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FINAL GROUNDWATER INVESTIGATION ADDENDUM 1 HAWTHORN FORMATION AT  
OPERABLE UNIT 4 (OU 4) NTC ORLANDO FL  
1/28/2010  
TETRA TECH



TETRA TECH

January 28, 2010

BRAC PMO Southeast  
ATTN: Mr. Art Sanford  
4130 Faber Place Drive, Suite 202  
North Charleston, SC 29405

Reference: CLEAN Contract No. N62467-04-D-0055  
Contract Task Order No. 0125

Subject: Final Groundwater Investigation of the Hawthorn Formation – Addendum No. 1 for  
Operable Unit 4, Naval Training Center, Orlando, Florida

Dear Mr. Sanford:

Please find enclosed the Final Groundwater Investigation Addendum No. 1 Report documenting groundwater investigation activities in the Hawthorn zone at Operable Unit 4 in hardcopy and CD formats for your use. There were no changes to the draft version. The final report includes the signed and stamped professional geologist certification page.

If you have any questions, please contact me at (865) 220-4701.

Sincerely,

Teresa K. Grayson  
Task Order Manager

Enclosure

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# Comprehensive Long-term Environmental Action Navy

CONTRACT NUMBER N62467-04-D-0055



Rev. 1  
01/28/10

## Groundwater Investigation of the Hawthorn Formation - Addendum No. 1 for Operable Unit 4

Naval Training Center  
Orlando, Florida

Contract Task Order 0125

January 2010



BRAC Program Management Office Southeast  
4130 Faber Place Drive, Suite 202  
North Charleston, South Carolina 29405

**GROUNDWATER INVESTIGATION OF THE HAWTHORN  
FORMATION – ADDENDUM No. 1  
FOR  
OPERABLE UNIT 4**

**NAVAL TRAINING CENTER  
ORLANDO, FLORIDA**

**COMPREHENSIVE LONG-TERM  
ENVIRONMENTAL ACTION NAVY (CLEAN) CONTRACT**

**Submitted to:  
BRAC Program Management Office Southeast  
4130 Faber Place Drive  
North Charleston, South Carolina 29405**

**Submitted by:  
Tetra Tech NUS, Inc.  
661 Andersen Drive  
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**CONTRACT NUMBER N62467-04-D-0055  
CONTRACT TASK ORDER 0125**

**JANUARY 2010**

**PREPARED UNDER THE SUPERVISION OF:**



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**APPROVED FOR SUBMITTAL BY:**



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PITTSBURGH, PENNSYLVANIA**

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## PROFESSIONAL GEOLOGIST CERTIFICATION

I hereby certify that this document, *Groundwater Investigation of the Hawthorn Formation – Addendum No. 1, for Operable Unit 4, Naval Training Center, Orlando, Florida*, was prepared under my direct supervision in accordance with acceptable standards of geological practice.

*Allan T. Jenkins 1-28-10*

Allan T. Jenkins, P.G. / Date  
License No. PG-0000663



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## ACRONYMS

ABB-ES	ABB Environmental Services, Inc.
amsl	above mean sea level
bgs	below ground surface
BTOC	below top of casing
cDCE	cis-1,2- dichloroethene
CMT	continuous multi-channel tubing
CTL	Cleanup Target Level
CVOC	chlorinated volatile organic compound
DOT	Department of Transportation
DRMO	Defense Reutilization and Marketing Office
EISOPQAM	Environmental Investigations Standard Operating Procedures and Quality Assurance Manual
FDEP	Florida Department of Environmental Protection
GCTL	Groundwater Cleanup Target Level
LHC	lower Hawthorn clay
ml/min	milliliter per minute
NAD	North American Datum
NAVFAC SE	Naval Facilities Engineering Command Southeast
NGVD	National Geodetic Vertical Datum
NTC	Naval Training Center
OU	Operable Unit
PCE	tetrachloroethene
PID	photoionization detector
POP	Project Operations Plan
PVC	polyvinyl chloride
SA	Study Area
TCE	trichloroethene
TtNUS	Tetra Tech NUS, Inc.
UHC	upper Hawthorn clay
USEPA	United States Environmental Protection Agency
VC	vinyl chloride
VOC	volatile organic compound
WBZ	water-bearing zone

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## EXECUTIVE SUMMARY

A series of previous environmental investigations conducted at Operable Unit (OU) 4, located at Area C of the former Naval Training Center (NTC) in Orlando, Florida, identified chlorinated volatile organic compounds (CVOCs) in soil and groundwater. As a result of the contamination, OU 4 property has been restricted to non-residential (i.e., commercial/industrial) use. The contamination release originated from the former laundry and dry-cleaning facility (former Building 1100) and resulted in a plume within the surficial aquifer that has migrated westward toward Lake Druid. More recent investigation of the upper Hawthorn clay (UHC), an aquitard that marks the bottom of the surficial aquifer, indicated that areas of the clay were highly contaminated and that CVOCs had penetrated the clay into an underlying water-bearing zone (WBZ) consisting of 30 to 60 feet of sand interbedded with silty sand, clayey sand, and shell layers within the upper Hawthorn Group. A groundwater plume was detected near the middle of the Hawthorn WBZ within a layer of sand, pebbles, and mostly broken shells.

The purpose of this investigation was to determine if CVOCs within the Hawthorn WBZ have migrated off site to the north of OU 4.

### **Fieldwork**

The field activities, conducted by Tetra Tech NUS, Inc. (TtNUS) during September and October 2008 and March 2009 consisted of the following:

- Collection of groundwater samples from continuous multi-channel tubing (CMT) wells OLD-13-68D, OLD-13-69D and OLD-13-70D for analysis of CVOC constituents.
- Advancement of soil boring SB08 and installation and surveying of nested monitoring wells OLD-13-81D and OLD-13-82D at the SB08 location to evaluate the potential presence of off-site contaminant migration within the Hawthorn WBZ.
- Collection of groundwater samples from the nested wells for analysis of CVOC constituents.
- Measurement of groundwater elevations from the Hawthorn well network.

### **Nested Well Installation**

Nested wells OLD-13-81D and OLD-13-82D were installed using the sonic rotary drilling method on March 9, 2009. These 1-inch inside diameter wells are co-located in a single, 6-inch, outside diameter borehole (SB08). The two well screens are separated vertically by 13 feet of elevation and isolated by placement of a 10-foot-thick interval of bentonite between them. Each well was completed with 5 feet of screen and a sand filter pack. The remaining annular space was filled with a 20:1 cement/bentonite grout to near the ground surface. The wells were completed within a single flush-mounted manhole and completed to grade.

Upper zone well OLD-13-81D was screened within the lithologic unit correlated with, and at the same approximate elevation (approximately 7 to 12 feet amsl) as, the on-site CVOC plume. The lower zone well OLD-13-82D was screened 13 feet deeper, near the bottom of the Hawthorn WBZ (approximately -8 to -13 feet amsl), to evaluate the vertical extent of contamination.

### **Groundwater Hydrology**

Groundwater levels were measured in the Hawthorn wells on March 16, 2009. The groundwater flow direction in the central portion of the Hawthorn WBZ is toward the north with a calculated hydraulic gradient of 0.003 and an average linear groundwater velocity of 0.036 feet per day, or 13.1 feet per year.

### **Monitoring Well Sampling**

The current investigation began in late September and early October 2008 when TtNUS sampled all six channels for each CMT well located along the northern OU 4 property line (OLD-13-68D, OLD-13-69D and OLD-13-70D) for analysis of CVOCs (total of 18 samples). Groundwater samples were subsequently collected from newly installed nested wells OLD-13-81D and OLD-13-82D on March 16, 2009, for analysis of CVOCs.

Additional Hawthorn well sampling results pertinent to this investigation were collected as part of monitoring performed by CH2MHill in January, April, and November 2008 and in January and July of 2009; these results are included in the data discussion and Table 4-2..

### **Conclusions**

Groundwater sampling conducted along the northern property line of OU 4 between January 2008 and January 2009 shows increasing concentrations of CVOCs at well OLD-13-69D (maximum PCE concentration of 6,070 µg/L), suggesting that the plume is migrating off site to the north. The data from deeper channels in this CMT well also suggest some vertical migration (deepening) of the plume. However, the most recent sample collected in July 2009 along the property line shows a decrease in CVOCs concentrations, although the maximum concentration of PCE (4,900 µg/L) is several orders of magnitude greater than the GCTL of 3 µg/L. Data from lateral wells OLD-13-68D and OLD-13-70D along the property line show that the area of concern for plume migration is relatively narrow (less than 150 feet).

Two new wells, nested in a single borehole and located 191 feet north of the property line (downgradient of well OLD-13-69D), were installed during this investigation and sampled in March and July 2009. The well depths for these two wells are consistent with the plume depths observed at the OU 4 property line. No CVOCs were detected in the samples from these wells, which demonstrates that off site migration to the north extends less than 191 feet beyond the property line.

**Recommendations**

Semi-annual monitoring of groundwater quality along and downgradient of the northern OU 4 boundary should be conducted.

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## 1.0 INTRODUCTION

Tetra Tech NUS, Inc. (TtNUS) has completed an additional groundwater investigation of the upper Hawthorn Group water-bearing zone (WBZ) in the area off site and to the north of Operable Unit (OU) 4, located in Area C of the former Naval Training Center (NTC) in Orlando, Florida. Figure 1-1 shows the location of Area C, and Figure 1-2 presents a site plan of OU 4 showing site features including Hawthorn monitoring wells installed prior to and during this investigation. Fieldwork was performed in September and October 2008 and March and April 2009 in accordance with the technical approach and methods detailed in the Work Plan for Operable Unit 4, (TtNUS, 2006) and Addendum No. 1 to the Work Plan for Operable Unit 4, (TtNUS, 2009a). The initial groundwater investigation of the Hawthorn Group was performed at OU 4 in 2006 and documented in the Investigation of the Hawthorn Formation and Vadose Soil for Operable Unit 4, (TtNUS, 2009b). This addendum to the 2006 document describes additional field activities performed to assess the contaminant plume within the Hawthorn WBZ and presents the results of the additional groundwater investigation.

### 1.1 SITE DESCRIPTION

OU 4 consists of Study Area (SA) 12 [Defense Reutilization and Marketing Office (DRMO) Warehouses and Salvage Yard], SA 13 (former base laundry and dry cleaning facility), and SA 14 (DRMO Storage Area). The eastern portion of the site has been developed and is relatively flat, with ground elevations ranging from 110 to 113 feet above mean sea level (amsl). Immediately west of former Building 1100, the site is mostly vegetated as the ground slopes gently westward down to the shoreline of Lake Druid at an elevation of approximately 100 feet amsl. Lake Druid is a roughly circular body of water approximately 16.5 acres in size with a maximum depth of about 14 feet near its center.

Former Building 1100 was constructed in 1943, and dry cleaning operations began in 1958 or possibly earlier. Figure 1-3 presents a plan schematic of former Building 1100 and shows the locations of potential releases of chlorinated solvents. The former dry cleaning operations and floor drains in the building are assumed to be the sources of contamination. Operations ceased in the fall of 1994, and all laundry equipment (conventional water-based and dry cleaning) was subsequently removed from the building. The building was demolished in 2004.

A series of environmental investigations conducted at OU 4 identified the presence of chlorinated volatile organic compounds (CVOCs) in soil and groundwater originating from the laundry. Groundwater from the Hawthorn WBZ contained concentrations of CVOCs, specifically tetrachloroethene (PCE), trichloroethene (TCE), cis-1,2-dichloroethene (cDCE), 1,1-dichloroethene, and vinyl chloride (VC), at concentrations greater than the Florida Department of Environmental Protection (FDEP) Groundwater Cleanup Target Levels (GCTLs). The areal distribution of the CVOC plume, defined by exceedances of the PCE GCTL,

based on the 2006 sample data was limited to an area of approximately 23,000 square feet, or 0.5 acre, near the center of the former laundry facility (former Building 1100). The downgradient extent (west of the former laundry facility) of the TCE plume (i.e., concentrations greater than GCTL) appeared to be within the Navy property at the time, and the plume limits for all CVOCs of concern were encompassed by the limit of the PCE plume (TtNUS, 2009b).

Groundwater analytical results from samples collected during routine semi-annual groundwater monitoring in January and April 2008 for well OLD-13-69D, channel 4, located along the northern boundary of OU 4, indicated that the extent of CVOCs in groundwater was not defined and potentially extended beyond the northern boundary of OU 4.

As a result of the CVOC contamination detected in subsurface soil and groundwater, the OU 4 property is deed restricted to non-residential (i.e., commercial/industrial) use.

## **1.2 PURPOSE AND OBJECTIVES**

The purpose of the additional groundwater investigation was to further evaluate the lateral and vertical extent of groundwater contamination in the Hawthorn WBZ along the northern OU 4 property boundary and off site to the north in the direction of groundwater flow in the Hawthorn WBZ. The objectives of the investigation in the Hawthorn Group were as follows:

- Collect groundwater samples for analysis of CVOCs from each channel of the three Hawthorn continuous multi-channeltubing (CMT) wells located along the northern boundary of OU 4 - OLD-13-68D, OLD-13-69D and OLD-13-70D.
- Advance one boring north of the site boundary in the direction of groundwater flow (north) using Rotasonic drilling methods.
- Collect continuous core samples at the boring location from approximately 65 feet below ground surface (bgs) through the Hawthorn WBZ to a total depth of approximately 130 feet bgs.
- Install a pair of nested monitoring wells in the boring. One well screened in the lithologic unit known to contain contamination at the property boundary, and the other well screened in the permeable zone below that target interval near the bottom of the Hawthorn WBZ.
- Survey the horizontal location, ground surface elevation, and top of casing elevation of each new permanent monitoring well.
- Measure water levels in newly installed and existing Hawthorn Group monitoring wells to evaluate groundwater flow direction and gradients.
- Collect and analyze groundwater samples from newly installed monitoring wells to characterize the lateral and vertical limits of the plume and to support future assessment action decisions.

### 1.3 PROJECT GUIDANCE

The Project Operations Plan for Site Investigations and Remedial Investigations (ABB-ES, 1997) was prepared and implemented to ensure that all consultants planned and executed field activities in a manner consistent with Naval Facilities Engineering Command Southeast (NAVFAC SE) (then known as Southern Division) and regulatory requirements. This investigation generally followed the methods and procedures described in the Project Operations Plan (POP) but implemented alternate methods and procedures, where applicable, in accordance with more recent guidance published by FDEP and United States Environmental Protection Agency (USEPA) as follows:

- Region 4, Environmental Investigations Standard Operating Procedures and Quality Assurance Manual (EISOPQAM), (USEPA, 2001a).
- FDEP Standard Operating Procedures for Laboratory Operations and Sample Collection Activities, 2002.
- FDEP Technical Report: Development of Cleanup Target Levels (CTLs) for Chapter 62-777, FAC., (2005).

Health and safety aspects of work performed by TtNUS at NTC Orlando were controlled in accordance with the *Health and Safety Plan for Groundwater Investigation at Operable Unit 4* (TtNUS, 2008).

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## **2.0 ENVIRONMENTAL SETTING**

### **2.1 SURFACE FEATURES AND TOPOGRAPHY**

OU 4 comprises 13.8 acres, of which 2.1 acres are part of the eastern portion of Lake Druid. The remaining 11.7 acres lie to the east of the lake. Approximately 9.2 acres are developed, and 2.5 acres are wooded land. Some of the natural vegetation at the site (east of Lake Druid) has been replaced with phytoremediation plantings (Figure 1-2). The developed area consists of the former laundry/dry cleaning facility (former Building 1100), warehouses, roadways, parking lots, and cleared land. Elevations at the site range from 100 to 113 feet amsl with a westward slope toward Lake Druid.

### **2.2 LAND USE**

Current land use adjacent to the northern boundary of OU 4, surrounding Lake Druid to the west, and along the southwestern border of the site, is residential. Adjacent properties along the southeastern corner and entire eastern boundary are commercial. The site is currently not used but anticipated future land use at OU 4 is commercial/industrial and recreational (in accordance with the transfer deed restrictions).

### **2.3 SITE GEOLOGY AND HYDROGEOLOGY**

The surficial aquifer at OU 4 is unconfined, extends from the ground surface to approximately 70 feet bgs, and is primarily composed of unconsolidated, poorly sorted, medium dense to dense, fine-grained quartz sand with varying amounts of silt and clay. Contained within the surficial aquifer at OU 4 is a partially cemented layer (sometimes referred to as hard pan) located approximately 15 to 20 feet bgs, with varying thicknesses that average approximately 5 feet. Although it acts as an aquitard, this hard pan layer does not act as a hydraulic or chemical confining layer or barrier. Groundwater flow in the surficial aquifer is predominantly horizontal and westerly toward Lake Druid. There is, however, a downward component of flow that is interpreted from a measured site-wide downward hydraulic gradient between shallow and deep wells. As a result, the entire thickness of the surficial sand (from the water table to the top of the Hawthorn Group) is available for the potential transport of contaminants. The base of the surficial aquifer is defined by the upper clay of the underlying Hawthorn Group (TtNUS, 2009b).

The upper portion of the Hawthorn Group at OU 4 contains upper and lower clay layers, upper Hawthorn clay (UHC) and lower Hawthorn clay (LHC), separated by a WBZ comprised of phosphatic mostly fine-grained sands, carbonate shell beds, and silty and clay-rich interbeds. The UHC occurs at a depth of approximately 56 to 70 feet bgs, ranges from about 6 to 36 feet in thickness, and consists of two clay units separated by a layer of loose, coarse to medium-grained shell hash at most boring locations at OU 4. This clay marks the bottom of the overlying surficial aquifer and acts to confine the underlying WBZ (TtNUS, 2009b).

Below the UHC lies a WBZ consisting of approximately 30 to 60 feet of sand interbedded with silty sand, clayey sand, and shell layers. Water levels from monitoring wells completed in the Hawthorn WBZ indicate that the groundwater flow direction is generally north. Groundwater elevations in the Hawthorn wells, at approximately 100 feet amsl, are approximately 3 to 5 feet lower than those historically observed in the overlying surficial aquifer, demonstrating a downward gradient from the surficial aquifer to the Hawthorn WBZ. The Hawthorn WBZ is considered a semi-confined aquifer system, which implies some hydraulic connection with the overlying surficial aquifer. A groundwater plume containing CVOCs was detected near the middle of the WBZ within a layer of relatively permeable sediments (sand, pebbles, and shells) in wells screened between 100 to 120 feet bgs (TtNUS, 2009b).

### 3.0 INVESTIGATION ACTIVITIES

Additional investigation of the upper Hawthorn Group was performed by TtNUS between September 2008 and March 2009. Initial field activities were performed between September 29 and October 3, 2008. Installation and sampling of off-site nested monitoring wells OLD-13-81D and OLD-13-82D was conducted in March 2009. The investigation period of performance is summarized below.

**TABLE 3-1**  
**SUMMARY OF PERIOD OF PERFORMANCE AND ASSOCIATED ACTIVITY**  
**NAVAL TRAINING CENTER**  
**ORLANDO, FLORIDA**

Period of Performance	Activity
<b>Groundwater Sampling of Select CMT wells</b>	
September 29 – October 3, 2008	Sampled all channels of CMT wells OLD-13-68D, OLD-13-69D, and OLD-13-70D for CVOCs.
<b>Off-Site Access</b>	
March 2, 2009	Obtained authorization for off-site access from Audubon Place City Condominiums north of OU 4.
<b>Soil Boring Advancement</b>	
March 9 – March 10, 2009	Advanced soil boring SB08. Continuous soil coring performed from 55 to 125 feet bgs.
<b>Well Installation</b>	
March 10, 2009	Installed 1-inch nested monitoring wells OLD-13-81D screened 97 to 102 feet bgs and OLD-13-82D screened 120 to 125 feet bgs.
<b>Groundwater Sampling and Water Level Measurements</b>	
March 16, 2009	Performed synoptic water level measurement in Hawthorn WBZ wells OLD-13-58D through OLD-13-70D, OLD-13-81D, and OLD-13-82D. Sampled wells OLD-13-81D and OLD-13-82D for CVOCs.
<b>Surveying</b>	
April 17, 2009	Surveyed horizontal locations and vertical tops of casing and adjacent ground surface elevations of wells OLD-13-81D and OLD-13-82D.

#### 3.1 GROUNDWATER SAMPLING

All six channels of CMT wells OLD-13-68D, OLD-13-69D and OLD-13-70D were sampled for CVOCs between September 29 and October 3, 2008. Monitoring wells OLD-13-81D and OLD-13-82D were sampled for CVOCs on March 16, 2009. Each well was purged and sampled in accordance with the Work Plan (TtNUS, 2006), and the samples were analyzed by ENCO Laboratories located in Orlando, Florida, with standard turnaround time. The groundwater sampling logs are provided in Appendix A.

### **3.2 SOIL BORING ADVANCEMENT**

Soil boring SB08 is located approximately 191 feet north of well OLD-13-69D on property owned by the Audubon Place City Condominiums. The location of SB08 was based on observations of groundwater flow direction in Hawthorn Group wells, analytical results of groundwater samples collected from monitoring wells along the northern property line, particularly well OLD-13-69D, and preferences of the Audubon Place City Condominium board.

The boring was advanced on March 9 and 10, 2009, using a Boart-Longyear Mini-Sonic drilling rig. A 6-inch-outer by 4-inch-inner diameter steel drill casing was used to advance the borehole. Continuous soil cores were collected at 5-foot intervals beginning at a depth of 55 feet bgs to a total depth of 125 feet bgs to evaluate the subsurface lithology of the Hawthorn WBZ. The target depths for the wells to be constructed in the borehole were projected based on groundwater contamination data from well OLD-13-66D located near the source area beneath the former laundry facility (Building 1100) and well OLD-13-69D located along the northern property line. Channel 4 of the CMT wells installed at both of these locations had the greatest PCE concentration associated with a zone of gravelly shells and sand within the WBZ at an elevation of approximately 7 feet amsl (or 103 to 105 feet bgs). At well OLD-13-66D, the gravelly shell layer was underlain by a thin zone of clay. The new borehole location was estimated to have a ground surface elevation approximately 3 feet lower than wells OLD-13-66D and OLD-13-69D; therefore, the target depth for the upper well was estimated to be approximately 100 ft bgs. The depth for the lower well was expected to be 10 to 15 feet below the target depth, near the bottom of the WBZ.

At the completion of the soil boring, the sonic drill casing was left in the hole to provide a temporary casing through which well construction was performed; therefore a surface casing was not installed. The soil boring log for SB08 is included in Appendix B.

### **3.3 NESTED WELL INSTALLATION**

A pair of nested 1-inch monitoring wells with pre-packed screens, OLD-13-81D and -82D, were installed in borehole SB08 on March 10, 2009. Prior to well installation, the borehole was sounded to verify depth. Evaluation of core samples indicated that the deeper zone well (OLD-13-82D) should be screened between 115 and 120 feet bgs in what was observed to be a permeable sand interval immediately above a clayey sand and clay interval (at 123 feet bgs) that correlated with the LHC (bottom of the WBZ). Bentonite chips were added to the bottom of the borehole and allowed to hydrate until a borehole depth of 121 feet bgs was achieved. A 1-foot layer of filter sand was then placed above the base bentonite seal. The lower well was then installed with a 5-foot-long by 1-inch-diameter 0.010-inch slotted pre-packed well screen threaded to Schedule 40 polyvinyl chloride (PVC) riser that was lowered into the borehole to a depth of 120 feet bgs. A 20/30 grade silica sand pack was then placed in the well annulus around the

pre-packed screen to 2 feet above the well screen. All well materials were placed through the drill casing, which provided a tremie pipe that was retracted as needed during the installation process.

