveness Evaluation	January 1999 to August 2000
Phase 3	Biannual Sampling and AS/SVE System Expansion and Operation	January 2002 to Nov 2003
Phase 4	Groundwater "Polishing" and Residential Well Installation	January 2004 to the present

During the current phase (Phase 4) of evaluating this technology, expansion of the AS/SVE system was conducted to treat a larger area and continue to remove existing contamination from the groundwater. The existing AS/SVE system, which previously actively addressed contamination in the area of MW-2 and

MW-8 was expanded to include treatment in the area of MW-7. The extension of the pilot-scale system and associated sampling and analysis activities is a continuation of the ongoing treatability study being conducted at this site and is intended to provide information regarding continued removal of PCE at relatively low levels. The results from the first three phases were used to determine the number of additional injection and extraction points and provided insight on the potential rebounding of contamination that may occur when the system is taken off-line. This information was used in the design and proposed operation of this phase of the project.

The initial AS/SVE testing conducted during Phase I (September 28, 1998 through October 1, 1998) and long-term operation in Phase 2 (January 15, 1999 through August, 2000) identified the effective radius of influence for the air injection and vapor extraction wells. The results obtained during these phases identified that the use of off-gas treatment such as carbon absorption (which is typically used for an AS/SVE system) was not required. The information obtained during Phase 1 and 2 was used in the design of the Phase 3 system. The Phase 3 AS/SVE system operated from January 14, 2002 through July 22, 2003.

The Phase 4 study, also referred to as the system enhancement, was field-implemented during the week of February 2, 2004. The objective of the current study (Phase 4) is to determine if the lower levels of contamination remaining in the groundwater can again be removed using the closer well spacing to concentrate the air flow to a more focused area. The information obtained will also be used to determine if additional air sparging will reduce or eliminate the level of contamination rebound observed after the remedial technology is halted. The following sections describe the activities associated with this field effort.

The Phase 4 study used a mobile, trailer-mounted AS/SVE pilot test unit that had remained on site since a previous phase testing. The current system alternates air flow from two well groupings consisting of three air sparge and three vapor extraction wells each. The unit was converted to operate three system well groups of approximately the same number of injection and extraction wells. The new group consisted of one existing and three new air sparge wells and three new vapor extraction wells in the area of MW-7. The unit was programmed to alternate between each well group so each group is operated for an 8-hour period and off for a 16 hour period. The current system including the above-described enhancements was turned on February 5, 2004. It was anticipated the system will operate for three months at which point it would be shut off and returned to service if rebound of contamination occurred. Groundwater samples were collected from MW2, MW7 and MW8 on a monthly basis until the next regularly scheduled sampling event which took place in May 2004. Results of the March and April sampling events for these three wells are discussed in Section 5.0.

#### **4.6 Installation of Pilot-Scale System**

The additional testing for the air sparging system (Phase 4) included installation of three (3) new AS wells plus utilization of one (1) existing AS well (installed during Phase I) for a total of four (4) air sparging points. In addition, three (3) new SVE wells were utilized for the soil vapor extraction system. The existing AS/SVE mobile treatment unit contains an air injection blower, a vapor extraction blower, moisture knockout tank, and miscellaneous flow controls and were adapted to accommodate this new well group (Well Group #3).

Prior to, during, and after the AS/SVE system operation, samples of groundwater were collected and analyzed. (See Section 5.0 for further discussion of monitoring and sampling activities).

Field work associated with the AS/SVE system enhancement installation was conducted according to the Air Sparging/Soil Vapor Extraction (AS/SVE) Treatability Study System Expansion and Enhancement Work Plan Addendum (TtNUS, January 2004b) including the Site-Specific Health and Safety Plan. Field notes collected during the installation are found in Appendix B.

##### **4.6.1 Well Installation**

Well borings were advanced using a minimum 8-inch outside diameter hollow-stem auger. Wells were constructed of schedule 40, flush-joint, 2-inch diameter, National Sanitation Foundation (NSF)-approved PVC well screen and riser pipe. The well screens have a slot size of 0.01 inches and are supplied with a PVC end cap.

Once the screen and riser pipe were in place, the annulus of the boring was backfilled with clean 20/30 U.S. standard sieve size silica sand from the bottom of the boring to two feet above the top of the well screen. Sand was maintained several inches thick inside of the augers during installation to ensure an adequate sand pack around the well. One foot thick of 30/65 U.S. standard sieve size silica sand was installed on top of the sand pack to serve as a seal. The thickness of the sand pack and seal was constantly monitored using a weighted plastic tape. The remainder of the annulus of the borehole (from the seal to the ground surface) was grouted with neat cement grout through a tremie pipe. Well construction details are depicted on the Overburden Monitoring Well Sheets found in Appendix B.

The wells were developed approximately 24 hours after installation in order to allow the cement grout to cure. The wells were developed to remove sediments in the wells by surging and/or by pumping using a submersible pump in accordance with TtNUS SOP GH-2.8. Measurements of pH, temperature, specific conductance, and turbidity were obtained after each well casing volume until pH, temperature, and specific conductance were within +/- 5 percent.

#### **4.6.2 Air Sparging/Soil Vapor Extraction Equipment**

The mobile AS/SVE unit included an injection blower capable of delivering 24 standard cubic feet per minute (scfm) and a vacuum blower capable of 100 scfm. The unit was replumbed to deliver air to three zones (MW07, MW08 and MW02 zones) on alternating time schedules.

The trailer-mounted equipment is located adjacent to the east side of the site. Silencers are used to provide quiet operation, and the unit is enclosed by a fence. The blower motor and motor starter are explosion proof. The unit utilizes a 3-phase, 230 volt, 60 amp power supply. This power source is located in the building adjacent to the unit.

#### **4.6.3 Piping**

Air transfer piping between the blowers and the extraction wells was installed above ground using 4-inch diameter schedule 40 PVC. The aboveground transfer line for the air injection was constructed of pressure hose and 2-inch Schedule 40 PVC pipe. The lines were connected to the blowers using 2-inch hoses equipped with quick-disconnect camlocks.

Piping was installed below the concrete driveway underlying the system at two locations which required the use of a concrete saw cutting subcontractor.

#### **4.6.4 Investigation-Derived Waste (IDW)**

Drill-cuttings produced during well installation were containerized in 55-gallon, DOT-approved metal drums. Development water, purge water, and decontamination water were also containerized in separate similar drums. Drums were labeled with the following: contents, date, and source. IDW was handled in accordance with the U.S. EPA guidance document "Management of Investigation-Derived Wastes During Site Inspections", (USEPA, 1991).

IDW was transported from the drilling sites to a secured, fenced area at the former NRL Orlando facility. The IDW was classified as non regulated material (non hazardous industrial soil and water). All IDW was transported on February 11, 2004 from the site by Freehold Cartage, Inc. under a contract with Florida Environmental Compliance Corporation. The drummed waste was received by C-MAC Environmental Group, Inc. of Glencoe, AL. A copy of the drum manifest can be found in Appendix B.

#### **4.7 Landscape Restoration**

Minor landscaping was required because of lawn damage caused during access to the residential well location by the drilling rig and the 4-wheel drive vehicle used for groundwater purging and sample collection. The restoration consisted of removing the damaged sod, replacing the sod with Seville Grass and rolling the area to grade. The restoration work was conducted during the week of April 12, 2004 by Eagle Landscaping of Apopka, Florida. Photographs of the lawn were taken before the drilling operations, at the conclusion of the drilling and sample operations, at the conclusion of the well abandonment operations and following the landscape restoration. Photographs of these events can be found in Appendix A. Recently the Swartwoods informed the Navy RPM that the type of grass used during the restoration did not match the original grass and they wanted replacement grass provided. The Navy agreed to this request, and arrangements are currently underway to procure replacement grass.

#### **5.0 LABORATORY ANALYSIS**

The laboratory data validation letter for the February 2004 quarterly groundwater monitoring event is found in Appendix D. Laboratory results of PCE concentrations in groundwater beginning with the baseline groundwater monitoring event in 1998 (Round 0) to the current round in February 2004 (Round 17) are shown in Table 4-1. Results of the February 2004 data show that the plume is still completely contained on Navy property, i.e., confined to wells MW2 through MW8. Of these wells, only MW7 had a detection of PCE exceeding FDEP criteria. The samples from the well on the Swartwood property, as well as all of the other wells along the right-of-way on their side (south) of Gatlin Avenue (MW14, MW15 and MW16) showed non-detects for PCE. The Navy prepared a Fact Sheet for public distribution and also sent it to the Swartwoods explaining the monitoring results. FDEP has agreed that the data from the one well installed is sufficient for them to make a determination and they will issue a letter upon receipt of the Navy's groundwater monitoring report stating that the Swartwood property is not impacted. As such, the Navy is of the opinion that further investigation (including a second well) is not warranted. At the request of the Swartwoods, the well located on their property was abandoned on April 8, 2004 and the area disturbed by the mobilization and drilling activities was landscaped during the week of April 12, 2004.

In addition to the quarterly groundwater sampling, groundwater samples were collected from MW2, MW7 and MW8 on March and April 2004. These samples were collected to help evaluate the enhancements made to the AS/SVE system in February 2004. With the exception of the MW8 (sample collected in March which had a PCE concentration of 2.3 µg/L), all other samples from these three wells had nondetected results for PCE.

## **6.0 HUMAN HEALTH RISK ASSESSMENT**

Residents in the area surrounding NRL Orlando use a public water supply. Therefore, direct contact with, or consumption of groundwater is unlikely. However, the presence of PCE, a volatile organic compound, suggests that there is limited probability that it may volatilize into the soil column and infiltrate through cracks into the building's foundation to be present in indoor air. In the Human Health Risk Assessment prepared for the site in November 1999, the maximum detected concentration of PCE (14.3 µg/L) was used to calculate potential residential risks associated with vapor intrusion. For the adult and child resident, this has resulted in hazard indices of 0.0004 and 0.0014 for the adult and child resident, respectively. Because these values are much less than one (1), this indicates that it is unlikely that residents would experience non-carcinogenic effects associated with inhalation of PCE resulting from vapor intrusion. This concentration has also resulted in potential cancer risks of 3.9E-08 and 3.4E-08 for the adult and child resident, respectively. These are much less (better) than FDEP's target cancer risk level of 1E-06. At this FDEP target level, there is less than a one-in-one million chance of developing cancer associated with inhalation of PCE resulting from vapor intrusion.

Since the time that this risk assessment was prepared, treatment of the groundwater onsite has resulted in significant reductions in the concentrations of PCE. This treatment has resulted in reduced migration of the PCE from its source. Consequently, the potential amount of exposure to PCE as a result of vapor intrusion is reduced, thus resulting in additional reductions in the potential risk described above.

## **7.0 CONCLUSIONS**

Results of current groundwater data show that the PCE plume is still completely contained on Navy property. The samples from the well on the Swartwood property, as well as all of the other wells along the right-of-way on their side (south) of Gatlin Avenue showed non-detect for PCE. As such, the Navy is of the opinion that further investigation (including a second well) is not warranted. The Navy prepared a Fact Sheet for public distribution and also sent it to the Swartwoods explaining the monitoring results. FDEP has agreed that the data from the one well installed is sufficient for them to make a determination, and they will issue a letter upon receipt of the Navy's groundwater monitoring report stating that the Swartwood property is not impacted. At the request of the Swartwoods, the well located on their property was abandoned on April 8, 2004 and the area disturbed by the mobilization and drilling activities was landscaped during the week of April 12, 2004.

## REFERENCES

Tetra Tech NUS (TtNUS), 2004a. Monitoring Well Installation and Groundwater Sampling Work Plan Addendum for Residential Property (January, 2004).

Tetra Tech NUS (TtNUS), 2004b. Air Sparging/Soil Vapor Extraction (AS/SVE) Treatability Study System Expansion and Enhancement Work Plan Addendum (January, 2004).

Tetra Tech NUS (TtNUS), 2004c. Fact Sheet - Former Naval Research Laboratory Orlando - Groundwater Remediation (March, 2004).

Tetra Tech NUS (TtNUS), 2004d. Point Paper - Potential Impact from Contaminated Groundwater at Residential Property Adjacent to Former NRL Orlando (March 29, 2004).

Tetra Tech NUS (TtNUS), 2004e. Operating Properly and Successfully (OPS) Demonstration Report for Air Sparging/Soil Vapor Extraction (AS/SVE) Treatability Study (March, 2004).

U.S. EPA, 1991. Management of Investigation - Derived Waste During Site Inspections.

TABLE 1  
PCE CONCENTRATIONS IN GROUNDWATER  
NAVAL RESEARCH LABORATORY, ORLANDO, FLORIDA

Sampling Date	Event	Phase <sup>(1)</sup>	Round	MW 2	MW 3	MW 4	MW 5	MW 6	MW 7	MW 8	MW 9	MW 10	MW 11
5/28/1998	Baseline Sampling	Phase 1	0	87.2	ND	5.6	ND	ND	32	12.2	14.8	ND	ND
1/14/1999	AS/SVE turned on	Phase 2	1										
2/22/1999	1 month after AS/SVE on	Phase 2	2	ND	ND			ND	ND	10.4			
5/20/1999	4 months after AS/SVE on	Phase 2	3	7.7	0.78			ND	ND	3.9			ND
8/12/1999	7 months after AS/SVE on	Phase 2	4	2.3	0.66	1.8		ND	ND	7.3	1.6J		
11/16/1999	10 months after AS/SVE on	Phase 2	5	6.1	ND	1.2J		ND	ND	5.6	ND		
2/22/2000	13 months after AS/SVE on - the system was shut down following this round to evaluate if PCE concentrations would rebound (start increasing)	Phase 2	6	5.6	2.1			ND	ND	7.3			
5/31/2000	10 months after AS/SVE on - 3 months into rebound evaluation	Phase 2	7	4.9	ND				2.5	2.2			
8/31/2000	19 months after AS/SVE on - 6 months into rebound evaluation	Phase 2	8	4	ND	3.8	ND		1.5J	5	2J	ND	0.74J
4/30/2002	First Biannual Sampling Event	Phase 3	9	6.4		1.9				10.3			
8/27/2002	Second Biannual Sampling Event	Phase 3	10	5.6		3.4				13.9			
1/14/2003	AS/SVE system expanded and turned on again	Phase 3	11	5		1.1				12			
4/21/2003	3 months after AS/SVE turned on again	Phase 3	12	ND		1.4				0.6			
5/27/2003	4 months after AS/SVE turned on again	Phase 3	13	ND		1.3				0.9			
6/26/2003	5 months after AS/SVE turned on again - system turned off after this event	Phase 3	14	ND		1.1				1			
8/14/2003	1 month after AS/SVE turned off	Phase 3	15	ND		ND	ND		9.1	6.3		ND	ND
11/6/2003	4 months after AS/SVE turned off	Phase 3	16	ND		2.2			12	4.2			
2/2/2004	GW Event 1 (323) - 7 months after AS/SVE turned off	Phase 4	17	0.9J		1.8			9.6	2.3			
3/3/2004	First monthly quick turn sampling event (MW2; 7 & 8)	Phase 4	18	ND		ND			ND	2.3			
4/9/2004	Second monthly quick turn sampling event (MW2; 7 & 8) System turned off	Phase 4	19	ND					ND	ND			
5/13/2004	GW event 2 (323) 3 months after February 2004 system expansion	Phase 4 1st Qtr <AL?	20	ND		1.1			ND	ND			
8/13/2004	GW event 3 (323) 6 months after February 2004 system expansion	Phase 4 2nd Qtr <AL?	21										
11/13/2004	Need Scope (from 271?) for GW 4 (3rd Qtr of <AL verification sampling)	Phase 4 3rd Qtr <AL?	22										
2/13/2005	Need Scope (from 271?) for GW 5 (4th Qtr of <AL verification sampling)	Phase 4 4th Qtr <AL?	23										

Sampling Date	Event	Phase <sup>(1)</sup>	Round	MW 12	MW 13	MW 14	MW 15	MW 16	MW 17	MW 18	TW 1	TW 2	MWPRIV01
5/28/1998	Baseline Sampling	Phase 1	0	42.1	ND	2.6	23.5	1.8J	ND	ND			
1/14/1999	AS/SVE turned on	Phase 2	1								ND	3.8	
2/22/1999	1 month after AS/SVE on	Phase 2	2	ND		1.5J	14.3						
5/20/1999	4 months after AS/SVE on	Phase 2	3	ND	2	2	ND	1.1J					
8/12/1999	7 months after AS/SVE on	Phase 2	4	4.3		0.77J	ND	ND					
11/16/1999	10 months after AS/SVE on	Phase 2	5	0.84J		ND	ND	0.81J					
2/22/2000	13 months after AS/SVE on - the system was shut down following this round to evaluate if PCE concentrations would rebound (start increasing)	Phase 2	6	ND		ND	ND	2.3					
5/31/2000	10 months after AS/SVE on - 3 months into rebound evaluation	Phase 2	7	0.77J		ND	0.82J	ND					
8/31/2000	19 months after AS/SVE on - 6 months into rebound evaluation	Phase 2	8	ND	ND	ND	2.4	ND	0.56J	ND	ND	0.56J	
4/30/2002	First Biannual Sampling Event	Phase 3	9	ND	ND		1.7	1.1					
8/27/2002	Second Biannual Sampling Event	Phase 3	10	ND	ND		1.7	0.64					
1/14/2003	AS/SVE system expanded and turned on again	Phase 3	11	1.5	ND		1.2	ND					
4/21/2003	3 months after AS/SVE turned on again	Phase 3	12	ND	ND		1.6	ND					
5/27/2003	4 months after AS/SVE turned on again	Phase 3	13	ND	ND		ND	ND					
6/26/2003	5 months after AS/SVE turned on again - system turned off after this event	Phase 3	14	ND	ND		ND	ND					
8/14/2003	1 month after AS/SVE turned off	Phase 3	15	ND	ND		ND	ND	ND				
11/6/2003	4 months after AS/SVE turned off	Phase 3	16	ND	ND		ND	ND					
2/2/2004	7 months after AS/SVE turned off	Phase 4	17	0.8J	ND	ND	ND	ND					ND
3/3/2004	First monthly quick-turn sampling event (MW2; 7 & 8)	Phase 4	18										
4/9/2004	Second monthly quick-turn sampling event (MW2; 7 & 8)	Phase 4	19										
5/13/2004	GW event 2 (323) 3 months after February 2004 system expansion	Phase 4 1st Qtr <AL?	20	ND	ND	0.3	ND	0.7					
8/13/2004	GW event 3 (323) 6 months after February 2004 system expansion	Phase 4 2nd Qtr <AL?	21										
11/13/2004	Need Scope (from 271?) for GW 4 (3rd Qtr of <AL verification sampling)	Phase 4 3rd Qtr <AL?	22										
2/13/2005	Need Scope (from 271?) for GW 5 (4th Qtr of <AL verification sampling)	Phase 4 4th Qtr <AL?	23										

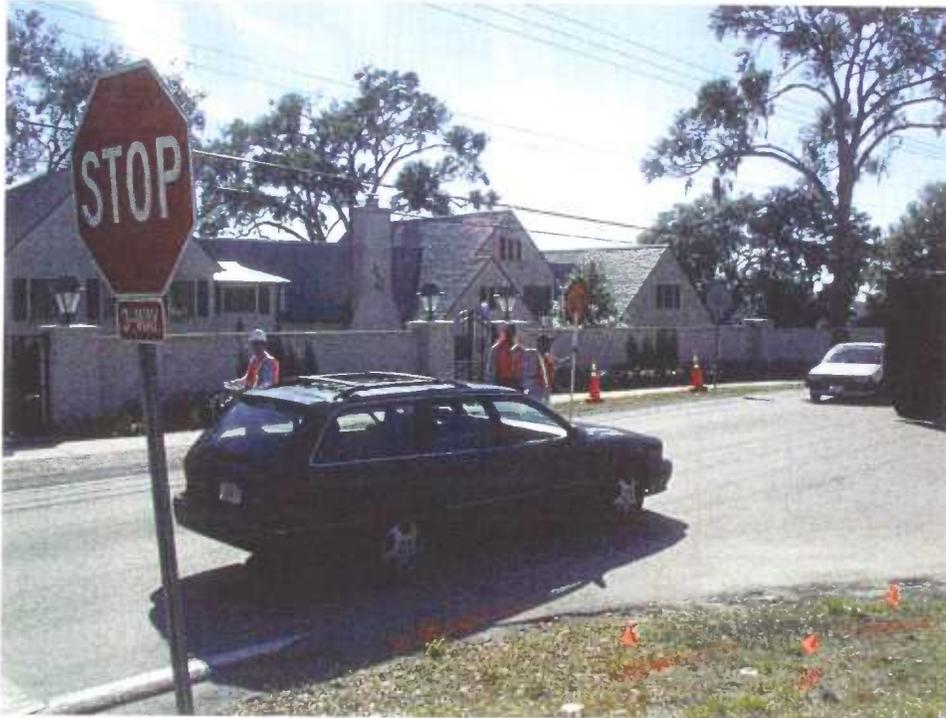
Regulatory exceedances are shown as red (dark)-shaded cells  
Blank cells indicate well was not sampled  
Green (light)-shaded cells are below FDEP criterion (3ppb)  
ND = Nondetected

**APPENDIX A**

**SITE PHOTOGRAPHS**



1. Traffic control sign (flagman ahead) on west side of Gatlin Avenue drilling operations.



2. Traffic control workers at intersection of Gatlin Avenue and Summerlin Street.



3. Utility markout pin flags on residential property prior to drilling operations.



4. Installation of right-of-way well (MW15A). Note mixing concrete in wheelbarrow for the residential well in front yard of Swartwood property (MWPRIV 01).



