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LETTER REPORT FOR STATUS OF GROUNDWATER REMEDIATION NTC ORLANDO FL
11/23/2004
TETRA TECH

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PITT 04-11-005

November 23, 2004

Project Number 7136

Commanding Officer
Department of the Navy
SOUTHNAVFACENGCOM
Atten: Ms. Barbara Nwokike, RPM Code 1873
P.O. Box 190010
North Charleston, SC 29419-9010

Reference: CLEAN Contract No. N62467-94-D-0888
Contract Task Order 323

Subject: LETTER REPORT FOR STATUS OF GROUNDWATER REMEDIATION AT FORMER NRL ORLANDO

Dear Ms.Nwokike:

Enclosed please find two (2) copies of the green cover pages and spines (final version) plus the changed text pages and two figures for the above-listed document for NRL Orlando. These have been prepared as three-hole punched copies for easy insertion into your draft copies. As you may recall, this is the document Mr. David Grabka with the FDEP needs in order to prepare a letter to the Swartwoods indicating the state's acknowledgement that PCE contamination is not currently found within the groundwater underlying their property. During a recent call from Ms. Swartwood, she is eager to receive this letter from the state. As per your direction, I have also sent one (1) copy to Mr. Grabka.

After the FDEP reviewed the draft copy of this document dated July 2004, they had two (2) comments, in their correspondence dated August 10, 2004 as described below along with Tetra Tech's responses to these comments:

(1) Please provide a figure showing the locations of all monitoring wells where groundwater samples have been collected, including the well recently installed on the Swartwood property and the two well points located next to Lake Gatlin.

Response: Figure 1 Monitoring Well Location was prepared and inserted in the final document and illustrates the locations of all monitoring wells including the well on the Swartwood property and the two temporary well points next to Lake Gatlin. A sentence was added to the text (page 3 last line) stating "The locations of all wells including the residential well are shown on Figure 1."

(2) Please provide a figure showing the current configuration of the air sparge/soil vapor extraction system.

Response: Figure 2 Phase IV AS/SVE Treatability System was prepared and inserted in the final document and illustrates the current system configuration. A sentence was added to the text (page 8, Section 4.6 first paragraph, last line) stating "The current system configuration is shown on Figure 2."

I will contact you and David next week to confirm receipt of this document and to answer any questions you have. Please call me at (412) 921-8415 or 1-800-245-2730 if you have any questions regarding this correspondence.

TETRA TECH NUS, INC.

Very truly yours,

Roger A. Clark, Ph.D.
Task Order Manager

RAC

Attachment

c: Mr. David Grabka (FDEP)
Mr. Mark Perry (TtNUS) letter only
Mr. Mark Francis (TtNUS) letter only
file

Letter Report
Status of Groundwater Remediation

for

Former Naval Research Laboratory
Underwater Sound Reference
Detachment
Orlando, Florida

NAVFAC
Naval Facilities Engineering Command

Southern Division
Naval Facilities Engineering Command

Contract Number N62467-94-D-0888

Contract Task Order 0323

November 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. The locations of all wells including the residential well are shown on Figure 1.

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.

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

Sample ID	Location	VOCs Analysis
NRL-GW-MW16-00-17	Gatlin Ave. ROW[1]	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). The current system configuration is shown on Figure 2.

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.

NOT TO SCALE

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A. JANOCHA	12/22/02
CHECKED BY	DATE
R. CLARK	11/17/04
COST/SCHEDULE-AREA	
SCALE	
AS NOTED	

MONITORING WELL LOCATION
NAVAL RESEARCH LABORATORY
ORLANDO, FLORIDA

CONTRACT NUMBER	
N7859 CTO 0062	
APPROVED BY	DATE
R. CLARK	11/17/04
APPROVED BY	DATE
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FIGURE 1	0