Evaluation of core samples indicated that the shallower zone well (OLD-13-81D) should be screened between 97 and 102 feet bgs at the bottom of a sand interval that contained a few shells and that graded downward into clayey sand. The lithology and elevation of this interval was consistent with the zone of groundwater contamination observed on the OU 4 property boundary. Bentonite chips were added and allowed to hydrate until a borehole depth of 103 feet bgs was achieved. A 1-foot layer of filter sand was then placed above the intermediate bentonite seal. A 5-foot-long by 1-inch-diameter 0.010-inch slotted pre-packed well screen was threaded to Schedule 40 PVC riser and lowered into the borehole to a depth of 102 feet bgs. A 20/30 grade silica sand pack was then placed in the well annulus around the pre-packed screen to 2 foot above the well screen. A 5-foot-thick primary bentonite seal was then placed above the filter sand. All well materials were placed through the drill casing, which provided a tremie pipe that was retracted as needed during the installation process. The remainder of the borehole was filled with a 20:1 cement/bentonite grout using a small-diameter tremie pipe. Both wells were completed within a single flush-mounted manhole and completed to grade.

Well installation was conducted in accordance with St. Johns River Water Management District regulations (Chapter 40C-3, Florida Administrative Code) described in Section 2.3.1 of Addendum No. 1 to the Work Plan for Operable Unit 4, (TtNUS, 2009a). The well locations and top of casing elevations were surveyed by a Florida-licensed surveyor following installation to the North American Datum (NAD) 83 SPC FL East and the National Geodetic Vertical Datum (NGVD) 1929. Well completion logs and survey data are provided in Appendix B.

### **3.4 WELL DEVELOPMENT**

Well development commenced immediately upon completion of the upper primary bentonite seal, but prior to extraction of the sonic drill casing and prior to installation of the cement/bentonite grout. This was done to achieve well completion and facilitate noise abatement and removal of drilling equipment from the residential property as quickly as possible. The sonic casing was temporarily left in place to the top of the bentonite seal to provide borehole stability but did not interfere with well development. Development began by inserting polyethylene tubing into each well with a 1-inch-diameter Q-Water check/surge valve attached to the lower end of the tubing. The tubing and valve were used to surge the well during initial pumping. A peristaltic pump was used to pump the deeper well (OLD-13-82D), and a small centrifugal pump was used to pump the shallower well (81D). The initial depth to water in both wells ranged between 6 to 10 feet bgs, and both wells contained less than 5 gallons in the water column. The development flow rate for deep well OLD-13-82D began around 100 milliliters per minute (ml/min) using the peristaltic pump and was increased to 230 ml/min until approximately 12 gallons of water was

removed after 2.5 hours of pumping. The final 2 gallons of water were removed from the deep well using the centrifugal pump, for a total of 14 gallons removed over approximately 3 hours of development. The development flow rate for shallow well OLD-13-81D began around 250 ml/min using the centrifugal pump and was increased to 880 ml/min until approximately 18 gallons of water was removed after approximately 2 hours of pumping. Development for both wells was halted when the following occurred:

- Three well volumes were removed
- Water clarity improved significantly and became asymptotic
- Little sediment or suspended particles were observed in samples of the development water

Following completion of well development, the remaining well annulus was filled with cement/bentonite grout using a tremie pipe as the sonic drill casing was retrieved.

### **3.5 INVESTIGATION - DERIVED WASTE MANAGEMENT**

Drill cuttings, purge water, and decontamination water were collected and containerized in Florida Department of Transportation (DOT)-approved (Specification 17C) 55-gallon drums for subsequent disposal by a licensed waste contractor. Two drums of drill cuttings and five drums of purge, development, and decontamination water were subsequently disposed by a licensed waste transportation and disposal company, American Compliance Technologies, Inc., of Bartow, Florida. Waste profile, manifests, and disposal documentation is provided in Appendix C.

## **4.0 INVESTIGATION RESULTS**

The focus of this supplemental investigation was to further evaluate the lateral and vertical extent of groundwater contamination in the Hawthorn WBZ and determine if the target contaminants have migrated north of the OU 4 property boundary.

### **4.1 HAWTHORN HYDROGEOLOGY**

Previous investigation of the Hawthorn included advancement of soil boring SB01 to a total depth of 275 feet bgs to characterize the geology to the top of the Floridan aquifer. No significant WBZ (saturated materials with a thickness greater than 5 feet) was observed below the LHC, and photoionization detector (PID) screening of soil samples below the LHC did not indicate the presence of VOC contamination (TtNUS 2009b). Previous investigations also included installation of seven 2-inch-diameter monitoring wells (OLD-13-58D through -64D) screened near the center of the Hawthorn WBZ, and six CMT wells (OLD-13-65D through -70D). Each CMT well was constructed with six channels screened at five different depths within the WBZ; the uppermost channel was screened near the bottom of the overlying surficial aquifer. The potentiometric surface of groundwater in each Hawthorn well rises above the screened interval and UHC and is encountered approximately 5 to 13 feet bgs (TtNUS, 2009b).

#### **4.1.1 Groundwater Flow Direction**

The groundwater flow direction for the Hawthorn WBZ was determined by measuring water levels in wells screened within the WBZ between the UHC and LHC, plotting the groundwater elevation for each well on a site map, and contouring the elevation data from wells screened at similar elevations to represent the Hawthorn potentiometric surface across the site. The groundwater flow direction was then estimated based on the direction of groundwater flow lines drawn perpendicular to the potentiometric surface contours. The top of each well casing has been surveyed with respect to NGVD 1929 vertical elevation datum, and the groundwater elevation in each well was determined by subtracting the measured depth to water from the top of casing elevation. Water levels in monitoring wells OLD-13-58D through OLD-13-64D, CMT wells OLD-13-65D through OLD-13-70D, and nested wells OLD-13-81D and OLD-13-82D were measured on March 16, 2009. Water table elevation data are presented in Table 4-1. As illustrated on Figure 4-1, predominant groundwater flow direction for the Hawthorn WBZ is to the north.

#### **4.1.2 Groundwater Gradient**

The average horizontal groundwater gradient in the WBZ across the site was calculated from the groundwater elevations measured in monitoring wells completed at similar elevations and in similar lithologies. The groundwater flow gradient was determined using the following equation (Freeze and Cherry, 1979):

$$i = \frac{h_1 - h_2}{d}$$

where:

$i$  = hydraulic gradient

$h_1$  = water elevation at point 1, the highest value

$h_2$  = water elevation at point 2, the lowest value

$d$  = horizontal distance between point 1 and point 2 parallel to the direction of groundwater flow

The highest and lowest groundwater elevation values measured in the WBZ monitoring wells were used to determine the difference in groundwater elevation across the off site area. The horizontal distance between the high and low groundwater elevation points was measured parallel to the estimated groundwater flow direction.

On March 16, 2009, the groundwater elevation along the northern property line at well OLD-13-69D (channel 4, 97.27 feet amsl) was 0.52 foot higher than the downgradient well OLD-13-81D (96.75 feet amsl) located off site to the north of the property line. The horizontal distance between these two wells is approximately 191 feet. These data result in a calculated hydraulic gradient of 0.003, which is consistent with the average on-site gradient of 0.002 previously reported for the Hawthorn WBZ (TtNUS, 2009b).

#### 4.1.3 Groundwater Flow Velocity

The sequence of sediments in the Hawthorn WBZ represents a porous permeable medium for which Darcy's Law is deemed applicable. Using this law, the groundwater flow velocity is directly proportional to the hydraulic gradient and is inversely proportional to the effective porosity. Using Darcy's Law, the average linear groundwater velocity may be calculated using the following equation (Freeze and Cherry, 1979):

$$V = \frac{K \times i}{\eta}$$

where:

$V$  = average linear groundwater velocity

$K$  = bulk horizontal hydraulic conductivity

$i$  = hydraulic gradient

$n$  = effective porosity of the aquifer

Using the geometric mean  $K$  value of 3.6 feet per day (TtNUS, 2009b), the horizontal gradient of 0.003, and an assumed effective porosity of 0.3, the calculated average linear groundwater velocity in the WBZ is 0.036 feet per day, or 13.1 feet per year.

#### 4.2 GROUNDWATER ANALYTICAL SUMMARY

A total of 20 groundwater samples, plus two duplicates, were collected from selected Hawthorn wells during this investigation. The sample events were conducted from September 29 through October 3, 2008, and on March 16, 2009. Groundwater samples were collected from three six-channel CMT wells located along the northern site boundary and from the two newly-installed, off site, 1-inch-diameter nested monitoring wells located north of OU 4. Groundwater samples were submitted to ENCO Laboratory for analysis of CVOCs. Groundwater sampling pertinent to this investigation was also conducted by CH2MHill at the request of the Navy and as part of on-going semi-annual groundwater sampling for OU 4. The July 2009 results were preliminary data at the time of this report. A summary of detected analytical results for the 2008 and 2009 sampling events is presented in Table 4-2. A complete analytical results table for validated data only is included in Appendix D.

As presented in Table 4-2, PCE, TCE, cDCE, and VC were detected in groundwater samples collected from channel #4 of CMT monitoring well OLD-13-69D at concentrations greater than GCTLs. Groundwater samples from channel 5 of CMT well OLD-13-69D also had PCE, TCE, and cDCE at concentrations exceeding GCTLs, and a single sample from channel #4 of well OLD-13-70 had a marginal exceedance for TCE only. No CVOCs were detected in the off site downgradient groundwater samples collected from newly installed wells OLD-13-81D or OLD-13-82D. The detected CVOCs are shown on Figure 4-2.

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## 5.0 CONCLUSIONS AND RECOMMENDATIONS

### 5.1 CONCLUSIONS

Groundwater from the Hawthorn WBZ along a segment of the northern property line of OU 4, in the area of well OLD-13-69D, was found to contain concentrations of CVOCs, specifically PCE, TCE, cDCE, and VC, in excess of GCTLs (see Figure 4-2). The maximum CVOC concentrations were detected in CMT channel 4 (7 to 12 feet amsl) near the middle of the Hawthorn WBZ. Samples collected in January and April 2008, prior to this investigation, showed an increasing PCE concentration trend suggesting that off-site plume migration was occurring. Sampling conducted during this investigation in October 2008 and January 2009 by CH2MHill showed that PCE concentrations continued to increase, with a maximum estimated PCE concentration of 6,070 µg/L. However, the most recent sample collected by CH2MHill in July 2009 indicated a decrease in PCE concentration (4,900 µg/L) at the northern property line. Concentrations of TCE, cDCE, and VC were an order of magnitude or more less than concentrations of PCE; however, concentrations of these chemicals exceeded GCTLs. Concentration trends for TCE and cDCE also increased during this investigation, similar to PCE. CMT channel 3 (22 to 27 feet amsl) at well OLD-13-69D had no exceedances during the August 2006 and October 2008 sampling events. CMT channel 5 (-3 to 2 feet amsl) did not have any exceedances of CVOCs in 2006 but did have exceedances and increasing concentrations of PCE, TCE, and cDCE in the samples collected between April 2008 and January 2009. These data suggest some vertical migration (deepening) of the CVOC plume at the property line.

Well OLD-13-68D located 115 feet east of OLD-13-69D along the northern property line, has had no exceedances of CVOCs during any of the investigations conducted to date. Well OLD-13-70D, located 85 west of well OLD-13-99D along the northern property line, had a single marginal exceedance of the TCE GCTL in January 2008 (4.8 µg/L GCTL of 3 µg/L), but was not compared to the TCE detected in this well in October 2008.

No CVOCs were detected in groundwater samples collected from the newly installed downgradient/off site monitoring wells OLD-13-81D or OLD-13-82D during the March and July 2009 sampling events. These data confirm that the lateral extent of the CVOC plume that exists at an elevation of approximately 7 to 12 feet amsl at the site extends less than 190 feet north of the property line and that the plume does not exist at the bottom of the WBZ (elevation of approximately -10 to -13 feet amsl).

The northerly groundwater flow direction, hydraulic gradient, and flow velocity within the WBZ support the potential for plume migration to the north within the Hawthorn WBZ. Based on the analytical data presented herein, the downgradient extent of the contaminant plume has been delineated and is within the existing monitoring well network.

## 5.2 RECOMMENDATIONS

The CVOC plume along the northern OU 4 perimeter is currently delineated. However, as a result of the increase in CVOC concentrations in northern boundary well OLD-13-69D, continued monitoring of groundwater quality in the plume source area (OLD-13-66D), along the northern OU 4 boundary (OLD-13-68D, -69D, and -70D), and off site to the north (OLD-13-81D and -82D) should be conducted. Based on the estimated groundwater flow velocity (13.1 feet per year) and predicted contaminant retardation, a semi-annual sample frequency is deemed adequate to monitor the plume.

## REFERENCES

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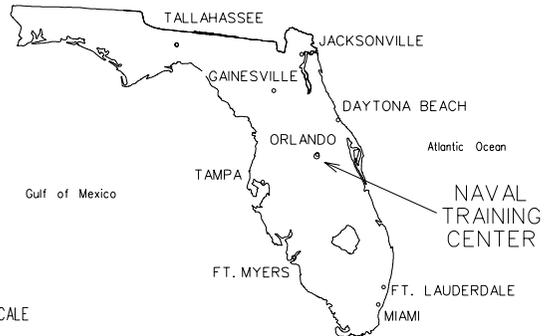
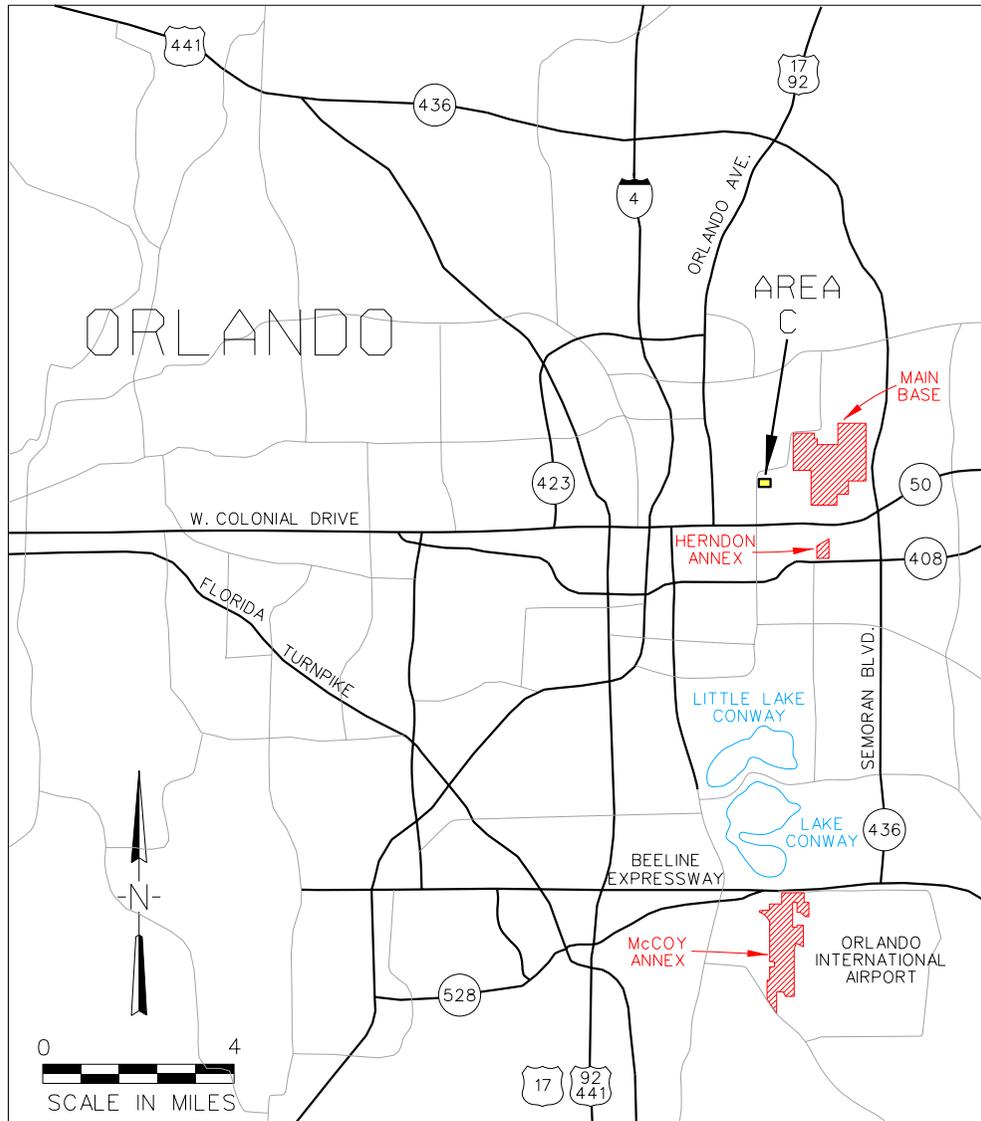
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USEPA, 2001a. Environmental Investigations Standard Operating Procedures and Quality Assurance Manual, Region 4.

## FIGURES



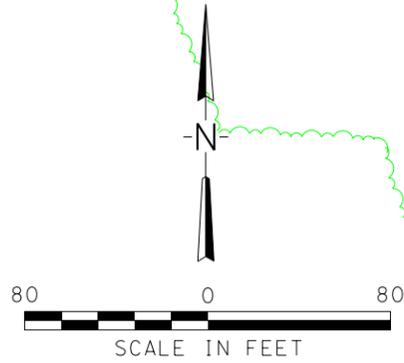
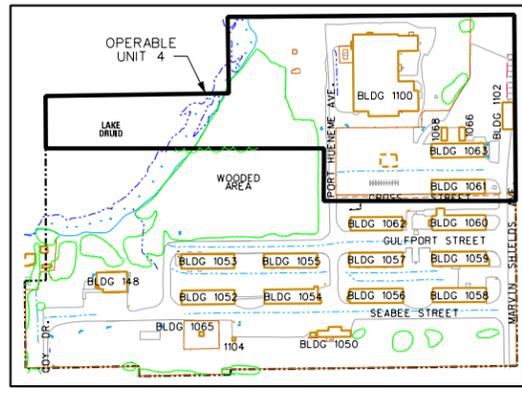
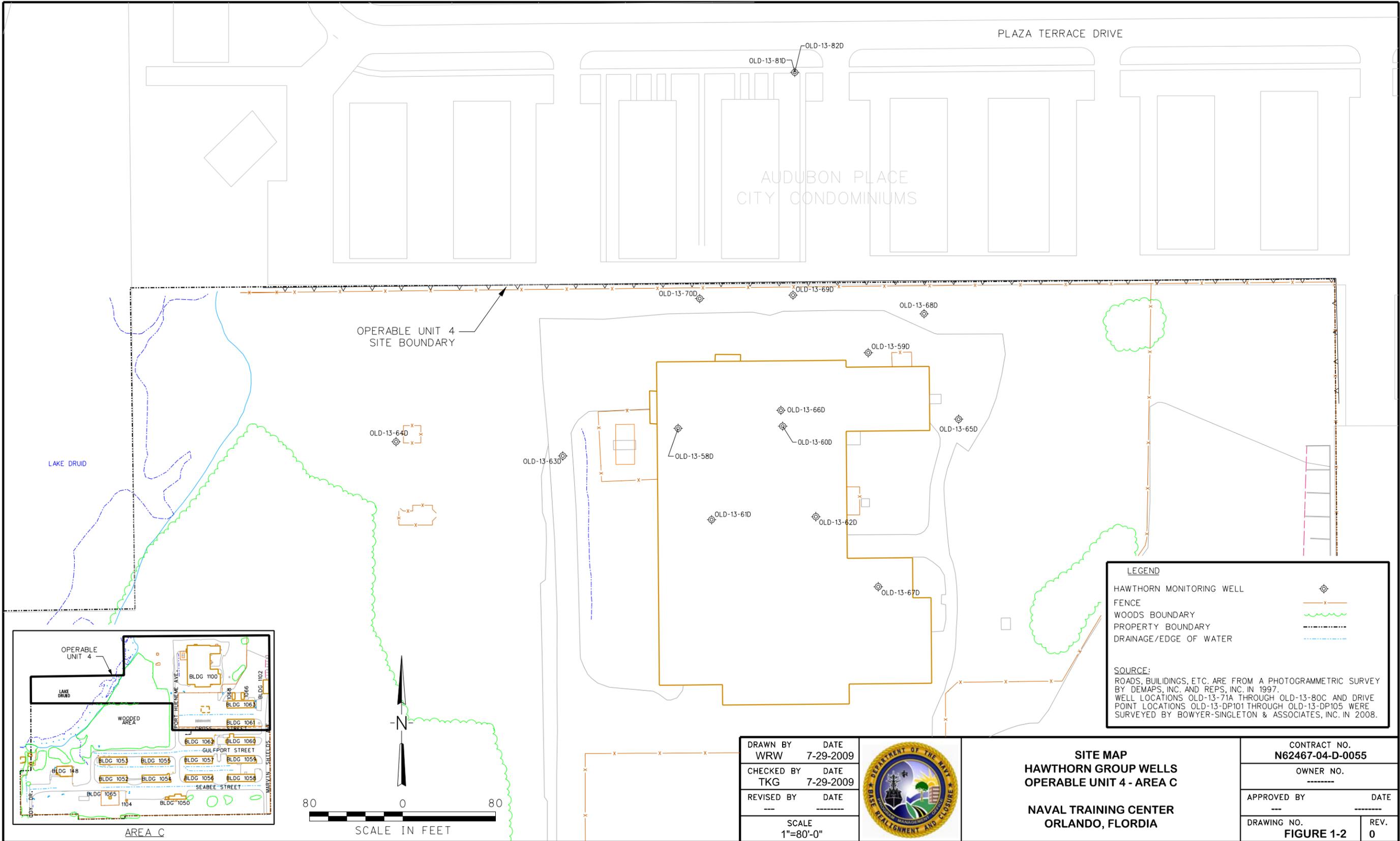
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REVISED BY ---	DATE -----
SCALE AS NOTED	



**SITE LOCATION MAP  
AREA C**

**NAVAL TRAINING CENTER  
ORLANDO, FLORIDA**

CONTRACT NO. <b>N62467-04-D-0055</b>	
OWNER NO. -----	
APPROVED BY ---	DATE -----
DRAWING NO. <b>FIGURE 1-1</b>	REV. <b>0</b>



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CHECKED BY TKG	DATE 7-29-2009
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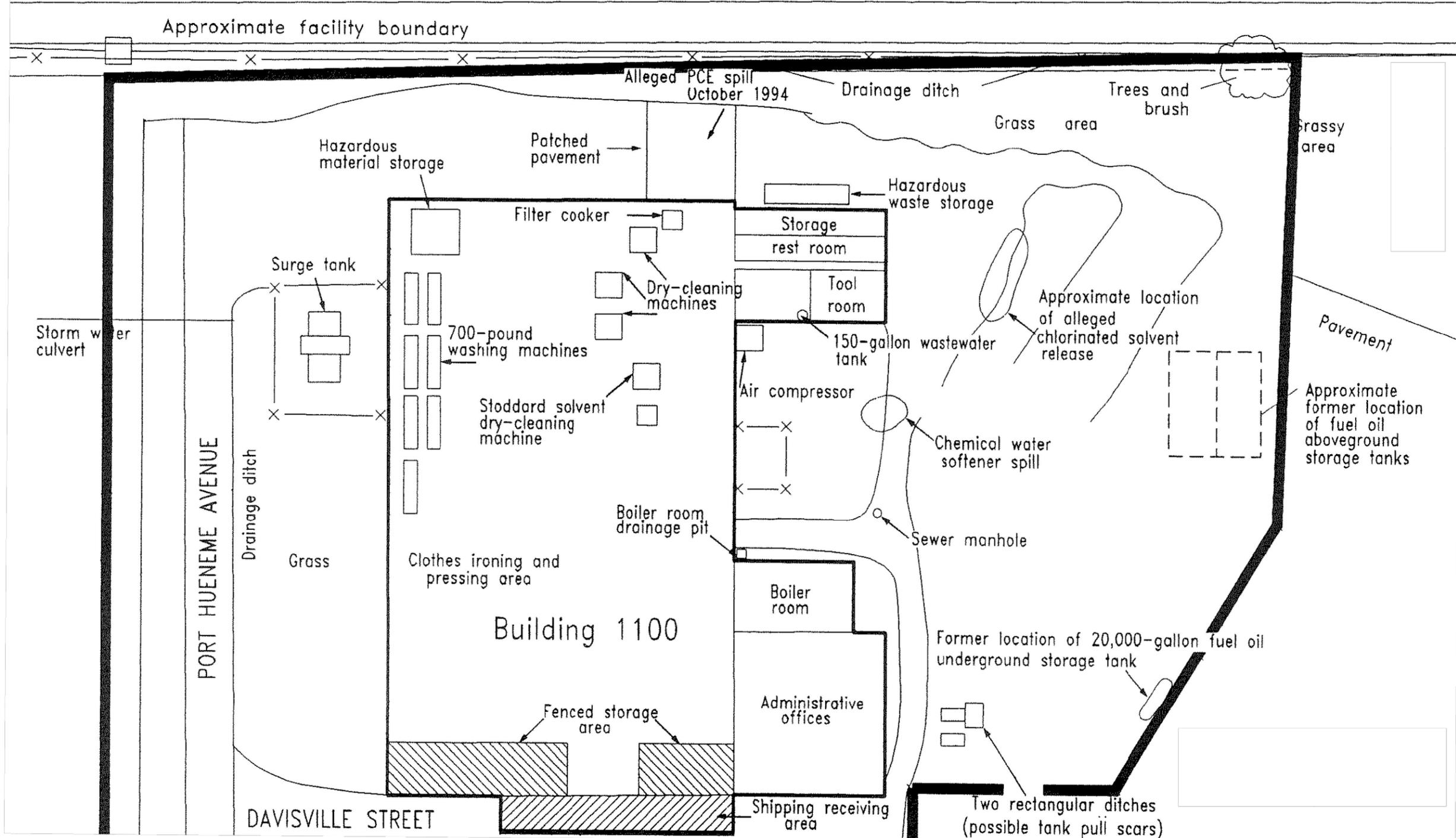


**SITE MAP  
HAWTHORN GROUP WELLS  
OPERABLE UNIT 4 - AREA C**

**NAVAL TRAINING CENTER  
ORLANDO, FLORIDA**

CONTRACT NO. <b>N62467-04-D-0055</b>	
OWNER NO. -----	
APPROVED BY ---	DATE -----
DRAWING NO. <b>FIGURE 1-2</b>	REV. <b>0</b>

CAD FILE NO./DATE: P:\Oak Ridge Drafting\NTC Orlando\ou4-00H.dgn



SOURCE:  
ENVIRONMENTAL BASELINE SURVEY (ABB-ES, 1994).