5. Monitoring well installation (MW15A) within right-of-way. Note: plastic sheeting, 4' x 8' composition boards and 55-gallon drums used for IDW containment.



6. Developing MWPRIV 01.



7. Grass damage and ruts caused by drill rig. Note: tree stump (one of three removed at owner's request).



8. Newly installed MWPRIV 01. Note: grass damage and ruts caused by drill rig.



9. Abandoned well (MWPRIV 01) in foreground.



10. Landscape repair. Note: Seville grass stacked prior to installation.



11. Residential property following landscape restoration 2004.

## **APPENDIX B**

### **FIELD DATA**

- **Geologist Field Notes**
- **Boring Logs/Monitoring Well Sheets**
- **Monitoring Well Development Records**
- **Groundwater Sample Log Sheets**
- **Chain-of-Custody Forms**
- **Non-Hazardous Waste Manifest**

Work continued from Page

19 Jan 2004

0830 Depart Tallahassee, FL travel to NRL Orlando, FL

1400 Arrive NRL Orlando. Don Westerhoff Health + Safety Officer arrived about same time. Perform site walk over. Determine addition H+S equipment needs. Travel to store to purchase equipment.

1600 Day over

Note to Reader: The original log book was lost at approximately 1300 hours on 20 January 2004 and has not been recovered. Notes were kept from that point on and later transferred to this log book. The original log book if found would supersede this record for the morning of the 20th.

20 Jan 2004

0745 Arrive On site - Drillers present waiting in trucks

0800 All Tetra Tech NUS crew Onsite - discuss current situation.

**Purpose** Installation of 4 to 5 wells in right-of-way of Gatlin Road and on private property (Swartwood).

**H+S** Primary concern traffic near rig and rig operations.

0810 Brief conversation with Mrs. Swartwood.

0815 Bob's Barricade crew arrives - discuss the approved MOP and site conditions - will use 3-man crew - begin setup then will be on hold.

Drillers begin decon set up

0820 Begin calibration of FID - access bathroom - site walk over.

**Weather** Sunny, clear, light breeze: 47°F to 60°+ in PM.

**Personnel On-site**  
Tetra Tech NUS Don Westerhoff SHSO  
Roger Chark PM  
Larry Smith FOL/Geologist  
Groundwater Protection (Driller) GeoProbe 6600  
Russ Wilkie

Dave Lemon Helper

Bob's Barricade (Traffic Control)

Dale Mitchell Head

Vincent Sparks

Gerome Brown

Southern Division

Hope Oaks

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DATE

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TITLE NRL Orlando

PROJECT NO. N7380

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BOOK NO.

Work continued from Page

- 0915 Don conducts Health and Safety meeting with FOL + Drill crew.
- 0930 Don performs rig H+S inspection - proves kill switches)
- 0935 After several calls regarding Southeast Survey utility day lighting, we  
5 determine to begin traffic control and move rig to MW-14A to drill replacement well in right-of-way. The contract for Southeast Survey may not be in force in time for them to mob to the site today.
- 0955 Begin 8 inch ID post hole to  $\approx$  4 ft bls. No utilities visible,
- 1020 Begin drilling MW-14A to  $\approx$  23 ft bls. Intend to set screen interval  
10 from 22.5 to 12.5 feet bls, with sand pack to 10.5 ft bls, fine sand seal to 9.0 ft bls then grout to surface with neat cement/bentonite mixture, in general accordance with the Work Plan and SOP. See Boring Log.
- 1050 Southeastern Survey crew arrives onsite. After brief discussion they  
15 set up at location MW-15A and vacuum soil in 8 inch diameter to 10 feet bls. Vacuumed soil is deposited in 65-gallon hopper.
- 1125 South east Survey Crew consists of Daryll DeMarch and Chris Taylor  
They move to private property location MWPRIV01 vacuum soil the same way. Utilities were not encountered @ either location.
- 1130 Drillers begin installation of sand pack via HSA as tremie - noticeable problem.  
20 well screen sand locked at initial removal effort MW-14A driller indicate there is no problem. No FID response while drilling.
- 1150 Tetra Tech Crew + Hope Oaks (South Dr.) and Mrs. Swartmore perform site  
25 walkover @ rear of private property. One suggested location was near the lake but there was concern regarding the septic drain field closer to the residence and the sprinkler system. Southeast Survey crew departs.
- 1220 Installation of sand pack + fine sand seal with grout completed at  
MW-14A. Rig moved to decon area for cleaning.
- 1320 Drillers depart to lunch, in process of leaving the support truck backs into  
30 the flag pole which now leans at approximate 10° angle. Reported the event to Mrs. Bryant of the Orlando School District
- 1335 Depart for lunch leaving rest of TT crew on-site.
- 1400 Back @ site. Drill crew mobing rig to MW-15A in similar fashion as  
MW-14A.
- 1410 Begin drilling MW-15A to 23 ft bls. See Boring Log.
- 455 Begin installation of sand pack.

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Work continued from Page

- 1515 Sand pack installed
- 1540 Grouting complete to 0.5 ft bls. Prior to leaving right-of-way area the uncompleted well heads were locked with friction fit caps and locks and traffic cones were placed on top of drum lids which covered each well. The open <sup>lays</sup> boring for monitoring well MWPRV01 was covered with 4x8 inch by 3/4 inch plywood and an empty drum. Drums with soil cuttings are moved to the NRL fence secured area. Barricade crew departs.
- 1610 Decom of rig + augers almost complete - finish labeling drums - clean up site. Summary MW-14A, and MW-15A installed w/o pads, 1 open boring.
- 1650 All personnel depart site by 1700.

0750 Arrive on site, Drillers arrive @ 0755 by 0800 every body has arrived.  
Purpose Installation of 2 monitoring wells on private property - well development + pad completion if possible.  
H+S As previous day concerns include rig operations and crossing Gathin Ave. in traffic. No barricades or traffic control today!  
Weather Sunny, clear, 11 breeze, 50° F to 65° F+ in afternoon  
Personnel Onsite T&NUS; Gar Rodger Clark, Don Westerhoff, Larry Smith  
 South DIN: Hope Oaks  
 Groundwater Protection: Russ Wilkie, Dave Lemon

0810 Opened monitoring wells MW-14A + MW-15A to measure total depth + water levels. Mr. Swartwood requested we install an intermediate aquifer well in place of one shallow well. Passed this information on to Roger Clark.

Monitoring Well	Wb	TD	Below Top of casing
MW-14A	Ø	15.5	*Well short of 22.5 ft.
MW-15A	16.3	23	

0900 Health and Safety meeting: concerns as described previously - rig inspection Discussed the shallow TD in MW-14A with driller suggested screen broken - he indicated that the cap came off the riser during the installation of the sand pack and sand likely entered the well at that time. We will flush the sand out with the rig pump. Today a Diedrich D-50 is the rig since we are not under the power lines. The rig and auger are decommissioned since arrival on-site. Don says the FID is calibrated and operating well.

SIGNATURE

*Larry W Smith*

DATE

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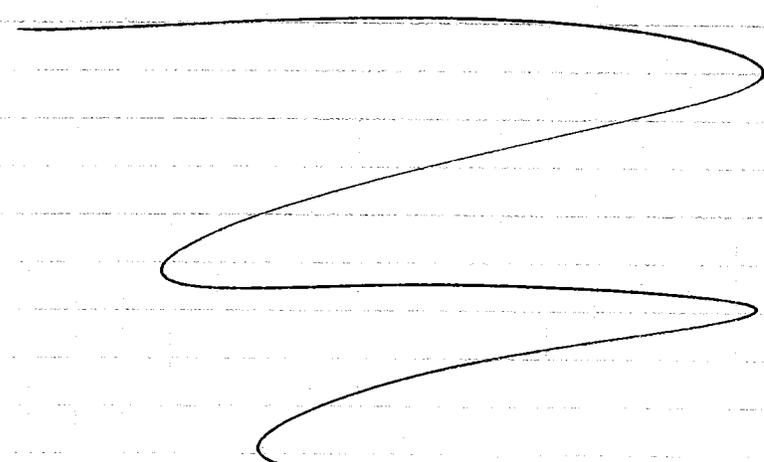
Work continued from Page

- 0910 Moved rig post decon to private property location MWPRIV01. Remove drum and ply wood, boring is in good condition. Conversation about depth of well continues. Correction rig moved to MW-14A to clean sand from well screen and riser then to MWPRIV01 - Water would not flush the sand. It is thought the sand is too coarse.
- 0925 Begin tree cutting, after the rig is located @ MWPRIV01 - Trees downed by abrasive gas saw.
- 1000 Rig @ MWPRIV01 see boring log. Roger indicates there will be no second private property monitoring well. See log of well MWPRIV01.
- 1045 Mrs. Swartwood arrives converses with Roger and Hope.
- 1100 Begin installation of sand pack and fine sand seal.
- 1133 ITSA out of the boring - begin location cleanup @ well head.
- 1215 Move rig adjacent to MW-14A to flush well. Water tank empty mob to decon and fill rig tank. Mean while remove cut trees to NRL property to clear site. Corey Cone of GWP was dropped off to help the drill crew.
- 1250 Return to MW-14A pump 50 gallons to TD in well via triemie with no results but lost water - or no return - the 50 gallons is an estimation.
- 1309 Set up to mix thin bentonite slurry which will have greater density to remove the sand, 50 gallons mixed - pumped - 20 gallons ejected with the coarse sand cleaning out the well to 22.2 ft b/s. Begin pumping well with peristaltic pump to remove as much slurry and groundwater as possible with tubing opening just above TD. 2.5 gallons of water was removed prior to the well going dry. The well recovered 0.5 ft/5 min approx.
- 1420 Began pumping MW-14A as before well pumped dry @ 1430 - removed  $\approx$  3 gal.
- 1425 Barbara Nwokike departs site, left message with Mrs. Bryants office about cut limbs on property. Inspected site wells with Rodger while pad completion and abandonment of 3/4 inch ID wells proceeded (MW-14, MW-15, and MW-16). Abandoned by injecting neat grout.
- 1445 Pumped MW-14A - again removed  $\approx$  3 gallons
- 1520 Mrs. Swartmore arrived and commented on the well pads.
- 1610 Began site cleanup - decon area disassembled - water pumped off to drum.
- 1645 Drillers of site. Remaining personnel off site.
- 1700 Depart site after labeling drums and securing fenced area.

*Larry W Smith*

Work continued from Page

- 0800 Arrive on site - Roger Clark arrives, site issues discussion.
- 0810 Don Westorhoff and Hope Oaks arrive - Groundwater Protection helper to arrive about 9:00 am. Organize to develop 3 monitoring wells. Discuss H+S with Don - primary concern this day is traffic
- 0845 Open decon/development drum - open monitoring wells MW-14A, MW-15A, and MWPRIV01.
- \* Note: MWPRIV01 was closed and bolted down the previous day, but the locking cap was found unlocked after removal of the manhole lid. The <sup>MWS</sup> pressure friction cap was in place but the lock was not closed.
- 0910 Charles Bucher of GWP protection arrives with peristaltic pump to develop the 3 newly installed monitoring wells.
- 0933 Begin development of MW-14A as per general accordance with regulatory requirements and SOP. See log sheet.
- 0945 MW-14A pumped dry move equipment and truck to MW-15A
- 1000 Begin development of MW-15A. See log sheet.
- 1127 Move to MWPRIV01
- 1120 Begin development of MWPRIV01. See log sheet.
- 1215 MWPRIV01 development complet - return to MW-14A
- 1220 Additional development of MW-14A. See log sheet. - Move equipment across street offsite. Secure all monitoring wells. secure drum lid of development water and lock gate.
- 1240 All personnel off-site, TENus and Hope Oaks of Southdiv.
- 1245 Depart site - travel to Tallahassee, FL.
- 1830 Arrive Tallahassee, FL.



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DATE

*Glenn W Smith*

Work continued from Page

8:00 - On site - Ship there already -  
 Sun Coast Environmental on site - surveying  
 situation - will go to Fed Ex to pick up  
 supplies

Call Tom Patton and have his ship me  
 a PID for drilling event. It will be here  
 tomorrow.

uncap wells + allow to equilibrate.

MW#	DTW	
MW-10	20.49	
MW-2	20.41	
MW-8	18.97	
MW-5	13.32	
MW-1A	10.60	
MW-11	13.19	
MW-16	12.97	
MW-14	17.38	2222
PRIVATE	15.93	21.60
MW-13	18.05	
MW-10	16.38	
MW-1-		

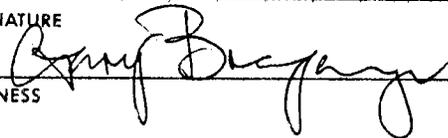
11:20 - Ray Swick on site

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

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2/2/04

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Work continued from Page

survey site - will move piping for front  
 of basement door  
 pick up ice for samples

13:00 - Larry Smith on site -  
 will take lunch and then sample wells  
 have to wait till Hope Oak from Southside gets  
 here to sample

Calibrate Horiba U-22 - Auto Calibration

14:00 - Begin purging MW-08  
 14:40 - collect sample from MW-08  
 Sample ID = NRL-GW-MW08-17 parameters  
 8260B

15:00 - Hope Oaks Arrives on site

15:00 - Begin purging MW-04  
 15:40 - collect sample from MW-04  
 Sample ID = NRL-GW-MW04-17  
 parameters = 8260B

15:52 - Begin purging MW-13  
 16:35 - collect sample NRL-GW-MW13-00-17

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

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SIGNATURE

WITNESS



DATE

DATE

2/2/04

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Cloudy, foggy 62°

7:45 - On site -

Suncoast Environmental on site - locating  
out concrete

Larry Smith on site will check on contractors

Calibrate Horiba U-22 - Auto calibration

will start on MW-12

8:20 - Begin purging well

water not pumping out of well - change  
tubing flush out systemRt Swick, Bkig Valliancourt and  
Hops Oaks on site

8:50 - Begin purging well

9:15 - collect sample from MW-12

Sample ID = NRL-GW-MW12-00-17

Sample parameters 8260 B

9:35 - Begin purging MW-14A

9:50 - collected sample from MW-14A

Sample ID = NRL-GW-MW14-00-17, Sample parameters = 8260 B

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

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SIGNATURE

Larry Smith

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WITNESS

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10:55 - Begin purging Private well Pull  
up sand through tubing - tubing clogged,  
replace tubing10:30 - Begin purging Private well  
Hops Oak present11:00 - Collect sample from private well  
well ID - NRL-GW-PRIV01-01

Collect duplicate NRL-GW-PRIV01-DUP

10:55 - Begin purging MW-15A

12:00 - Collect sample from MW-15A  
Sample ID = NRL-GW-MW15A-00-17  
Sample parameters 8260 BWill break for lunch - Larry Smith  
to head back to TallahasseeTo Fed Ex to pick up PHD for  
shipping event tomorrow14:30 - Back at site - Hops Oak has  
to leave - therefore will continue sampling  
tomorrow

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

Work continued to Page

SIGNATURE

Larry Smith

WITNESS

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2/3/04

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Work continued from Page

Partly cloudy 57°

7:15 - On site. Drillers present - Groundwater protection - Charles + Billy. Will be using gasprobe to install two shallow VE wells today.

Conduct H&S briefing - collect medical approval forms + OSHA training certificates.

Calibrate PID - mini Raes 2000.

Show drillers locations of VE wells - will begin post testing.

7:45 - Skip Valhanscot on site.

8:05 - Rob Simcik shows up - have him check well locations.

8:10 - Hope Oaks from South div on site.

8:20 - Begin drilling VE-12  
check drillers breathing zone = 0 ppm.  
booth = 0.0 ppm.

SIGNATURE

154 Gary Benz  
WITNESS

DATE

2/4/04

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Work continued from Page

8:40 - Rob Simcik will oversee drilling  
I will be completing sampling.

9:05 - Set up on MW-16.

10:05 - Sample MW-16. Sample ID =  
= NRL-GW-MW16-00-17.

Sample parameters = 8260 B. Collect  
extra set of samples for MS/MSD

10:15 - Set up on MW-02

10:50 - Sample MW-02. Sample ID =  
= NRL-GW-MW02-00-17

Sample parameters 8260 B  
collected duplicate sample ID  
= NRL-GW-DUPO1-00-17.

11:10 - Set up on MW-07.

11:50 Sample ID = NRL-GW-MW07-00-17  
sample parameters = 8260 B

Driller complete installation of VE-12  
VE-11 - Total depth of both wells = 16 ft

SIGNATURE

155 Gary Benz  
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12:30 - Drillers begin to install VE-10A well will be same specs as other two VE wells.

The specs include total depth = 16 ft, -  
Screen = 5 ft (0.01 slot size). 20/30 sand pack to 2 ft above screen. 1 ft ~~thick~~ sand (30/65) coat to the surface

13:30 - Complete installation of VE-10A  
Drillers will install a pad for MW-7 and MW-4

Also instruct drillers to develop AS-2

15:00 - Driller complete all activities. Drill with ~~drums~~ drums are stored in front of AS/SVE system and secured with caution tape.

15:15 - Off site + head to office Depot to buy packing material pack samples.

16:30 - Ship samples to Lankers Tenby lab.  
Fed X # : 830337928431

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

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Bunny 57°

7:00 - On site preparation -  
Will install the air-sparging wells

Calibrate mini Rae 2000. - in air and 150 mg/l (100 ppm)

7:30 - Drillers on site - Groundwater Protection -  
Driller is Jeff Ziegler - two helpers - Towed link and Coxy Coe.

Collect driver + S information. OSHA certificates + medical clearance forms.

Conduct H+S briefing.

Check all switches on rig - Rig is a CME-350 - its in good shape - inspection reveals no frayed hoses or leaks.

Drillers will set up on AS-10 first Go over specs with driller  
total depth of wells = 40 ft, 5 ft of 0.01 slot screen. Sand pack 20/30 - to 2 ft above screen. 30/65 fine sand seal (2 ft thick) Coat to the surface. (Schedule 40 PVC used for casing + screen)

SCIENTIFIC BINDERY PRODUCTIONS CHICAGO 60605

Work continued to Page

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2/5/04

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Work continued from Page

8:00 - Rob Semick on site, Hope Oaks arrives also

8:15 - Begin drilling AS-10.  
PID readings  $l_3 = 0$  ppm, borohole = 0 ppm.

8:45 - 12 ft -  $l_3 = 0$  ppm, borohole = 0 ppm.