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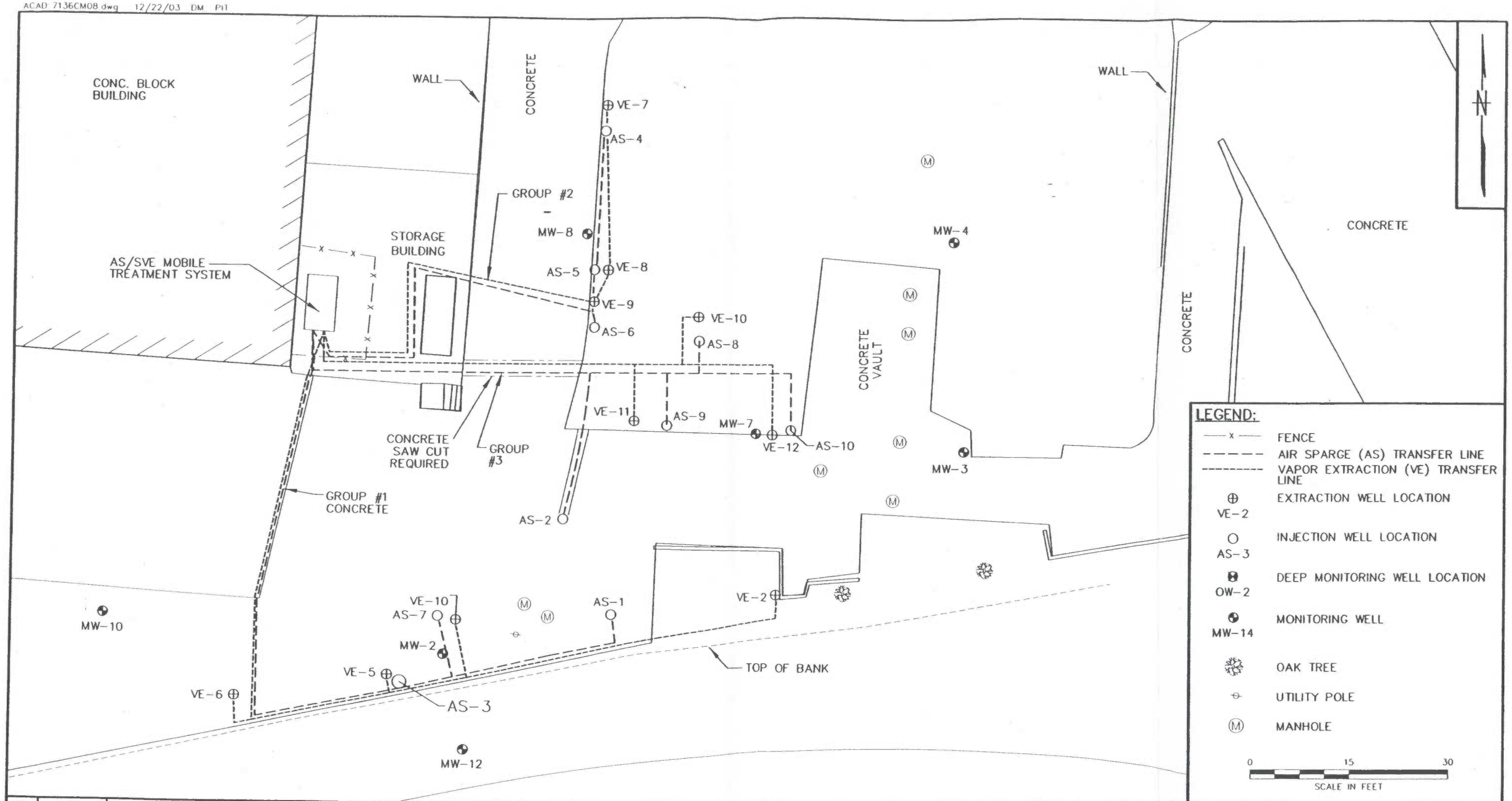

NO.	DATE	REVISIONS	BY	CHKD	APPD	REFERENCES

DRAWN BY DATE: DM 12/22/03
CHECKED BY DATE
COST/SCHED-AREA
SCALE: AS NOTED

PHASE IV
AS/SVE TREATABILITY SYSTEM
NAVAL RESEARCH LABORATORY
ORLANDO, FLORIDA

CONTRACT NO. 7136
APPROVED BY DATE
APPROVED BY DATE
DRAWING NO. FIGURE 2
REV. 0

FORM CADD NO. SDIV_BH.DWG - REV 0 - 1/20/98