DRAWN BY	DATE
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CHECKED BY	DATE
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REVISED BY	DATE
ILG	07-15-08

SCALE  
AS NOTED

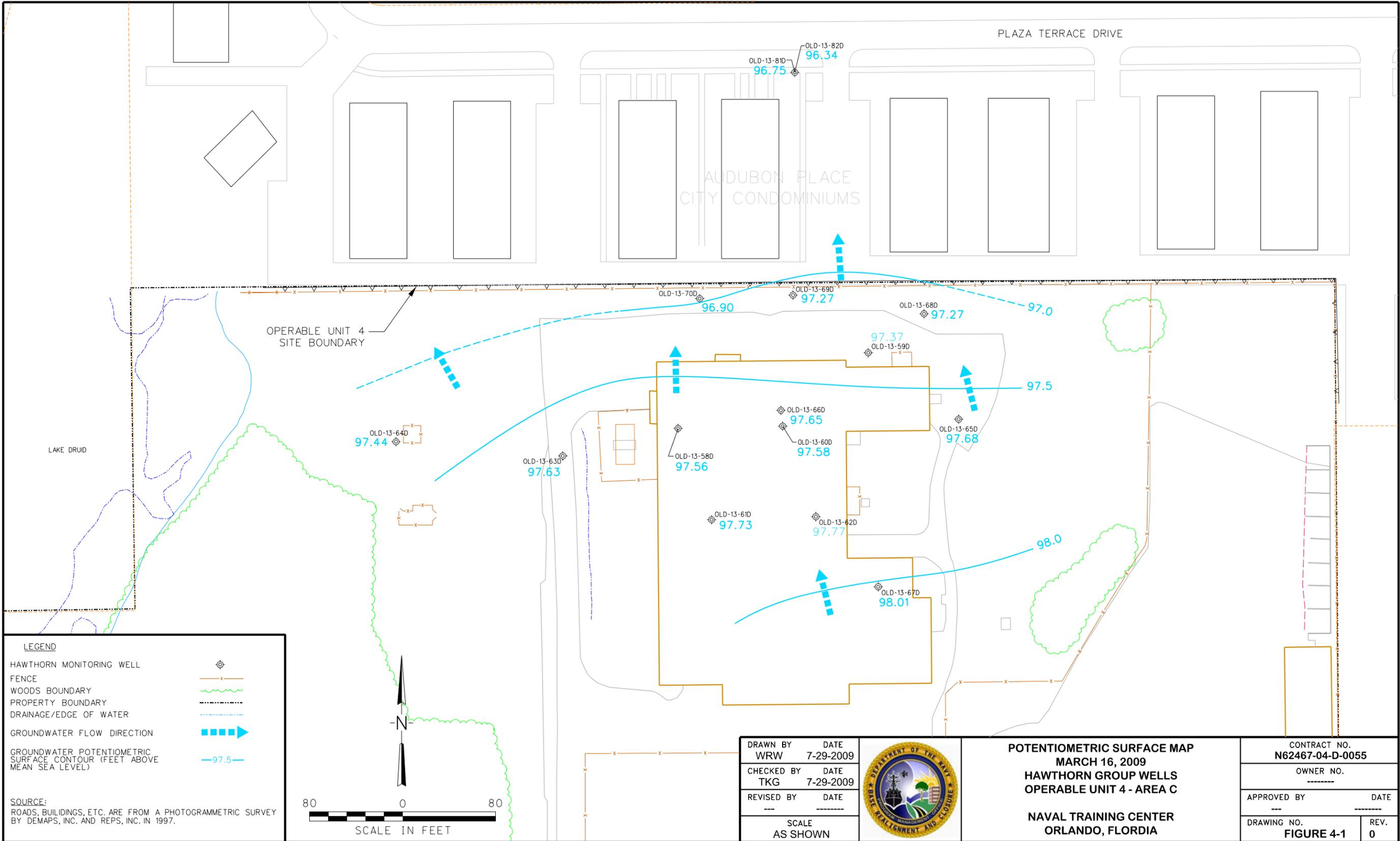


**FACILITY SCHEMATIC - BUILDING 1100  
FORMER DRY CLEANING FACILITY  
OPERABLE UNIT 4 - AREA C**

**NAVAL TRAINING CENTER  
ORLANDO, FLORIDA**

CONTRACT NO. <b>N62467-04-D-0055</b>	
OWNER NO. -----	
APPROVED BY ---	DATE -----
DRAWING NO. <b>FIGURE 1-3</b>	REV. <b>0</b>

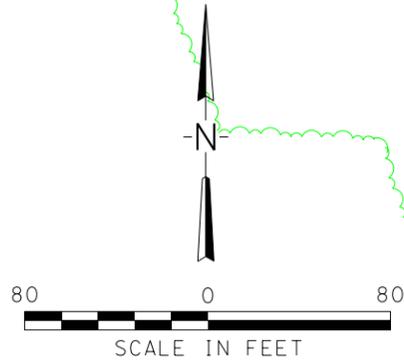
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**LEGEND**

- HAWTHORN MONITORING WELL
- FENCE
- WOODS BOUNDARY
- PROPERTY BOUNDARY
- DRAINAGE/EDGE OF WATER
- GROUNDWATER FLOW DIRECTION
- GROUNDWATER POTENTIOMETRIC SURFACE CONTOUR (FEET ABOVE MEAN SEA LEVEL)

SOURCE:  
ROADS, BUILDINGS, ETC. ARE FROM A PHOTOGRAMMETRIC SURVEY BY DEMAPS, INC. AND REPS, INC. IN 1997.

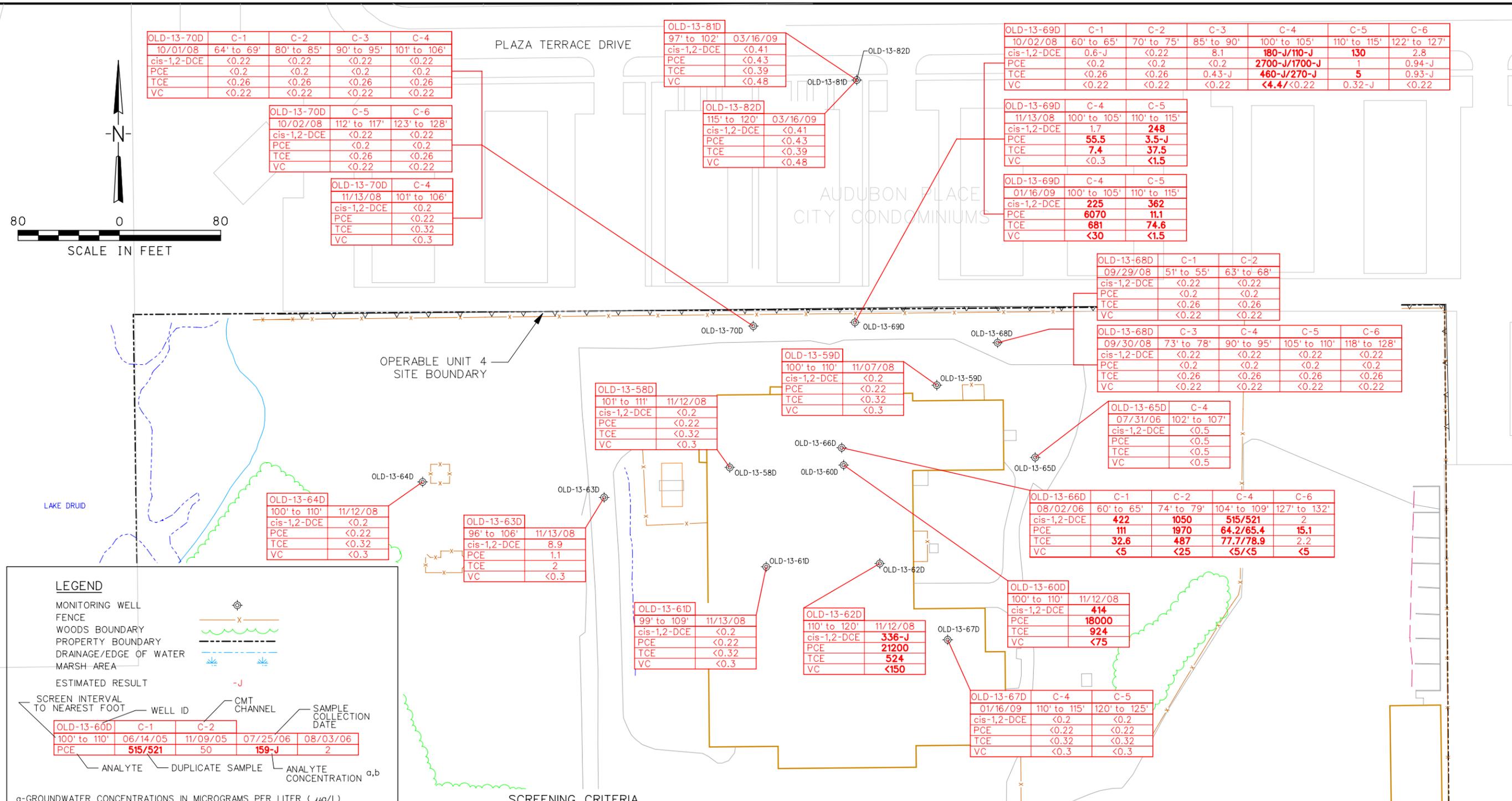


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REVISED BY ---	DATE -----
SCALE AS SHOWN	



**POTENTIOMETRIC SURFACE MAP**  
**MARCH 16, 2009**  
**HAWTHORN GROUP WELLS**  
**OPERABLE UNIT 4 - AREA C**  
  
**NAVAL TRAINING CENTER**  
**ORLANDO, FLORIDIA**

CONTRACT NO. <b>N62467-04-D-0055</b>	
OWNER NO. -----	
APPROVED BY ---	DATE -----
DRAWING NO. <b>FIGURE 4-1</b>	REV. <b>0</b>



**LEGEND**

- MONITORING WELL
- FENCE
- WOODS BOUNDARY
- PROPERTY BOUNDARY
- DRAINAGE/EDGE OF WATER
- MARSH AREA

ESTIMATED RESULT -J

SCREEN INTERVAL TO NEAREST FOOT

WELL ID

CMT CHANNEL

SAMPLE COLLECTION DATE

OLD-13-60D	C-1	C-2	07/25/06	08/03/06
100' to 110'	06/14/05	11/09/05	50	159-J
PCE	515/521	50	159-J	2

ANALYTE

DUPLICATE SAMPLE

ANALYTE CONCENTRATION a,b

a-GROUNDWATER CONCENTRATIONS IN MICROGRAMS PER LITER (µg/L)  
b-BOLD CONCENTRATION INDICATES RESULTS GREATER THAN OR EQUAL TO GCTL.

**NOTE**

RESULTS FROM NOVEMBER 2008 AND JANUARY 2009 ARE FROM CH2M HILL SEMI-ANNUAL MONITORING.

MOST RECENT RESULTS FOR WELLS OLD-13-65D AND OLD-13-66D ARE PROVIDED FROM 2006.

**SCREENING CRITERIA**

ABBREVIATION	ANALYTE	GCTL
cis-1,2-DCE	cis-1,2-DICHLOROETHENE	70
PCE	TETRACHLOROETHENE	3
TCE	TRICHLOROETHENE	3
VC	VINYL CHLORIDE	1

GCTL=GROUNDWATER CLEANUP TARGET LEVEL

DRAWN BY: WRW DATE: 7-29-2009

CHECKED BY: TKG DATE: 7-29-2009

REVISED BY: DATE:

SCALE: 1"=80'-0"



**CHLORINATED VOCs IN HAWTHORN GROUNDWATER OPERABLE UNIT 4 - AREA C SEPTEMBER 2008 TO MARCH 2009**

**NAVAL TRAINING CENTER ORLANDO, FLORIDA**

CONTRACT NO. N62467-04-D-0055

OWNER NO.

APPROVED BY: DATE:

DRAWING NO. FIGURE 4-2

REV. 0

## **TABLES**

TABLE 4-1

HAWTHORN MONITORING WELL CONSTRUCTION AND WATER LEVEL DATA  
OPERABLE UNIT 4

NAVAL TRAINING CENTER  
ORLANDO, FLORIDA

Well ID	Channel	Well Diameter (in.)	Total Depth (ft bgs)	Stickup (ft ags)	TOC Elevation (ft amsl)	Top Screen (ft bgs)	Bottom Screen (ft bgs)	Depth to Water (ft BTOC)						Groundwater Elevation (ft amsl)					
								10/26/04	05/05/05	06/01/05	04/01/06	7/25/06 08/2/06*	03/16/09	10/26/04	05/05/05	06/01/05	04/01/06	7/25/06 08/2/06*	3/16/09
OLD-13-58D	--	2	111	2.5	112.67	101	111	12.71	14.27	14.30	15.01	14.50	<b>15.11</b>	99.96	98.40	98.37	97.66	98.17	97.56
OLD-13-59D	--	2	110	-0.2	110.33	100	110	15.80	12.12	12.15	12.86	12.34	<b>12.96</b>	94.53	98.21	98.18	97.47	97.99	97.37
OLD-13-60D	--	2	110	2.6	113.67	100	110	13.69	15.24	15.30	15.99	15.64	<b>16.09</b>	99.98	98.43	98.37	97.68	98.03	97.58
OLD-13-61D	--	2	109	2.6	113.47	99	109	13.30	14.91	14.95	15.63	15.05	<b>15.74</b>	100.17	98.56	98.52	97.84	98.42	97.73
OLD-13-62D	--	2	120	2.6	113.63	110	120	13.51	15.00	15.07	15.78	FP	<b>15.86</b>	100.12	98.63	98.56	97.85	--	97.77
OLD-13-63D	--	2	106	-0.4	107.49	96	106	7.60	9.07	9.08	9.82	9.38	<b>9.86</b>	99.89	98.42	98.41	97.67	98.11	97.63
OLD-13-64D	--	2	110	-0.3	103.75	100	110	2.88	5.53	5.58	6.28	5.73	<b>6.31</b>	100.87	98.22	98.17	97.47	98.02	97.44
OLD-13-65D	1	1.9	130	-0.1	111.11	64	69	--	--	--	--	7.50	<b>8.12</b>	--	--	--	--	103.61	102.99
	2					75	80	--	--	--	--	8.21	<b>8.87</b>	--	--	--	--	102.90	102.24
	3					87	92	--	--	--	--	12.73	<b>13.36</b>	--	--	--	--	98.38	97.75
	4					102	107	--	--	--	--	12.79	<b>13.43</b>	--	--	--	--	98.32	97.68
	5					113	118	--	--	--	--	12.85	<b>13.48</b>	--	--	--	--	98.26	97.63
	6					125	130	--	--	--	--	12.96	<b>13.58</b>	--	--	--	--	98.15	97.53
OLD-13-66D	1	1.9	132	3.1	114.18	60	65	--	--	--	--	11.01	<b>11.55</b>	--	--	--	--	103.17	102.63
	2					74	79	--	--	--	--	15.46	<b>16.02</b>	--	--	--	--	98.72	98.16
	3					89	94	--	--	--	--	15.92	<b>16.45</b>	--	--	--	--	98.26	97.73
	4					104	109	--	--	--	--	15.95	<b>16.53</b>	--	--	--	--	98.23	97.65
	5					115	120	--	--	--	--	15.96	<b>16.52</b>	--	--	--	--	98.22	97.66
	6					127	132	--	--	--	--	16.11	<b>16.66</b>	--	--	--	--	98.07	97.52
OLD-13-67D	1	1.9	142	3.4	114.45	55	60	--	--	--	--	10.94	<b>11.65</b>	--	--	--	--	103.51	102.80
	2					68	73	--	--	--	--	15.39	<b>16.06</b>	--	--	--	--	99.06	98.39
	3					84	89	--	--	--	--	15.74	<b>16.35</b>	--	--	--	--	98.71	98.10
	4					110	115	--	--	--	--	15.82	<b>16.44</b>	--	--	--	--	98.63	98.01
	5					120	125	--	--	--	--	15.79	<b>16.47</b>	--	--	--	--	98.66	97.98
	6					137	142	--	--	--	--	15.79	<b>16.42</b>	--	--	--	--	98.66	98.03
OLD-13-68D	1	1.9	128	3.4	113.49	51	55	--	--	--	--	9.94	<b>10.56</b>	--	--	--	--	103.55	102.93
	2					63	68	--	--	--	--	10.05	<b>10.73</b>	--	--	--	--	103.44	102.76
	3					73	78	--	--	--	--	15.00	<b>15.59</b>	--	--	--	--	98.49	97.90
	4					90	95	--	--	--	--	15.58	<b>16.22</b>	--	--	--	--	97.91	97.27
	5					105	110	--	--	--	--	15.67	<b>16.29</b>	--	--	--	--	97.82	97.20
	6					118	128	--	--	--	--	16.61	<b>17.20</b>	--	--	--	--	96.88	96.29

TABLE 4-1

HAWTHORN MONITORING WELL CONSTRUCTION AND WATER LEVEL DATA  
OPERABLE UNIT 4

NAVAL TRAINING CENTER  
ORLANDO, FLORIDA

Well ID	Channel	Well Diameter (in.)	Total Depth (ft bgs)	Stickup (ft ags)	TOC Elevation (ft amsl)	Top Screen (ft bgs)	Bottom Screen (ft bgs)	Depth to Water (ft BTOC)						Groundwater Elevation (ft amsl)					
								10/26/04	05/05/05	06/01/05	04/01/06	7/25/06 08/2/06*	03/16/09	10/26/04	05/05/05	06/01/05	04/01/06	7/25/06 08/2/06*	3/16/09
OLD-13-69D	1	1.9	127	3.5	111.62	60	65	--	--	--	--	8.58	<b>9.20</b>	--	--	--	--	103.04	102.42
	2					70	75	--	--	--	--	10.86	<b>13.02</b>	--	--	--	--	100.76	98.60
	3					85	90	--	--	--	--	13.67	<b>14.26</b>	--	--	--	--	97.95	97.36
	4					100	105	--	--	--	--	13.74	<b>14.35</b>	--	--	--	--	97.88	97.27
	5					110	115	--	--	--	--	13.79	<b>14.40</b>	--	--	--	--	97.83	97.22
	6					122	127	--	--	--	--	14.21	<b>14.82</b>	--	--	--	--	97.41	96.80
OLD-13-70D	1	1.9	128	3.3	111.85	64	69	--	--	--	--	9.32	<b>9.29</b>	--	--	--	--	102.53	102.56
	2					80	85	--	--	--	--	13.30	<b>14.28</b>	--	--	--	--	98.55	97.57
	3					90	95	--	--	--	--	13.99	<b>14.55</b>	--	--	--	--	97.86	97.30
	4					101	106	--	--	--	--	14.01	<b>14.95</b>	--	--	--	--	97.84	96.90
	5					112	117	--	--	--	--	14.30	<b>14.58</b>	--	--	--	--	97.55	97.27
	6					123	128	--	--	--	--	13.96	<b>14.75</b>	--	--	--	--	97.89	97.10
OLD-13-81D	--	1	125	-0.4	106.72	97	102	--	--	--	--	--	<b>9.97</b>	--	--	--	--	--	96.75
OLD-13-82D	--	1	125	-0.4	106.70	115	120	--	--	--	--	--	<b>10.36</b>	--	--	--	--	--	96.34

ags - Above ground surface  
amsl - Above mean sea level  
bgs - Below ground surface  
BTOC - Below top of casing  
CMT - Continuous multi-channel tubing  
FP - Free product present  
ft - Feet  
in - Inches  
O.D. - Outer diameter  
PVC - Polyvinyl chloride  
TOC - Top of casing

2-Inch O.D. wells are constructed of Schedule 40 PVC riser and well screen; 1.9-inch O.D. wells are polyethelene CMT with stainless steel mesh screens.

\* CMT water levels and groundwater elevations shown for 7/25/06 were measured on 7/26/06 (70D) and 8/2/06; these data represent the best available site-wide synoptic elevation data for the Hawthorn water-bearing zone for this event.