9:30 - Complete installation of AS-10  
Total depth of 40 ft.  
Driller will develop well before seal is installed

10:05 - Driller set up on AS-9 (adjacent to VE-11)

10:15 - begin drilling AS-9  
driller  $l_3 = 0$  ppm, borohole = 0 ppm

10:52 - 25 ft depth - driller  $l_3 = 0$  ppm, borohole = 0 ppm

11:45 - Complete installation of AS-9.  
driller develops well

SIGNATURE

158 Gary B. [Signature]  
WITNESS

DATE

2/5/04

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Work continued from Page

12:20 - Lunch - Skip will be on site with driller

13:30 Drillers set up on AS-8 (adjacent to VE-10A)

13:40 - begin drilling well AS-8  
driller  $l_3 = 0$  ppm, borohole = 0 ppm

4:10 - 20 ft - driller  $l_3 = 0$  ppm, borohole = 0 ppm

14:45 - Complete installation of AS-8.  
Driller to develop well

Driller abandons DMW-2 - goes to surface (they abandoned SUE-1 yesterday).  
Also replace broken lid on MW-10. Could not replace lid on OW-1 lid would not fit

Driller complete sealing and grouting wells.  
Place drums near AS/SUE system. Collect a total of 13 soil drums and 4 purge water.  
Skip to begin installing piping - will balance system tomorrow

SIGNATURE

Gary B. [Signature]  
WITNESS

DATE

2/5/04

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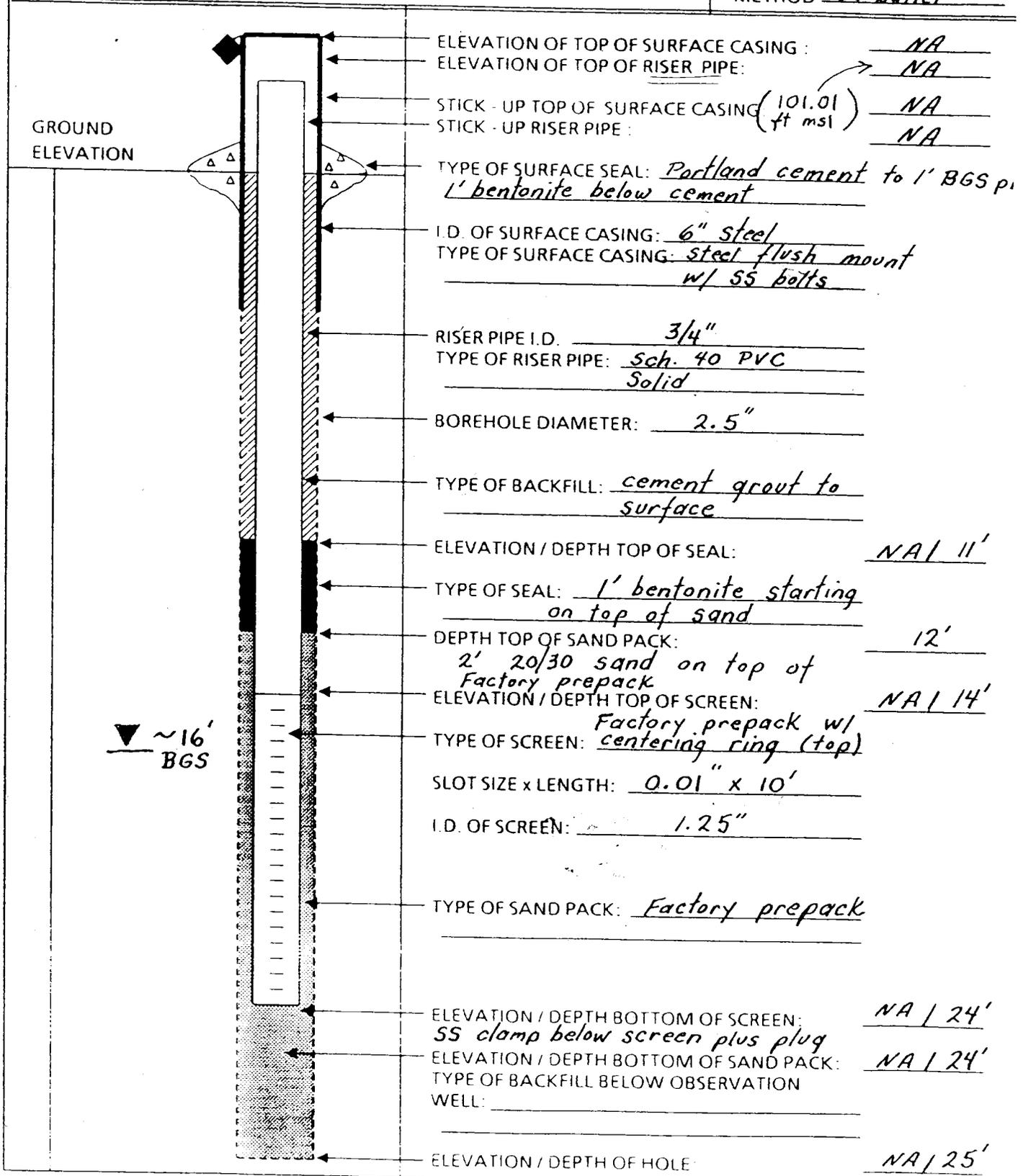
Tetra Tech NUS, Inc.

# OVERBURDEN MONITORING WELL SHEET

*Juan Morales  
Raymond Alpacó*

PROJECT NRL Orlando LOCATION Gatlin ROW  
 PROJECT NO. 7859 BORING MW 14  
 ELEVATION NA (101.01 ft msl) DATE 5/27/98  
 FIELD GEOLOGIST Noel Manarang

DRILLER Precision  
 DRILLING Rods  
 METHOD DPT (3' x 1 7/8" ID)  
 DEVELOPMENT Manual  
 METHOD SS bailer





Tetra Tech NUS, Inc.

BORING NO.: MW 15

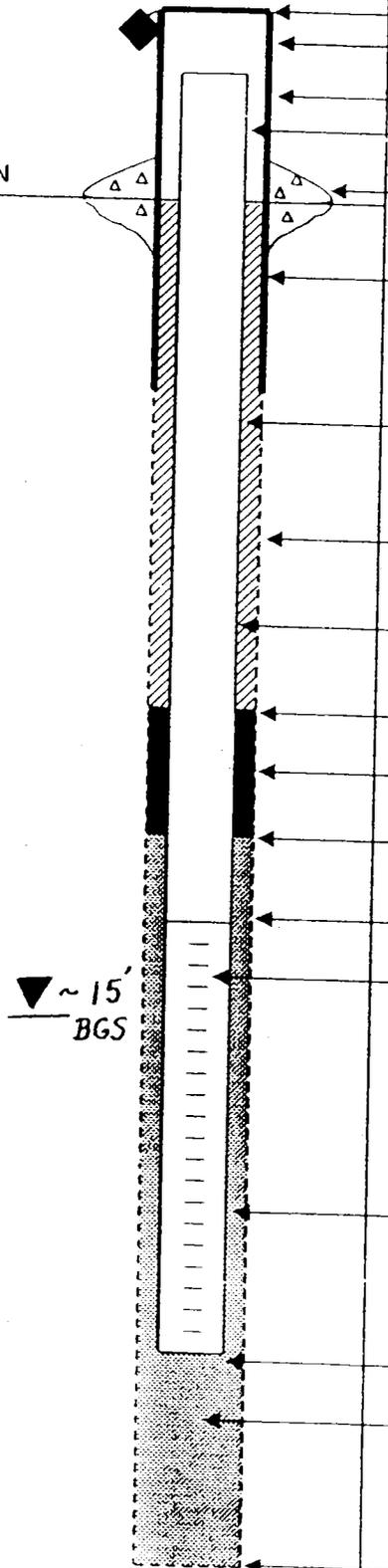
# OVERBURDEN MONITORING WELL SHEET

Juan Morales  
Raymond Alpaco

PROJECT NRL Orlando LOCATION Gatlin ROW  
 PROJECT NO. 7859 BORING MW 15  
 ELEVATION NA (99.93 ft msl) DATE 5/27/98  
 FIELD GEOLOGIST Noel Manarang

DRILLER Precision  
 DRILLING Rods  
 METHOD DPT (3' x 1 1/8" ID)  
 DEVELOPMENT Manual  
 METHOD SS baller

GROUND  
ELEVATION

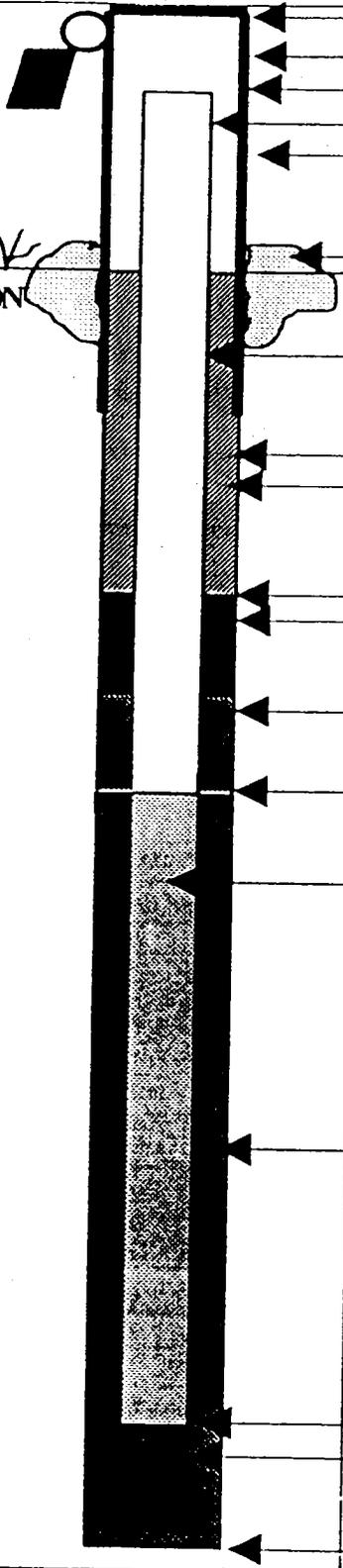


ELEVATION OF TOP OF SURFACE CASING: NA  
 ELEVATION OF TOP OF RISER PIPE: 99.93 ft msl NA  
 STICK - UP TOP OF SURFACE CASING: NA  
 STICK - UP RISER PIPE: NA  
 TYPE OF SURFACE SEAL: Portland cement to 1' BGS plus 1' bentonite below cement  
 I.D. OF SURFACE CASING: 6"  
 TYPE OF SURFACE CASING: steel flush mount w/ SS bolts  
 RISER PIPE I.D.: 3/4"  
 TYPE OF RISER PIPE: Sch. 40 PVC Solid  
 BOREHOLE DIAMETER: 2.5"  
 TYPE OF BACKFILL: cement grout to surface  
 ELEVATION / DEPTH TOP OF SEAL: NA / 9.5'  
 TYPE OF SEAL: 1' bentonite starting on top of sand  
 DEPTH TOP OF SAND PACK: 10.5'  
2' 20/30 sand on top of Factory prepack  
 ELEVATION / DEPTH TOP OF SCREEN: NA / 12.5'  
 TYPE OF SCREEN: Factory prepack w/ centering ring (top)  
 SLOT SIZE x LENGTH: 0.01" x 10'  
 I.D. OF SCREEN: 1.25"  
 TYPE OF SAND PACK: Factory prepack  
 ELEVATION / DEPTH BOTTOM OF SCREEN: NA / 22.5'  
SS clamp below screen plus plug  
 ELEVATION / DEPTH BOTTOM OF SAND PACK: NA / 22.5'  
 TYPE OF BACKFILL BELOW OBSERVATION WELL: \_\_\_\_\_  
 ELEVATION / DEPTH OF HOLE: 23.5'

# OVERBURDEN MONITORING WELL SHEET

PROJECT <u>NRI-Orlando</u>	LOCATION: <u>MW-16</u>	DRILLER <u>Partidge</u>
PROJECT NO. <u>7859</u>	BORING	METHOD: <u>DPT Mike Nicholas</u>
ELEVATION <u>96.19 ftmsl</u>	DATE <u>5/17/99</u>	DRILLING <u>HSA</u>
FIELD GEOLOGIST <u>Bruce Bragg</u>		DEVELOPMENT: <u>NA</u>

GROUND  
ELEVATION



ELEVATION OF TOP OF SURFACE CASING: N/A  
 ELEVATION OF TOP OF RISER PIPE: 96.19 → N/A  
 STICK-UP TOP OF SURFACE CASING: (ftmsl) N/A  
 STICK-UP RISER PIPE: N/A  
 I.D. OF SURFACE CASING: N/A  
 TYPE OF SURFACE CASING: N/A

TYPE OF SURFACE SEAL: Portland cement

RISER PIPE I.D.: 2"  
 TYPE OF RISER PIPE: Sch. 40 PVC

BOREHOLE DIAMETER: 8"  
 TYPE OF SEAL: Bentonite/Grout Slurry (cairaplug)

ELEVATION / DEPTH OF SEAL: 15.00  
 TYPE OF SEAL: fine silica sand 30/65 grade

DEPTH TOP OF SAND PACK: 16.00

ELEVATION / DEPTH TOP OF SCREEN: 18.00

TYPE OF SCREEN: Sch. 40 PVC (bedrock enterprised)  
 SLOT SIZE X LENGTH: 0.02 x 5 ft

I.D. OF SCREEN: 2"

TYPE OF SAND PACK: 20/30 silica sand (7/50 lbs bags)

ELEVATION / DEPTH BOTTOM OF SCREEN: 123.00

ELEVATION / DEPTH BOTTOM OF SAND PACK: 123.50

TYPE OF BACKFILL BELOW OBSERVATION WELL:

ELEVATION / DEPTH OF HOLE: 128.50







# BORING LOG

PROJECT NAME: NRL - Islands BORING NUMBER: MW-16  
 PROJECT NUMBER: 7859 DATE: 5/19/99  
 RILLING COMPANY: Partridge GEOLOGIST: Gary Brogan  
 DRILLING RIG: Foremost Mobile - B-3500 DRILLER: Mike Nicholas

Sample No. and Type or RQD	Depth (FL) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/FL) 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**
	0.5	/								0	0	0	0
	5	/								0	0	0	0
	10	/								0	0	0	0
	15	/								0	0	0	0
	16	/								0	0	0	0
	20	/								0	0	0	0
	23	/											

\* When rock coring, enter rock brokenness.

\* Include monitor reading in 8 foot intervals @ borehole. Increase reading frequency if elevated response read.

Remarks: \_\_\_\_\_

Drilling Area Background (ppm): 0

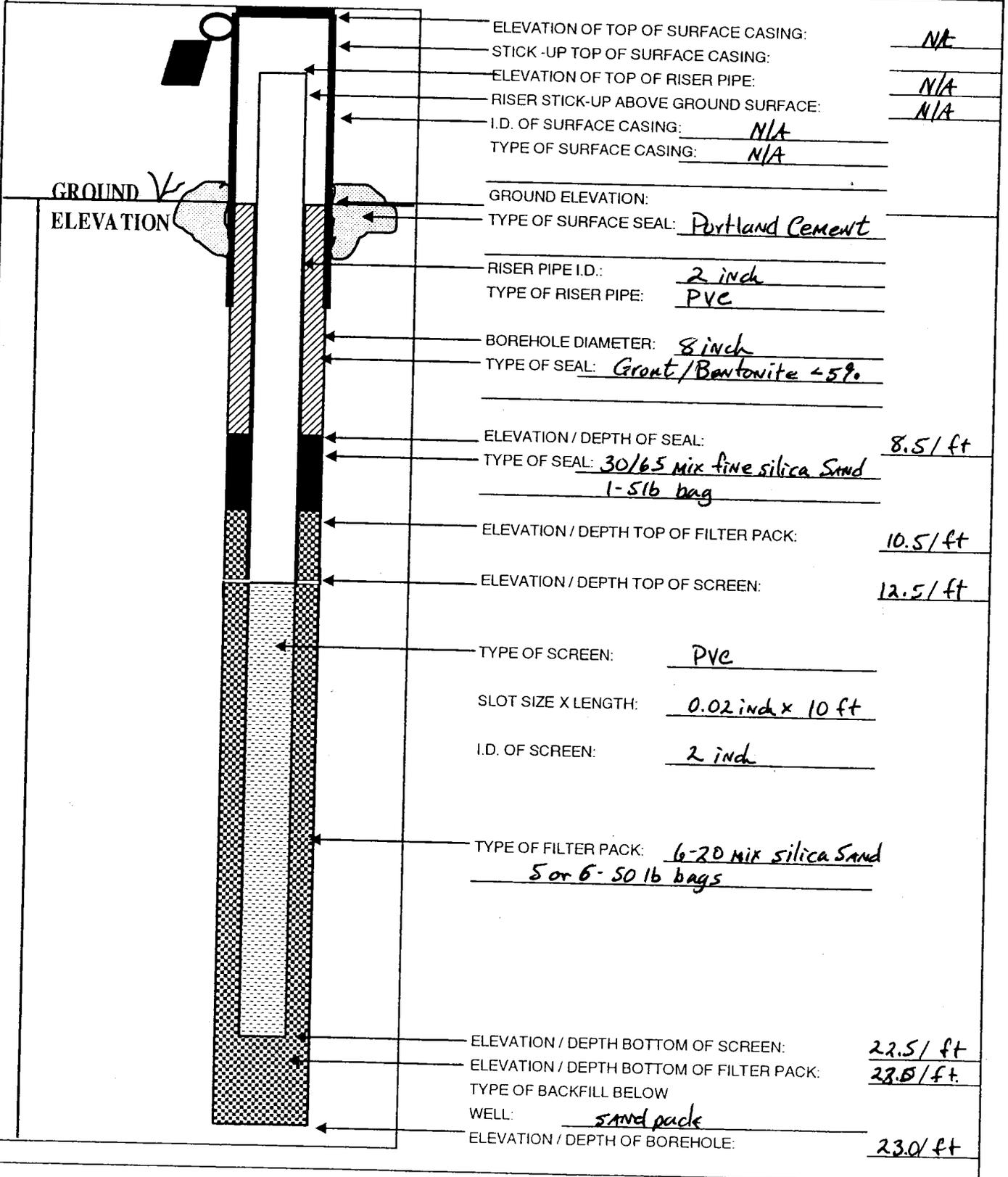
Converted to Well: Yes \_\_\_\_\_ No \_\_\_\_\_ Well I.D. #: \_\_\_\_\_



Tetra Tech NUS, Inc. **OVERBURDEN MONITORING WELL SHEET**

BORING NO.: MW-PR101

PROJECT: NRL Orlando DRILLING Co.: Groundwater BORING No.: MW-PR101  
 PROJECT No.: N7380 DRILLER: Wilkie DATE COMPLETED: 21 JAN 04  
 SITE: \_\_\_\_\_ DRILLING METHOD: HSA NORTHING: \_\_\_\_\_  
 GEOLOGIST: Larry Smith DEV. METHOD: pump EASTING: \_\_\_\_\_





Tetra Tech NUS, Inc.

# BORING LOG

PROJECT NAME: NRL Orlando  
 PROJECT NUMBER: N7380  
 DRILLING COMPANY: Groundwater Protection  
 DRILLING RIG: Diachrich D-50

BORING No.: MAU-PRIV01  
~~MAU-Private1~~  
 DATE: 21 JAN 04  
 GEOLOGIST: Larry Smith  
 DRILLER: Russ Wilkie

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*	
				Grout Sch 40 2 inch ID PVC Riser			Grass/ Top Soil		0 to 10 ft bls soil removed via vacuum extraction					
	5													
	10													
		12/24				TAN		Clayey, Silty, Fine Sand sized Qtz	ML	Moist	φ	φ	φ	φ
		18/24						lt tan			φ	φ	φ	φ
	15									φ	φ	φ	φ	
		18/24												
		20/24					As above increase silty fine Qtz sand		increase in moisture	φ	φ	φ	φ	
		23/24					lt tan			φ	φ	φ	φ	
	20									φ	φ	φ	φ	
		20/24					Lighter TAN carbone	SM	Mottled carbon Black	φ	φ	φ	φ	
		20/24								φ	φ	φ	φ	
	23													
				TDE 23ft										

Time

1010

Augered to 18' bls 1035

1020

1045

1055

\* When rock coring, enter rock brokenness.

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

Remarks: 0 to 10 ft bls soil vacuumed by southeast survey

Drilling Area Background (ppm):

Converted to Well: Yes  No  Well I.D. #: \_\_\_\_\_





Tetra Tech NUS, Inc.

# BORING LOG

PROJECT NAME: NRL Orlando  
 PROJECT NUMBER: \_\_\_\_\_  
 DRILLING COMPANY: GroundWater Protection  
 DRILLING RIG: GeoProbe 6600

BORING No.: MW-15A  
 DATE: 20 Jan 04  
 GEOLOGIST: Larry Smith  
 DRILLER: Russ Wilk

Time	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*
0210		0								Soil Cut for utility discovery	∅	∅	∅	
0215		5			Fine to 2 inch ID PVC Riser 30-65 Sand Grout					None detected	∅	∅	∅	
0230		10								145A	∅	∅	∅	
0240		15			Sand Pack 5 Bags 6-20						∅	∅	∅	
0250		20									∅	∅	∅	
		25									∅	∅	∅	

\* When rock coring, enter rock brokenness.

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

Remarks: 0.010 Slot Screen

Drilling Area Background (ppm):

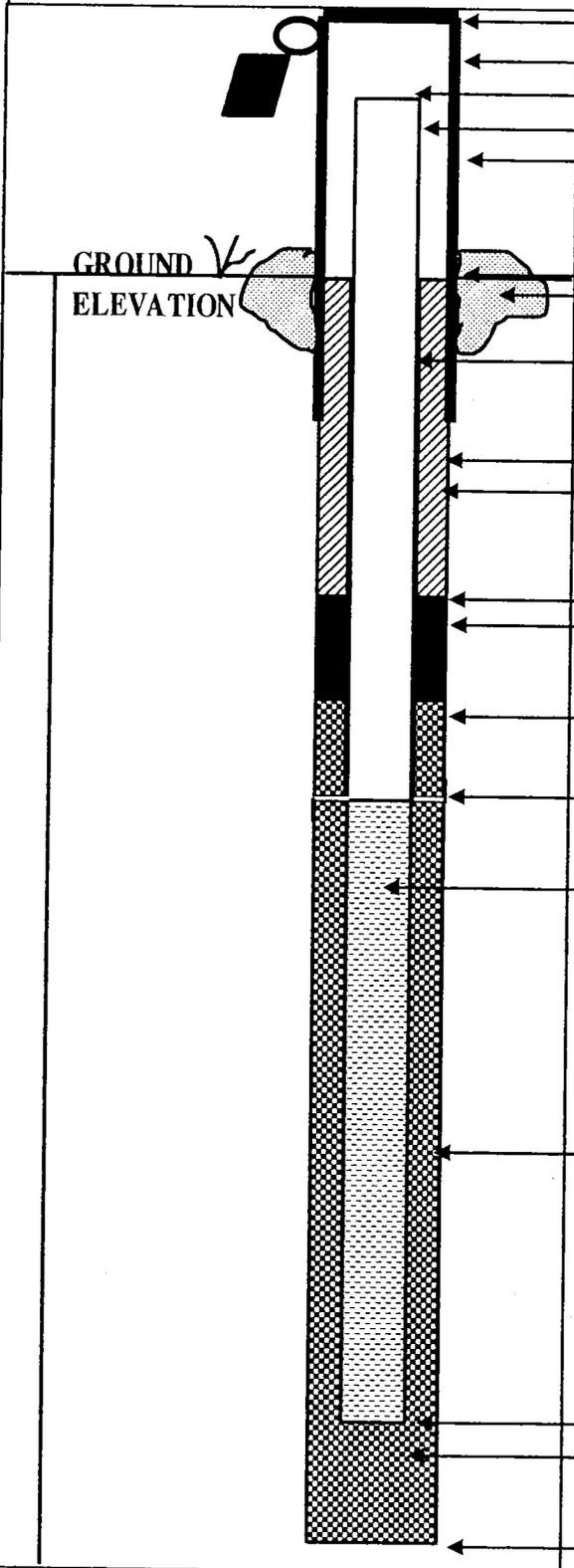
Converted to Well: Yes  No  Well I.D. #: \_\_\_\_\_



Tetra Tech NUS, Inc. **OVERBURDEN MONITORING WELL SHEET**

BORING NO.: MW-14A

PROJECT:	<u>NRL Orlando</u>	DRILLING Co.:	<u>Groundwater Pros.</u>	BORING No.:	<u>MW-14A</u>
PROJECT No.:	<u>N7380</u>	DRILLER:	<u>R. Wilkie</u>	DATE COMPLETED:	<u>20 JAN 04</u>
SITE:	<u>NRL Orlando</u>	DRILLING METHOD:	<u>HSA</u>	NORTHING:	
GEOLOGIST:	<u>Larry Smith</u>	DEV. METHOD:	<u>Pump</u>	EASTING:	



ELEVATION OF TOP OF SURFACE CASING:	<u>N/A</u>
STICK-UP TOP OF SURFACE CASING:	
ELEVATION OF TOP OF RISER PIPE:	<u>N/A</u>
RISER STICK-UP ABOVE GROUND SURFACE:	<u>N/A</u>
I.D. OF SURFACE CASING:	<u>N/A</u>
TYPE OF SURFACE CASING:	<u>N/A</u>
GROUND ELEVATION:	
TYPE OF SURFACE SEAL:	<u>Portland Cement</u>
RISER PIPE I.D.:	<u>2 inch</u>
TYPE OF RISER PIPE:	<u>PVC</u>
BOREHOLE DIAMETER:	<u>8 inch</u>
TYPE OF SEAL:	<u>30/65 mix fine silica Sand Bentonite &lt; 5% Grout</u>
ELEVATION / DEPTH OF SEAL:	<u>8.5 / ft</u>
TYPE OF SEAL:	<u>30/65 mix fine silica Sand 1- 50lb bag</u>
ELEVATION / DEPTH TOP OF FILTER PACK:	<u>10.5 / ft</u>
ELEVATION / DEPTH TOP OF SCREEN:	<u>17.5 / ft</u>
TYPE OF SCREEN:	<u>0.02 PVC</u>
SLOT SIZE X LENGTH:	<u>0.02 x 10 ft</u>
I.D. OF SCREEN:	<u>2 inch</u>
TYPE OF FILTER PACK:	<u>6-20 silica Sand 6- 50lb bags</u>
ELEVATION / DEPTH BOTTOM OF SCREEN:	<u>22.0 / ft</u>
ELEVATION / DEPTH BOTTOM OF FILTER PACK:	<u>23.0 / ft</u>
TYPE OF BACKFILL BELOW	
WELL:	<u>N/A</u>
ELEVATION / DEPTH OF BOREHOLE:	<u>23.0 / ft</u>

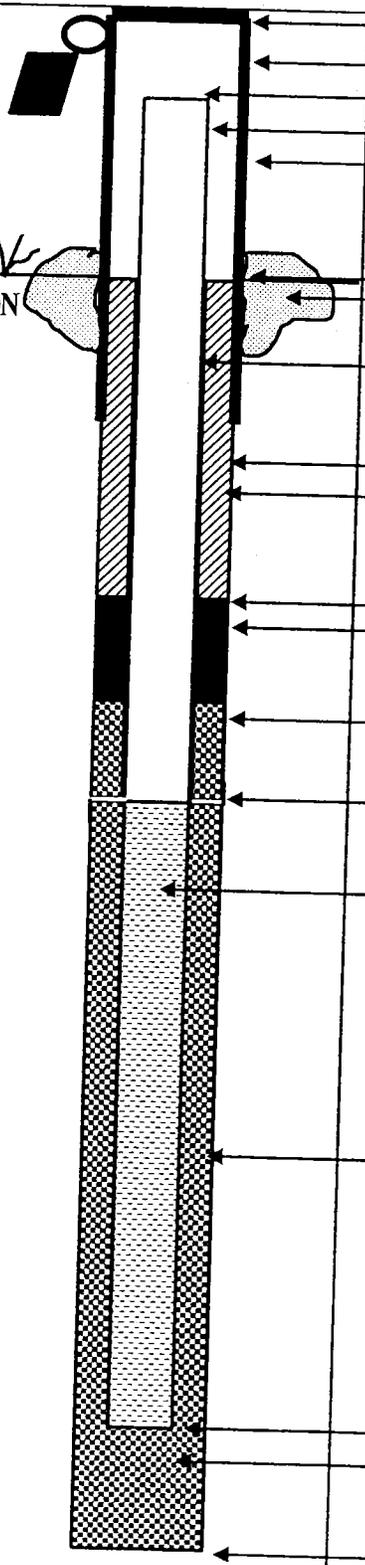


Tetra Tech NUS, Inc. **OVERBURDEN MONITORING WELL SHEET**

BORING NO.: MW-15A

PROJECT: MRL Orlando DRILLING Co.: Groundwater BORING No.: MW-15A  
 PROJECT No.: N7380 DRILLER: Wilkie DATE COMPLETED: 20 Jan 04  
 SITE: \_\_\_\_\_ DRILLING METHOD: Itsa NORTHING: \_\_\_\_\_  
 GEOLOGIST: Larry Smith DEV. METHOD: pump EASTING: \_\_\_\_\_

GROUND  
ELEVATION



ELEVATION OF TOP OF SURFACE CASING: NA  
 STICK-UP TOP OF SURFACE CASING: \_\_\_\_\_  
 ELEVATION OF TOP OF RISER PIPE: NA  
 RISER STICK-UP ABOVE GROUND SURFACE: NA  
 I.D. OF SURFACE CASING: N/A  
 TYPE OF SURFACE CASING: N/A  
 GROUND ELEVATION: \_\_\_\_\_  
 TYPE OF SURFACE SEAL: Portland Cement  
 RISER PIPE I.D.: 2 inch  
 TYPE OF RISER PIPE: PVC  
 BOREHOLE DIAMETER: 8 inch  
 TYPE OF SEAL: Grout/Bentonite 45%  
 ELEVATION / DEPTH OF SEAL: 7.5 / ft  
 TYPE OF SEAL: 30/65 mix fine silica Sand  
1-5lb bag  
 ELEVATION / DEPTH TOP OF FILTER PACK: 9.5 / ft  
 ELEVATION / DEPTH TOP OF SCREEN: 12.5 / ft  
 TYPE OF SCREEN: PVC  
 SLOT SIZE X LENGTH: 0.02 x 10 ft  
 I.D. OF SCREEN: 2 inch  
 TYPE OF FILTER PACK: 6-20 silica Sand  
5-50lb bags  
 ELEVATION / DEPTH BOTTOM OF SCREEN: 21.9 / ft  
 ELEVATION / DEPTH BOTTOM OF FILTER PACK: 22.5 / ft  
 TYPE OF BACKFILL BELOW WELL: Sand pack  
 ELEVATION / DEPTH OF BOREHOLE: 23.0 / ft

























Work continued from Page

Partly cloudy

8:00 - On site - (skip Vallancourt + Gary Bunge) - preparator

	DTW
MW-8	19.05
MW-7	18.11
MW-4	16.73
MW-2	20.51
MW-12	16.49
MW-13	18.10
MW-14A	17.46
MW-15A	16.23
MW-16	13.09

Call Roger Clark to confirm the wells we were to sample for this quarterly event.

9:20 - begin purging MW-16

10:00 - collect sample NRL-GW-MW16-00-18

Set up on MW-15A

Work continued to Page

SIGNATURE

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WITNESS

DATE

5/12/04

DATE

Work continued from Page

10:10 - Begin purging 15A

11:05 - collect sample from MW15A  
sample ID = NRL-GW-MW15A-00-18, sample parameters 8260 B

11:25 - Begin purging 14A

12:10 - collect sample from MW14A  
sample ID = NRL-GW-MW14A-00-18  
sample parameter 8260 B

14:15 - collect sample from MW12  
sample ID = NRL-GW-MW12-00-18  
sample parameters 8260

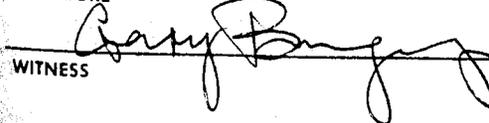
15:15 - collect sample from MW13  
sample ID = NRL-GW-13-00-18  
sample parameters 8260

Clean up -

16:00 - off site

Work continued to Page

SIGNATURE



WITNESS

DATE

5/12/04

DATE

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PROJECT NO: 7380		FACILITY: NRL		PROJECT MANAGER Roger Clark		PHONE NUMBER (412) 921-7090		LABORATORY NAME AND CONTACT: LAUCK TESTING LAB - ANH HO				
SAMPLERS (SIGNATURE) Gary Bragg				FIELD OPERATIONS LEADER Gary Bragg		PHONE NUMBER (561) 302-4137		ADDRESS 940 S. HARNEY ST				
				CARRIER/WAYBILL NUMBER FEDEX/845002568879				CITY, STATE SEATTLE, WA				
STANDARD TAT <input checked="" type="checkbox"/> RUSH TAT <input type="checkbox"/> <input type="checkbox"/> 24 hr. <input type="checkbox"/> 48 hr. <input type="checkbox"/> 72 hr. <input type="checkbox"/> 7 day <input type="checkbox"/> 14 day						CONTAINER TYPE PLASTIC (P) or GLASS (G)		HCL & PRESERVATIVE USED				
						PRESERVATIVE USED						
DATE YEAR	TIME	SAMPLE ID	LOCATION ID	TOP DEPTH (FT)	BOTTOM DEPTH (FT)	MATRIX (GW, SO, SW, SD, QC, ETC.)	COLLECTION METHOD GRAP (G) COMP (C)	No. OF CONTAINERS	TYPE OF ANALYSIS 8260B			COMMENTS
5/13	9:40	NRL-GW-MW02-00-18	MW02			GW		3	X			
	13:55	NRL-GW-MW04-00-18	MW04					3	X			
	12:35	NRL-GW-MW07-00-18	MW07					3	X			
	11:40	NRL-GW-MW08-00-18	MW08					3	X			
5/12	14:15	NRL-GW-MW12-00-18	MW12					3	X			
	15:15	NRL-GW-MW13-00-18	MW13					3	X			
	12:10	NRL-GW-MW14A-00-18	MW14A					3	X			
	11:05	NRL-GW-MW15A-00-18	MW15A					3	X			
	10:00	NRL-GW-MW16-00-18	MW16					3	X			
		NRL-GW-DU001-00-18						3	X			
		TRIP BLANK						2				

1. RELINQUISHED BY Gary Bragg	DATE 5/13/04	TIME	1. RECEIVED BY	DATE	TIME
2. RELINQUISHED BY	DATE	TIME	2. RECEIVED BY	DATE	TIME
3. RELINQUISHED BY	DATE	TIME	3. RECEIVED BY	DATE	TIME

COMMENTS

# Tetra Tech NUS Groundwater Purging and Sampling Log

Date 2/3/04

Project Site Name: \_\_\_\_\_  
Project No.: \_\_\_\_\_

Sample Location: MW - PRIVO1

Domestic Well Data

Flow-Thru Cell  
Make/Model: Astrobe U-22

Sample ID No.: NRL-GW-PRIVO1-01

Monitoring Well Data

Sampled By: Gary Braganza/Kevyn Smith

Other Well Type: \_\_\_\_\_

Serial Nos.: \_\_\_\_\_

C-O-C No.: \_\_\_\_\_

### PURGING DATA

Casing Size (In.)	Gal. per ft. of Water	Liters	Time Hr:Min	pH pH units	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/L	ORP mV	DTW ft BTOC	Flow Rate ml/min
0.5	<del>0.01</del>	<del>0.038</del>	1030	5.99	0.193	24.3	90.9	4.32	78	15.92	200
1	<del>0.041</del>	<del>0.155</del>	1035	5.82	0.210	24.6	31.5	3.00	55	15.92	200
2	<del>0.163</del>	<del>0.617</del>	1040	5.83	0.212	24.6	-9.5	2.82	41	"	200
4	<del>0.653</del>	<del>2.47</del>	1045	5.82	0.212	24.6	34.3	2.68	34	15.93	200
6	<del>1.469</del>	<del>5.56</del>	1050	5.84	0.215	24.6	49.4	2.56	30	15.93	200
8	<del>2.611</del>	<del>9.88</del>	1055	5.84	0.215	24.6	48.1	2.53	27	15.93	200
10	<del>4.08</del>	<del>15.44</del>	1100	5.85	0.218	24.6	17.8	2.51	22	15.93	200
[1 gal. = 3.785 L]											

PID Reading (ppm): \_\_\_\_\_

Well Casing Diameter: 2 inch

Total Well Depth: 21.70

Static Water Level: 15.94

Tube Intake Depth: 18.82

Start Purge (hr): 1025

End Purge (hr): 1100

Total Purge Time (min): 35

Total Vol. Purged: 7 L

### WATER QUALITY SAMPLE PARAMETERS

Date:	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	DTW	Flow Rate
Time:	Description	pH units	mS/cm	°C	NTU	mg/L	mV	ft BTOC	ml/min
<u>2/3/04</u>	<u>clear</u>	<u>5.85</u>	<u>0.218</u>	<u>24</u>					
<u>11:05</u>									

### ANALYSES INFORMATION

Analysis	Preservative	Container Requirements	Collected
TCL VOCs	HCl	3 40 ml glass vials	<input checked="" type="checkbox"/>
SVOCs/PAHs	None	2 1-liter amber glass	<input checked="" type="checkbox"/>
Pesticides	None	1 1-liter amber glass	<input checked="" type="checkbox"/>
Herbicides	None	1 1-liter amber glass	<input checked="" type="checkbox"/>
X-tra Organic	None	1 or 2 1-liter amber glass	<input checked="" type="checkbox"/>
TAL Metals	HNO <sub>3</sub>	1 1-liter HDPE	<input checked="" type="checkbox"/>
TRPH	H <sub>2</sub> SO <sub>4</sub>	1 1-liter amber glass	<input checked="" type="checkbox"/>

### ADDITIONAL INFORMATION

Comments: Bottom of well screen sampled in to

Method:  
 Peristaltic Pump  
 Centrifugal Pump  
 Bladder Pump  
 Tube Evacuation  
 Vacuum Jug Assembly  
 Bailor

Tubing Type:  
 Polyethylene  
 Teflon  
 Teflon-lined Polyethylene

### QA/QC SAMPLES

MS/MSD: \_\_\_\_\_ Duplicate ID No.: NRL-GW-PRIVO1-DUP

Signature(s): Kevyn Smith / Gary Braganza

# Tetra Tech NUS Groundwater Purging and Sampling Log

Date 2/4/04

Project Site Name: \_\_\_\_\_  
Project No.: \_\_\_\_\_

Sample Location: MW-2

Domestic Well Data

Flow-Thru Cell: \_\_\_\_\_  
Make/Model: Horiba U-22

Sample ID No.: NRL-GW-MW02-00-17

Monitoring Well Data

Sampled By: GB

Other Well Type: \_\_\_\_\_

Serial Nos.: \_\_\_\_\_

C-O-C No.: \_\_\_\_\_

### PURGING DATA

Casing Size (In.)	Gal. per ft. of Water	Liters	Time Hr:Min	pH	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/L	ORP mV	DTW ft BTOC	Flow Rate ml/min
0.5	0.01	0.038	10:25	5.93	0.155	24.9	25.6	8.13	78	20.39	200
1	0.041	0.155	10:30	5.92	0.160	25.0	7.9	6.68	82	20.39	200
2	0.163	0.617	10:35	5.92	0.161	25.0	3.7	6.46	88	20.39	200
4	0.653	2.47	10:40	5.92	0.162	25.1	6.1	6.40	90	"	"
6	1.469	5.56	10:45	5.92	0.162	25.1	5.2	6.32	94	"	"
8	2.611	9.88									
10	4.08	15.44									
		[1 gal. = 3.785 L]									
PID Reading (ppm): <u>N/A</u>											
Well Casing Diameter: <u>2"</u>											
Total Well Depth: <u>24.62</u>											
Static Water Level: <u>20.37</u>											
Tube Intake Depth: _____											
Start Purge (hr): <u>10:20</u>											
End Purge (hr): <u>10:45</u>											
Total Purge Time (min): <u>25</u>											
Total Vol. Purged: <u>5L</u>											

### WATER QUALITY SAMPLE PARAMETERS

Date:	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	DTW	Flow Rate
	Description	pH units	mS/cm	°C	NTU	mg/L	mV	ft BTOC	ml/min
<u>2/4/04</u>	<u>clear</u>	<u>5.92</u>	<u>0.162</u>	<u>25.1</u>	<u>5.2</u>	<u>6.32</u>	<u>94</u>	<u>20.39</u>	<u>200</u>

### ANALYSES INFORMATION

Analysis	Preservative	Container Requirements	Collected	
TCL VOCs	8260B	HCl	3 40 ml glass vials	✓
SVOCs/PAHs	8270C/8310	None	2 1-liter amber glass	
Pesticides	8081A	None	1 1-liter amber glass	
Herbicides	8151	None	1 1-liter amber glass	
X-tra Organic	8XXX	None	1 or 2 1-liter amber glass	
TAL Metals	6000/7000	HNO <sub>3</sub>	1 1-liter HDPE	
TRPH	FL PRO	H <sub>2</sub> SO <sub>4</sub>	1 1-liter amber glass	

### ADDITIONAL INFORMATION

Comments: \_\_\_\_\_

Method:  Peristaltic Pump  
 Centrifugal Pump  
 Bladder Pump  
 Tube Evacuation  
 Vacuum Jug Assembly  
 Baller