TABLE 4-2

SUMMARY OF DETECTIONS HAWTHORN GROUNDWATER ANALYTICAL RESULTS  
OPERABLE UNIT 4

NAVAL TRAINING CENTER  
ORLANDO, FLORIDA

Page 1 of 6

Well ID	Florida GCTL (µg/l)	OLD1368D							
Top of Screen, ft bgs		51	63	73	73	90	105	105	105
Bottom of Screen, ft bgs		55	68	78	78	95	110	110	110
Sample Date		09/29/08	09/29/08	07/31/06	09/30/08	09/30/08	07/31/06	01/24/08	09/30/08
<b>Volatile Organics (µg/L)</b>									
1,1,2-Trichlorotrifluoroethane	210000							1 U	
1,1-Dichloroethene	7	0.5 U	1 U	0.5 U					
2-Butanone	4200	1.3 UR	1.3 UR	2.5 U	1.5 J	1.3 UR	2.5 U	10 UJ	1.3 UR
2-Hexanone	280	0.5 U	0.5 U	2.5 U	0.5 U	0.5 U	2.5 U	5 U	0.5 U
4-Methyl-2-Pentanone	560	0.67 UR	0.67 UR	2.5 U	0.67 UR	0.67 UR	2.5 U	5 U	0.67 UR
Acetone	6300	1.5 U	1.5 U	7.3 J	2.6 J	1.5 U	5 U	10 UJ	1.5 U
Benzene	1	0.3 U	0.3 U	0.5 U	0.3 U	0.3 U	0.5 U	1 U	0.3 U
Carbon Disulfide	700	0.22 U	0.22 U	1 U	0.5 J	0.22 U	1 U	1 U	0.22 U
Chloroform	70	0.27 U	0.27 U	3.2	0.27 U	0.27 U	0.5 U	1 U	0.27 U
cis-1,2-Dichloroethene	70	0.22 U	0.22 U	0.5 U	0.22 U	0.22 U	0.5 U	1 U	0.22 U
Tetrachloroethene	3	0.2 U	0.2 U	0.5 U	0.2 U	0.2 U	0.5 U	1 U	0.2 U
Toluene	40	0.26 U	0.26 U	0.5 U	0.26 U	0.26 U	0.5 U	1 U	0.26 U
trans-1,2-Dichloroethene	100	0.43 U	0.43 U	0.5 U	0.43 U	0.43 U	0.5 U	1 U	0.43 U
Trichloroethene	3	0.26 U	0.26 U	0.5 U	0.26 U	0.26 U	0.5 U	1 U	0.26 U
Vinyl Chloride	1	0.22 U	0.22 U	0.5 U	0.22 U	0.22 U	0.5 U	1 U	0.22 U

TABLE 4-2

SUMMARY OF DETECTIONS HAWTHORN GROUNDWATER ANALYTICAL RESULTS  
OPERABLE UNIT 4

NAVAL TRAINING CENTER  
ORLANDO, FLORIDA

Page 2 of 6

Well ID	Florida GCTL (µg/l)	OLD1368D				OLD1369D			
Top of Screen, ft bgs		118	118	60	70	85	85	100	100
Bottom of Screen, ft bgs		128	128	65	75	90	90	105	105
Sample Date		07/31/06	09/30/08	10/02/08	10/02/08	08/01/06	10/02/08	01/24/08	04/16/08
<b>Volatile Organics (µg/L)</b>									
1,1,2-Trichlorotrifluoroethane	210000							2 J	
1,1-Dichloroethene	7	0.5 U	1.6 J	2.3 U					
2-Butanone	4200	2.5 U	1.3 UR	14 J	1.4 J	2.5 U	92 J	50 UJ	20 U
2-Hexanone	280	2.5 U	0.5 U	1.5 J	0.5 U	2.5 U	3.5 J	25 U	29 U
4-Methyl-2-Pentanone	560	2.5 U	0.67 UR	0.67 UR	0.67 UR	2.5 U	0.67 UR	25 U	22 U
Acetone	6300	5 U	1.5 U	3 J	2.5 J	5 U	7.6	50 UJ	100 U
Benzene	1	0.5 U	0.3 U	0.3 U	0.3 U	0.5 U	0.3 U	5 U	2 U
Carbon Disulfide	700	1 U	0.33 J	0.22 U	0.45 J	1 U	0.75 J	5 U	2 U
Chloroform	70	0.5 U	0.27 U	0.27 U	0.27 U	0.65 J	0.27 U	5 U	2.1 U
cis-1,2-Dichloroethene	70	0.5 U	0.22 U	0.6 J	0.22 U	1	8.1	170	139
Tetrachloroethene	3	0.5 U	0.2 U	0.2 U	0.2 U	1.5	0.2 U	1500	1980
Toluene	40	0.5 U	0.26 U	0.26 U	0.26 U	0.5 U	0.26 U	5 U	2.7 U
trans-1,2-Dichloroethene	100	0.5 U	0.43 U	0.43 U	0.43 U	0.5 U	0.43 U	5 U	2 U
Trichloroethene	3	0.5 U	0.26 U	0.26 U	0.26 U	1.2	0.43 J	320	260
Vinyl Chloride	1	0.5 U	0.22 U	0.22 U	0.22 U	0.5 U	0.22 U	5 U	3.4 U

TABLE 4-2

SUMMARY OF DETECTIONS HAWTHORN GROUNDWATER ANALYTICAL RESULTS  
OPERABLE UNIT 4

NAVAL TRAINING CENTER  
ORLANDO, FLORIDA

Page 3 of 6

Well ID	Florida GCTL (µg/l)	OLD1369D						
		100	100	100	100	110	110	110
Top of Screen, ft bgs		105	105	105	105	115	115	115
Bottom of Screen, ft bgs								
Sample Date		10/3/2008	11/13/08	01/16/09	07/10/09*	08/01/06	04/16/08	10/03/08
<b>Volatile Organics (µg/L)</b>								
1,1,2-Trichlorotrifluoroethane	210000		0.34 U	34 U				
1,1-Dichloroethene	7	10U/ 1.2	0.54 U	54 U	<b>13.2 U</b>	0.5U/ 0.5U	1.7 J	0.87 J
2-Butanone	4200	39J/ 39J			120 U	2.5U/ 2.5U	4 U	120 J
2-Hexanone	280	18J/ 3.9J	5 UJ	500 U	60 U	2.5U/ 2.5U	5.7 U	0.5 U
4-Methyl-2-Pentanone	560	28J/ 0.67UR	2 U	200 U	50 U	2.5U/ 2.5U	4.4 U	0.67 UR
Acetone	6300	30U/ 7.1	10 J	1000 U	180 U	5.1J/ 5.1J	20 U	9.2
Benzene	1	6U/ 0.3U	0.4 U	40 U	<b>10 U</b>	0.5U/ 0.5U	0.4 U	0.3 U
Carbon Disulfide	700	4.4U/ 0.22U	0.4 U	40 U	11.4 U	1U/ 1U	0.4 U	0.22 U
Chloroform	70	5.4U/ 0.27U	0.28 U	28 U	14.1 U	1.6/ 1.5	0.42 U	0.27 U
cis-1,2-Dichloroethene	70	<b>180J/ 110J</b>	1.7	<b>225</b>	<b>149</b>	8.3/ 8.1	<b>167</b>	<b>130</b>
Tetrachloroethene	3	<b>2700J/ 1700J</b>	<b>55.5</b>	<b>6070</b>	<b>4390 J</b>	0.5U/ 0.5U	0.5 U	1
Toluene	40	5.2U/ 0.26U	0.35 U	35 U	10 U	0.5U/ 0.5U	0.54 U	0.26 U
trans-1,2-Dichloroethene	100	8.6U/ 0.44J	0.45 U	45 U	11.7 U	0.5U/ 0.5U	0.4 U	0.43 U
Trichloroethene	3	<b>460J/ 270J</b>	<b>7.4</b>	<b>681</b>	<b>611</b>	0.5U/ 0.5U	0.76 U	<b>5</b>
Vinyl Chloride	1	<b>4.4U/ 0.22U</b>	0.3 U	<b>30 U</b>	<b>13.8 U</b>	0.5U/ 0.5U	0.68 U	0.32 J

TABLE 4-2

SUMMARY OF DETECTIONS HAWTHORN GROUNDWATER ANALYTICAL RESULTS  
OPERABLE UNIT 4

NAVAL TRAINING CENTER  
ORLANDO, FLORIDA

Page 4 of 6

Well ID	Florida GCTL (µg/l)	OLD1369D					OLD1370D	
		110	110	110	122	122	64	80
Top of Screen, ft bgs		115	115	115	127	127	69	85
Bottom of Screen, ft bgs		11/13/08	01/16/09	07/10/09*	08/01/06	10/03/08	10/01/08	10/01/08
Sample Date								
Volatile Organics (µg/L)								
1,1,2-Trichlorotrifluoroethane	210000	1.7 U	1.7 U					
1,1-Dichloroethene	7	2.8 J	4.1 J	13.2 U	0.5 U	0.5 U	0.5 U	0.5 U
2-Butanone	4200			120 U	2.5 U	4.9 J	20 J	1.3 UR
2-Hexanone	280	25 U	25 U	60 U	2.5 U	0.5 U	7.4	0.5 U
4-Methyl-2-Pentanone	560	10 U	10 U	50 U	2.5 U	0.67 UR	1.1 J	0.67 UR
Acetone	6300	50 U	50 U	180 U	5 U	1.5 U	120	1.5 U
Benzene	1	2 U	2 U	10 U	0.5 U	0.3 U	0.3 U	0.3 U
Carbon Disulfide	700	2 U	2 U	11.4 U	1 U	0.27 J	1.3 J	0.22 U
Chloroform	70	1.4 J	1.4 J	14.1 U	0.75 J	0.27 U	0.27 U	0.27 U
cis-1,2-Dichloroethene	70	248 U	362 U	149	0.5 U	2.8	0.22 U	0.22 U
Tetrachloroethene	3	3.5 J	11.1	4390 J	0.5 U	0.94 J	0.2 U	0.2 U
Toluene	40	1.8 U	1.8 U	10 U	0.5 U	0.26 U	0.47 J	0.26 U
trans-1,2-Dichloroethene	100	2.3 U	2.3 U	11.7 U	0.5 U	0.43 U	0.43 U	0.43 U
Trichloroethene	3	37.5	74.6	611	0.5 U	0.93 J	0.26 U	0.26 U
Vinyl Chloride	1	1.5 U	1.5 U	13.8 U	0.5 U	0.22 U	0.22 U	0.22 U

TABLE 4-2

SUMMARY OF DETECTIONS HAWTHORN GROUNDWATER ANALYTICAL RESULTS  
OPERABLE UNIT 4

NAVAL TRAINING CENTER  
ORLANDO, FLORIDA

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Well ID	Florida GCTL (µg/l)	OLD1370D						
		90	101	101	101	101	112	123
Top of Screen, ft bgs								
Bottom of Screen, ft bgs								
Sample Date		10/01/08	07/31/06	01/24/08	10/01/08	11/13/08	10/02/08	10/02/08
<b>Volatile Organics (µg/L)</b>								
1,1,2-Trichlorotrifluoroethane	210000			1 U		0.34 U		
1,1-Dichloroethene	7	0.5 U	0.5 U	1 U	0.5U/ 0.5U	0.54 U	0.5 U	0.5 U
2-Butanone	4200	1.3 UR	2.5 U	10 UJ	1.3UR/ 1.3UR		1.3 UR	5.8 J
2-Hexanone	280	0.5 U	2.5 U	5 U	0.5U/ 0.5U	5 UJ	0.5 U	2.6 J
4-Methyl-2-Pentanone	560	0.67 UR	2.5 U	5 U	0.67UR/ 0.67UR	2 U	0.67 UR	0.74 J
Acetone	6300	1.5 U	5 U	10 UJ	1.5U/ 1.5U	1.5 U	2.9 J	12
Benzene	1	0.3 U	0.5 U	1 U	0.3U/ 0.3U	0.4 U	0.3 U	0.3 U
Carbon Disulfide	700	0.22 U	1 U	1 U	0.22U/ 0.22J	0.4 U	0.22 U	0.41 J
Chloroform	70	0.27 U	1.2	1 U	0.27U/ 0.27U	0.28 U	0.27 U	0.27 U
cis-1,2-Dichloroethene	70	0.22 U	0.5 U	1 U	0.22U/ 0.22U	0.2 U	0.22 U	0.22 U
Tetrachloroethene	3	0.2 U	0.5 U	4.8	0.2U/ 0.2U	0.22 U	0.2 U	0.2 U
Toluene	40	0.26 U	0.5 U	1 U	0.26U/ 0.26U	0.35 U	0.26 U	0.26 U
trans-1,2-Dichloroethene	100	0.43 U	0.5 U	1 U	0.43U/ 0.43U	0.45 U	0.43 U	0.43 U
Trichloroethene	3	0.26 U	0.5 U	0.23 J	0.26U/ 0.26U	0.32 U	0.26 U	0.26 U
Vinyl Chloride	1	0.22 U	0.5 U	1 U	0.22U/ 0.22U	0.3 U	0.22 U	0.22 U

TABLE 4-2

SUMMARY OF DETECTIONS HAWTHORN GROUNDWATER ANALYTICAL RESULTS  
OPERABLE UNIT 4

NAVAL TRAINING CENTER  
ORLANDO, FLORIDA

Page 6 of 6

Well ID	Florida GCTL (µg/l)	OLD1381D		OLD1382D	
Top of Screen, ft bgs		97	97	115	115
Bottom of Screen, ft bgs		102	102	120	120
Sample Date		3/16/09	07/10/09*	03/16/09	07/10/09*
<b>Volatile Organics (µg/L)</b>					
1,1,2-Trichlorotrifluoroethane	210000				
1,1-Dichloroethene	7	0.5 U	1.3 U	0.5 U	1.3 U
2-Butanone	4200	3.2 J	12 U	1.5 J	12 U
2-Hexanone	280	0.7 U	6 U	0.7 U	6 U
4-Methyl-2-Pentanone	560	1.5 U	5 U	1.5 U	5 U
Acetone	6300	1 U	18 U	1 U	18 U
Benzene	1	0.41 J	1 U	0.35 U	1 U
Carbon Disulfide	700	0.48 U	1.1 U	0.48 U	1.1 U
Chloroform	70	1.2	1.4 U	1	1.4 U
cis-1,2-Dichloroethene	70	0.41 U	1.4 U	0.41 U	1.4 U
Tetrachloroethene	3	0.43 U	1.7 U	0.43 U	1.7 U
Toluene	40	0.43 U	1 U	0.43 U	1 U
trans-1,2-Dichloroethene	100	0.47 U	1.2 U	0.47 U	1.2 U
Trichloroethene	3	0.39 U	1.3 U	0.39 U	1.3 U
Vinyl Chloride	1	0.48 U	1.4 U	0.48 U	1.4 U

bgs - Below ground surface  
 J - Estimated value  
 R - Rejected value  
 U - Less than laboratory method detection limit  
 µg/L - Micrograms per liter  
 Bold indicates non-detect result equal to or greater than GCTL.  
 Concentrations in micrograms per liter (µg/l).  
 Empty cells indicate parameter not analyzed.  
 Shaded cell indicates result equal to or greater than GCTL.  
 \* Results from July 2009 are preliminary and not yet validated.

**APPENDIX A**  
**GROUNDWATER SAMPLING LOGS**



# GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NTC ORLANDO - OU-4 Sample ID No.: NTC 13668D/09292008  
 Project No.: \_\_\_\_\_ Sample Location: OLD-13-68D-C-1  
 Sampled By: BP  
 C.O.C. No.: \_\_\_\_\_  
 Domestic Well Data  
 Monitoring Well Data  
 Other Well Type: \_\_\_\_\_  
 QA Sample Type: \_\_\_\_\_  
 Type of Sample:  
 Low Concentration  
 High Concentration

SAMPLING DATA:								
Date:	Color	pH	S.C.	Temp.	Turbidity	DO	Salinity	Other
<u>9/29/08</u>	(Visual)	(S.U.)	(mS/cm)	(°C)	(NTU)	(mg/l)	<u>1000</u>	<u>ORP</u>
Time: <u>16:40</u>								
Method: <u>reverse</u>	<u>clear</u>	<u>6.82</u>	<u>0.356</u>	<u>25.44</u>	<u>0.10</u>	<u>0.43</u>	<u>-148.2</u>	

PURGE DATA:								
Date:	Volume	pH	S.C.	Temp.	Turbidity	DO	Salinity	Other Time
<u>9/29/08</u>							<u>ORP</u>	
Method: <u>low flow</u>	<u>2500ml</u>	<u>6.85</u>	<u>0.366</u>	<u>25.56</u>	<u>0.11</u>	<u>0.63</u>	<u>-151.9</u>	<u>16:25</u>
Monitor Reading (ppm): <u>N/A</u>	<u>300ml</u>	<u>6.84</u>	<u>0.364</u>	<u>25.48</u>	<u>0.10</u>	<u>0.51</u>	<u>-149.9</u>	<u>16:28</u>
Well Casing Diameter & Material	<u>300ml</u>	<u>6.83</u>	<u>0.352</u>	<u>25.45</u>	<u>0.11</u>	<u>0.49</u>	<u>-153.2</u>	<u>16:31</u>
Type: <u>PMT</u>	<u>300ml</u>	<u>6.83</u>	<u>0.354</u>	<u>25.46</u>	<u>0.10</u>	<u>0.45</u>	<u>-149.7</u>	<u>16:34</u>
Total Well Depth (TD): <u>55</u>	<u>300</u>	<u>6.82</u>	<u>0.356</u>	<u>25.44</u>	<u>0.10</u>	<u>0.43</u>	<u>-148.2</u>	<u>16:37</u>
Static Water Level (WL): <u>8.41</u>								
One Casing Volume (gal/L):								
Start Purge (hrs): <u>16:00</u>								
End Purge (hrs): <u>16:37</u>								
Total Purge Time (min): <u>37</u>								
Total Vol. Purged (gal/L): <u>3.7L</u>								

SAMPLE COLLECTION INFORMATION:			
Analysis	Preservative	Container Requirements	Collected
<u>NOCs</u>	<u>HCl</u>	<u>3-46 ml Vials</u>	<input checked="" type="checkbox"/>

OBSERVATIONS / NOTES:

Circle if Applicable: MS/MSD Duplicate ID No.: \_\_\_\_\_ Signature(s): Gray Brogan



# GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NTC Orlando - 04 - 4 Sample ID No.: NTC13668D2092908  
 Project No.: \_\_\_\_\_ Sample Location: OLD-13-68D-C2  
 Domestic Well Data Sampled By: BB  
 Monitoring Well Data C.O.C. No.: \_\_\_\_\_  
 Other Well Type: \_\_\_\_\_ Type of Sample:  
 QA Sample Type: \_\_\_\_\_  Low Concentration  
 High Concentration

**SAMPLING DATA:**

Date:	<u>9/29/08</u>	Color	pH	S.C.	Temp.	Turbidity	DO	Salinity	Other
Time:	<u>17:</u>	(Visual)	(S.U.)	(mS/cm)	(°C)	(NTU)	(mg/l)	(%)	<u>ORP</u>
Method:	<u>reverse flow</u>	<u>clear</u>	<u>6.51</u>	<u>0.379</u>	<u>25.25</u>	<u>0.11</u>	<u>0.42</u>	<u>-126.5</u>	

**PURGE DATA:**

Date:	<u>9/29/08</u>	Volume	pH	S.C.	Temp.	Turbidity	DO	Salinity	Other
Method:	<u>low flow</u>	<u>4000 ml</u>	<u>6.50</u>	<u>0.377</u>	<u>25.26</u>	<u>0.15</u>	<u>0.69</u>	<u>-123.5</u>	<u>16:30</u>
Monitor Reading (ppm):	<u>-</u>	<u>300 ml</u>	<u>6.50</u>	<u>0.375</u>	<u>25.26</u>	<u>0.17</u>	<u>0.55</u>	<u>-125.2</u>	<u>17:33</u>
Well Casing Diameter & Material		<u>300 ml</u>	<u>6.50</u>	<u>0.376</u>	<u>25.24</u>	<u>0.12</u>	<u>0.48</u>	<u>-126.7</u>	<u>17:36</u>
Type: <u>CMT</u>		<u>300 ml</u>	<u>6.50</u>	<u>0.377</u>	<u>25.23</u>	<u>0.11</u>	<u>0.44</u>	<u>-127.5</u>	<u>17:39</u>
Total Well Depth (TD): <u>68</u>		<u>300 ml</u>	<u>6.51</u>	<u>0.379</u>	<u>25.25</u>	<u>0.11</u>	<u>0.42</u>	<u>-126.5</u>	<u>17:42</u>
Static Water Level (WL): <u>8.41</u>									
One Casing Volume (gal/L):									
Start Purge (hrs): <u>16:51</u>									
End Purge (hrs): <u>17:40</u>									
Total Purge Time (min): <u>50</u>									
Total Vol. Purged (gal/L): <u>5.2L</u>									

**SAMPLE COLLECTION INFORMATION:**

Analysis	Preservative	Container Requirements	Collected
<u>VOC</u>	<u>HCl</u>	<u>3-40 ml vials</u>	<input checked="" type="checkbox"/>

**OBSERVATIONS / NOTES:**

Circle if Applicable:

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

Signature(s): Gary Brangar



# GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NTC ORLANDO - OU-4 Sample ID No.: NTC13968D309302008  
 Project No.: CTO-125 Sample Location: OU-13-68D/C-3  
 Domestic Well Data  
 Monitoring Well Data  
 Other Well Type:  
 QA Sample Type:  
 Sampled By: CB  
 C.O.C. No.:  
 Type of Sample:  
 Low Concentration  
 High Concentration

**SAMPLING DATA:**

Date:	Color (Visual)	pH (S.U.)	S.C. (mS/cm)	Temp. (°C)	Turbidity (NTU)	DO (mg/l)	Salinity (‰)	Other
9/30/08		7.16	1.040	25.02	0.10	0.90	-113.5	
Time: 10:15								
Method: <u>reverse flow</u>	<u>clear</u>							

**PURGE DATA:**

Date:	Volume	pH	S.C.	Temp.	Turbidity	DO	Salinity (‰)	Other
9/30/08	3500	7.16	1.071	25.01	0.11	1.94	-120.8	9:55
Method: <u>low flow/peristaltic</u>								
Monitor Reading (ppm): -	300	7.15	1.041	25.04	0.11	1.20	-117.2	9:58
Well Casing Diameter & Material	300	7.15	1.041	25.02	0.11	1.03	-114.1	10:02
Type: <u>CMT</u>	300	7.15	1.040	25.03	0.11	0.96	-113.3	10:05
Total Well Depth (TD): <u>78</u>	300	7.16	1.040	25.02	0.10	0.90	-113.5	10:08
Static Water Level (WL): <u>13.16</u>								
One Casing Volume (gal/L):								
Start Purge (hrs): <u>9:20</u>								
End Purge (hrs): <u>10:10</u>								
Total Purge Time (min): <u>50</u>								
Total Vol. Purged (gal/L): <u>5.2L</u>								

**SAMPLE COLLECTION INFORMATION:**

Analysis	Preservative	Container Requirements	Collected
<u>VOC</u>	<u>HCl</u>	<u>3-40 ml vials</u>	<input checked="" type="checkbox"/>

**OBSERVATIONS / NOTES:**

Circle if Applicable:

MS/MSD	Duplicate ID No.:	Signature(s): <u>Randy Bryson</u>
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# GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NTC Orlando - SU-4 Sample ID No.: NTC13G6SD40930 2008  
 Project No.: CTO-025 Sample Location: OLD-13-68DC-4  
 Sampled By: GB  
 C.O.C. No.: \_\_\_\_\_  
 Type of Sample: \_\_\_\_\_  
 Domestic Well Data  
 Monitoring Well Data  
 Other Well Type: \_\_\_\_\_  
 QA Sample Type: \_\_\_\_\_  
 Low Concentration  
 High Concentration

**SAMPLING DATA:**

Date:	Color (Visual)	pH (S.U.)	S.C. (mS/cm)	Temp. (°C)	Turbidity (NTU)	DO (mg/l)	Salinity (mg/l)	Other
9/30/08	clear	7.09	1.53	25.03	0.09	0.63	-100.0	ORP

**PURGE DATA:**

Date:	Volume	pH	S.C.	Temp.	Turbidity	DO	Salinity	Other
9/30/08	3000 ul	7.08	1.015	24.97	0.15	0.88	-99.8	10:55
Method: low flow/peristaltic	300 ul	7.09	1.179	24.98	0.14	0.79	-99.4	10:58
Monitor Reading (ppm):								
Well Casing Diameter & Material	300	7.10	1.165	24.99	0.12	0.70	-98.4	10:01
Type: CMT	300	7.09	1.159	25.01	0.10	0.68	-99.9	11:04
Total Well Depth (TD): 95	300	7.09	1.153	25.03	0.09	0.63	-100.0	11:07
Static Water Level (WL): 13.98								
One Casing Volume (gal/L):								
Start Purge (hrs): 10:25								
End Purge (hrs): 11:05								
Total Purge Time (min): 40								
Total Vol. Purged (gal/L): 42								

**SAMPLE COLLECTION INFORMATION:**

Analysis	Preservative	Container Requirements	Collected
VOCs	HCl	3-40 ml vials	✓

**OBSERVATIONS / NOTES:**

Circle if Applicable:

MS/MSD	Duplicate ID No.:	Signature(s): <i>Gary Braganza</i>
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# GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NTC Orlando - OLL-4 Sample ID No.: NTC13668D509302008  
 Project No.: CTO-0125 Sample Location: OLL-13-68D-C-5  
 Sampled By: [Signature]  
 C.O.C. No.: \_\_\_\_\_  
 Type of Sample:  
 Low Concentration  
 High Concentration

Domestic Well Data  
 Monitoring Well Data  
 Other Well Type: \_\_\_\_\_  
 QA Sample Type: \_\_\_\_\_