Tubing Type:  Polyethylene  
 Teflon  
 Teflon-lined Polyethylene

### QA/QC SAMPLES

MS/MSD: \_\_\_\_\_ Duplicate ID No.: NRL-RW-DUP-01-00-17

Signature(s): Gary Boyer

# Tetra Tech NUS Groundwater Purging and Sampling Log

Date 2/2/04

Page 1 of 1

Project Site Name: \_\_\_\_\_  
Project No.: \_\_\_\_\_

Sample Location: MW-4

Domestic Well Data

Flow-Thru Cell  
Make/Model: Horiba U-22

Sample ID No.: NRL-GW-MW04-a-17

Monitoring Well Data

Sampled By: GB/LWS

Other Well Type: \_\_\_\_\_

Serial Nos.: \_\_\_\_\_

C-O-C No.: \_\_\_\_\_

### PURGING DATA

Casing Size (In.)	Gals. per ft. of Water	Liters	Time Hr:Min	pH pH units	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/L	ORP mV	DTW ft BTOC	Flow Rate ml/min
0.5	<del>0.01</del>	<del>0.038</del>	1500	5.40	0.352	23.9	54.1	4.38	143	18.60	200/min
1	<del>0.041</del>	<del>0.155</del>	1505	4.49	0.350	24.0	50.0	1.93	126	"	"
(2)	<del>0.163</del>	<del>0.617</del>	1510	5.51	0.342	24.1	40.1	1.95	106	"	"
4	<del>0.653</del>	<del>2.47</del>	1515	5.52	0.336	24.1	43.3	1.47	91	"	"
6	<del>1.469</del>	<del>5.56</del>	1520	5.51	0.333	24.2	46.4	1.35	80	"	"
8	<del>2.611</del>	<del>9.88</del>	1525	5.53	0.333	24.1	17.0	1.29	69	"	"
10	<del>4.08</del>	<del>15.44</del>	1530	5.55	0.325	24.1	17.0	1.26	63	"	"
	[1 gal. = 3.785 L]		1535	5.55	0.325	24.0	19.5	1.22	56	"	"

PID Reading (ppm): N/A

Well Casing Diameter: 2 inch

Total Well Depth: 2693

Static Water Level: 18.60

Tube Intake Depth: 13.60

Start Purge (hr): 1449

End Purge (hr): 15:35

Total Purge Time (min): 45

Total Vol. Purged: 7L

### WATER QUALITY SAMPLE PARAMETERS

Date:	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	DTW	Flow Rate
Time:	Description	pH units	mS/cm	°C	NTU	mg/L	mV	ft BTOC	ml/min
<u>2/2/04</u>	<u>Clear</u>	<u>5.55</u>	<u>0.325</u>	<u>24.0</u>	<u>19.5</u>	<u>1.22</u>	<u>56</u>	<u>18.60</u>	<u>200</u>

### ANALYSES INFORMATION

Analysis	Preservative	Container Requirements	Collected
TCL VOCs	HCl	3 40 ml glass vials	<input checked="" type="checkbox"/>
SVOCs/PAHs	None	2 1-liter amber glass	<input type="checkbox"/>
Pesticides	None	1 1-liter amber glass	<input type="checkbox"/>
Herbicides	None	1 1-liter amber glass	<input type="checkbox"/>
X-tra Organic	None	1 or 2 1-liter amber glass	<input type="checkbox"/>
TAL Metals	HNO <sub>3</sub>	1 1-liter HDPE	<input type="checkbox"/>
TRPH	H <sub>2</sub> SO <sub>4</sub>	1 1-liter amber glass	<input type="checkbox"/>

### ADDITIONAL INFORMATION

Comments: \_\_\_\_\_

Method:

- Peristaltic Pump
- Centrifugal Pump
- Bladder Pump
- Tube Evacuation
- Vacuum Jug Assembly
- Bailor

Tubing Type:

- Polyethylene
- Teflon
- Teflon-lined Polyethylene

### QA/QC SAMPLES

MS/MSD: \_\_\_\_\_

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

Signature(s):

*Gary Breganz / Gary W Smith*

# Tetra Tech NUS Groundwater Purging and Sampling Log

Date 2/4/04

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Project Site Name: \_\_\_\_\_

Project No.: \_\_\_\_\_

Sample Location: MW-07

Domestic Well Data

Flow-Thru Cell  
Make/Model: Acme U-22

Sample ID No.: NRL-GW-MW07-02-17

Monitoring Well Data

Sampled By: GB

Other Well Type: \_\_\_\_\_

Serial Nos.: \_\_\_\_\_

C-O-C No.: \_\_\_\_\_

### PURGING DATA

Casing Size (in.)	Gal. per ft. of Water	Liters	Time Hr:Min	pH pH units	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/L	ORP mV	DTW ft BTOC	Flow Rate ml/min
0.5	0.01	0.038	11:10	5.64	0.348	23.9	0.8	3.16	96	18.01	200
1	0.041	0.155	11:15	5.68	0.341	23.9	1.4	3.06	101	"	"
2	0.163	0.617	11:20	5.68	0.344	23.9	0.3	3.12	104	"	"
4	0.653	2.47	11:25	5.69	0.346	23.9	-4.0	3.20	106	"	"
6	1.469	5.56	11:30	5.69	0.349	23.9	-10.0	3.32	109	"	"
8	2.611	9.88	11:35	5.70	0.350	23.9	-10	3.68	114	"	"
10	4.09	15.44									
		[1 gal. = 3.785 L]									
PID Reading (ppm): <u>N/A</u>											
Well Casing Diameter: <u>2"</u>											
Total Well Depth: <u>22.50</u>											
Static Water Level: <u>18.01</u>											
Tube Intake Depth: <u>20.25</u>											
Start Purge (hr): <u>11:05</u>											
End Purge (hr): <u>11:35</u>											
Total Purge Time (min): <u>30</u>											
Total Vol. Purged: <u>6L</u>											

### WATER QUALITY SAMPLE PARAMETERS

Date:	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	DTW	Flow Rate
	Description	pH units	mS/cm	°C	NTU	mg/L	mV	ft BTOC	ml/min
<u>2/4/04</u>	<u>clear</u>	<u>5.70</u>	<u>0.350</u>	<u>23.9</u>	<u>-10</u>	<u>3.68</u>	<u>114</u>	<u>18.0</u>	<u>200</u>
Time: <u>11:40</u>									

### ANALYSES INFORMATION

Analysis	Preservative	Container Requirements	Collected
TCL VOCs	8260B	HCl 3 40 ml glass vials	<input checked="" type="checkbox"/>
SVOCs/PAHs	8270C/8310	None 2 1-liter amber glass	<input type="checkbox"/>
Pesticides	8081A	None 1 1-liter amber glass	<input type="checkbox"/>
Herbicides	8151	None 1 1-liter amber glass	<input type="checkbox"/>
X-tra Organic	8XXX	None 1 or 2 1-liter amber glass	<input type="checkbox"/>
TAL Metals	6000/7000	HNO <sub>3</sub> 1 1-liter HDPE	<input type="checkbox"/>
TRPH	FL PRO	H <sub>2</sub> SO <sub>4</sub> 1 1-liter amber glass	<input type="checkbox"/>

### ADDITIONAL INFORMATION

Comments: \_\_\_\_\_

Method:  
 Peristaltic Pump  
 Centrifugal Pump  
 Bladder Pump  
 Tube Evacuation  
 Vacuum Jug Assembly  
 Baller

Tubing Type:  
 Polyethylene  
 Teflon  
 Teflon-lined Polyethylene

### QA/QC SAMPLES

MS/MSD: \_\_\_\_\_ Duplicate ID No.: \_\_\_\_\_

Signature(s): Randy Boyer

**Tetra Tech NUS  
Groundwater Purging and Sampling Log**

Date 2/2/04

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Project Site Name: \_\_\_\_\_  
Project No.: \_\_\_\_\_

Sample Location: MW-8

Domestic Well Data

Flow-Thru Cell  
Make/Model: Hanna U-22

Sample ID No.: NRL-GW-MW08-00-17

Monitoring Well Data

Sampled By: GB/LWS

Other Well Type: \_\_\_\_\_

C-O-C No.: \_\_\_\_\_

**PURGING DATA**

Casing Size (in.)	Gals. per ft. of Water	Liters	Time Hr:Min	pH pH units	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/L	ORP mV	DTW ft BTOC	Flow Rate ml/min
0.5	0.01	0.038	14:00	5.19	0.327	25.2	72.4	8.17	139	19.00	200/l
1	0.041	0.155	14:05	5.20	0.308	25.1	27.8	6.77	144	19.00	200/l
2	0.163	0.617	14:10	5.23	0.297	25.1	5.0	7.05	144	19.00	u
4	0.653	2.47	14:15	5.26	0.291	25.0	1.9	6.53	143	u	u
6	1.469	5.56	14:20	5.29	0.286	25.1	1.2	6.85	141	u	u
8	2.611	9.88	14:25	5.31	0.278	25.1	-2.3	6.66	141	u	u
10	4.08	15.44	14:30	5.34	0.272	25.1	-3.7	6.52	140	u	u
	[1 gal. = 3.785 L]		14:35	5.36	0.263	25.1	-6.5	7.24	138	u	u
			14:40	5.39	0.268	25.1	-9.0	6.26	137	u	u
PID Reading (ppm): <u>N/A</u>											
Well Casing Diameter: <u>2 inch</u>											
Total Well Depth: <u>22.53</u>											
Static Water Level: <u>18.94</u> 1355											
Tube Intake Depth: <u>10.94</u>											
Well Volume: <u>2.2 L.</u>											
Tubing/Cell Volume: <u>657 ml.</u>											
Start Purge (hr): <u>14:00</u>											
End Purge (hr): <u>14:40</u>											
Total Purge Time (min): <u>40</u>											
Total Vol. Purged: <u>8 L.</u>											

**WATER QUALITY SAMPLE PARAMETERS**

Date:	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	DTW	Flow Rate
Description	pH units	mS/cm	°C	NTU	mg/L	mV	ft BTOC	ml/min	
<u>2/2/04</u>	<u>clear</u>	<u>5.39</u>	<u>0.268</u>	<u>25.1</u>	<u>-9.0</u>	<u>6.26</u>	<u>137</u>	<u>19.00</u>	<u>200</u>
Time: <u>14:40</u>									

**ANALYSES INFORMATION**

Analysis	Preservative	Container Requirements	Collected
TCL VOCs	HCl	3 40 ml glass vials	✓
SVOCs/PAHs	None	2 1-liter amber glass	
Pesticides	None	2 1-liter amber glass	
Herbicides	None	2 1-liter amber glass	
TAL Metals	HNO <sub>3</sub>	1 1-liter HDPE	

**ADDITIONAL INFORMATION**

Comments: \_\_\_\_\_

Method:  Peristaltic Pump  
 Centrifugal Pump  
 Bladder Pump  
 Tube Evacuation  
 Vacuum Jug Assembly  
 Bailer

Tubing Type:  Polyethylene  
 Teflon  
 Teflon-lined Polyethylene

**QA/QC SAMPLES**

MS/MSD: \_\_\_\_\_ Duplicate ID No.: \_\_\_\_\_

Signature(s): Gary Bragg / Gary W Smith

# Tetra Tech NUS Groundwater Purging and Sampling Log

Date 2/3/04

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Project Site Name: \_\_\_\_\_  
Project No.: \_\_\_\_\_

Sample Location: MW-12

Domestic Well Data

Flow-Thru Cell  
Make/Model: Horiba U-22

Sample ID No.: NRL-GW-MW12-00-17

Monitoring Well Data

Sampled By: RPB

Other Well Type: \_\_\_\_\_

Serial Nos.: \_\_\_\_\_

C-O-C No.: \_\_\_\_\_

### PURGING DATA

Casing Size (In.)	Gals. per ft. of Water	Liters	Time Hr:Min	pH pH units	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/L	ORP mV	DTW ft BTOC	Flow Rate ml/min
0.5	0.01	0.038	0820	5.40	0.347	23.3	146	5.87	-21	2012	16.34
1	0.041	0.155	0850	5.82	0.287	24.3	38.2	1.53	-26	"	16.34
2	0.163	0.617	0855	5.85	0.285	24.3	13.6	1.33	-15	"	16.34
4	0.653	2.47	0900	5.87	0.282	24.4	18.8	1.27	-9	"	"
6	1.469	5.56	0905	5.89	0.280	24.5	25.1	1.23	-1	"	"
8	2.611	9.88	0910	5.31	0.256	24.4	38.5	1.30	6	"	"
10	4.08	15.44	0915	5.92	0.275	24.5	48.7	1.54	15	"	"
[1 gal. = 3.785 L]											

PID Reading (ppm): N/A

Well Casing Diameter: 2"

Total Well Depth: 24.00

Static Water Level: 16.34

Tube Intake Depth: \_\_\_\_\_

Start Purge (hr): 8:15

End Purge (hr): 9:15

Total Purge Time (min): 60

Total Vol. Purged: 12 L

### WATER QUALITY SAMPLE PARAMETERS

Date:	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	DTW	Flow Rate
	Description	pH units	mS/cm	°C	NTU	mg/L	mV	ft BTOC	ml/min
Date: <u>2/3/04</u>									
Time: <u>19:20</u>	<u>Clear</u>	<u>5.92</u>	<u>0.275</u>	<u>24.5</u>	<u>48.7</u>	<u>1.54</u>	<u>15</u>	<u>16.34</u>	<u>200</u>

### ANALYSES INFORMATION

Analysis	Preservative	Container Requirements	Collected	
TCL VOCs	8260B	HCl	3 40 ml glass vials	<input checked="" type="checkbox"/>
SVOCs/PAHs	8270C/8310	None	2 1-liter amber glass	<input checked="" type="checkbox"/>
Pesticides	8081A	None	1 1-liter amber glass	<input type="checkbox"/>
Herbicides	8151	None	1 1-liter amber glass	<input type="checkbox"/>
X-tra Organic	8XXX	None	1 or 2 1-liter amber glass	<input type="checkbox"/>
TAL Metals	6000/7000	HNO <sub>3</sub>	1 1-liter HDPE	<input type="checkbox"/>
TRPH	FL PRO	H <sub>2</sub> SO <sub>4</sub>	1 1-liter amber glass	<input type="checkbox"/>

### ADDITIONAL INFORMATION

Comments: \_\_\_\_\_

Method:  Peristaltic Pump  
 Centrifugal Pump  
 Bladder Pump  
 Tube Evacuation  
 Vacuum Jug Assembly  
 Baller

Tubing Type:  Polyethylene  
 Teflon  
 Teflon-lined Polyethylene

### QA/QC SAMPLES

MS/MSD: \_\_\_\_\_ Duplicate ID No.: \_\_\_\_\_

Signature(s): Long W Smith, Perry Bragg

# Tetra Tech NUS Groundwater Purging and Sampling Log

Date: 2/2/04

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Project Site Name: \_\_\_\_\_  
 Project No.: \_\_\_\_\_  
 Sample Location: MW-13  
 Domestic Well Data      Flow-Thru Cell  
 Make/Model: Hoshizaki U-22  
 Monitoring Well Data      Sample ID No.: NRL-RW-MW-13-0017  
 Serial Nos.: \_\_\_\_\_      Sampled By: GB  
 Other Well Type: \_\_\_\_\_      C-O-C No.: \_\_\_\_\_

### PURGING DATA

Casing Size (In.)	Gal. per ft. of Water	Liters per ft. of Water	Time Hr:Min	pH units	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/L	ORP mV	DTW ft BTOC	Flow Rate ml/min
0.5	0.01	0.038	16:00	5.68	0.342	25.6	12.9	2.73	88	18.02	200
1	0.041	0.155	16:05	5.65	0.335	25.6	11.3	2.61	86	18.02	200
2	0.183	0.617	16:10	5.65	0.332	25.6	17.1	2.60	85	18.02	200
4	0.653	2.47	16:15	5.64	0.330	25.6	79.0	2.74	88		200
6	1.469	5.56	16:20	5.63	0.328	25.6	25.6	2.73	90		200
8	2.611	9.88	16:25								
10	4.08	15.44									
[1 gal. = 3.785 L]											
PID Reading (ppm): <u>N/A</u>											
Well Casing Diameter: <u>2"</u>											
Total Well Depth: <u>25.20</u>											
Static Water Level: <u>18.02</u>											
Tube Intake Depth: <u>13.62</u>											
Start Purge (hr): <u>15:52</u>											
End Purge (hr): <u>16:20</u>											
Total Purge Time (min): <u>30</u>											
Total Vol. Purged: <u>66</u>											

### WATER QUALITY SAMPLE PARAMETERS

Date:	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	DTW	Flow Rate
Time:	Description	pH units	mS/cm	°C	NTU	mg/L	mV	ft BTOC	ml/min
<u>2/2/04</u>	<u>clear</u>	<u>5.63</u>	<u>0.328</u>	<u>25.6</u>	<u>25.6</u>	<u>2.73</u>	<u>90</u>	<u>18.02</u>	<u>200</u>

### ANALYSES INFORMATION

Analysis	Preservative	Container Requirements	Collected
TCL VOCs	8260B	HCl	3 40 ml glass vials
SVOCs/PAHs	8270C/8310	None	2 1-liter amber glass
Pesticides	8081A	None	1 1-liter amber glass
Herbicides	8151	None	1 1-liter amber glass
X-tra Organic	8XXX	None	1 or 2 1-liter amber glass
TAL Metals	6000/7000	HNO <sub>3</sub>	1 1-liter HDPE
TRPH	FL PRO	H <sub>2</sub> SO <sub>4</sub>	1 1-liter amber glass

### ADDITIONAL INFORMATION

Comments: \_\_\_\_\_

Method:  
 Peristaltic Pump  
 Centrifugal Pump  
 Bladder Pump  
 Tube Evacuation  
 Vacuum Jug Assembly  
 Baller

Tubing Type:  
 Polyethylene  
 Teflon  
 Teflon-lined Polyethylene

### QA/QC SAMPLES

MS/MSD: \_\_\_\_\_ Duplicate ID No.: \_\_\_\_\_

Signature(s): Gary Braganza / Gary W Smith

**Tetra Tech NUS  
Groundwater Purging and Sampling Log**

Date 2/3/04

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Project Site Name: \_\_\_\_\_

Project No.: \_\_\_\_\_

Sample Location: MW-14A

Domestic Well Data

Flow-Thru Cell  
Make/Model: HANNA U-22

Sample ID No.: RRL-GW-MW-14-00-17

Monitoring Well Data

Serial Nos.: \_\_\_\_\_

Sampled By: GPS LS

Other Well Type: \_\_\_\_\_

C-O-C No.: \_\_\_\_\_

**PURGING DATA**

Casing Size (In.)	Gal. per ft. of Water	Liters	Time Hr:Min	pH pH units	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/L	ORP mV	DTW ft BTOC	Flow Rate ml/min
0.5	<del>0.01</del>	<del>0.038</del>	<u>0935</u>	<u>6.63</u>	<u>0.783</u>	<u>24.3</u>	<u>16.2</u>	<u>7.39</u>	<u>61</u>	<u>18.50</u>	<u>200</u>
1	<del>0.041</del>	<del>0.155</del>	<u>0940</u>	<u>6.63</u>	<u>0.791</u>	<u>24.1</u>	<u>-5.6</u>	<u>5.46</u>	<u>60</u>	<u>18.98</u>	<u>100</u>
2	<del>0.163</del>	<del>0.617</del>	<u>0945</u>	<u>6.69</u>	<u>0.791</u>	<u>24.0</u>	<u>-6.3</u>	<u>5.49</u>	<u>57</u>	<u>19.45</u>	<u>100</u>
4	<del>0.653</del>	<del>2.47</del>	<u>0950</u>	<u>6.75</u>	<u>0.784</u>	<u>24.2</u>	<u>-5.3</u>	<u>5.18</u>	<u>56</u>	<u>19.72</u>	<u>100</u>
6	<del>1.469</del>	<del>5.56</del>									
8	<del>2.611</del>	<del>9.88</del>									
10	<del>4.08</del>	<del>15.44</del>									
	[1 gal. = 3.785 L]										

PID Reading (ppm): N/A

Well Casing Diameter: 2"

Total Well Depth: 22.22

Static Water Level: 17.38

Tube Intake Depth: 19.80

Start Purge (hr): 0935

End Purge (hr): 0950

Total Purge Time (min): 25

Total Vol. Purged: 2.5L

**WATER QUALITY SAMPLE PARAMETERS**

Date:	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	DTW	Flow Rate
	Description	pH units	mS/cm	°C	NTU	mg/L	mV	ft BTOC	ml/min
Date: <u>2/3/04</u>									
Time: <u>9:55</u>	<u>clear</u>	<u>6.75</u>	<u>0.784</u>	<u>24.2</u>	<u>-5.3</u>	<u>5.18</u>	<u>56</u>	<u>19.72</u>	<u>100</u>

**ANALYSES INFORMATION**

Analysis	Preservative	Container Requirements	Collected
TCL VOCs	8260B	HCl	3 40 ml glass vials
SVOCs/PAHs	8270C/8310	None	2 1-liter amber glass
Pesticides	8081A	None	1 1-liter amber glass
Herbicides	8151	None	1 1-liter amber glass
X-tra Organic	8XXX	None	1 or 2 1-liter amber glass
TAL Metals	6000/7000	HNO <sub>3</sub>	1 1-liter HDPE
TRPH	FL PRO	H <sub>2</sub> SO <sub>4</sub>	1 1-liter amber glass

**ADDITIONAL INFORMATION**

Comments: \_\_\_\_\_

Method:  
 Peristaltic Pump  
 Centrifugal Pump  
 Bladder Pump  
 Tube Evacuation  
 Vacuum Jug Assembly  
 Baller

Tubing Type:  
 Polyethylene  
 Teflon  
 Teflon-lined Polyethylene

**QA/QC SAMPLES**

MS/MSD: \_\_\_\_\_

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

Signature(s): Gary Braganza / [unclear]

**Tetra Tech NUS  
Groundwater Purging and Sampling Log**

Date 2/3/04

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Project Site Name: \_\_\_\_\_

Project No.: \_\_\_\_\_

Sample Location: MW-15

Domestic Well Data

Flow-Thru Cell  
Make/Model: Acela 4-22

Sample ID No.: NRL-GW-MW15-00-17

Monitoring Well Data

Sampled By: GB

Other Well Type: \_\_\_\_\_

Serial Nos.: \_\_\_\_\_

C-O-C No.: \_\_\_\_\_

**PURGING DATA**

Casing Size (In.)	Gals. per ft. of Water	Liters	Time Hr:Min	pH pH units	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/L	ORP mV	DTW ft BTOC	Flow Rate ml/min
0.5	<del>0.01</del>	<del>0.038</del>	11:30	5.91	0.229	24.4	323	3.94	89	16.18	150
1	<del>0.041</del>	<del>0.155</del>	11:35	5.90	0.222	24.5	216	3.80	85	16.18	150
2	<del>0.163</del>	<del>0.617</del>	11:40	5.91	0.221	24.4	101	3.87	85	16.18	150
4	<del>0.653</del>	<del>2.47</del>	11:45	5.92	0.218	24.5	50.6	3.86	82	16.18	150
6	<del>1.469</del>	<del>5.56</del>	11:50	5.93	0.216	24.7	18.7	3.84	78	16.18	150
8	<del>2.611</del>	<del>9.88</del>	11:55	5.93	0.215	24.6	-2.6	3.82	74	16.18	150
10	<del>4.08</del>	<del>15.44</del>									

[1 gal. = 3.785 L]

PID Reading (ppm): N/A

Well Casing Diameter: 2"

Total Well Depth: 22.60

Static Water Level: 16.14

Tube Intake Depth: 19.37

Start Purge (hr): 10:55

End Purge (hr): 11:55

Total Purge Time (min): 60

Total Vol. Purged: 9L

**WATER QUALITY SAMPLE PARAMETERS**

Date:	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	DTW	Flow Rate
Description	pH units	mS/cm	°C	NTU	mg/L	mV	ft BTOC	ml/min	
<u>2/3/04</u>	<u>char</u>	<u>5.93</u>	<u>0.215</u>	<u>24.6</u>	<u>-2.6</u>	<u>3.82</u>	<u>74</u>	<u>16.18</u>	<u>150</u>

**ANALYSES INFORMATION**

Analysis	Preservative	Container Requirements	Collected
TCL VOCs 8260B	HCl	3 40 ml glass vials	<input checked="" type="checkbox"/>
SVOCs/PAHs 8270C/8310	None	2 1-liter amber glass	<input type="checkbox"/>
Pesticides 8081A	None	1 1-liter amber glass	<input type="checkbox"/>
Herbicides 8151	None	1 1-liter amber glass	<input type="checkbox"/>
X-tra Organic 8X0X	None	1 or 2 1-liter amber glass	<input type="checkbox"/>
TAL Metals 6000/7000	HNO <sub>3</sub>	1 1-liter HDPE	<input type="checkbox"/>
TRPH FL PRO	H <sub>2</sub> SO <sub>4</sub>	1 1-liter amber glass	<input type="checkbox"/>

**ADDITIONAL INFORMATION**

Comments: \_\_\_\_\_

Method:

- Peristaltic Pump
- Centrifugal Pump
- Bladder Pump
- Tube Evacuation
- Vacuum Jug Assembly
- Bailor

Tubing Type:

- Polyethylene
- Teflon
- Teflon-lined Polyethylene

**QA/QC SAMPLES**

MS/MSD: \_\_\_\_\_

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

Signature(s):

*Bary Braganza / Gary W Smith*

**Tetra Tech NUS  
Groundwater Purging and Sampling Log**

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Project Site Name: \_\_\_\_\_  
Project No.: \_\_\_\_\_

Sample Location: MW-16

Domestic Well Data

Flow-Thru Cell  
Make/Model: Horiba U-22

Sample ID No.: NRL-GW-MW16-00-17

Monitoring Well Data

Serial Nos.: \_\_\_\_\_

Sampled By: GB

Other Well Type: \_\_\_\_\_

C-O-C No.: \_\_\_\_\_

**PURGING DATA**

Casing Size (in.)	Gals per ft. of Water	Liters	Time Hr:Min	pH pH units	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/L	ORP mV	DTW ft BTOC	Flow Rate ml/min
0.5	0.01	0.038	9:20	5.61	0.326	21.6	42.1	6.16	72	12.95	200
1	0.041	0.155	9:25	5.46	0.321	22.9	92	1.92	-1	12.95	200
2	0.163	0.617	9:30	5.57	0.322	22.9	77.2	1.28	-17	12.95	200
4	0.653	2.47	9:35	5.54	0.322	22.9	56.2	1.08	-21	"	"
6	1.469	5.56	9:40	5.59	0.323	22.9	16.7	0.97	-26	"	"
8	2.611	9.88	9:45	5.60	0.325	22.9	9.8	0.90	-27	"	"
10	4.08	15.44	9:50	5.62	0.328	22.9	3.0	0.81	-29	"	"
	[1 gal. = 3.785 L]		9:55	5.63	0.326	22.9	1.0	0.75	-30	"	"
			10:00	5.64	0.325	23.0	-10	0.70	-32	"	"
PID Reading (ppm): <u>N/A</u>											
Well Casing Diameter: <u>24</u>											
Total Well Depth: <u>23.70</u>											
Static Water Level: <u>12.95</u>											
Tube Intake Depth: <u>18.32</u>											
Start Purge (hr): <u>9:15</u>											
End Purge (hr): <u>10:00</u>											
Total Purge Time (min): <u>45</u>											
Total Vol. Purged: <u>9L</u>											

**WATER QUALITY SAMPLE PARAMETERS**

Date:	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	DTW	Flow Rate
Time:	Description	pH units	mS/cm	°C	NTU	mg/L	mV	ft BTOC	ml/min
<u>2/4/04</u>	<u>clear</u>	<u>5.64</u>	<u>0.325</u>	<u>23.0</u>	<u>-10</u>	<u>0.70</u>	<u>-32</u>	<u>12.95</u>	<u>200</u>

**ANALYSES INFORMATION**

Analysis	Preservative	Container Requirements	Collected
TCL VOCs	HCl	3 40 ml glass vials	<input checked="" type="checkbox"/>
SVOCs/PAHs	None	2 1-liter amber glass	<input type="checkbox"/>
Pesticides	None	1 1-liter amber glass	<input type="checkbox"/>
Herbicides	None	1 1-liter amber glass	<input type="checkbox"/>
X-tra Organic	None	1 or 2 1-liter amber glass	<input type="checkbox"/>
TAL Metals	HNO <sub>3</sub>	1 1-liter HDPE	<input type="checkbox"/>
TRPH	H <sub>2</sub> SO <sub>4</sub>	1 1-liter amber glass	<input type="checkbox"/>

**ADDITIONAL INFORMATION**

Comments: \_\_\_\_\_

Method:  
 Peristaltic Pump  
 Centrifugal Pump  
 Bladder Pump  
 Tube Evacuation  
 Vacuum Jug Assembly  
 Bailor

Tubing Type:  
 Polyethylene  
 Teflon  
 Teflon-lined Polyethylene

**QA/QC SAMPLES**

MS/MSD:

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

Signature(s): Gary Bragge

**NON-HAZARDOUS WASTE MANIFEST**

1. Generator's US EPA ID No.

Manifest Document No.

2. Page 1 of 1

Generator's Name and Mailing Address

Naval Research Laboratory  
3909 South Summerlin Street  
Orlando, FL 32896

4. Generator's Phone (561) 302-4137

5. Transporter 1 Company Name

Freehold Cartage, Inc.

6. US EPA ID Number

N-1-D-0-5-4-1-7-6-9-8-4

A. Transporter's Phone

800/458-5229

7. Transporter 2 Company Name

8. US EPA ID Number

B. Transporter's Phone

9. Designated Facility Name and Site Address

C-MAC Environmental Group, Inc.  
402 Webster Chapel Road  
Glencoe, AL 35905-0410

10. US EPA ID Number

A-1-D-9-8-1-0-2-0-8-9-4

C. Facility's Phone

(256) 492-8540

11. Waste Shipping Name and Description

12. Containers

No.

Type

13. Total Quantity

14. Unit Wt/Vol

a. Non Regulated Material (Industrial Soils)  
RCRA & D.O.T. Non Hazardous (None)

PF# 71780

013 DM

007.15

G

b. Non Regulated Material (Industrial Water)  
RCRA & D.O.T. (Non Hazardous) None

PF# 71871

004 DM

002.20

G

Additional Descriptions for Materials Listed Above

E. Handling Codes for Wastes Listed Above

15. Special Handling Instructions and Additional Information

Emergency Response (Mail Manifest to:  
Florida Environmental Compliance Corporation  
2418 Silver Star Road  
Orlando, FL 32804-3312 FECC Cust#1576 FECC PR# 040105  
Technical Contact: Gary Borganza Phone 561/302-4137

16. GENERATOR'S CERTIFICATION: I certify the materials described above on this manifest are not subject to federal regulations for reporting proper disposal of Hazardous Waste.

Printed/Typed Name

BARBARA NUUKIKE

Signature

Barbara Nuukike

Month Day Year  
02 11 04

17. Transporter 1 Acknowledgement of Receipt of Materials

Printed/Typed Name

William R. Ross

Signature

William R. Ross

Month Day Year  
02 11 04

18. Transporter 2 Acknowledgement of Receipt of Materials

Printed/Typed Name

Signature

Month Day Year

19. Discrepancy Indication Space

Facility Owner or Operator: Certification of receipt of waste materials covered by this manifest except as noted in Item 19.

Printed/Typed Name

Signature

Month Day Year

GENERATOR'S COPY

GENERATOR

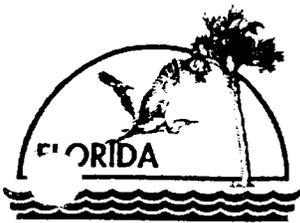
TRANSPORTER

FACILITY

## **APPENDIX C**

### **CORRESPONDENCE**

- **Letter Dated October 31, 2003 from David Grabka, P.G. (FDEP) to Barbara Nwokike (Southdiv Navy)**
- **Letter Dated January 15, 2004 (including Consent to Enter Property Agreement) from Barbara Nwokike (Southdiv Navy) to Mr. and Mrs. Swartwood**
- **Letter Dated April 1, 2004 from Barbara Nwokike (Southdiv Navy) to David Grabka, P.G. (FDEP)**



# Department of Environmental Protection

GOV. BUSH  
Governor

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

David B. Struhs  
Secretary

October 31, 2003

404 10 2003

Mrs. Barbara Nwokike  
Code ES33  
Southern Division  
Naval Facilities Engineering Command  
P.O. Box 190010  
North Charleston, South Carolina 29419-0068

RE: Naval Research Laboratory, Underwater Sound Reference  
Detachment, Orlando, Florida.

Dear Mrs. Nwokike:

This letter is in response to concerns that were conveyed to the Navy and the Department by the Swartwood family in a meeting at the Swartwood's home on October 14, 2003. The Swartwood family's concern is that perchloroethylene (PCE) groundwater contamination that originated on the former Naval Research Laboratory across the street may exist beneath their property and that such contamination may pose human health risks or may impact upon the value of their property. Based on the Swartwood property being hydraulically downgradient of the source of the PCE contamination, and based upon past detections of PCE in wells at the front of the Swartwood property and in a temporary well at the edge of Lake Gatlin behind the Swartwood property, the Department believes that the Swartwood's concerns that the PCE plume extended onto their property are reasonable. While the Navy has conducted two remedial actions to address the source of the PCE contamination on the former Naval Research Laboratory and has greatly reduced PCE concentrations in wells both on their property and across the street, the Department can make no assurances as to the condition of groundwater under the Swartwood property with respect to PCE without actual groundwater data being collected from the property. In order to be proactive in addressing the Swartwood family's concerns, I suggest that groundwater samples be collected from the Swartwood property in areas most likely to have been impacted by the PCE plume. By voluntarily assessing the property at this time, the Swartwood family's concerns may be addressed prior to the issuance of the Proposed Plan requesting community input on remedial actions taken at the site.

Mrs. Barbara Nwokike  
Naval Research Laboratory  
October 31, 2003  
Page 2

If I can be of any further assistance with this matter,  
please contact me at (850)245-8997.

Sincerely,

  
David P. Grabka, P.G.  
Remedial Project Manager

cc: Roger Clark, Tetra Tech NUS, Pittsburgh  
Mr. and Mrs. Swartwood, 754 Gatlin Ave., Orlando, FL 32806

JJC

gge

ESN

ESN



DEPARTMENT OF THE NAVY

SOUTHERN DIVISION
NAVAL FACILITIES ENGINEERING COMMAND
P.O. BOX 190010
2155 EAGLE DRIVE
NORTH CHARLESTON, S.C. 29419-9010

Code ES33
January 15, 2004

Mr. and Mrs. Greg Swartwood
754 Gatlin Avenue
Orlando, FL 32806

Dear Mr. and Mrs. Swartwood:

Attached is Consent to Enter Property. Fieldwork for the replacement of wells along the right-of-way of Gatlin Avenue and the two new groundwater monitoring wells that will be installed on your property is scheduled for the week of January 19, 2004. Drilling operations will begin on January 20, 2004. Preliminary field activities such as utility clearance will occur prior to this time. We wish to take the time to reiterate our agreed upon activity and to make you aware of what will be required.

- Drilling operations can be dangerous and our first concern is for your safety. Please be aware that at no time will any unauthorized person be allowed within the operating area of the drilling operations.
• We will need unobstructed vehicular access down your driveway to the proposed well location in the back of your house during the week of January 19th.
• As we discussed on December 2, 2003, we anticipate some minor damage to the asphalt driveway and grass leading to the two drilling locations but will take all necessary precautions to minimize this damage.
• We will also remove the three trees leading to the drilling location in front of the house as agreed. Please mark the trees to be removed so that there is no confusion.

Anticipated Schedule of Events:

January 15, 2004 ..... Utility Clearance Request.
January 19, 2004..... Site mobilization, setup, and access restrictions.
January 20-22, 2004..... Residential and replacement well installation.
January 24, 2004..... Well development
February 3, 2004..... Groundwater sampling
February 24, 2004..... Obtain groundwater sampling results in approximately two weeks, determine if below FDEP GCTLs, if below criteria make preparations to have residential wells abandoned and site restored.

Mrs. Hope Oaks, Environmental Engineer from our office will be on site representing the Navy if you have any concerns while the fieldwork is on-going. Also you can call me at (843) 820-5566 if you have additional questions or concerns.

Very Respectfully,

Barbara Nwokike

BARBARA NWOKIKE
Remedial Project Manager

Copy:
FDEP (David Grabka)
TTNUS (Roger Clark)

To Jeff Meyer: 893-820-5563

### CONSENT TO ENTER PROPERTY

1. The undersigned property owners (hereafter "Owners"), hereby give permission to the Department of the Navy, its employees, agents and/or contractors (hereafter "Navy") to enter upon Owners' property (hereafter "Property") for the specific purpose of the Navy undertaking the following activities:
  - (a) The installation of 2 groundwater-monitoring wells (hereafter "wells"). The wells are to be placed to monitor groundwater within the uppermost water-bearing zone to be encountered at approximately 20 feet or less below ground surface. They will be constructed of PVC casing and screen.
  - (b) The installation of flush-mounted surface concrete pads (approximately 2 feet by 2 feet) around each well.
  - (c) Periodic well monitoring after installation of the wells.
2. The wells are to be installed and monitored for the purpose of determining the presence of any PCE in groundwater.
3. This consent to enter for well installation shall be effective for the period 1 January 2004 to 1 January 2005 and the Navy may enter the Property to conduct such installation activities during this period during normal business hours or as otherwise consented to by Owners. Periodic well monitoring will be allowed for the period 1 January 2004 to 1 January 2005 upon prior twenty-four (24) hour notice to Owner.
4. The Navy shall be responsible for obtaining all the necessary permits for well installations as may be required under federal, state, or local law.
5. The Navy shall coordinate closely with Owners to ensure that the sites selected for the wells will have a minimum impact on residential use of the property.
5. This consent to enter is not intended, nor should it be construed, acknowledgment by any of the undersigned parties that environmental contamination of any kind in excess of federal or state regulatory standards currently exists on or beneath the Property ~~and shall be indemnified by the Navy~~ *HOA 1/15/04*
7. Owners shall not be liable for any injury to any employee, agent, or contractor of the Navy for on-site personal injury or property damage or loss not directly occasioned by the negligence or wrongful intentional acts of Owner or his/her agents. *1/17/04*
8. The Navy shall be responsible for compensating Owners for any on-site injury(ies) to third persons or for physical damage(s) sustained to the Property ~~in the manner and to the extent authorized under the provisions of the Federal Tort Claims Act (28 U.S.C. 2671 et seq.)~~ *pursuant to applicable law.*
9. After completion of all necessary groundwater sampling activities the monitoring

wells to be installed will be properly abandoned in accordance with applicable federal and/or state laws or regulation, and the concrete pads will be removed. It is agreed by Owners that the installation of such wells and subsequent taking of groundwater sampling is not intended, nor shall it otherwise be construed to constitute, a legal taking of said Property by condemnation or otherwise. Owners further acknowledge that it will seek no monetary compensation from the Navy in return for allowing such activities to be conducted on the Property.

Solely [Signature] 1/7/04

10. The results of all groundwater sampling collected from the Property will be made available to the Owners upon request and at not cost, after appropriate laboratory analysis and validation have been completed. Additionally, upon request, and upon providing a suitable container, Owner may obtain a portion ("split sample") of any groundwater samples taken for the purpose of independent laboratory analysis at Owner's own expense.

[Signature]  
OWNER AUTHORIZED REPRESENTATIVE

1/7/04  
DATE

Gregory D. Simons

or other property [Signature]  
1/15/04

11. Any damage to landscaping shall be repaired / replaced by the Navy with like material but not limited to, replacing damaged sod with St. Augustine "Seville" Sod as is grown in the yard currently.

[Signature] 1/7/04



DEPARTMENT OF THE NAVY

SOUTHERN DIVISION  
NAVAL FACILITIES ENGINEERING COMMAND  
P.O. BOX 190010  
2155 EAGLE DRIVE  
NORTH CHARLESTON, S.C. 29419-0010

5090  
ES333BN  
01 April 2004

Mr. David Grabka  
Florida Department of Environmental Protection  
Twin Towers Office Building  
2600 Blair Stone Road  
Tallahassee, FL 32399-2400

Subj: GROUNDWATER MONITORING CONCERNING PROPERTY OWNERS  
ADJACENT TO NRL, ORLANDO

Dear Mr. Grabka:

This letter is in response to the installation of one groundwater monitoring well in the front yard of Mr. & Mrs. Gregory Stewartwood at 754 Gatlin Avenue. New wells along the right-of-way of Gatlin Avenue were also installed. All of the fieldwork for installing these wells occurred in mid January of 2004 and were sampled in February 2004. Analytical results were NONDETECT for both the primary sample and the duplicate in all the wells that were installed in the front of the property at 754 Gatlin Avenue. The purpose for installing these wells was to monitor whether PCE contamination has migrated offsite from the NRL facility. These current results from the groundwater monitoring definitely show that there is no detection of PCE at the Stewartwood property or none directly down gradient from the former NRL Orlando facility.

The Navy will continue to operate the AS/AVE system and reevaluate PCE groundwater concentrations to determine when remediation is complete at the former NRL Orlando. Attached is a Fact Sheet that will be given out to the community surrounding the former NRL facility. This fact sheet will help summarize the status of the remediation of the PCE contaminants in the groundwater at the southern end of the former NRL site.

The Navy is requesting that FDEP send a letter to the Stewartwood's explaining to them that there are no environmental problems on their property as shown from the latest sampling results.