**SAMPLING DATA:**

Date:	Color (Visual)	pH (S.U.)	S.C. (mS/cm)	Temp. (°C)	Turbidity (NTU)	DO (mg/l)	Salinity (ppt)	Other
<u>9/30/08</u>	<u>clear</u>	<u>7.52</u>	<u>0.366</u>	<u>25.47</u>	<u>-0.11</u>	<u>0.66</u>	<u>-125.1</u>	
Time: <u>14:15</u>								
Method:								

**PURGE DATA:**

Date:	Volume	pH	S.C.	Temp.	Turbidity	DO	Salinity	Other
<u>9/30/08</u>	<u>3000 ml</u>	<u>7.52</u>	<u>0.366</u>	<u>25.44</u>	<u>-0.03</u>	<u>0.71</u>	<u>-123.1</u>	<u>14:00</u>
Method: <u>low flow/pneumatic</u>								
Monitor Reading (ppm): <u>n/a.</u>	<u>300</u>	<u>7.52</u>	<u>0.365</u>	<u>25.49</u>	<u>-0.10</u>	<u>0.69</u>	<u>-125.1</u>	<u>14:03</u>
Well Casing Diameter & Material	<u>300</u>	<u>7.52</u>	<u>0.364</u>	<u>25.49</u>	<u>-0.12</u>	<u>0.64</u>	<u>-127.1</u>	<u>14:06</u>
Type: <u>CMT</u>	<u>300</u>	<u>7.52</u>	<u>0.366</u>	<u>25.47</u>	<u>-0.11</u>	<u>0.60</u>	<u>-125.1</u>	<u>14:09</u>
Total Well Depth (TD): <u>110</u>								
Static Water Level (WL): <u>13.82</u>								
One Casing Volume(gal/L):								
Start Purge (hrs): <u>13:30</u>								
End Purge (hrs): <u>14:40</u>								
Total Purge Time (min): <u>40</u>								
Total Vol. Purged (gal/L): <u>3.9L</u>								

**SAMPLE COLLECTION INFORMATION:**

Analysis	Preservative	Container Requirements	Collected
<u>VOCs</u>	<u>HCl</u>	<u>3-40 ml vials</u>	<input checked="" type="checkbox"/>

**OBSERVATIONS / NOTES:**

Circle if Applicable:

<input type="checkbox"/> MS/MSD	Duplicate ID No.:	Signature(s): <u>Gary Braganza</u>
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# GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NIC Orlando - 04.4 Sample ID No.: NIC13G68D609302008  
 Project No.: \_\_\_\_\_ Sample Location: OLD-13-68D C-6  
 Domestic Well Data Sampled By: EP  
 Monitoring Well Data C.O.C. No.: \_\_\_\_\_  
 Other Well Type: \_\_\_\_\_ Type of Sample:  
 Low Concentration  
 QA Sample Type: \_\_\_\_\_  High Concentration

### SAMPLING DATA:

Date:	Color	pH	S.C.	Temp.	Turbidity	DO	Salinity	Other
<u>9/30/08</u>	(Visual)	(S.U.)	(mS/cm)	(°C)	(NTU)	(mg/l)	<u>0.86</u>	<u>15:08</u>
Time: <u>15:40</u>	<u>clear</u>	<u>7.93</u>	<u>0.840</u>	<u>25.46</u>	<u>-0.12</u>	<u>0.86</u>	<u>-79.9</u>	
Method: <u>reverse flow</u>								

### PURGE DATA:

Date:	Volume	pH	S.C.	Temp.	Turbidity	DO	Salinity	Other
<u>9/30/08</u>								
Method: <u>low flow (peristaltic)</u>	<u>3000 ml</u>	<u>7.39</u>	<u>0.840</u>	<u>25.57</u>	<u>-0.09</u>	<u>1.69</u>	<u>-78.8</u>	<u>15:20</u>
Monitor Reading (ppm): <u>N/A</u>	<u>300 ml</u>	<u>7.40</u>	<u>0.878</u>	<u>25.47</u>	<u>-0.10</u>	<u>1.21</u>	<u>-78.9</u>	<u>15:23</u>
Well Casing Diameter & Material	<u>300 ml</u>	<u>7.39</u>	<u>0.835</u>	<u>25.49</u>	<u>-0.11</u>	<u>1.07</u>	<u>-82.8</u>	<u>15:26</u>
Type: <u>CMT</u>	<u>300 ml</u>	<u>7.39</u>	<u>0.840</u>	<u>25.47</u>	<u>-0.13</u>	<u>0.95</u>	<u>-83.4</u>	<u>15:29</u>
Total Well Depth (TD): <u>128</u>	<u>300 ml</u>	<u>7.39</u>	<u>0.840</u>	<u>25.46</u>	<u>-0.12</u>	<u>0.86</u>	<u>-79.9</u>	<u>15:32</u>
Static Water Level (WL): <u>14.79</u>								
One Casing Volume (gal/L):								
Start Purge (hrs): <u>14:50</u>								
End Purge (hrs): <u>15:30</u>								
Total Purge Time (min): <u>40</u>								
Total Vol. Purged (gal/L): <u>4.2</u>								

### SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
<u>VOCs</u>	<u>HCL</u>	<u>3-40 ml vials</u>	<input checked="" type="checkbox"/>

### OBSERVATIONS / NOTES:

Circle if Applicable: MS/MSD  Duplicate ID No.: \_\_\_\_\_ Signature(s): Gary Bragg Jr.



# GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NTC ORLANDO - OU-4 Sample ID No.: NTC13669D110022008  
 Project No.: CTD-0125 Sample Location: OLD-13-69, C-1  
 Domestic Well Data  
 Monitoring Well Data  
 Other Well Type: \_\_\_\_\_  
 QA Sample Type: \_\_\_\_\_  
 Sampled By: GB  
 C.O.C. No.: \_\_\_\_\_  
 Type of Sample:  
 Low Concentration  
 High Concentration

### SAMPLING DATA:

Date:	Color (Visual)	pH (S.U.)	S.C. (mS/cm)	Temp. (°C)	Turbidity (NTU)	DO (mg/l)	Salinity (%)	Other
10/2/08		5.35	0.187	25.36	-0.15	0.69	42.2	
Time: 11:40								
Method: <u>reverse flow</u>								

### PURGE DATA:

Date:	Volume	pH	S.C.	Temp.	Turbidity	DO	Salinity	Other
10/2/08	3500L	5.38	0.186	25.28	0.21	1.34	52.2	11:25
Method: <u>low flow/peristaltic</u>								
Monitor Reading (ppm): <u>N/A</u>	300	5.33	0.188	25.30	-0.20	1.15	50.9	11:28
Well Casing Diameter & Material	400	5.36	0.187	25.36	-0.19	0.86	44.8	11:32
Type: <u>CMT</u>	300	5.35	0.187	25.35	-0.17	0.77	43.4	11:25
Total Well Depth (TD): <u>65</u>	300	5.35	0.187	25.36	-0.15	0.69	42.2	11:28
Static Water Level (WL): <u>7.26</u>								
One Casing Volume (gal/L):								
Start Purge (hrs): <u>10:50</u>								
End Purge (hrs): <u>11:30</u>								
Total Purge Time (min): <u>40</u>								
Total Vol. Purged (gal/L): <u>4.7L</u>								

### SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
<u>VOC</u>	<u>HCl</u>	<u>3-40ml vials</u>	<input checked="" type="checkbox"/>

### OBSERVATIONS / NOTES:

Circle if Applicable:

MS/MSD	Duplicate ID No.:	Signature(s): <u>Gary Braggins</u>
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# GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NTC Orlando - 01-4 Sample ID No.: NTC13G69D210022008  
 Project No.: 672-0125 Sample Location: DL0-13-69D C-2  
 Domestic Well Data  
 Monitoring Well Data  
 Other Well Type: \_\_\_\_\_  
 QA Sample Type: \_\_\_\_\_  
 Sampled By: GB  
 C.O.C. No.: \_\_\_\_\_  
 Type of Sample:  
 Low Concentration  
 High Concentration

**SAMPLING DATA:**

Date:	Color	pH	S.C.	Temp.	Turbidity	DO	Salinity	Other
Time:	(Visual)	(S.U.)	(mS/cm)	(°C)	(NTU)	(mg/l)	(%)	
10/2/08	clear	5.97	0.229	25.81	-0.11	0.73	-53.1	ORA
14:45								
Method: <u>reverse flow</u>								

**PURGE DATA:**

Date:	Volume	pH	S.C.	Temp.	Turbidity	DO	Salinity	Other
Method:								
10/2/08	300	5.77	0.214	25.94	-0.15	2.10	-31.2	14:25
Method: <u>flow flow</u>								
Monitor Reading (ppm): -	300	5.85	0.217	25.86	-0.12	1.48	-37.7	14:28
Well Casing Diameter & Material	300	5.90	0.221	25.90	-0.11	1.06	-47.9	14:31
Type: <u>CMT</u>	300	5.94	0.222	25.85	-0.14	0.89	-49.7	14:34
Total Well Depth (TD): <u>75</u>	300	5.96	0.226	25.83	-0.12	0.79	-52.2	14:37
Static Water Level (WL): <u>10.88</u>	300	5.97	0.229	25.81	-0.11	0.73	-53.1	14:40
One Casing Volume (gal/L):								
Start Purge (hrs): <u>13:55</u>								
End Purge (hrs): <u>14:40</u>								
Total Purge Time (min): <u>45</u>								
Total Vol. Purged (gal/L): <u>4.5L</u>								

**SAMPLE COLLECTION INFORMATION:**

Analysis	Preservative	Container Requirements	Collected
<u>VOC's</u>	<u>HCl</u>	<u>3-40 ml vials</u>	<input checked="" type="checkbox"/>

**OBSERVATIONS / NOTES:**

Circle If Applicable: MS/MSD Duplicate ID No.: \_\_\_\_\_ Signature(s): Gary Bragan



# GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NTC Orlando - 0114 Sample ID No.: NTC13669D31002 2008  
 Project No.: ETO-0125 Sample Location: LD-13-69D 4-3  
 Domestic Well Data  
 Monitoring Well Data  
 Other Well Type: \_\_\_\_\_  
 QA Sample Type: \_\_\_\_\_  
 Sampled By: BTB  
 C.O.C. No.: \_\_\_\_\_  
 Type of Sample:  
 Low Concentration  
 High Concentration

**SAMPLING DATA:**

Date:	Color (Visual)	pH (S.U.)	S.C. (mS/cm)	Temp. (°C)	Turbidity (NTU)	DO (mg/l)	Salinity (‰) OKP	Other
10/2/08	clear	7.18	0.639	25.80	-0.12	0.67	-132.6	
Time: 15:50								
Method: reverse flow								

**PURGE DATA:**

Date:	Volume	pH	S.C.	Temp.	Turbidity	DO	Salinity OKP	Other
10/2/08	3500	7.15	0.644	25.86	-0.17	1.71	-140.6	15.30
Method: low flow								
Monitor Reading (ppm): N/A	300	7.16	0.643	25.77	-0.13	1.06	-138.7	15.33
Well Casing Diameter & Material	300	7.17	0.641	25.77	-0.11	0.80	-132.8	15.36
Type: CMT	300	7.18	0.639	25.79	-0.10	0.71	-129.3	15.39
Total Well Depth (TD): 90	300	7.18	0.639	25.80	-0.12	0.67	-132.6	15.42
Static Water Level (WL): 1200								
One Casing Volume (gal/L):								
Start Purge (hrs): 14:55								
End Purge (hrs): 15:45								
Total Purge Time (min): 50								
Total Vol. Purged (gal/L): 5.0								

**SAMPLE COLLECTION INFORMATION:**

Analysis	Preservative	Container Requirements	Collected
VOC	HCl	3-40 ml vials	✓

**OBSERVATIONS / NOTES:**

Circle if Applicable: MS/MSD  Duplicate ID No.: \_\_\_\_\_

Signature(s): Gary Braganz



# GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NTC ORLANDO-DU-4  
Project No.: OTO-0125

Sample ID No.: NTC13669D410032008

Sample Location: OLD-13-LAD-C-4

Sampled By: RB

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

- Domestic Well Data
- Monitoring Well Data
- Other Well Type: \_\_\_\_\_
- QA Sample Type: \_\_\_\_\_

- Type of Sample:
- Low Concentration
  - High Concentration

### SAMPLING DATA:

Date: <u>10/3/08</u>	Color (Visual)	pH (S.U.)	S.C. (mS/cm)	Temp. (°C)	Turbidity (NTU)	DO (mg/l)	Salinity (‰)	Other
Time: <u>12:00</u>							<u>ORP</u>	
Method: <u>reverse flow</u>	<u>clear</u>	<u>7.21</u>	<u>4.061</u>	<u>25.26</u>	<u>-0.11</u>	<u>0.70</u>	<u>-130.2</u>	

### PURGE DATA:

Date: <u>10/3/08</u>	Volume	pH	S.C.	Temp.	Turbidity	DO	Salinity	Other
Method: <u>low flow</u>	<u>3000W</u>	<u>7.21</u>	<u>4.096</u>	<u>25.38</u>	<u>-0.17</u>	<u>0.89</u>	<u>-131.7</u>	<u>11:40</u>
Monitor Reading (ppm): <u>N/A</u>	<u>300</u>	<u>7.21</u>	<u>4.077</u>	<u>25.31</u>	<u>-0.15</u>	<u>0.83</u>	<u>-130.3</u>	<u>11:43</u>
Well Casing Diameter & Material	<u>300</u>	<u>7.21</u>	<u>4.063</u>	<u>25.29</u>	<u>-0.13</u>	<u>0.79</u>	<u>-130.4</u>	<u>11:46</u>
Type: <u>CMT</u>	<u>300</u>	<u>7.21</u>	<u>4.062</u>	<u>25.27</u>	<u>-0.11</u>	<u>0.75</u>	<u>-130.0</u>	<u>11:49</u>
Total Well Depth (TD): <u>105</u>	<u>300</u>	<u>7.21</u>	<u>4.061</u>	<u>25.26</u>	<u>-0.11</u>	<u>0.70</u>	<u>-130.2</u>	<u>11:51</u>
Static Water Level (WL): <u>12.18</u>								
One Casing Volume (gal/L):								
Start Purge (hrs): <u>11:10</u>								
End Purge (hrs): <u>11:55</u>								
Total Purge Time (min): <u>45</u>								
Total Vol. Purged (gal/L): <u>4.5</u>								

### SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
<u>VOCs</u>	<u>Hel</u>	<u>3 - 40 ml vials</u>	<input checked="" type="checkbox"/>

### OBSERVATIONS / NOTES:

### Circle if Applicable:

MS/MSD  Duplicate ID No.: NTC13669D0210032008

Signature(s): Gary Grayson



# GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NTC Orlando - OU-4 Sample ID No.: NTC13469DS10032008  
 Project No.: CTO-0125 Sample Location: OLD-13-69D-C-5  
 Domestic Well Data  
 Monitoring Well Data  
 Other Well Type: \_\_\_\_\_  
 QA Sample Type: \_\_\_\_\_  
 Sampled By: RTB  
 C.O.C. No.: \_\_\_\_\_  
 Type of Sample:  
 Low Concentration  
 High Concentration

**SAMPLING DATA:**

Date:	Color (Visual)	pH (S.U.)	S.C. (mS/cm)	Temp. (°C)	Turbidity (NTU)	DO (mg/l)	Salinity (‰)	Other
<u>10/3/08</u>	<u>clear</u>	<u>7.48</u>	<u>1.289</u>	<u>24.89</u>	<u>-0.10</u>	<u>1.08</u>	<u>-150.2</u>	
Time: <u>9:40</u>								
Method: <u>reverse flow</u>								

**PURGE DATA:**

Date:	Volume	pH	S.C.	Temp.	Turbidity	DO	Salinity (‰)	Other
<u>10/3/08</u>	<u>3000ml</u>	<u>7.45</u>	<u>1.287</u>	<u>24.85</u>	<u>-0.18</u>	<u>1.92</u>	<u>-166.2</u>	<u>9:15</u>
Method: <u>low flow</u>								
Monitor Reading (ppm): <u>—</u>	<u>3000</u>	<u>7.47</u>	<u>1.285</u>	<u>24.86</u>	<u>-0.17</u>	<u>1.27</u>	<u>-153.0</u>	<u>9:18</u>
Well Casing Diameter & Material Type: <u>CMT</u>	<u>300</u>	<u>7.48</u>	<u>1.285</u>	<u>24.87</u>	<u>-0.11</u>	<u>1.16</u>	<u>-154.3</u>	<u>9:21</u>
	<u>300</u>	<u>7.48</u>	<u>1.288</u>	<u>24.89</u>	<u>-0.13</u>	<u>1.13</u>	<u>-152.4</u>	<u>9:25</u>
Total Well Depth (TD): <u>115</u>	<u>300</u>	<u>7.48</u>	<u>1.289</u>	<u>24.89</u>	<u>-0.10</u>	<u>1.08</u>	<u>-150.2</u>	<u>9:30</u>
Static Water Level (WL): <u>12.12</u>								
One Casing Volume (gal/L):								
Start Purge (hrs): <u>8:45</u>								
End Purge (hrs): <u>9:35</u>								
Total Purge Time (min): <u>50</u>								
Total Vol. Purged (gal/L): <u>5L</u>								

**SAMPLE COLLECTION INFORMATION:**

Analysis	Preservative	Container Requirements	Collected
<u>VOCs</u>	<u>HCl</u>	<u>3-40 ml vials</u>	<input checked="" type="checkbox"/>

**OBSERVATIONS / NOTES:**

Circle if Applicable:

MS/MSD	Duplicate ID No.:	Signature(s): <u>Gary Bragg</u>
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# GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NTC DRANDU - DU-4  
Project No.: CTD-0125

Sample ID No.: NTC13R69D61003 2008  
Sample Location: OLD-13-69D C-6

- Domestic Well Data
- Monitoring Well Data
- Other Well Type: \_\_\_\_\_
- QA Sample Type: \_\_\_\_\_

Sampled By: RB  
C.O.C. No.: \_\_\_\_\_  
Type of Sample:  
 Low Concentration  
 High Concentration

### SAMPLING DATA:

Date:	Color	pH	S.C.	Temp.	Turbidity	DO	Salinity	Other
Time:	(Visual)	(S.U.)	(mS/cm)	(°C)	(NTU)	(mg/l)	(‰)	
<u>10/3/08</u>	<u>clear</u>	<u>7.54</u>	<u>0.378</u>	<u>25.07</u>	<u>0.10</u>	<u>0.72</u>	<u>-161.0</u>	

### PURGE DATA:

Date:	Volume	pH	S.C.	Temp.	Turbidity	DO	Salinity	Other	
Method:	Monitor Reading (ppm):	Well Casing Diameter & Material Type:	Total Well Depth (TD):	Static Water Level (WL):	One Casing Volume(gal/L):	Start Purge (hrs):	End Purge (hrs):	Total Purge Time (min):	Total Vol. Purged (gal/L):
<u>10/3/08</u>	<u>3500</u>	<u>300</u>	<u>127</u>	<u>12.60</u>		<u>10:00</u>	<u>10:50</u>	<u>50</u>	<u>500</u>
<u>low flow</u>	<u>300</u>	<u>300</u>	<u>300</u>	<u>300</u>					
	<u>7.54</u>	<u>7.54</u>	<u>7.54</u>	<u>7.54</u>					
	<u>0.378</u>	<u>0.378</u>	<u>0.378</u>	<u>0.378</u>					
	<u>25.19</u>	<u>25.15</u>	<u>25.11</u>	<u>25.09</u>					
	<u>0.14</u>	<u>0.12</u>	<u>0.10</u>	<u>0.13</u>					
	<u>0.90</u>	<u>0.82</u>	<u>0.80</u>	<u>0.74</u>					
	<u>-164.2</u>	<u>-162.0</u>	<u>-163.2</u>	<u>-161.7</u>					

### SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
<u>VOC</u>	<u>HCl</u>	<u>3-40 ml vials</u>	<input checked="" type="checkbox"/>

### OBSERVATIONS / NOTES:

Circle if Applicable:

MS/MSD Duplicate ID No.:

Signature(s):

*[Handwritten Signature]*



### GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NTC ORLANDO-OU-4 Sample ID No.: NTC13970D11001 2008  
 Project No.: CTO-0125 Sample Location: OLD-13-70D C-1  
 Domestic Well Data  
 Monitoring Well Data  
 Other Well Type: \_\_\_\_\_  
 QA Sample Type: \_\_\_\_\_  
 Sampled By: GB  
 C.O.C. No.: \_\_\_\_\_  
 Type of Sample:  
 Low Concentration  
 High Concentration

**SAMPLING DATA:**

Date:	<u>10/01/08</u>	Color	pH	S.C.	Temp.	Turbidity	DO	Salinity	Other
Time:	<u>11:30</u>	(Visual)	(S.U.)	(mS/cm)	(°C)	(NTU)	(mg/l)	(%)	
Method:	<u>reverse flow</u>	<u>clear</u>							

**PURGE DATA:**

Date:	<u>10/01/08</u>	Volume	pH	S.C.	Temp.	Turbidity	DO	Salinity	Other
Method:	<u>low flow</u>								
Monitor Reading (ppm):	<u>N/A</u>	<u>Channel purges dry after 3 minutes. Turn pump off &amp; allow well to recover repeat process 3 times before sample. Could not collect water quality pre 1</u>							
Well Casing Diameter & Material Type:	<u>CMT</u>								
Total Well Depth (TD):	<u>69</u>								
Static Water Level (WL):	<u>25.87</u>								
One Casing Volume(gal/L):									
Start Purge (hrs):	<u>2</u>								
End Purge (hrs):									
Total Purge Time (min):									
Total Vol. Purged (gal/L):									

**SAMPLE COLLECTION INFORMATION:**

Analysis	Preservative	Container Requirements	Collected
<u>VOCs</u>	<u>Hei</u>	<u>3-40 ml vials</u>	<input checked="" type="checkbox"/>

**OBSERVATIONS / NOTES:**

Circle if Applicable: MS/MSD  Duplicate ID No.: \_\_\_\_\_ Signature(s): Randy Brown



# GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NTC ORLANDO - OU 4 Sample ID No.: NTC13G-70D210 012008  
 Project No.: CTO-0125 Sample Location: OLD-13-70D C-2  
 Sampled By: GP  
 C.O.C. No.: \_\_\_\_\_  
 Type of Sample:  
 Domestic Well Data  
 Monitoring Well Data  
 Other Well Type: \_\_\_\_\_  
 QA Sample Type: \_\_\_\_\_  
 Low Concentration  
 High Concentration

**SAMPLING DATA:**

Date:	Color	pH	S.C.	Temp.	Turbidity	DO	Salinity	Other
Time:	(Visual)	(S.U.)	(mS/cm)	(°C)	(NTU)	(mg/l)	(%) OR P	
10/1/08		6.66	0.912	25.83	0.20	0.84	-88.0	
Method: <u>low flow - coarse</u>	<u>clear</u>							

**PURGE DATA:**

Date:	Volume	pH	S.C.	Temp.	Turbidity	DO	Salinity	Other
Time:								
10/1/08	3500	6.68	0.922	25.91	0.22	1.50	-93.0	10:30
Method: <u>low flow/peristaltic</u>								
Monitor Reading (ppm): <u>N/A</u>	300	6.68	0.919	25.87	0.23	1.21	-94.8	10:33
Well Casing Diameter & Material	300	6.67	0.916	25.87	0.20	1.02	-89.7	10:35
Type: <u>CMT</u>	300	6.66	0.914	25.85	0.21	0.93	-87.3	10:38
Total Well Depth (TD): <u>35</u>	300	6.66	0.912	25.83	0.20	0.84	-88.0	10:41
Static Water Level (WL): <u>11.85</u>								
One Casing Volume (gal/L):								
Start Purge (hrs): <u>9:55</u>								
End Purge (hrs): <u>10:40</u>								
Total Purge Time (min): <u>45</u>								
Total Vol. Purged (gal/L): <u>4.7L</u>								

**SAMPLE COLLECTION INFORMATION:**

Analysis	Preservative	Container Requirements	Collected
<u>VOC's</u>	<u>HCL</u>	<u>3-40 ml vials</u>	<input checked="" type="checkbox"/>

**OBSERVATIONS / NOTES:**

Circle if Applicable:

MS/MSD	Duplicate ID No.:	Signature(s): <u>[Signature]</u>
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# GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NTC ORLANDO - OU-4 Sample ID No.: NTC13G-70D310062008  
 Project No.: CTO-0125 Sample Location: OLD 13-70D C-3  
 Sampled By: CTB  
 C.O.C. No.: \_\_\_\_\_  
 Type of Sample:  
 Domestic Well Data  
 Monitoring Well Data  
 Other Well Type: \_\_\_\_\_  
 QA Sample Type: \_\_\_\_\_  
 Low Concentration  
 High Concentration

### SAMPLING DATA:

Date:	Color (Visual)	pH (S.U.)	S.C. (mS/cm)	Temp. (°C)	Turbidity (NTU)	DO (mg/l)	Salinity (‰)	Other
<u>10/01/08</u>	<u>Clear</u>	<u>7.03</u>	<u>1.584</u>	<u>26.03</u>	<u>-0.30</u>	<u>0.87</u>	<u>-123.3</u>	<u>0.02 P</u>
Time: <u>14:30</u>								
Method: <u>reverse flow</u>								

### PURGE DATA:

Date:	Volume	pH	S.C.	Temp.	Turbidity	DO	Salinity	Other
<u>10/01/08</u>	<u>3500</u>	<u>7.03</u>	<u>1.552</u>	<u>26.12</u>	<u>-0.35</u>	<u>1.60</u>	<u>-127.4</u>	<u>14:05</u>
Method: <u>low flow</u>								
Monitor Reading (ppm): <u>N/A</u>	<u>300</u>	<u>7.03</u>	<u>1.556</u>	<u>26.14</u>	<u>-0.40</u>	<u>1.29</u>	<u>-129.2</u>	<u>14:08</u>
Well Casing Diameter & Material	<u>300</u>	<u>7.03</u>	<u>1.579</u>	<u>26.15</u>	<u>-0.43</u>	<u>1.12</u>	<u>-126.0</u>	<u>14:11</u>
Type: <u>CMT</u>	<u>300</u>	<u>7.03</u>	<u>1.580</u>	<u>26.06</u>	<u>-0.32</u>	<u>1.00</u>	<u>-124.0</u>	<u>14:14</u>
Total Well Depth (TD): <u>95</u>	<u>300</u>	<u>7.03</u>	<u>1.582</u>	<u>26.04</u>	<u>-0.31</u>	<u>0.92</u>	<u>-122.6</u>	<u>14:17</u>
Static Water Level (WL): <u>12.22</u>	<u>300</u>	<u>7.03</u>	<u>1.584</u>	<u>26.03</u>	<u>-0.30</u>	<u>0.87</u>	<u>-123.3</u>	<u>14:20</u>
One Casing Volume (gal/L):								
Start Purge (hrs): <u>13:30</u>								
End Purge (hrs): <u>14:05</u>								
Total Purge Time (min): <u>35</u>								
Total Vol. Purged (gal/L): <u>5.5</u>								

### SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
<u>VOCs</u>	<u>HCl</u>	<u>3-40 ml Vials</u>	<input checked="" type="checkbox"/>

### OBSERVATIONS / NOTES:

Circle if Applicable: MS/MSD  Duplicate ID No.: \_\_\_\_\_ Signature(s): Gary Bragg



# GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NTC Orlando - OU-4 Sample ID No.: NTC13GF00110012008  
 Project No.: CTO-0125 Sample Location: OLD-13-70DC-4  
 Domestic Well Data  
 Monitoring Well Data  
 Other Well Type: \_\_\_\_\_  
 QA Sample Type: \_\_\_\_\_  
 Sampled By: GB  
 C.O.C. No.: \_\_\_\_\_  
 Type of Sample:  
 Low Concentration  
 High Concentration

**SAMPLING DATA:**

Date:	Color	pH	S.C.	Temp.	Turbidity	DO	Salinity	Other
Time:	(Visual)	(S.U.)	(mS/cm)	(°C)	(NTU)	(mg/l)	(%)	
10/01/08		7.10	2.830	25.86	0.10	0.76	-110.1	
Method: <u>no flow</u>	<u>clear</u>							

**PURGE DATA:**

Date:	Volume	pH	S.C.	Temp.	Turbidity	DO	Salinity	Other
Method:								
10/01/08	3000 ml	7.09	2.927	26.44	0.14	1.23	-110.9	15:35
Method: <u>no flow</u>								
Monitor Reading (ppm):	300	7.09	2.918	26.30	0.11	1.12	-113.7	15:38
Well Casing Diameter & Material	300	7.10	2.902	26.18	0.10	1.04	-114.7	15:41
Type: <u>CMT</u>	300	7.02	2.834	26.01	0.12	1.14	-104.3	15:45
Total Well Depth (TD):	300	7.08	2.830	25.87	0.11	0.94	-108.6	15:48
Static Water Level (WL): <u>12.24</u>	300	7.10	2.832	25.88	0.10	0.84	-110.7	15:51
One Casing Volume (gal/L):	300	7.10	2.830	25.86	0.10	0.76	-110.1	15:54
Start Purge (hrs): <u>15:05</u>								
End Purge (hrs): <u>15:55</u>								
Total Purge Time (min): <u>50</u>								
Total Vol. Purged (gal/L): <u>50</u>								

**SAMPLE COLLECTION INFORMATION:**

Analysis	Preservative	Container Requirements	Collected
<u>VOCS</u>	<u>HCl</u>	<u>3-40 ml</u>	<input checked="" type="checkbox"/>

**OBSERVATIONS / NOTES:**

Circle if Applicable:

MS/MSD	Duplicate ID No.: <u>NTC13GF00110012008</u>	Signature(s): <u>[Signature]</u>
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# GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NTC Orlando - 011-4 Sample ID No.: NTC13G70DS10022008  
 Project No.: \_\_\_\_\_ Sample Location: OLD-13-70D C-5  
 Domestic Well Data  
 Monitoring Well Data  
 Other Well Type: \_\_\_\_\_  
 QA Sample Type: \_\_\_\_\_  
 Sampled By: SB  
 C.O.C. No.: \_\_\_\_\_  
 Type of Sample:  
 Low Concentration  
 High Concentration

**SAMPLING DATA:**

Date:	Color	pH	S.C.	Temp.	Turbidity	DO	Salinity	Other
Time:	(Visual)	(S.U.)	(mS/cm)	(°C)	(NTU)	(mg/l)	(%)	
<u>10/2/08</u>								
<u>9:30</u>								
Method: <u>reverse flow</u>								

**PURGE DATA:**

Date:	Volume	pH	S.C.	Temp.	Turbidity	DO	Salinity	Other
<u>10/2/08</u>								
Method: <u>low flow</u>								
Monitor Reading (ppm):	<u>N/A channel 5 purged Dry - parameters could not be collected</u>							
Well Casing Diameter & Material								
Type:	<u>CMT</u>							
Total Well Depth (TD):								
Static Water Level (WL):	<u>12.38</u>							
One Casing Volume(gal/L):								
Start Purge (hrs):	<u>8:35</u>							
End Purge (hrs):								
Total Purge Time (min):								
Total Vol. Purged (gal/L):								

**SAMPLE COLLECTION INFORMATION:**

Analysis	Preservative	Container Requirements	Collected
<u>VOC's</u>	<u>HCl</u>	<u>3-40 ml vials</u>	<input checked="" type="checkbox"/>

**OBSERVATIONS / NOTES:**

Circle if Applicable: MS/MSD Duplicate ID No.: \_\_\_\_\_ Signature(s): Bary B...



### GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NTC Orlando - OU-4 Sample ID No.: NTC13G-70D61002-2008  
 Project No.: CTD-0125 Sample Location: OLD-13-70DC-6  
 Domestic Well Data  
 Monitoring Well Data  
 Other Well Type: \_\_\_\_\_  
 QA Sample Type: \_\_\_\_\_  
 Sampled By: GTB  
 C.O.C. No.: \_\_\_\_\_  
 Type of Sample:  
 Low Concentration  
 High Concentration

**SAMPLING DATA:**

Date:	Color	pH	S.C.	Temp.	Turbidity	DO	Salinity	Other
Time:	(Visual)	(S.U.)	(mS/cm)	(°C)	(NTU)	(mg/l)	(%)	
<u>10/2/08</u>	<u>clear</u>	<u>7.63</u>	<u>0.441</u>	<u>25.02</u>	<u>-0.22</u>	<u>1.01</u>	<u>-159.5</u>	

**PURGE DATA:**

Date:	Volume	pH	S.C.	Temp.	Turbidity	DO	Salinity	Other
<u>10/2/08</u>	<u>300 ml</u>	<u>7.64</u>	<u>0.444</u>	<u>25.03</u>	<u>-0.17</u>	<u>1.68</u>	<u>-159.6</u>	<u>10:15</u>
Method: <u>low flow</u>	<u>300 ml</u>	<u>7.64</u>	<u>0.443</u>	<u>25.03</u>	<u>-0.16</u>	<u>1.34</u>	<u>-156.1</u>	<u>10:18</u>
Monitor Reading (ppm): <u>N/A</u>	<u>300 ml</u>	<u>7.64</u>	<u>0.442</u>	<u>25.02</u>	<u>-0.18</u>	<u>1.18</u>	<u>-158.8</u>	<u>10:21</u>
Well Casing Diameter & Material	<u>300 ml</u>	<u>7.63</u>	<u>0.441</u>	<u>25.02</u>	<u>-0.20</u>	<u>1.08</u>	<u>-158.9</u>	<u>10:24</u>
Type: <u>CMT</u>	<u>300 ml</u>	<u>7.63</u>	<u>0.441</u>	<u>25.02</u>	<u>-0.22</u>	<u>1.01</u>	<u>-159.5</u>	<u>10:27</u>
Total Well Depth (TD):	<u>300 ml</u>	<u>7.63</u>	<u>0.441</u>	<u>25.02</u>	<u>-0.22</u>	<u>1.01</u>	<u>-159.5</u>	<u>10:27</u>
Static Water Level (WL): <u>12.42</u>								
One Casing Volume (gal/L):								
Start Purge (hrs): <u>9:45</u>								
End Purge (hrs): <u>10:30</u>								
Total Purge Time (min): <u>45</u>								
Total Vol. Purged (gal/L): <u>4.2L</u>								

**SAMPLE COLLECTION INFORMATION:**

Analysis	Preservative	Container Requirements	Collected
<u>VOCs</u>	<u>HCl</u>	<u>3-40 ml vials</u>	<input checked="" type="checkbox"/>

**OBSERVATIONS / NOTES:**

Circle if Applicable:

<input type="checkbox"/> MS/MSD	Duplicate ID No.:	Signature(s): <u>Gary Sanger</u>
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# GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NTC ORLANDO-04-4  
 Project No.: 112&01606

Sample ID No.: OLD-13-81D-03162009  
 Sample Location: OLD-13-81D  
 Sampled By: GTB  
 C.O.C. No.: 3768  
 Type of Sample:  
 Low Concentration  
 High Concentration

- Domestic Well Data
- Monitoring Well Data
- Other Well Type: \_\_\_\_\_
- QA Sample Type: \_\_\_\_\_

### SAMPLING DATA:

Date:	Color (Visual)	pH (S.U.)	S.C. (mS/cm)	Temp. (°C)	Turbidity (NTU)	DO (mg/l)	Salinity (g/l) <sup>ORP</sup>	Other <sup>DTW</sup>
3/16/09								
Time: 12:13								
Method: Reverse-flow	clear	7.66	1.008	25.55	6.31	0.67	-386.9	12.24

### PURGE DATA:

Date:	Volume (ml)	pH	S.C.	Temp.	Turbidity	DO	Salinity <sup>ORP</sup>	Other <sup>Time</sup>
3/16/09								
Method: low flow peristaltic	18,000	7.65	0.994	25.48	6.98	0.88	-384.6	11:55
Monitor Reading (ppm): N/A	18,300	7.63	0.994	25.50	7.21	0.84	-381.5	11:58
Well Casing Diameter & Material Type: 1" PVC	18,600	7.64	0.998	25.52	5.32	0.79	-383.4	12:01
	18,900	7.66	1.008	25.54	5.12	0.70	-385.2	12:04
Total Well Depth (TD): 102	19,200	7.66	1.008	25.55	6.31	0.67	-386.9	12:07
Static Water Level (WL): 9.97								
One Casing Volume (gal/L): 13.9L								
Start Purge (hrs): 10:55								
End Purge (hrs): 12:07								
Total Purge Time (min): 72								
Total Vol. Purged (gal/L): 19.2								

DTW  
13.35  
13.23  
13.23  
13.23  
13.23

### SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
VOC's	HCl	3-40 ml Vials	<input checked="" type="checkbox"/>

### OBSERVATIONS / NOTES:

Purge well at 300 ml/minute for 60 minutes, then reduce purge rate to 100 ml/min when collecting water quality parameters.

Circle if Applicable:

MS/MSD

Duplicate ID No.:

Signature(s):

*Randy Braganza*



**APPENDIX B**  
**SOIL BORING LOG, WELL COMPLETION LOGS, AND SURVEY DATA**



# BORING LOG

PROJECT NAME NTC ORLANDO OU 4  
 PROJECT NUMBER 112G01606  
 DRILLING COMPANY Boart Longyear  
 DRILLING RIG Mini Sonic

BORING No.: SB08  
 DATE: 3/9/2009 - 3/10/2009  
 GEOLOGIST: Allan Jenkins  
 DRILLER: Ernest Shutt / Douglas Buchanan

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**	
				NO SAMPLE					no soil core					
										0-55' →		0	0	0
55														
	1					lgt. grey	SAND, fine-medium, little	SW	moist, trace	0	0	0	0	
					loose		silt, loose, medium silty	SM	fine black grains	0				
			5'				SAND, very fine-fine,	SM		0				
						gm-grey	trace to some silt,			0				
60					loose		loose			0				
	2						same	SM		0	0	0	0	
							about 3" interval of 1/3"		moist	0				
			5'				to 1/2" dry hard clay			0				
							frags at 63'			0				
65										0				
	3				m. stiff	dk gm-grey	same		becomes wet	0				
							clayey SAND at 66'	SC	>PL	0				
			5'		stiff		fine to very fine		moist	0				
						grey-gm	sandy CLAY at 68'	SC-CL	mod. plastic	0				
70							fine			0				
	4				stiff	grey-gm	Sandy CLAY, some silt	CL-SC		0	0	0	0	
							very fine sand, finely		moist	0				
			5'			dk. grey	laminated, mottled dark		mod. plastic	0				
						to tan	and light laminae, dry			0				
75							hard clay frags, yel-brn			0				
	5					dk. grey-gm	sandy CLAY, very fine	SC-CL		0				
							sand, massive bold, some		moist	0				
			5'		stiff		light brown to fine mottled		mod. plastic	0				
							zones or inclusions			0				
80										0				



# BORING LOG

PROJECT NAME NTC ORLANDO OU 4  
 PROJECT NUMBER 112G01606  
 DRILLING COMPANY Boart Longyear  
 DRILLING RIG Mini Sonic

BORING No.: SB08  
 DATE: 3/9/2009 - 3/10/2009  
 GEOLOGIST: Allan Jenkins  
 DRILLER: Ernest Shutt / Douglas Buchanan

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**
	6				loose	dk. grey	SAND, fine-very fine, little silt, massive bold Clayey	SP	wet, >PL	0			
			5'				SAND at 82' very fine to fine massive bold.	SC	moist to wet	0			
85					mod. stiff	dk. Grn-grey				0			
	7						Clayey SAND, cemented	SC		0			
			5'		mod. stiff	dk. grey-gm	shell hash at 86' ~4", light grey to white 20-30%		moist to wet	0			
							broken shell hash 86-90'		lg. shell frag ~3" at ~90'	0			
90										0			
	8						same to ~92.5', 5-10% shell hash, SAND at 92.5'		moist	0			
			5'		mod. stiff	dk. gm-grey	very fine-fine, some silt, trace clay			0			
95					loose					0			
	9						Same, some medium ~1-5% black grains, very fine grains			0			
			5'		loose				wet, >PL	0			
100					hard	lgt. grey	Clayey SAND, cemented	SC	few shells	0			
	10				hard	lgt. grey	Clayey SAND to 100.5' is cemented, 2" lens of SAND			0			
			5'		loose	dk. grey				0			
					stiff	med gm-grey	medium grain, 30% black grains, Clayey SAND, silty	SC	moist	0			
105										0			
	11									0			
			5'							0			
					loose		SAND, fine green, some silt, trace clay	SW	moist	0			
110										0			



# BORING LOG

PROJECT NAME NTC ORLANDO OU 4  
 PROJECT NUMBER 112G01606  
 DRILLING COMPANY Boart Longyear  
 DRILLING RIG Mini Sonic

BORING No.: SB08  
 DATE: 3/9/2009 - 3/10/2009  
 GEOLOGIST: Allan Jenkins  
 DRILLER: Ernest Shutt / Douglas Buchanan

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**
	12						Clayey SAND, fine-med		moist	0			
					very stiff	med- lgt grn grey	grain, few c-grains	SC		0			
			5'							0			
										0			
115										0			
	13				loose	med grey	SAND, very fine, trace		moist-wet	0			
							silt			0			
			5'		very stiff	lgt grey	Clayey SAND, partially		moist-dry	0			
					to loose		cemented, friable, occ			0			
							hard dry clay frags			0			
120										0			
	14				very stiff		Clayey SAND, partially	SC	moist	0			
							becomes Sandy CLAY		no cement	0			
			5'							0			
					very stiff		becomes CLAY, little sand	CL	moist	0			
125							massive			0			

\* When rock coring, enter rock brokenness.

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

Drilling Area

Remarks: Stop at 125', hit good clay at 123'=lower Hawthorn Clay

Background (ppm): 0

Set two wells, 5' screen each 1" ID screen

Nested wells

Converted to Well: **Yes**  **No**

Well I.D. #: OLD-13-81D, OLD-13-82D

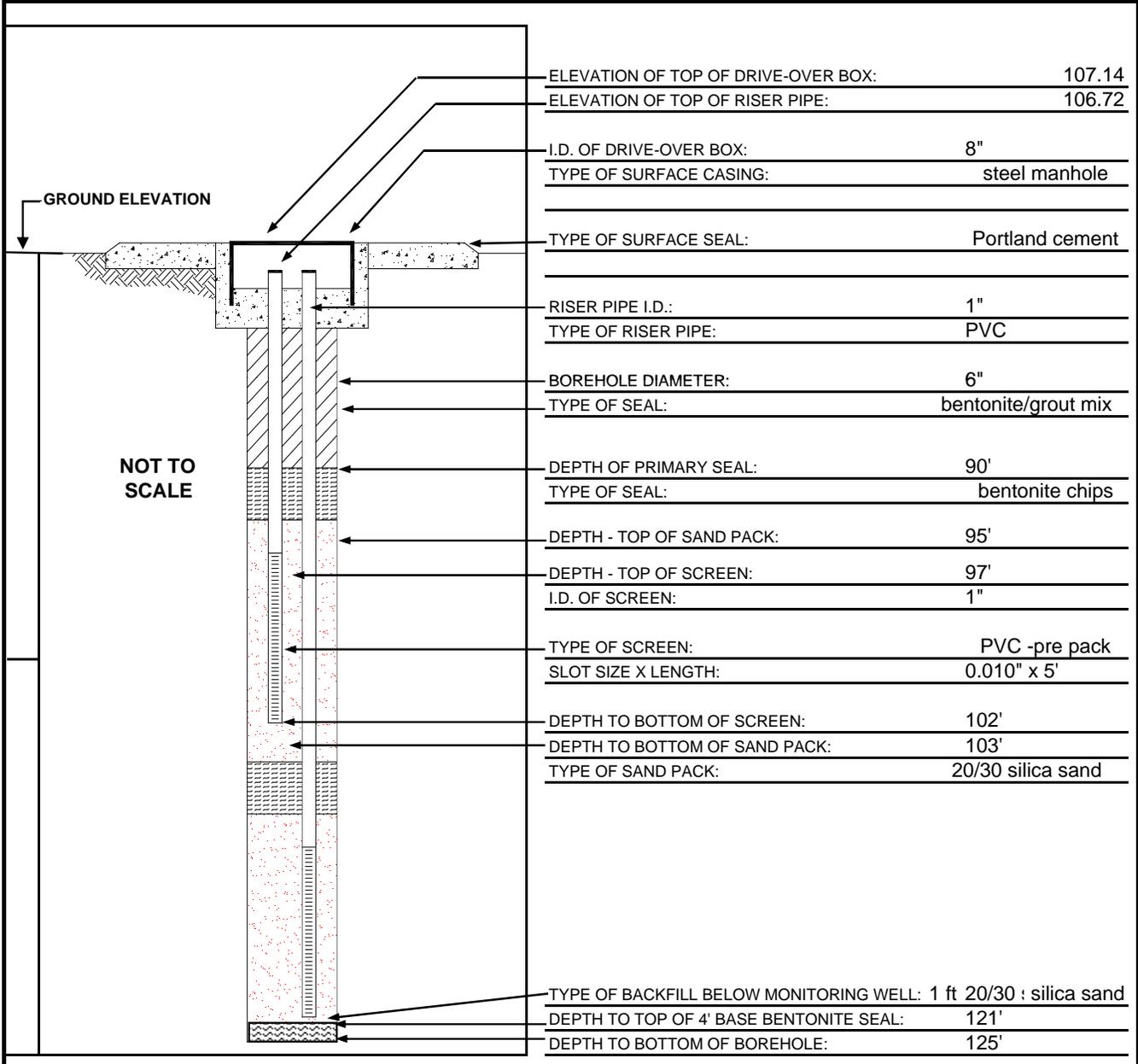
**WELL NO. OLD-13-81D**  
 (nested with well OLD-13-82D)

**OVERBURDEN  
 MONITORING WELL SHEET  
 FLUSH - MOUNT**



**Tetra Tech NUS, Inc.**

PROJECT	NTC Orlando	LOCATION	OU 4	DRILLER	Boart Longyear
PROJECT NO.	112G01606	BORING	SB08	DRILLING METHOD:	SONIC
ELEVATION	106.72	DATE	3/10/2009	DEVELOPMENT:	
FIELD GEOLOGIST	Gary Braganza				



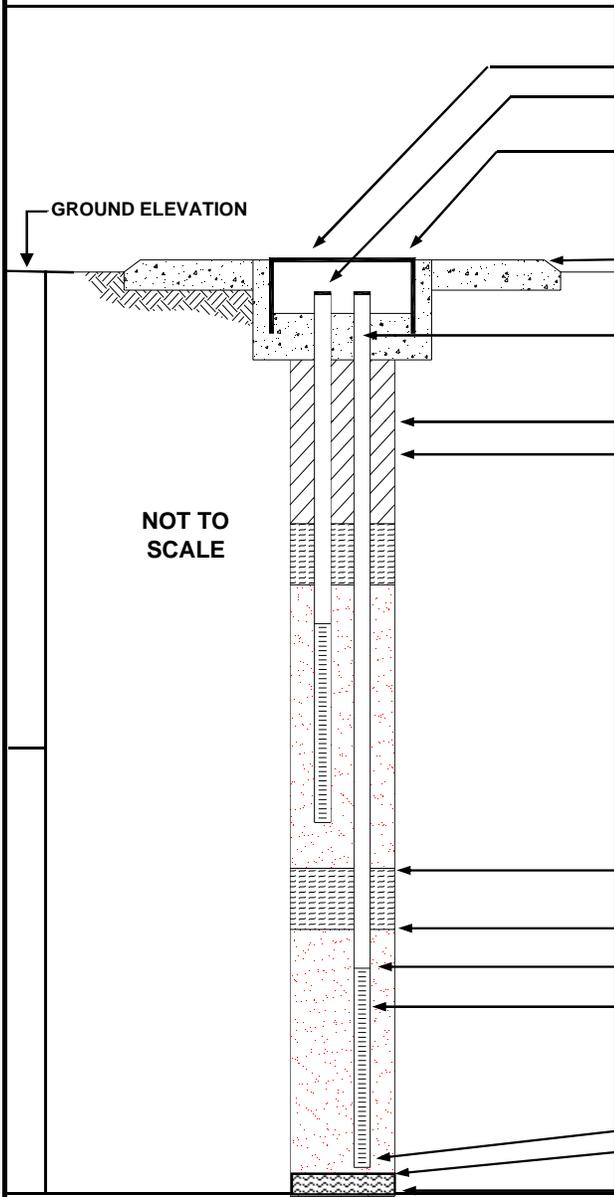
**WELL NO. OLD-13-82D**  
 (nested with well OLD-13-81D)