If you have any further questions or concerns, please contact me at (843) 820-5566.

Sincerely,

BARBARA NWOKIKE  
Remedial Project Manager  
Environmental Restoration III Branch

Copy to:

Mr. & Mrs. Stewartwood

→ TTNUS (Roger Clark)

## **APPENDIX D**

### **LABORATORY DATA**

- **Organic Data Validation Letter**
- **Chain-of-Custody Form**



Tetra Tech NUS

INTERNAL CORRESPONDENCE

TO: ~~REDACTED~~ DATE: MARCH 1, 2004  
 FROM: SETH C. STAFFEN COPIES: DV FILE  
 SUBJECT: ORGANIC DATA VALIDATION - VOA  
 CTO 271, NRL ORLANDO  
 SDG: 27108  
 SAMPLES: 13/Aqueous/VOA

NRL-GW-DUP01-00-17	NRL-GW-MW02-00-17	NRL-GW-MW04-00-17
NRL-GW-MW07-00-17	NRL-GW-MW08-00-17	NRL-GW-MW12-00-17
NRL-GW-MW13-00-17	NRL-GW-MW14A-00-17	NRL-GW-MW15A-00-17
NRL-GW-MW16-00-17	NRL-GW-MWPRIV01-01	NRL-GW-MWPRIV01-DUP
NRL-GW-TB01-00-17		

OVERVIEW

The sample set for CTO 271, NRL Orlando; SDG 27108 consists of twelve (12) aqueous environmental samples and one (1) trip blank. The samples were analyzed for Target Compound List (TCL) volatile organic compounds (VOA). Two field duplicate pairs were included in this SDG: NRL-GW-DUP01-00-17 / NRL-GW-MW02-00-17 and NRL-GW-MWPRIV01-DUP / NRL-GW-MWPRIV01-01.

The samples were collected by TetraTech NUS on February 2, 3, and 4, 2004 and analyzed by Laucks Testing Laboratories. The analysis was conducted in accordance with Naval Facilities Engineering Service Center (NFESC) Quality Assurance/Quality Control (QA/QC) criteria using SW-846 Method 8260B analysis and reporting protocol. The data contained in this SDG were validated with regard to the following parameters:

- \* • Data completeness
- \* • Holding times
- \* • GC/MS tuning and system performance
- Initial/continuing calibrations
- \* • Laboratory method and field quality control blank results
- \* • Surrogate spike recoveries
- \* • Matrix Spike/Matrix Spike Duplicate Results
- \* • Laboratory Control Sample Results
- \* • Field Duplicate Precision
- \* • Internal Standard Performance
- \* • Compound Identification
- \* • Compound Quantitation
- \* • Detection Limits

The symbol (\*) indicates that quality control criteria were met for this parameter. Problems affecting data quality are discussed below; documentation supporting these findings is presented in Appendix C. Qualified Analytical results are presented in Appendix A. Results as reported by the laboratory are presented in Appendix B.

## VOLATILE

The initial calibration on 1/14/04 contained relative percent standard deviations (%RSDs) that exceeded the 30% quality control limit for acetone and methylene chloride. Only nondetected results were reported for the aforementioned compounds and were qualified as estimated, UJ, in all samples.

The continuing calibration on 2/06/04 at 1129 contained a percent difference (%D) that exceeded the 25% quality control limit for methylene chloride. Only nondetected results were reported and were qualified as estimated, UJ, in the associated samples.

### Additional Comments:

Positive results below the reporting limit (RL) were qualified as estimated, J, due to uncertainty near the detection limit.

The laboratory truncated the sample IDs on the Form Is. The "NRL-GW" was not included as part of the sample IDs.

According to documentation recorded on the laboratory cooler receipt form, the following volatile sample (NRL-GW-TB01-00-17) consisted of 2 vials with air bubbles less than ¼ inch. No validation action was required due to the presence of air bubbles. This was noted for completeness.

Sample date and time information were missing on the chain of custody for samples NRL-GW-DUP01-00-17, NRL-GW-TB01-00-17, NRL-GW-MWPRIV01-01, and NRL-GW-MWPRIV01-DUP. The laboratory listed the missing information on the cooler receipt form.

According to the laboratory, samples NRL-GW-MW14A-00-17 and NRL-GW-MW15A-00-17 were labeled as NRL-GW-MW14-00-17 and NRL-GW-MW15-00-17 on the bottleware. The chain of custody was correct and the appropriate samples IDs are NRL-GW-MW14A-00-17 and NRL-GW-MW15A-00-17.

## EXECUTIVE SUMMARY

**Laboratory Performance Issues:** Acetone and methylene chloride did not meet initial and/or continuing calibration quality control criteria (%RSD and %D).

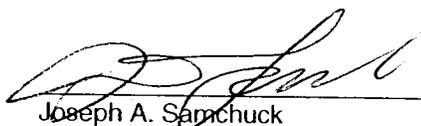
**Other Factors Affecting Data Quality:** None.

The data for these analyses were reviewed with reference to the EPA Functional Guidelines for Organic Data Validation (October, 1999), and the NFESC guidelines IRCDQM (September, 1999). The text of this report has been formulated to address only those problem areas affecting data quality.

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

  
Seth C. Staffen

Environmental Scientist/Data Validator  
Tetra Tech NUS

  
Joseph A. Samchuck

Data Validation Quality Assurance Officer  
TetraTech NUS

Attachments:

1. Appendix A - Qualified Analytical Results
2. Appendix B - Results as Reported by the Laboratory
3. Appendix C - Support Documentation

**APPENDIX A**

**QUALIFIED ANALYTICAL RESULTS**

**Qualifier Codes:**

- A = Lab Blank Contamination
- B = Field Blank Contamination
- C = Calibration Noncompliance (i.e., % RSDs, %Ds, ICVs, CCVs, RRFs, etc.)
- C01 = GC/MS Tuning Noncompliance
- D = MS/MSD Recovery Noncompliance
- E = LCS/LCSD Recovery 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 - includes ICS % R Noncompliance
- L = Instrument Calibration Range Exceedance
- M = Sample Preservation Noncompliance
- N = Internal Standard Noncompliance
- N01 = Internal Standard Recovery Noncompliance Dioxins
- N02 = Recovery Standard Noncompliance Dioxins
- N03 = Clean-up Standard Noncompliance Dioxins
- 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; i.e. chromatography, interferences, etc.)
- R = Surrogates Recovery Noncompliance
- S = Pesticide/PCB Resolution
- T = % Breakdown Noncompliance for DDT and Endrin
- U = % Difference between columns/detectors  $>25\%$  for positive results determined via GC/HPLC
- V = Non-linear calibrations; correlation coefficient  $r < 0.995$
- W = EMPC result
- X = Signal to noise response drop
- Y = Percent solids  $<30\%$
- Z = Uncertainty at 2 sigma deviation is less than sample activity

PROJ\_N 7136

SDG: 27108 MEDIA: WATER DATA FRACTION: OV

nsample NRL-GW-DUP01-00-17  
 samp\_date 2/4/2004  
 lab\_id 0402054-10  
 qc\_type NM  
 units UG/L  
 Pct\_Solids  
 DUP\_OF: NRL-GW-MW02-00-17

nsample NRL-GW-DUP01-00-17  
 samp\_date 2/4/2004  
 lab\_id 0402054-10  
 qc\_type NM  
 units UG/L  
 Pct\_Solids  
 DUP\_OF: NRL-GW-MW02-00-17

nsample NRL-GW-MW02-00-17  
 samp\_date 2/4/2004  
 lab\_id 0402054-01  
 qc\_type NM  
 units UG/L  
 Pct\_Solids  
 DUP\_OF:

Parameter	Result	Val Qual	Qual Code
1,1,1-TRICHLOROETHANE	1	U	
1,1,2,2-TETRACHLOROETHANE	1	U	
1,1,2-TRICHLOROETHANE	1	U	
1,1-DICHLOROETHANE	1	U	
1,1-DICHLOROETHENE	1	U	
1,2-DICHLOROETHANE	1	U	
1,2-DICHLOROPROPANE	1	U	
2-BUTANONE	5	U	
2-HEXANONE	5	U	
4-METHYL-2-PENTANONE	5	U	
ACETONE	5	UJ	C
BENZENE	1	U	
BROMODICHLOROMETHANE	1	U	
BROMOFORM	1	U	
BROMOMETHANE	2	U	
CARBON DISULFIDE	1	U	
CARBON TETRACHLORIDE	1	U	
CHLOROBENZENE	1	U	
CHLORODIBROMOMETHANE	1	U	
CHLOROETHANE	2	U	
CHLOROFORM	1	U	
CHLOROMETHANE	2	U	
CIS-1,2-DICHLOROETHENE	1	U	
CIS-1,3-DICHLOROPROPENE	1	U	
ETHYLBENZENE	1	U	
METHYL TERT-BUTYL ETHER	1	U	
METHYLENE CHLORIDE	1	UJ	C
STYRENE	1	U	
TETRACHLOROETHENE	0.9	J	P
TOLUENE	1	U	
TOTAL XYLENES	1	U	
TRANS-1,2-DICHLOROETHENE	1	U	

Parameter	Result	Val Qual	Qual Code
TRANS-1,3-DICHLOROPROPENE	1	U	
TRICHLOROETHENE	1	U	
VINYL CHLORIDE	2	U	

Parameter	Result	Val Qual	Qual Code
1,1,1-TRICHLOROETHANE	1	U	
1,1,2,2-TETRACHLOROETHANE	1	U	
1,1,2-TRICHLOROETHANE	1	U	
1,1-DICHLOROETHANE	1	U	
1,1-DICHLOROETHENE	1	U	
1,2-DICHLOROETHANE	1	U	
1,2-DICHLOROPROPANE	1	U	
2-BUTANONE	5	U	
2-HEXANONE	5	U	
4-METHYL-2-PENTANONE	5	U	
ACETONE	5	UJ	C
BENZENE	1	U	
BROMODICHLOROMETHANE	1	U	
BROMOFORM	1	U	
BROMOMETHANE	2	U	
CARBON DISULFIDE	1	U	
CARBON TETRACHLORIDE	1	U	
CHLOROBENZENE	1	U	
CHLORODIBROMOMETHANE	1	U	
CHLOROETHANE	2	U	
CHLOROFORM	1	U	
CHLOROMETHANE	2	U	
CIS-1,2-DICHLOROETHENE	1	U	
CIS-1,3-DICHLOROPROPENE	1	U	
ETHYLBENZENE	1	U	
METHYL TERT-BUTYL ETHER	1	U	
METHYLENE CHLORIDE	1	UJ	C
STYRENE	1	U	
TETRACHLOROETHENE	0.9	J	P
TOLUENE	1	U	
TOTAL XYLENES	1	U	
TRANS-1,2-DICHLOROETHENE	1	U	

nsample NRL-GW-MW02-00-17  
 samp\_date 2/4/2004  
 lab\_id 0402054-01  
 qc\_type NM  
 units UG/L  
 Pct\_Solids  
 DUP\_OF:

nsample NRL-GW-MW04-00-17  
 samp\_date 2/2/2004  
 lab\_id 0402054-02  
 qc\_type NM  
 units UG/L  
 Pct\_Solids  
 DUP\_OF:

nsample NRL-GW-MW04-00-17  
 samp\_date 2/2/2004  
 lab\_id 0402054-02  
 qc\_type NM  
 units UG/L  
 Pct\_Solids  
 DUP\_OF:

Parameter	Result	Val Qual	Qual Code
TRANS-1,3-DICHLOROPROPENE	1	U	
TRICHLOROETHENE	1	U	
VINYL CHLORIDE	2	U	

Parameter	Result	Val Qual	Qual Code
1,1,1-TRICHLOROETHANE	1	U	
1,1,2,2-TETRACHLOROETHANE	1	U	
1,1,2-TRICHLOROETHANE	1	U	
1,1-DICHLOROETHANE	1	U	
1,1-DICHLOROETHENE	1	U	
1,2-DICHLOROETHANE	1	U	
1,2-DICHLOROPROPANE	1	U	
2-BUTANONE	5	U	
2-HEXANONE	5	U	
4-METHYL-2-PENTANONE	5	U	
ACETONE	5	UJ	C
BENZENE	1	U	
BROMODICHLOROMETHANE	1	U	
BROMOFORM	1	U	
BROMOMETHANE	2	U	
CARBON DISULFIDE	1	U	
CARBON TETRACHLORIDE	1	U	
CHLOROENZENE	1	U	
CHLORODIBROMOMETHANE	1	U	
CHLOROETHANE	2	U	
CHLOROFORM	1	U	
CHLOROMETHANE	2	U	
CIS-1,2-DICHLOROETHENE	1	U	
CIS-1,3-DICHLOROPROPENE	1	U	
ETHYLBENZENE	1	U	
METHYL TERT-BUTYL ETHER	1	U	
METHYLENE CHLORIDE	1	UJ	C
STYRENE	1	U	
TETRACHLOROETHENE	1.8		
TOLUENE	1	U	
TOTAL XYLENES	1	U	
TRANS-1,2-DICHLOROETHENE	1	U	

Parameter	Result	Val Qual	Qual Code
TRANS-1,3-DICHLOROPROPENE	1	U	
TRICHLOROETHENE	1	U	
VINYL CHLORIDE	2	U	

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SDG: 27108 MEDIA: WATER DATA FRACTION: OV

nsample NRL-GW-MW07-00-17  
 samp\_date 2/4/2004  
 lab\_id 0402054-03  
 qc\_type NM  
 units UG/L  
 Pct\_Solids  
 DUP\_OF:

nsample NRL-GW-MW07-00-17  
 samp\_date 2/4/2004  
 lab\_id 0402054-03  
 qc\_type NM  
 units UG/L  
 Pct\_Solids  
 DUP\_OF:

nsample NRL-GW-MW08-00-17  
 samp\_date 2/2/2004  
 lab\_id 0402054-04  
 qc\_type NM  
 units UG/L  
 Pct\_Solids  
 DUP\_OF:

Parameter	Result	Val Qual	Qual Code
1,1,1-TRICHLOROETHANE	0.6	J	P
1,1,1,2,2-TETRACHLOROETHANE	1	U	
1,1,1,2-TRICHLOROETHANE	1	U	
1,1-DICHLOROETHANE	1	U	
1,1-DICHLOROETHENE	1	U	
1,2-DICHLOROETHANE	1	U	
1,2-DICHLOROPROPANE	1	U	
2-BUTANONE	5	U	
2-HEXANONE	5	U	
4-METHYL-2-PENTANONE	5	U	
ACETONE	5	UJ	C
BENZENE	1	U	
BROMODICHLOROMETHANE	1	U	
BROMOFORM	1	U	
BROMOMETHANE	2	U	
CARBON DISULFIDE	1	U	
CARBON TETRACHLORIDE	1	U	
CHLOROBENZENE	1	U	
CHLORODIBROMOMETHANE	1	U	
CHLOROETHANE	2	U	
CHLOROFORM	1	U	
CHLOROMETHANE	2	U	
CIS-1,2-DICHLOROETHENE	1	U	
CIS-1,3-DICHLOROPROPENE	1	U	
ETHYLBENZENE	1	U	
METHYL TERT-BUTYL ETHER	1	U	
METHYLENE CHLORIDE	1	UJ	C
STYRENE	1	U	
TETRACHLOROETHENE	9.6		
TOLUENE	1	U	
TOTAL XYLENES	1	U	
TRANS-1,2-DICHLOROETHENE	1	U	

Parameter	Result	Val Qual	Qual Code
TRANS-1,3-DICHLOROPROPENE	1	U	
TRICHLOROETHENE	1	U	
VINYL CHLORIDE	2	U	

Parameter	Result	Val Qual	Qual Code
1,1,1-TRICHLOROETHANE	1	U	
1,1,1,2,2-TETRACHLOROETHANE	1	U	
1,1,2-TRICHLOROETHANE	1	U	
1,1-DICHLOROETHANE	1	U	
1,1-DICHLOROETHENE	1	U	
1,2-DICHLOROETHANE	1	U	
1,2-DICHLOROPROPANE	1	U	
2-BUTANONE	5	U	
2-HEXANONE	5	U	
4-METHYL-2-PENTANONE	5	U	
ACETONE	5	UJ	C
BENZENE	1	U	
BROMODICHLOROMETHANE	1	U	
BROMOFORM	1	U	
BROMOMETHANE	2	U	
CARBON DISULFIDE	1	U	
CARBON TETRACHLORIDE	1	U	
CHLOROBENZENE	1	U	
CHLORODIBROMOMETHANE	1	U	
CHLOROETHANE	2	U	
CHLOROFORM	1	U	
CHLOROMETHANE	2	U	
CIS-1,2-DICHLOROETHENE	1	U	
CIS-1,3-DICHLOROPROPENE	1	U	
ETHYLBENZENE	1	U	
METHYL TERT-BUTYL ETHER	1	U	
METHYLENE CHLORIDE	1	UJ	C
STYRENE	1	U	
TETRACHLOROETHENE	2.3		
TOLUENE	1	U	
TOTAL XYLENES	1	U	
TRANS-1,2-DICHLOROETHENE	1	U	

nsample NRL-GW-MW08-00-17  
 samp\_date 2/2/2004  
 lab\_id 0402054-04  
 qc\_type NM  
 units UG/L  
 Pct\_Solids  
 DUP\_OF:

nsample NRL-GW-MW12-00-17  
 samp\_date 2/3/2004  
 lab\_id 0402054-05  
 qc\_type NM  
 units UG/L  
 Pct\_Solids  
 DUP\_OF:

nsample NRL-GW-MW12-00-17  
 samp\_date 2/3/2004  
 lab\_id 0402054-05  
 qc\_type NM  
 units UG/L  
 Pct\_Solids  
 DUP\_OF:

Parameter	Result	Val Qual	Qual Code
TRANS-1,3-DICHLOROPROPENE	1	U	
TRICHLOROETHENE	1	U	
VINYL CHLORIDE	2	U	

Parameter	Result	Val Qual	Qual Code
1,1,1-TRICHLOROETHANE	1	U	
1,1,2,2-TETRACHLOROETHANE	1	U	
1,1,2-TRICHLOROETHANE	1	U	
1,1-DICHLOROETHANE	1	U	
1,1-DICHLOROETHENE	1	U	
1,2-DICHLOROETHANE	1	U	
1,2-DICHLOROPROPANE	1	U	
2-BUTANONE	5	U	
2-HEXANONE	5	U	
4-METHYL-2-PENTANONE	5	U	
ACETONE	5	UJ	C
BENZENE	1	U	
BROMODICHLOROMETHANE	1	U	
BROMOFORM	1	U	
BROMOMETHANE	2	U	
CARBON DISULFIDE	1	U	
CARBON TETRACHLORIDE	1	U	
CHLOROENZENE	1	U	
CHLORODIBROMOMETHANE	1	U	
CHLOROETHANE	2	U	
CHLOROFORM	1	U	
CHLOROMETHANE	2	U	
CIS-1,2-DICHLOROETHENE	1	U	
CIS-1,3-DICHLOROPROPENE	1	U	
ETHYLBENZENE	1	U	
METHYL TERT-BUTYL ETHER	1	U	
METHYLENE CHLORIDE	1	UJ	C
STYRENE	1	U	
TETRACHLOROETHENE	0.8	J	P
TOLUENE	1	U	
TOTAL XYLENES	1	U	
TRANS-1,2-DICHLOROETHENE	1	U	

Parameter	Result	Val Qual	Qual Code
TRANS-1,3-DICHLOROPROPENE	1	U	
TRICHLOROETHENE	1	U	
VINYL CHLORIDE	2	U	

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nsample NRL-GW-MW13-00-17  
 samp\_date 2/2/2004  
 lab\_id 0402054-06  
 qc\_type NM  
 units UG/L  
 Pct\_Solids  
 DUP\_OF:

nsample NRL-GW-MW13-00-17  
 samp\_date 2/2/2004  
 lab\_id 0402054-06  
 qc\_type NM  
 units UG/L  
 Pct\_Solids  
 DUP\_OF:

nsample NRL-GW-MW14A-00-17  
 samp\_date 2/3/2004  
 lab\_id 0402054-07  
 qc\_type NM  
 units UG/L  
 Pct\_Solids  
 DUP\_OF:

Parameter	Result	Val Qual	Qual Code
1,1,1-TRICHLOROETHANE	1	U	
1,1,2,2-TETRACHLOROETHANE	1	U	
1,1,2-TRICHLOROETHANE	1	U	
1,1-DICHLOROETHANE	1	U	
1,1-DICHLOROETHENE	1	U	
1,2-DICHLOROETHANE	1	U	
1,2-DICHLOROPROPANE	1	U	
2-BUTANONE	5	U	
2-HEXANONE	5	U	
4-METHYL-2-PENTANONE	5	U	
ACETONE	5	UJ	C
BENZENE	1	U	
BROMODICHLOROMETHANE	1	U	
BROMOFORM	1	U	
BROMOMETHANE	2	U	
CARBON DISULFIDE	1	U	
CARBON TETRACHLORIDE	1	U	
CHLOROBENZENE	1	U	
CHLORODIBROMOMETHANE	1	U	
CHLOROETHANE	2	U	
CHLOROFORM	1	U	
CHLOROMETHANE	2	U	
CIS-1,2-DICHLOROETHENE	1	U	
CIS-1,3-DICHLOROPROPENE	1	U	
ETHYLBENZENE	1	U	
METHYL TERT-BUTYL ETHER	1	U	
METHYLENE CHLORIDE	1	UJ	C
STYRENE	1	U	
TETRACHLOROETHENE	1	U	
TOLUENE	1	U	
TOTAL XYLENES	1	U	
TRANS-1,2-DICHLOROETHENE	1	U	

Parameter	Result	Val Qual	Qual Code
TRANS-1,3-DICHLOROPROPENE	1	U	
TRICHLOROETHENE	1	U	
VINYL CHLORIDE	2	U	

Parameter	Result	Val Qual	Qual Code
1,1,1-TRICHLOROETHANE	1	U	
1,1,2,2-TETRACHLOROETHANE	1	U	
1,1,2-TRICHLOROETHANE	1	U	
1,1-DICHLOROETHANE	1	U	
1,1-DICHLOROETHENE	1	U	
1,2-DICHLOROETHANE	1	U	
1,2-DICHLOROPROPANE	1	U	
2-BUTANONE	5	U	
2-HEXANONE	5	U	
4-METHYL-2-PENTANONE	5	U	
ACETONE	5	UJ	C
BENZENE	1	U	
BROMODICHLOROMETHANE	9.8		
BROMOFORM	1	U	
BROMOMETHANE	2	U	
CARBON DISULFIDE	1	U	
CARBON TETRACHLORIDE	1	U	
CHLOROBENZENE	1	U	
CHLORODIBROMOMETHANE	4.3		
CHLOROETHANE	2	U	
CHLOROFORM	24		
CHLOROMETHANE	2	U	
CIS-1,2-DICHLOROETHENE	1	U	
CIS-1,3-DICHLOROPROPENE	1	U	
ETHYLBENZENE	1	U	
METHYL TERT-BUTYL ETHER	1	U	
METHYLENE CHLORIDE	1	UJ	C
STYRENE	1	U	
TETRACHLOROETHENE	1	U	
TOLUENE	1	U	
TOTAL XYLENES	1	U	
TRANS-1,2-DICHLOROETHENE	1	U	

nsample NRL-GW-MW14A-00-17  
 samp\_date 2/3/2004  
 lab\_id 0402054-07  
 qc\_type NM  
 units UG/L  
 Pct\_Solids  
 DUP\_OF:

nsample NRL-GW-MW15A-00-17  
 samp\_date 2/3/2004  
 lab\_id 0402054-08  
 qc\_type NM  
 units UG/L  
 Pct\_Solids  
 DUP\_OF:

nsample NRL-GW-MW15A-00-17  
 samp\_date 2/3/2004  
 lab\_id 0402054-08  
 qc\_type NM  
 units UG/L  
 Pct\_Solids  
 DUP\_OF:

Parameter	Result	Val Qual	Qual Code
TRANS-1,3-DICHLOROPROPENE	1	U	
TRICHLOROETHENE	1	U	
VINYL CHLORIDE	2	U	

Parameter	Result	Val Qual	Qual Code
1,1,1-TRICHLOROETHANE	1	U	
1,1,2,2-TETRACHLOROETHANE	1	U	
1,1,2-TRICHLOROETHANE	1	U	
1,1-DICHLOROETHANE	1	U	
1,1-DICHLOROETHENE	1	U	
1,2-DICHLOROETHANE	1	U	
1,2-DICHLOROPROPANE	1	U	
2-BUTANONE	5	U	
2-HEXANONE	5	U	
4-METHYL-2-PENTANONE	5	U	
ACETONE	5	UJ	C
BENZENE	1	U	
BROMODICHLOROMETHANE	1	U	
BROMOFORM	1	U	
BROMOMETHANE	2	U	
CARBON DISULFIDE	1	U	
CARBON TETRACHLORIDE	1	U	
CHLOROETHANE	2	U	
CHLOROBENZENE	1	U	
CHLORODIBROMOMETHANE	1	U	
CHLOROFORM	1	U	
CHLOROMETHANE	2	U	
CIS-1,2-DICHLOROETHENE	1	U	
CIS-1,3-DICHLOROPROPENE	1	U	
ETHYLBENZENE	1	U	
METHYL TERT-BUTYL ETHER	1	U	
METHYLENE CHLORIDE	1	UJ	C
STYRENE	1	U	
TETRACHLOROETHENE	1	U	
TOLUENE	1	U	
TOTAL XYLENES	1	U	
TRANS-1,2-DICHLOROETHENE	1	U	

Parameter	Result	Val Qual	Qual Code
TRANS-1,3-DICHLOROPROPENE	1	U	
TRICHLOROETHENE	1	U	
VINYL CHLORIDE	2	U	

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SDG: 27108 MEDIA: WATER DATA FRACTION: OV

nsample NRL-GW-MW16-00-17  
 samp\_date 2/4/2004  
 lab\_id 0402054-09  
 qc\_type NM  
 units UG/L  
 Pct\_Solids  
 DUP\_OF:

nsample NRL-GW-MW16-00-17  
 samp\_date 2/4/2004  
 lab\_id 0402054-09  
 qc\_type NM  
 units UG/L  
 Pct\_Solids  
 DUP\_OF:

nsample NRL-GW-MWPRIV01-01  
 samp\_date 2/3/2004  
 lab\_id 0402054-11  
 qc\_type NM  
 units UG/L  
 Pct\_Solids  
 DUP\_OF:

Parameter	Result	Val Qual	Qual Code
1,1,1-TRICHLOROETHANE	1	U	
1,1,2,2-TETRACHLOROETHANE	1	U	
1,1,2-TRICHLOROETHANE	1	U	
1,1-DICHLOROETHANE	1	U	
1,1-DICHLOROETHENE	1	U	
1,2-DICHLOROETHANE	1	U	
1,2-DICHLOROPROPANE	1	U	
2-BUTANONE	5	U	
2-HEXANONE	5	U	
4-METHYL-2-PENTANONE	5	U	
ACETONE	5	UJ	C
BENZENE	1	U	
BROMODICHLOROMETHANE	1	U	
BROMOFORM	1	U	
BROMOMETHANE	2	U	
CARBON DISULFIDE	1	U	
CARBON TETRACHLORIDE	1	U	
CHLOROBENZENE	1	U	
CHLORODIBROMOMETHANE	1	U	
CHLOROETHANE	2	U	
CHLOROFORM	1	U	
CHLOROMETHANE	2	U	
CIS-1,2-DICHLOROETHENE	1	U	
CIS-1,3-DICHLOROPROPENE	1	U	
ETHYLBENZENE	1	U	
METHYL TERT-BUTYL ETHER	1	U	
METHYLENE CHLORIDE	1	UJ	C
STYRENE	1	U	
TETRACHLOROETHENE	1	U	
TOLUENE	1	U	
TOTAL XYLENES	1	U	
TRANS-1,2-DICHLOROETHENE	1	U	

Parameter	Result	Val Qual	Qual Code
TRANS-1,3-DICHLOROPROPENE	1	U	
TRICHLOROETHENE	1	U	
VINYL CHLORIDE	2	U	

Parameter	Result	Val Qual	Qual Code
1,1,1-TRICHLOROETHANE	1	U	
1,1,2,2-TETRACHLOROETHANE	1	U	
1,1,2-TRICHLOROETHANE	1	U	
1,1-DICHLOROETHANE	1	U	
1,1-DICHLOROETHENE	1	U	
1,2-DICHLOROETHANE	1	U	
1,2-DICHLOROPROPANE	1	U	
2-BUTANONE	5	U	
2-HEXANONE	5	U	
4-METHYL-2-PENTANONE	5	U	
ACETONE	5	UJ	C
BENZENE	1	U	
BROMODICHLOROMETHANE	1	U	
BROMOFORM	1	U	
BROMOMETHANE	2	U	
CARBON DISULFIDE	1	U	
CARBON TETRACHLORIDE	1	U	
CHLOROBENZENE	1	U	
CHLORODIBROMOMETHANE	1	U	
CHLOROETHANE	2	U	
CHLOROFORM	1	U	
CHLOROMETHANE	2	U	
CIS-1,2-DICHLOROETHENE	1	U	
CIS-1,3-DICHLOROPROPENE	1	U	
ETHYLBENZENE	1	U	
METHYL TERT-BUTYL ETHER	1	U	
METHYLENE CHLORIDE	1	UJ	C
STYRENE	1	U	
TETRACHLOROETHENE	1	U	
TOLUENE	1	U	
TOTAL XYLENES	1	U	
TRANS-1,2-DICHLOROETHENE	1	U	

nsample NRL-GW-MWPRIV01-01  
 samp\_date 2/3/2004  
 lab\_id 0402054-11  
 qc\_type NM  
 units UG/L  
 Pct\_Solids  
 DUP\_OF:

nsample NRL-GW-MWPRIV01-DUP  
 samp\_date 2/3/2004  
 lab\_id 0402054-12  
 qc\_type NM  
 units UG/L  
 Pct\_Solids  
 DUP\_OF: NRL-GW-MWPRIV01-01

nsample NRL-GW-MWPRIV01-DUP  
 samp\_date 2/3/2004  
 lab\_id 0402054-12  
 qc\_type NM  
 units UG/L  
 Pct\_Solids  
 DUP\_OF: NRL-GW-MWPRIV01-01

Parameter	Result	Val Qual	Qual Code
TRANS-1,3-DICHLOROPROPENE	1	U	
TRICHLOROETHENE	1	U	
VINYL CHLORIDE	2	U	

Parameter	Result	Val Qual	Qual Code
1,1,1-TRICHLOROETHANE	1	U	
1,1,2,2-TETRACHLOROETHANE	1	U	
1,1,2-TRICHLOROETHANE	1	U	
1,1-DICHLOROETHANE	1	U	
1,1-DICHLOROETHENE	1	U	
1,2-DICHLOROETHANE	1	U	
1,2-DICHLOROPROPANE	1	U	
2-BUTANONE	5	U	
2-HEXANONE	5	U	
4-METHYL-2-PENTANONE	5	U	
ACETONE	5	UJ	C
BENZENE	1	U	
BROMODICHLOROMETHANE	1	U	
BROMOFORM	1	U	
BROMOMETHANE	2	U	
CARBON DISULFIDE	1	U	
CARBON TETRACHLORIDE	1	U	
CHLOROBENZENE	1	U	
CHLORODIBROMOMETHANE	1	U	
CHLOROETHANE	2	U	
CHLOROFORM	1	U	
CHLOROMETHANE	2	U	
CIS-1,2-DICHLOROETHENE	1	U	
CIS-1,3-DICHLOROPROPENE	1	U	
ETHYLBENZENE	1	U	
METHYL TERT-BUTYL ETHER	1	U	
METHYLENE CHLORIDE	1	UJ	C
STYRENE	1	U	
TETRACHLOROETHENE	1	U	
TOLUENE	1	U	
TOTAL XYLENES	1	U	
TRANS-1,2-DICHLOROETHENE	1	U	

Parameter	Result	Val Qual	Qual Code
TRANS-1,3-DICHLOROPROPENE	1	U	
TRICHLOROETHENE	1	U	
VINYL CHLORIDE	2	U	

nsample NRL-GW-TB01-00-17  
 samp\_date 2/3/2004  
 lab\_id 0402054-13  
 qc\_type NM  
 units UG/L  
 Pct\_Solids  
 DUP\_OF:

nsample NRL-GW-TB01-00-17  
 samp\_date 2/3/2004  
 lab\_id 0402054-13  
 qc\_type NM  
 units UG/L  
 Pct\_Solids  
 DUP\_OF:

Parameter	Result	Val Qual	Qual Code
1,1,1-TRICHLOROETHANE	1	U	
1,1,2,2-TETRACHLOROETHANE	1	U	
1,1,2-TRICHLOROETHANE	1	U	
1,1-DICHLOROETHANE	1	U	
1,1-DICHLOROETHENE	1	U	
1,2-DICHLOROETHANE	1	U	
1,2-DICHLOROPROPANE	1	U	
2-BUTANONE	5	U	
2-HEXANONE	5	U	
4-METHYL-2-PENTANONE	5	U	
ACETONE	5	UJ	C
BENZENE	1	U	
BROMODICHLOROMETHANE	1	U	
BROMOFORM	1	U	
BROMOMETHANE	2	U	
CARBON DISULFIDE	1	U	
CARBON TETRACHLORIDE	1	U	
CHLOROBENZENE	1	U	
CHLORODIBROMOMETHANE	1	U	
CHLOROETHANE	2	U	
CHLOROFORM	1	U	
CHLOROMETHANE	2	U	
CIS-1,2-DICHLOROETHENE	1	U	
CIS-1,3-DICHLOROPROPENE	1	U	
ETHYLBENZENE	1	U	
METHYL TERT-BUTYL ETHER	1	U	
METHYLENE CHLORIDE	1	UJ	C
STYRENE	1	U	
TETRACHLOROETHENE	1	U	
TOLUENE	1	U	
TOTAL XYLENES	1	U	
TRANS-1,2-DICHLOROETHENE	1	U	

Parameter	Result	Val Qual	Qual Code
TRANS-1,3-DICHLOROPROPENE	1	U	
TRICHLOROETHENE	1	U	
VINYL CHLORIDE	2	U	





PROJECT NO: CTO-0323	FACILITY: NRL ORLANDO	PROJECT MANAGER ROGER CLARK	PHONE NUMBER (412) 921-7090	LABORATORY NAME AND CONTACT: LAUCKS - ANH HO
SAMPLERS (SIGNATURE) <i>[Signature]</i>		FIELD OPERATIONS LEADER GARY BRAGANZA	PHONE NUMBER (501) 302-4137	ADDRESS 940 SOUTH HARNEY ST
		CARRIER/WAYBILL NUMBER FEDEX / 830337928431		CITY, STATE SEATTLE, WA 98108

STANDARD TAT <input checked="" type="checkbox"/>	CONTAINER TYPE PLASTIC (P) or GLASS (G) <input checked="" type="checkbox"/>
RUSH TAT <input type="checkbox"/>	PRESERVATIVE USED
<input type="checkbox"/> 24 hr. <input type="checkbox"/> 48 hr. <input type="checkbox"/> 72 hr. <input type="checkbox"/> 7 day <input type="checkbox"/> 14 day	HCC <input checked="" type="checkbox"/>

DATE YEAR	TIME	SAMPLE ID	LOCATION ID	TOP DEPTH (FT)	BOTTOM DEPTH (FT)	MATRIX (GW, SO, SW, SD, QC, ETC.)	COLLECTION METHOD GRAP (G) COMP (C)	No. OF CONTAINERS	TYPE OF ANALYSIS	COMMENTS
2/4	10:50	NRL-GW-MW02-00-17	MW02	-	-	GW		3	X	
2/2	15:40	NRL-GW-MW04-00-17	MW04						X	
2/4	11:40	NRL-GW-MW07-00-17	MW07						X	
2/2	15:40	NRL-GW-MW08-00-17	MW08						X	
2/3	9:15	NRL-GW-MW12-00-17	MW12						X	
2/2	16:35	NRL-GW-MW13-00-17	MW13						X	
2/3	9:50	NRL-GW-MW14-00-17	MW14						X	
2/3	12:00	NRL-GW-MW15A-00-17	MW15						X	
2/4	10:05	NRL-GW-MW16-00-17	MW16					6	X	MS/MSD
		NRL-GW-DUP01-00-17						3	X	
		NRL-GW-TB01-00-17						2		TRIP BLANK

1. RELINQUISHED BY <i>[Signature]</i>	DATE 2/4/04	TIME 18:15	1. RECEIVED BY	DATE	TIME
2. RELINQUISHED BY	DATE	TIME	2. RECEIVED BY	DATE	TIME
3. RELINQUISHED BY	DATE	TIME	3. RECEIVED BY	DATE	TIME

COMMENTS

# NON-HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No.

Manifest Document No.

2. Page 1 of

3. Generator's Name and Mailing Address

NAVA Research Laboratory  
1400 North Summerlin Parkway  
Summerlin, NV 89143

4. Generator's Phone ( )

702-881-1111

5. Transporter 1 Company Name

Freehold Cartage, Inc.

6. US EPA ID Number

41-010-5-41-7-2-8-4

A. Transporter's Phone

800/458-5229

7. Transporter 2 Company Name

8. US EPA ID Number

B. Transporter's Phone

9. Designated Facility Name and Site Address

Global Environmental Group, Inc.  
402 Webster Chapel Road  
Alpharetta, GA 30009-4611

10. US EPA ID Number

41-010-8-1-0-2-0-8-4-4

C. Facility's Phone

770-290-4300

11. Waste Shipping Name and Description

12. Containers

No.

Type

13. Total Quantity

14. Unit Wt/Vol

a. Non Regulated Material (Industrial Solids)  
RCRA & DDT, Non Hazardous (None)

P# 11780

013

DM

0.0715

g

b. Non Regulated Material (Industrial Waxes)  
RCRA & DDT, (Non Hazardous) None

P# 11871

004

DM

002.20

g

D. Additional Descriptions for Materials Listed Above

E. Handling Codes for Wastes Listed Above

15. Special Handling Instructions and Additional Information

Emergency Response: Mail Manifest to:  
Florida Environmental Compliance Corporation  
1413 Miller St. Road  
Orlando, FL 32804-2117 PECO Cust#1576 PECO PRA 040105  
Technical Contact: Gary Berganza Phone 351/302-4137

16. GENERATOR'S CERTIFICATION: I certify the materials described above on this manifest are not subject to federal regulations for reporting proper disposal of Hazardous Waste.

Printed/Typed Name

BARBARA NUCKIE

Signature

Barbara Nuckie

Month Day Year  
02/17/04

17. Transporter 1 Acknowledgement of Receipt of Materials

Printed/Typed Name

William R. Mos

Signature

William R. Mos

Month Day Year  
02/19/04

18. Transporter 2 Acknowledgement of Receipt of Materials

Printed/Typed Name

Signature

Month Day Year

19. Discrepancy Indication Space

20. Facility Owner or Operator: Certification of receipt of waste materials covered by this manifest except as noted in Item 19.

Printed/Typed Name

Signature

Month Day Year

GENERATOR'S COPY



PROJECT NO: 177390		FACILITY: NRL-ORLANDO		PROJECT MANAGER Roger Blank		PHONE NUMBER 412-521-7000		LABORATORY NAME AND CONTACT: LAWRENCE TESTER LAB					
SAMPLERS (SIGNATURE) 				FIELD OPERATIONS LEADER		PHONE NUMBER		ADDRESS 540 HAINES ST					
				CARRIER/WAYBILL NUMBER Fed Ex # 840725503095				CITY, STATE SEATTLE WA					
STANDARD TAT <input type="checkbox"/> RUSH TAT <input checked="" type="checkbox"/> <input type="checkbox"/> 24 hr. <input type="checkbox"/> 48 hr. <input checked="" type="checkbox"/> 72 hr. <input type="checkbox"/> 7 day <input type="checkbox"/> 14 day				CONTAINER TYPE PLASTIC (P) or GLASS (G)		PRESERVATIVE USED		TYPE OF ANALYSIS 8260 HLL					
DATE YEAR 2004				TOP DEPTH (FT)		BOTTOM DEPTH (FT)						MATRIX (GW, SO, SW, SD, QC, ETC.)	
TIME				LOCATION ID		No. OF CONTAINERS		COMMENTS					
SAMPLE ID													
1 3/2 0923 NR-600-MW-02-SUP-01						6 3		X					
2 3/2 1045 NR-600-MW-07-SUP-01						6 3		X					
3 3/2 1204 NR-600-MW-08-SUP-01						6 3		X					
1. RELINQUISHED BY				DATE 3/2/04		TIME 1425		1. RECEIVED BY		DATE		TIME	
2. RELINQUISHED BY				DATE		TIME		2. RECEIVED BY		DATE		TIME	
3. RELINQUISHED BY				DATE		TIME		3. RECEIVED BY		DATE 03/2/04		TIME 9:00	
COMMENTS													