**OVERBURDEN  
 MONITORING WELL SHEET  
 FLUSH - MOUNT**



**Tetra Tech NUS, Inc.**

PROJECT	NTC Orlando	LOCATION	OU 4	DRILLER	Boart Longyear
PROJECT NO.	112G01606	BORING		DRILLING METHOD:	SONIC
ELEVATION	106.70	DATE	3/10/2009	DEVELOPMENT:	Submersible pump
FIELD GEOLOGIST	Gary Braganza				



ELEVATION OF TOP OF DRIVE-OVER BOX:	107.14
ELEVATION OF TOP OF RISER PIPE:	106.7
I.D. OF DRIVE-OVER BOX:	8"
TYPE OF SURFACE CASING:	steel manhole
TYPE OF SURFACE SEAL:	Portland cement
RISER PIPE I.D.:	1"
TYPE OF RISER PIPE:	PVC
BOREHOLE DIAMETER:	6"
TYPE OF SEAL:	bentonite/grout mix
I.D. OF SCREEN:	1"
SLOT SIZE X LENGTH:	0.010" x 5'
TYPE OF SEAL:	bentonite chips
DEPTH TO TOP OF INTERMEDIATE SEAL:	103'
DEPTH - TOP OF SAND PACK:	113'
DEPTH - TOP OF SCREEN:	115'
TYPE OF SCREEN:	PVC pre-pack
TYPE OF SAND PACK:	20/30 silica sand
TYPE OF BACKFILL BELOW MONITORING WELL:	20/30 silica sand
DEPTH TO BOTTOM OF SCREEN:	120'
DEPTH TO TOP OF 4' BASE BENTONITE SEAL:	121'
DEPTH TO BOTTOM OF BOREHOLE:	125'

ORLANDO NAVAL TRAINING CENTER  
 SITE OU-4  
 MONITORING WELLS

Project No. 112G01606  
 Field Surveys April 17, 2009

**Note:** Horizontal Datum is NAD (North American Datum) 83 SPC Fl. E. US Survey Ft. (As provide by Client)

Vertical Datum is NGVD (National Geodetic Vertical Datum) 1929. As provide by Client)

Description	North Coord.	East Coord.	-----Elevation-----		
			TOC	Conc.	Ground
(*)Svy. Pt.					
<u>Survey Control Points: (By others)</u>					
7 (PK & Washer)	1536901.035	545162.333	-----	-----	(*)110.69
21 (PK & Washer)	1536774.363	545140.423	-----	-----	(*)111.22
Monitor Wells: (By Tetra Tech, Inc. (IER)					
105 (OLD 13-81D)	1537130.17	545022.07	106.72	107.14	107.10
106 (OLD 13-82D)	1537130.01	545022.13	106.70	107.14	107.10

## **APPENDIX C**

### **INVESTIGATION - DERIVED WASTE MANAGEMENT DOCUMENTATION**

**NON-HAZARDOUS WASTE MANIFEST**

1. Generator ID Number  
 2. Page 1 of 1  
 3. Emergency Response Phone 800-226-0911  
 4. Waste Tracking Number 48311

5. Generator's Name and Mailing Address U.S. NAVY  
 4130 FABER PLACE DRIVE  
 NORTH CHARLESTON, SC 29405  
 Generator's Phone: 843-743-2135  
 Generator's Site Address (if different than mailing address)  
 NTC ORLANDO, 1060 WAREHOUSE RD.  
 ORLANDO, FL 32813

6. Transporter 1 Company Name FREEHOLD CARTAGE, INC. U.S. EPA ID Number NJD054126164

7. Transporter 2 Company Name U.S. EPA ID Number

8. Designated Facility Name and Site Address AMERICAN COMPLIANCE TECHNOLOGIES, INC.  
 1875 W. MAIN STREET  
 BARTOW, FL 33830 USA  
 Facility's Phone: 800-226-0911 U.S. EPA ID Number FLR000011049

9. Waste Shipping Name and Description	10. Containers		11. Total Quantity	12. Unit Wt./Vol.	
	No.	Type			
1. NONHAZARDOUS INVESTIGATION DERIVED SOIL	2	DM	1500	P	
2. NONHAZARDOUS INVESTIGATION DERIVED GROUNDWATER	5	DM	275	G	
3.					
4.					

13. Special Handling Instructions and Additional Information  
 LINE 1: APPROVAL #13140-L  
 LINE 2: APPROVAL #13141-WW

14. 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.  
 Generator's/Offeror's Printed/Typed Name Signature Month Day Year

15. International Shipments  Import to U.S.  Export from U.S. Port of entry/exit: Date leaving U.S.:

16. Transporter Acknowledgment of Receipt of Materials  
 Transporter 1 Printed/Typed Name Signature Month Day Year  
 Transporter 2 Printed/Typed Name Signature Month Day Year

17. Discrepancy  
 17a. Discrepancy Indication Space  Quantity  Type  Residue  Partial Rejection  Full Rejection  
 Manifest Reference Number:

17b. Alternate Facility (or Generator) U.S. EPA ID Number  
 Facility's Phone:  
 17c. Signature of Alternate Facility (or Generator) Month Day Year

18. Designated Facility Owner or Operator: Certification of receipt of materials covered by the manifest except as noted in Item 17a  
 Printed/Typed Name Signature Month Day Year

GENERATOR  
INT'L  
TRANSPORTER  
DESIGNATED FACILITY

61009  
720700

<b>NON-HAZARDOUS WASTE MANIFEST</b>		1. Generator ID Number	2. Page 1 of 1	3. Emergency Response Phone 800-226-0911	4. Waste Tracking Number 48311	
5. Generator's Name and Mailing Address U.S. NAVY 4130 FABER PLACE DRIVE NORTH CHARLESTON, SC 29405 Generator's Phone: 843-743-2135			Generator's Site Address (if different than mailing address) NTC ORLANDO, 1060 WAREHOUSE RD. ORLANDO, FL 32813			
6. Transporter 1 Company Name FREEHOLD CARTAGE, INC.				U.S. EPA ID Number NJ0054126164		
7. Transporter 2 Company Name				U.S. EPA ID Number		
8. Designated Facility Name and Site Address AMERICAN COMPLIANCE TECHNOLOGIES, INC. 1875 W. MAIN STREET BARTOW, FL 33830 USA Facility's Phone: 800-226-0911			U.S. EPA ID Number FLR000011049			
GENERATOR	9. Waste Shipping Name and Description		10. Containers		11. Total Quantity	12. Unit Wt./Vol.
			No.	Type		
	1. NONHAZARDOUS INVESTIGATION DERIVED SOIL		2	DM	1500	P
	2. NONHAZARDOUS INVESTIGATION DERIVED GROUNDWATER		84 DB	DM	275	G
	3.					
4.						
13. Special Handling Instructions and Additional Information LINE 1: APPROVAL #13140-L LINE 2: APPROVAL #13141-WW ACT PROJECT#11472						
14. 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.						
Generator's/Officer's Printed/Typed Name MARK E. DAVIDSON			Signature <i>Mark E. Davidson</i>		Month Day Year 6   10   09	
15. International Shipments <input type="checkbox"/> Import to U.S. <input type="checkbox"/> Export from U.S. Port of entry/exit: _____ Date leaving U.S.: _____						
16. Transporter Acknowledgment of Receipt of Materials						
Transporter 1 Printed/Typed Name STEPHEN J. GARNER			Signature <i>Stephen J. Garner</i>		Month Day Year 6   10   09	
Transporter 2 Printed/Typed Name			Signature		Month Day Year	
17. Discrepancy						
17a. Discrepancy Indication Space <input type="checkbox"/> Quantity <input type="checkbox"/> Type <input type="checkbox"/> Residue <input type="checkbox"/> Partial Rejection <input type="checkbox"/> Full Rejection Manifest Reference Number: _____						
17b. Alternate Facility (or Generator) U.S. EPA ID Number						
Facility's Phone: _____						
17c. Signature of Alternate Facility (or Generator) Month Day Year						
18. Designated Facility Owner or Operator: Certification of receipt of materials covered by the manifest except as noted in Item 17a						
Printed/Typed Name			Signature		Month Day Year	

**NON-HAZARDOUS WASTE MANIFEST**

1. Generator ID Number

2. Page 1 of 1

3. Emergency Response Phone  
800-226-0911

4. Waste Tracking Number  
48433

5. Generator's Name and Mailing Address

U.S. NAVY  
4130 FABER PLACE DRIVE  
843-743-2135 NORTH CHARLESTON, SC 29405

Generator's Site Address (if different than mailing address)

NTC ORLANDO, 1060 WAREHOUSE RD.  
ORLANDO, FL 32813

Generator's Phone:

6. Transporter 1 Company Name

AMERICAN COMPLIANCE TECHNOLOGIES, INC.

U.S. EPA ID Number

FLR000011049

7. Transporter 2 Company Name

U.S. EPA ID Number

8. Designated Facility Name and Site Address

AMERICAN COMPLIANCE TECHNOLOGIES, INC.  
1875 W. MAIN STREET  
800-226-0911 BARTOW, FL 33830 USA

U.S. EPA ID Number

FLR000011049

Facility's Phone:

9. Waste Shipping Name and Description

10. Containers

No.

Type

11. Total Quantity

12. Unit Wt./Vol.

1. NONHAZARDOUS INVESTIGATION DERIVED GROUNDWATER

1

DF

55

G

13. Special Handling Instructions and Additional Information

ACT PROJECT #11472 Drum #7  
LINE 1: APPROVAL #13141-WW  
55 gallon metal overpacked in poly salvage drum

14. 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.

Generator's/Officer's Printed/Typed Name

MARK E. DAVIDSON

Signature

*Mark E. Davidson*

Month Day Year

06 16 09

15. International Shipments

Import to U.S.

Export from U.S.

Port of entry/exit:

Transporter Signature (for exports only):

Date leaving U.S.:

16. Transporter Acknowledgment of Receipt of Materials

Transporter 1 Printed/Typed Name

Signature

Month Day Year

Transporter 2 Printed/Typed Name

Signature

Month Day Year

17. Discrepancy

17a. Discrepancy Indication Space

Quantity

Type

Residue

Partial Rejection

Full Rejection

Manifest Reference Number:

17b. Alternate Facility (or Generator)

U.S. EPA ID Number

Facility's Phone:

17c. Signature of Alternate Facility (or Generator)

Month Day Year

18. Designated Facility Owner or Operator: Certification of receipt of materials covered by the manifest except as noted in Item 17a

Printed/Typed Name

Signature

Month Day Year

GENERATOR

TRANSPORTER

DESIGNATED FACILITY

**APPENDIX D**  
**GROUNDWATER ANALYTICAL RESULTS**

APPENDIX D

SELECT HISTORICAL HAWTHORN GROUNDWATER ANALYTICAL RESULTS - VALIDATED  
OPERABLE UNIT 4

NAVAL TRAINING CENTER  
ORLANDO, FLORIDA

Page 1 of 6

Well ID	CAS	Florida GCTL (ug/l)	OLD1368D	OLD1368D	OLD1368D	OLD1368D	OLD1368D	OLD1368D	OLD1368D
Sample ID			NTC13G68D109292008	NTC13G68D209292008	NTC13G68D301	NTC13G68D309302008	NTC13G68D409302008	NTC13G68D501	0581368DQ108
Top of Screen, ft bgs			51	63	73	73	90	105	105
Bottom of Screen, ft bgs			55	68	78	78	95	110	110
Sample Date	09/29/08	09/29/08	07/31/06	09/30/08	09/30/08	07/31/06	01/24/08		
<b>Volatile Organics (µg/L)</b>									
1,1,1-Trichloroethane	71-55-6	200	0.22 U	0.22 U	0.5 U	0.22 U	0.22 U	0.5 U	1 U
1,1,2,2-Tetrachloroethane	79-34-5	0.2	<b>0.39 U</b>	<b>0.39 U</b>	<b>0.4 U</b>	<b>0.39 U</b>	<b>0.39 U</b>	<b>0.4 U</b>	<b>0.5 U</b>
1,1,2-Trichloroethane	79-00-5	5	0.2 U	0.2 U	0.5 U	0.2 U	0.2 U	0.5 U	1 U
1,1,2-Trichlorotrifluoroethane	76-13-1	210000							1 U
1,1-Dichloroethane	75-34-3	70	0.21 U	0.21 U	0.5 U	0.21 U	0.21 U	0.5 U	1 U
1,1-Dichloroethene	75-35-4	7	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	1 U
1,2,3-Trichlorobenzene	87-61-6	70							1 U
1,2,4-Trichlorobenzene	120-82-1	70							1 U
1,2-Dibromo-3-Chloropropane	96-12-8	0.2							<b>0.5 U</b>
1,2-Dibromoethane	106-93-4	0.02							<b>0.5 U</b>
1,2-Dichlorobenzene	95-50-1	600							1 U
1,2-Dichloroethane	107-06-2	3	0.26 U	0.26 U	0.5 U	0.26 U	0.26 U	0.5 U	1 U
1,2-Dichloropropane	78-87-5	5	0.4 U	0.4 U	0.5 U	0.4 U	0.4 U	0.5 U	1 U
1,3-Dichlorobenzene	541-73-1	210							1 U
1,4-Dichlorobenzene	106-46-7	75							1 U
2-Butanone	78-93-3	4200	1.3 UR	1.3 UR	2.5 U	1.5 J	1.3 UR	2.5 U	10 UJ
2-Hexanone	591-78-6	280	0.5 U	0.5 U	2.5 U	0.5 U	0.5 U	2.5 U	5 U
4-Methyl-2-Pentanone	108-10-1	560	0.67 UR	0.67 UR	2.5 U	0.67 UR	0.67 UR	2.5 U	5 U
Acetone	67-64-1	6300	1.5 U	1.5 U	7.3 J	2.6 J	1.5 U	5 U	10 UJ
Benzene	71-43-2	1	0.3 U	0.3 U	0.5 U	0.3 U	0.3 U	0.5 U	1 U
Bromochloromethane	74-97-5	91							1 U
Bromodichloromethane	75-27-4	0.6	0.25 U	0.25 U	0.5 U	0.25 U	0.25 U	0.5 U	0.6 U
Bromofom	75-25-2	4.4	0.2 U	0.2 U	0.5 U	0.2 U	0.2 U	0.5 U	1 U
Bromomethane	74-83-9	9.8	0.4 U	0.4 U	1 U	0.4 U	0.4 U	1 U	1 UJ
Carbon Disulfide	75-15-0	700	0.22 U	0.22 U	1 U	0.5 J	0.22 U	1 U	1 U
Carbon Tetrachloride	56-23-5	3	0.27 U	0.27 U	0.5 U	0.27 U	0.27 U	0.5 U	1 U
Chlorobenzene	108-90-7	100	0.28 U	0.28 U	0.5 U	0.28 U	0.28 U	0.5 U	1 U
Chlorodibromomethane	124-48-1	0.4	0.25 U	0.25 U	0.4 U	0.25 U	0.25 U	0.4 U	
Chloroethane	75-00-3	12	0.93 U	0.93 U	1 U	0.93 U	0.93 U	1 U	1 U
Chloroform	67-66-3	70	0.27 U	0.27 U	3.2	0.27 U	0.27 U	0.5 U	1 U
Chloromethane	74-87-3	2.7	0.27 U	0.27 U	1 U	0.27 U	0.27 U	1 U	1 U
Cis-1,2-Dichloroethene	156-59-2	70	0.22 U	0.22 U	0.5 U	0.22 U	0.22 U	0.5 U	1 U
Cis-1,3-Dichloropropene	10061-01-5	NA	0.27 U	0.27 U	0.3 U	0.27 U	0.27 U	0.3 U	1 U
Dichlorodifluoromethane	75-71-8	1400							1 U
Ethylbenzene	100-41-4	30	0.25 U	0.25 U	0.5 U	0.25 U	0.25 U	0.5 U	1 U
Isopropylbenzene	98-82-8	0.8							0.8 U
M+P-Xylenes	TTNUS054	NA	0.71 U	0.71 U		0.71 U	0.71 U		
Methyl Acetate	79-20-9	3000							1 U
Methyl Tert-Butyl Ether	1634-04-4	20	0.27 U	0.27 U		0.27 U	0.27 U		1 U
Methylene Chloride	75-09-2	5	0.27 U	0.27 U	1 U	0.27 U	0.27 U	1 U	1 U
O-Xylene	95-47-6	NA	0.22 U	0.22 U		0.22 U	0.22 U		
Styrene	100-42-5	100	0.2 U	0.2 U	0.5 U	0.2 U	0.2 U	0.5 U	1 U
Tetrachloroethene	127-18-4	3	0.2 U	0.2 U	0.5 U	0.2 U	0.2 U	0.5 U	1 U
Toluene	108-88-3	40	0.26 U	0.26 U	0.5 U	0.26 U	0.26 U	0.5 U	1 U
Total Xylenes	1330-20-7	20	0.71 U	0.71 U	1 U	0.71 U	0.71 U	1 U	1 U
Trans-1,2-Dichloroethene	156-60-5	100	0.43 U	0.43 U	0.5 U	0.43 U	0.43 U	0.5 U	1 U
Trans-1,3-Dichloropropene	10061-02-6	NA	0.2 U	0.2 U	0.3 U	0.2 U	0.2 U	0.3 U	1 U
Trichloroethene	79-01-6	3	0.26 U	0.26 U	0.5 U	0.26 U	0.26 U	0.5 U	1 U
Trichlorofluoromethane	75-69-4	2100							1 U
Vinyl Chloride	75-01-4	1	0.22 U	0.22 U	0.5 U	0.22 U	0.22 U	0.5 U	1 U

APPENDIX D

SELECT HISTORICAL HAWTHORN GROUNDWATER ANALYTICAL RESULTS - VALIDATED  
OPERABLE UNIT 4

NAVAL TRAINING CENTER  
ORLANDO, FLORIDA

Well ID	CAS	Florida GCTL (ug/l)	OLD1368D	OLD1368D	OLD1368D	OLD1369D	OLD1369D	OLD1369D	OLD1369D
Sample ID			NTC13G68D509302008	NTC13G68D601	NTC13G68D609302008	NTC13G69D110022008	NTC13G69D210022008	NTC13G69D301	NTC13G69D310022008
Top of Screen, ft bgs			105	118	118	60	70	85	85
Bottom of Screen, ft bgs			110	128	128	65	75	90	90
Sample Date	09/30/08	07/31/06	09/30/08	10/02/08	10/02/08	08/01/06	10/02/08		
<b>Volatile Organics (µg/L)</b>									
1,1,1-Trichloroethane	71-55-6	200	0.22 U	0.5 U	0.22 U	0.22 U	0.22 U	0.5 U	0.22 U
1,1,2,2-Tetrachloroethane	79-34-5	0.2	<b>0.39 U</b>	<b>0.4 U</b>	<b>0.39 U</b>	<b>0.39 U</b>	<b>0.39 U</b>	<b>0.4 U</b>	<b>0.39 U</b>
1,1,2-Trichloroethane	79-00-5	5	0.2 U	0.5 U	0.2 U	0.2 U	0.2 U	0.5 U	0.2 U
1,1,2-Trichlorotrifluoroethane	76-13-1	210000							
1,1-Dichloroethane	75-34-3	70	0.21 U	0.5 U	0.21 U	0.21 U	0.21 U	0.5 U	0.21 U
1,1-Dichloroethene	75-35-4	7	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2,3-Trichlorobenzene	87-61-6	70							
1,2,4-Trichlorobenzene	120-82-1	70							
1,2-Dibromo-3-Chloropropane	96-12-8	0.2							
1,2-Dibromoethane	106-93-4	0.02							
1,2-Dichlorobenzene	95-50-1	600							
1,2-Dichloroethane	107-06-2	3	0.26 U	0.5 U	0.26 U	0.26 U	0.26 U	0.5 U	0.26 U
1,2-Dichloropropane	78-87-5	5	0.4 U	0.5 U	0.4 U	0.4 U	0.4 U	0.5 U	0.4 U
1,3-Dichlorobenzene	541-73-1	210							
1,4-Dichlorobenzene	106-46-7	75							
2-Butanone	78-93-3	4200	1.3 UR	2.5 U	1.3 UR	14 J	1.4 J	2.5 U	92 J
2-Hexanone	591-78-6	280	0.5 U	2.5 U	0.5 U	1.5 J	0.5 U	2.5 U	3.5 J
4-Methyl-2-Pentanone	108-10-1	560	0.67 UR	2.5 U	0.67 UR	0.67 UR	0.67 UR	2.5 U	0.67 UR
Acetone	67-64-1	6300	1.5 U	5 U	1.5 U	3 J	2.5 J	5 U	7.6
Benzene	71-43-2	1	0.3 U	0.5 U	0.3 U	0.3 U	0.3 U	0.5 U	0.3 U
Bromochloromethane	74-97-5	91							
Bromodichloromethane	75-27-4	0.6	0.25 U	0.5 U	0.25 U	0.25 U	0.25 U	0.5 U	0.25 U
Bromoform	75-25-2	4.4	0.2 U	0.5 U	0.2 U	0.2 U	0.2 U	0.5 U	0.2 U
Bromomethane	74-83-9	9.8	0.4 U	1 U	0.4 U	0.4 U	0.4 U	1 U	0.4 U
Carbon Disulfide	75-15-0	700	0.22 U	1 U	0.33 J	0.22 U	0.45 J	1 U	0.75 J
Carbon Tetrachloride	56-23-5	3	0.27 U	0.5 U	0.27 U	0.27 U	0.27 U	0.5 U	0.27 U
Chlorobenzene	108-90-7	100	0.28 U	0.5 U	0.28 U	0.28 U	0.28 U	0.5 U	0.28 U
Chlorodibromomethane	124-48-1	0.4	0.25 U	0.4 U	0.25 U	0.25 U	0.25 U	0.4 U	0.25 U
Chloroethane	75-00-3	12	0.93 U	1 U	0.93 U	0.93 U	0.93 U	1 U	0.93 U
Chloroform	67-66-3	70	0.27 U	0.5 U	0.27 U	0.27 U	0.27 U	0.65 J	0.27 U
Chloromethane	74-87-3	2.7	0.27 U	1 U	0.27 U	0.27 U	0.27 U	1 U	0.27 U
Cis-1,2-Dichloroethene	156-59-2	70	0.22 U	0.5 U	0.22 U	0.6 J	0.22 U	1	8.1
Cis-1,3-Dichloropropene	10061-01-5	NA	0.27 U	0.3 U	0.27 U	0.27 U	0.27 U	0.3 U	0.27 U
Dichlorodifluoromethane	75-71-8	1400							
Ethylbenzene	100-41-4	30	0.25 U	0.5 U	0.25 U	0.25 U	0.25 U	0.5 U	0.25 U
Isopropylbenzene	98-82-8	0.8							
M+P-Xylenes	TTNUS054	NA	0.71 U		0.71 U	0.71 U	0.71 U		0.71 U
Methyl Acetate	79-20-9	3000							
Methyl Tert-Butyl Ether	1634-04-4	20	0.27 U		0.27 U	0.27 U	0.27 U		0.27 U
Methylene Chloride	75-09-2	5	0.27 U	1 U	0.27 U	0.27 U	0.27 U	1.7 U	0.27 U
O-Xylene	95-47-6	NA	0.22 U		0.22 U	0.22 U	0.22 U		0.22 U
Styrene	100-42-5	100	0.2 U	0.5 U	0.2 U	0.2 U	0.2 U	0.5 U	0.2 U
Tetrachloroethene	127-18-4	3	0.2 U	0.5 U	0.2 U	0.2 U	0.2 U	1.5	0.2 U
Toluene	108-88-3	40	0.26 U	0.5 U	0.26 U	0.26 U	0.26 U	0.5 U	0.26 U
Total Xylenes	1330-20-7	20	0.71 U	1 U	0.71 U	0.71 U	0.71 U	1 U	0.71 U
Trans-1,2-Dichloroethene	156-60-5	100	0.43 U	0.5 U	0.43 U	0.43 U	0.43 U	0.5 U	0.43 U
Trans-1,3-Dichloropropene	10061-02-6	NA	0.2 U	0.3 U	0.2 U	0.2 U	0.2 U	0.3 U	0.2 U
Trichloroethene	79-01-6	3	0.26 U	0.5 U	0.26 U	0.26 U	0.26 U	1.2	0.43 J
Trichlorofluoromethane	75-69-4	2100							
Vinyl Chloride	75-01-4	1	0.22 U	0.5 U	0.22 U	0.22 U	0.22 U	0.5 U	0.22 U

APPENDIX D

SELECT HISTORICAL HAWTHORN GROUNDWATER ANALYTICAL RESULTS - VALIDATED  
OPERABLE UNIT 4

NAVAL TRAINING CENTER  
ORLANDO, FLORIDA

Well ID	CAS	Florida GCTL (ug/l)	OLD1369D	OLD1369D	OLD1369D	OLD1369D	OLD1369D	OLD1369D	OLD1369D
Sample ID			0581369DQ108	NTC13G69D404162008	NTC13G69D410032008	NTC13G69D410022008-D	NTC13G69D501	NTC13G69D501-D	NTC13G69D504162008
Top of Screen, ft bgs			100	100	100	100	110	110	110
Bottom of Screen, ft bgs			105	105	105	105	115	115	115
Sample Date	01/24/08	04/16/08	10/3/2008	10/02/08	08/01/06	08/01/06	04/16/08		
<b>Volatile Organics (µg/L)</b>									
1,1,1-Trichloroethane	71-55-6	200	U	2.9 U	4.4 U	0.22 U	0.5 U	0.5 U	0.58 U
1,1,2,2-Tetrachloroethane	79-34-5	0.2	U	3.7 U	7.8 U	0.39 U	0.4 U	0.4 U	0.74 U
1,1,2-Trichloroethane	79-00-5	5	U	3 U	4 U	0.2 U	0.5 U	0.5 U	0.6 U
1,1,2-Trichlorotrifluoroethane	76-13-1	210000	J						
1,1-Dichloroethane	75-34-3	70	U	2.5 U	4.2 U	0.21 U	0.5 U	0.5 U	0.5 U
1,1-Dichloroethene	75-35-4	7	J	2.3 U	10 U	1.2	0.5 U	0.5 U	1.7 J
1,2,3-Trichlorobenzene	87-61-6	70	U						
1,2,4-Trichlorobenzene	120-82-1	70	U						
1,2-Dibromo-3-Chloropropane	96-12-8	0.2	U						
1,2-Dibromoethane	106-93-4	0.02	U						
1,2-Dichlorobenzene	95-50-1	600	U						
1,2-Dichloroethane	107-06-2	3	U	2 U	5.2 U	0.26 U	0.5 U	0.5 U	0.4 U
1,2-Dichloropropane	78-87-5	5	U	2.5 U	8 U	0.4 U	0.5 U	0.5 U	0.5 U
1,3-Dichlorobenzene	541-73-1	210	U						
1,4-Dichlorobenzene	106-46-7	75	U						
2-Butanone	78-93-3	4200	UJ	20 U	39 J	39 J	2.5 U	2.5 U	4 U
2-Hexanone	591-78-6	280	U	29 U	18 J	3.9 J	2.5 U	2.5 U	5.7 U
4-Methyl-2-Pentanone	108-10-1	560	U	22 U	28 J	0.67 UR	2.5 U	2.5 U	4.4 U
Acetone	67-64-1	6300	UJ	100 U	30 U	7.1	5.1 J	5.1 J	20 U
Benzene	71-43-2	1	U	2 U	6 U	0.3 U	0.5 U	0.5 U	0.4 U
Bromochloromethane	74-97-5	91	U						
Bromodichloromethane	75-27-4	0.6	U	2.9 U	5 U	0.25 U	0.5 U	0.5 U	0.58 U
Bromoform	75-25-2	4.4	U	2.8 U	4 U	0.2 U	0.5 U	0.5 U	0.56 U
Bromomethane	74-83-9	9.8	UJ	5.4 U	8 U	0.4 U	1 U	1 U	1.1 U
Carbon Disulfide	75-15-0	700	U	2 U	4.4 U	0.22 U	1 U	1 U	0.4 U
Carbon Tetrachloride	56-23-5	3	U	2.9 U	5.4 U	0.27 U	0.5 U	0.5 U	0.58 U
Chlorobenzene	108-90-7	100	U	2 U	5.6 U	0.28 U	0.5 U	0.5 U	0.4 U
Chlorodibromomethane	124-48-1	0.4		2 U	5 U	0.25 U	0.4 U	0.4 U	0.4 U
Chloroethane	75-00-3	12	U	4.6 U	19 U	0.93 U	1 U	1 U	0.92 U
Chloroform	67-66-3	70	U	2.1 U	5.4 U	0.27 U	1.6	1.5	0.42 U
Chloromethane	74-87-3	2.7	U	3.8 U	5.4 U	0.27 U	1 U	1 U	0.76 U
Cis-1,2-Dichloroethene	156-59-2	70		139	180 J	110 J	8.3	8.1	167
Cis-1,3-Dichloropropene	10061-01-5	NA	U	2.4 U	5.4 U	0.27 U	0.3 U	0.3 U	0.48 U
Dichlorodifluoromethane	75-71-8	1400	U						
Ethylbenzene	100-41-4	30	U	2 U	5 U	0.25 U	0.5 U	0.5 U	0.4 U
Isopropylbenzene	98-82-8	0.8	U						
M+P-Xylenes	TTNUS054	NA			14 U	0.71 U			
Methyl Acetate	79-20-9	3000	U						
Methyl Tert-Butyl Ether	1634-04-4	20	U	2.5 U	5.4 U	0.27 U			0.5 U
Methylene Chloride	75-09-2	5	U	10 UJ	5.4 U	0.27 U	2 U	2 U	2 UJ
O-Xylene	95-47-6	NA			4.4 U	0.22 U			
Styrene	100-42-5	100	U	2 U	4 U	0.2 U	0.5 U	0.5 U	0.4 U
Tetrachloroethene	127-18-4	3		1980	2700 J	1700 J	0.5 U	0.5 U	0.5 U
Toluene	108-88-3	40	U	2.7 U	5.2 U	0.26 U	0.5 U	0.5 U	0.54 U
Total Xylenes	1330-20-7	20	U	5.6 U	14 U	0.71 U	1 U	1 U	1.1 U
Trans-1,2-Dichloroethene	156-60-5	100	U	2 U	8.6 U	0.44 J	0.5 U	0.5 U	0.4 U
Trans-1,3-Dichloropropene	10061-02-6	NA	U	2.1 U	4 U	0.2 U	0.3 U	0.3 U	0.42 U
Trichloroethene	79-01-6	3		260	460 J	270 J	0.5 U	0.5 U	0.76 U
Trichlorofluoromethane	75-69-4	2100	U						
Vinyl Chloride	75-01-4	1	U	3.4 U	4.4 U	0.22 U	0.5 U	0.5 U	0.68 U

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SELECT HISTORICAL HAWTHORN GROUNDWATER ANALYTICAL RESULTS - VALIDATED  
OPERABLE UNIT 4

NAVAL TRAINING CENTER  
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Well ID	CAS	Florida GCTL (ug/l)	OLD1369D	OLD1369D	OLD1369D	OLD1370D	OLD1370D	OLD1370D	OLD1370D
Sample ID			NTC13G69D510032008	NTC13G69D601	NTC13G69D610032008	NTC13G70D110012008	NTC13G70D210012008	NTC13G70D310012008	NTC13G70D401
Top of Screen, ft bgs			110	122	122	64	80	90	101
Bottom of Screen, ft bgs			115	127	127	69	85	95	106
Sample Date	10/3/2008	08/01/06	10/3/2008	10/01/08	10/01/08	10/01/08	07/31/06		
<b>Volatile Organics (µg/L)</b>									
1,1,1-Trichloroethane	71-55-6	200	0.22 U	0.5 U	0.22 U	0.22 U	0.22 U	0.22 U	0.5 U
1,1,2,2-Tetrachloroethane	79-34-5	0.2	<b>0.39 U</b>	<b>0.4 U</b>	<b>0.39 U</b>	<b>0.39 U</b>	<b>0.39 U</b>	<b>0.39 U</b>	<b>0.4 U</b>
1,1,2-Trichloroethane	79-00-5	5	0.2 U	0.5 U	0.2 U	0.2 U	0.2 U	0.2 U	0.5 U
1,1,2-Trichlorotrifluoroethane	76-13-1	210000							
1,1-Dichloroethane	75-34-3	70	0.21 U	0.5 U	0.21 U	0.21 U	0.21 U	0.21 U	0.5 U
1,1-Dichloroethene	75-35-4	7	0.87 J	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2,3-Trichlorobenzene	87-61-6	70							
1,2,4-Trichlorobenzene	120-82-1	70							
1,2-Dibromo-3-Chloropropane	96-12-8	0.2							
1,2-Dibromoethane	106-93-4	0.02							
1,2-Dichlorobenzene	95-50-1	600							
1,2-Dichloroethane	107-06-2	3	0.26 U	0.5 U	0.26 U	0.26 U	0.26 U	0.26 U	0.5 U
1,2-Dichloropropane	78-87-5	5	0.4 U	0.5 U	0.4 U	0.4 U	0.4 U	0.4 U	0.5 U
1,3-Dichlorobenzene	541-73-1	210							
1,4-Dichlorobenzene	106-46-7	75							
2-Butanone	78-93-3	4200	120 J	2.5 U	4.9 J	20 J	1.3 UR	1.3 UR	2.5 U
2-Hexanone	591-78-6	280	0.5 U	2.5 U	0.5 U	7.4	0.5 U	0.5 U	2.5 U
4-Methyl-2-Pentanone	108-10-1	560	0.67 UR	2.5 U	0.67 UR	1.1 J	0.67 UR	0.67 UR	2.5 U
Acetone	67-64-1	6300	9.2	5 U	1.5 U	120	1.5 U	1.5 U	5 U
Benzene	71-43-2	1	0.3 U	0.5 U	0.3 U	0.3 U	0.3 U	0.3 U	0.5 U
Bromochloromethane	74-97-5	91							
Bromodichloromethane	75-27-4	0.6	0.25 U	0.5 U	0.25 U	0.25 U	0.25 U	0.25 U	0.5 U
Bromoform	75-25-2	4.4	0.2 U	0.5 U	0.2 U	0.2 U	0.2 U	0.2 U	0.5 U
Bromomethane	74-83-9	9.8	0.4 U	1 U	0.4 U	0.4 U	0.4 U	0.4 U	1 U
Carbon Disulfide	75-15-0	700	0.22 U	1 U	0.27 J	1.3 J	0.22 U	0.22 U	1 U
Carbon Tetrachloride	56-23-5	3	0.27 U	0.5 U	0.27 U	0.27 U	0.27 U	0.27 U	0.5 U
Chlorobenzene	108-90-7	100	0.28 U	0.5 U	0.28 U	0.28 U	0.28 U	0.28 U	0.5 U
Chlorodibromomethane	124-48-1	0.4	0.25 U	0.4 U	0.25 U	0.25 U	0.25 U	0.25 U	0.4 U
Chloroethane	75-00-3	12	0.93 U	1 U	0.93 U	0.93 U	0.93 U	0.93 U	1 U
Chloroform	67-66-3	70	0.27 U	0.75 J	0.27 U	0.27 U	0.27 U	0.27 U	1.2
Chloromethane	74-87-3	2.7	0.27 U	1 U	0.27 U	0.27 U	0.27 U	0.27 U	1 U
Cis-1,2-Dichloroethene	156-59-2	70	<b>130</b>	0.5 U	2.8	0.22 U	0.22 U	0.22 U	0.5 U
Cis-1,3-Dichloropropene	10061-01-5	NA	0.27 U	0.3 U	0.27 U	0.27 U	0.27 U	0.27 U	0.3 U
Dichlorodifluoromethane	75-71-8	1400							
Ethylbenzene	100-41-4	30	0.25 U	0.5 U	0.25 U	0.25 U	0.25 U	0.25 U	0.5 U
Isopropylbenzene	98-82-8	0.8							
M+P-Xylenes	TTNUS054	NA	0.71 U		0.71 U	0.71 U	0.71 U	0.71 U	
Methyl Acetate	79-20-9	3000							
Methyl Tert-Butyl Ether	1634-04-4	20	0.27 U		0.27 U	0.27 U	0.27 U	0.27 U	
Methylene Chloride	75-09-2	5	0.27 U	1 U	0.27 U	0.27 U	0.27 U	0.27 U	1.1 U
O-Xylene	95-47-6	NA	0.22 U		0.22 U	0.22 U	0.22 U	0.22 U	
Styrene	100-42-5	100	0.2 U	0.5 U	0.2 U	0.2 U	0.2 U	0.2 U	0.5 U
Tetrachloroethene	127-18-4	3	1	0.5 U	0.94 J	0.2 U	0.2 U	0.2 U	0.5 U
Toluene	108-88-3	40	0.26 U	0.5 U	0.26 U	0.47 J	0.26 U	0.26 U	0.5 U
Total Xylenes	1330-20-7	20	0.71 U	1 U	0.71 U	0.71 U	0.71 U	0.71 U	1 U
Trans-1,2-Dichloroethene	156-60-5	100	0.43 U	0.5 U	0.43 U	0.43 U	0.43 U	0.43 U	0.5 U
Trans-1,3-Dichloropropene	10061-02-6	NA	0.2 U	0.3 U	0.2 U	0.2 U	0.2 U	0.2 U	0.3 U
Trichloroethene	79-01-6	3	<b>5</b>	0.5 U	0.93 J	0.26 U	0.26 U	0.26 U	0.5 U
Trichlorofluoromethane	75-69-4	2100							
Vinyl Chloride	75-01-4	1	0.32 J	0.5 U	0.22 U	0.22 U	0.22 U	0.22 U	0.5 U

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SELECT HISTORICAL HAWTHORN GROUNDWATER ANALYTICAL RESULTS - VALIDATED  
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Well ID	CAS	Florida GCTL (ug/l)	OLD1370D	OLD1370D	OLD1370D	OLD1370D
Sample ID			0581370DQ108	NTC13G70D410012008	NTC13G70D410012008-D	NTC13G70D510022008
Top of Screen, ft bgs			101	101	101	112
Bottom of Screen, ft bgs			106	106	106	117
Sample Date			01/24/08	10/01/08	10/01/08	10/02/08
Volatile Organics (µg/L)						
1,1,1-Trichloroethane	71-55-6	200	1 U	0.22 U	0.22 U	0.22 U
1,1,2,2-Tetrachloroethane	79-34-5	0.2	0.5 U	0.39 U	0.39 U	0.39 U
1,1,2-Trichloroethane	79-00-5	5	1 U	0.2 U	0.2 U	0.2 U
1,1,2-Trichlorotrifluoroethane	76-13-1	210000	1 U			
1,1-Dichloroethane	75-34-3	70	1 U	0.21 U	0.21 U	0.21 U
1,1-Dichloroethene	75-35-4	7	1 U	0.5 U	0.5 U	0.5 U
1,2,3-Trichlorobenzene	87-61-6	70	1 U			
1,2,4-Trichlorobenzene	120-82-1	70	1 U			
1,2-Dibromo-3-Chloropropane	96-12-8	0.2	0.5 U			
1,2-Dibromoethane	106-93-4	0.02	0.5 U			
1,2-Dichlorobenzene	95-50-1	600	1 U			
1,2-Dichloroethane	107-06-2	3	1 U	0.26 U	0.26 U	0.26 U
1,2-Dichloropropane	78-87-5	5	1 U	0.4 U	0.4 U	0.4 U
1,3-Dichlorobenzene	541-73-1	210	1 U			
1,4-Dichlorobenzene	106-46-7	75	1 U			
2-Butanone	78-93-3	4200	10 UJ	1.3 UR	1.3 UR	1.3 UR
2-Hexanone	591-78-6	280	5 U	0.5 U	0.5 U	0.5 U
4-Methyl-2-Pentanone	108-10-1	560	5 U	0.67 UR	0.67 UR	0.67 UR
Acetone	67-64-1	6300	10 UJ	1.5 U	1.5 U	2.9 J
Benzene	71-43-2	1	1 U	0.3 U	0.3 U	0.3 U
Bromochloromethane	74-97-5	91	1 U			
Bromodichloromethane	75-27-4	0.6	0.6 U	0.25 U	0.25 U	0.25 U
Bromoform	75-25-2	4.4	1 U	0.2 U	0.2 U	0.2 U
Bromomethane	74-83-9	9.8	1 UJ	0.4 U	0.4 U	0.4 U
Carbon Disulfide	75-15-0	700	1 U	0.22 U	0.22 J	0.22 U
Carbon Tetrachloride	56-23-5	3	1 U	0.27 U	0.27 U	0.27 U
Chlorobenzene	108-90-7	100	1 U	0.28 U	0.28 U	0.28 U
Chlorodibromomethane	124-48-1	0.4		0.25 U	0.25 U	0.25 U
Chloroethane	75-00-3	12	1 U	0.93 U	0.93 U	0.93 U
Chloroform	67-66-3	70	1 U	0.27 U	0.27 U	0.27 U
Chloromethane	74-87-3	2.7	1 U	0.27 U	0.27 U	0.27 U
Cis-1,2-Dichloroethene	156-59-2	70	1 U	0.22 U	0.22 U	0.22 U
Cis-1,3-Dichloropropene	10061-01-5	NA	1 U	0.27 U	0.27 U	0.27 U
Dichlorodifluoromethane	75-71-8	1400	1 U			
Ethylbenzene	100-41-4	30	1 U	0.25 U	0.25 U	0.25 U
Isopropylbenzene	98-82-8	0.8	0.8 U			
M+P-Xylenes	TTNUS054	NA		0.71 U	0.71 U	0.71 U
Methyl Acetate	79-20-9	3000	1 U			
Methyl Tert-Butyl Ether	1634-04-4	20	1 U	0.27 U	0.27 U	0.27 U
Methylene Chloride	75-09-2	5	1 U	0.27 U	0.27 U	0.27 U
O-Xylene	95-47-6	NA		0.22 U	0.22 U	0.22 U
Styrene	100-42-5	100	1 U	0.2 U	0.2 U	0.2 U
Tetrachloroethene	127-18-4	3	4.8	0.2 U	0.2 U	0.2 U
Toluene	108-88-3	40	1 U	0.26 U	0.26 U	0.26 U
Total Xylenes	1330-20-7	20	1 U	0.71 U	0.71 U	0.71 U
Trans-1,2-Dichloroethene	156-60-5	100	1 U	0.43 U	0.43 U	0.43 U
Trans-1,3-Dichloropropene	10061-02-6	NA	1 U	0.2 U	0.2 U	0.2 U
Trichloroethene	79-01-6	3	0.23 J	0.26 U	0.26 U	0.26 U
Trichlorofluoromethane	75-69-4	2100	1 U			
Vinyl Chloride	75-01-4	1	1 U	0.22 U	0.22 U	0.22 U

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SELECT HISTORICAL HAWTHORN GROUNDWATER ANALYTICAL RESULTS - VALIDATED  
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Well ID	CAS	Florida GCTL (ug/l)	OLD1370D	OLD1381D	OLD1382D
Sample ID			NTC13G70D610022008	NTC13G81D03162009	NTC13G82D03162009
Top of Screen, ft bgs			123	97	115
Bottom of Screen, ft bgs			128	102	120
Sample Date			10/02/08	03/16/09	03/16/09
Volatile Organics (µg/L)					
1,1,1-Trichloroethane	71-55-6	200	0.22 U	0.4 U	0.4 U
1,1,1,2-Tetrachloroethane	79-34-5	0.2	0.39 U	0.23 U	0.23 U
1,1,2-Trichloroethane	79-00-5	5	0.2 U	0.34 U	0.34 U
1,1,2-Trichlorotrifluoroethane	76-13-1	210000			
1,1-Dichloroethane	75-34-3	70	0.21 U	0.45 U	0.45 U
1,1-Dichloroethene	75-35-4	7	0.5 U	0.5 U	0.5 U
1,2,3-Trichlorobenzene	87-61-6	70			
1,2,4-Trichlorobenzene	120-82-1	70			
1,2-Dibromo-3-Chloropropane	96-12-8	0.2			
1,2-Dibromoethane	106-93-4	0.02			
1,2-Dichlorobenzene	95-50-1	600			
1,2-Dichloroethane	107-06-2	3	0.26 U	0.34 U	0.34 U
1,2-Dichloropropane	78-87-5	5	0.4 U	0.34 U	0.34 U
1,3-Dichlorobenzene	541-73-1	210			
1,4-Dichlorobenzene	106-46-7	75			
2-Butanone	78-93-3	4200	5.8 J	3.2 J	1.5 J
2-Hexanone	591-78-6	280	2.6 J	0.7 U	0.7 U
4-Methyl-2-Pentanone	108-10-1	560	0.74 J	1.5 U	1.5 U
Acetone	67-64-1	6300	12	1 U	1 U
Benzene	71-43-2	1	0.3 U	0.41 J	0.35 U
Bromochloromethane	74-97-5	91			
Bromodichloromethane	75-27-4	0.6	0.25 U	0.31 U	0.31 U
Bromoform	75-25-2	4.4	0.2 U	0.22 U	0.22 U
Bromomethane	74-83-9	9.8	0.4 U	0.63 U	0.63 U
Carbon Disulfide	75-15-0	700	0.41 J	0.48 U	0.48 U
Carbon Tetrachloride	56-23-5	3	0.27 U	0.51 U	0.51 U
Chlorobenzene	108-90-7	100	0.28 U	0.37 U	0.37 U
Chlorodibromomethane	124-48-1	0.4	0.25 U	0.24 U	0.24 U
Chloroethane	75-00-3	12	0.93 U	0.66 U	0.66 U
Chloroform	67-66-3	70	0.27 U	1.2	1
Chloromethane	74-87-3	2.7	0.27 U	0.53 U	0.53 U
Cis-1,2-Dichloroethene	156-59-2	70	0.22 U	0.41 U	0.41 U
Cis-1,3-Dichloropropene	10061-01-5	NA	0.27 U	0.3 U	0.3 U
Dichlorodifluoromethane	75-71-8	1400			
Ethylbenzene	100-41-4	30	0.25 U	0.43 U	0.43 U
Isopropylbenzene	98-82-8	0.8			
M+P-Xylenes	TTNUS054	NA	0.71 U	0.85 U	0.85 U
Methyl Acetate	79-20-9	3000			
Methyl Tert-Butyl Ether	1634-04-4	20	0.27 U	0.26 U	0.26 U
Methylene Chloride	75-09-2	5	0.27 U	0.41 U	0.41 U
O-Xylene	95-47-6	NA	0.22 U	0.39 U	0.39 U
Styrene	100-42-5	100	0.2 U	0.33 U	0.33 U
Tetrachloroethene	127-18-4	3	0.2 U	0.43 U	0.43 U
Toluene	108-88-3	40	0.26 U	0.43 U	0.43 U
Total Xylenes	1330-20-7	20	0.71 U	0.85 U	0.85 U
Trans-1,2-Dichloroethene	156-60-5	100	0.43 U	0.47 U	0.47 U
Trans-1,3-Dichloropropene	10061-02-6	NA	0.2 U	0.37 U	0.37 U
Trichloroethene	79-01-6	3	0.26 U	0.39 U	0.39 U
Trichlorofluoromethane	75-69-4	2100			
Vinyl Chloride	75-01-4	1	0.22 U	0.48 U	0.48 U

Notes:  
bgs - below ground surface  
ft - feet  
J - estimated value  
R - rejected value

U - less than laboratory method detection limit  
µg/L - micrograms per liter  
Concentrations in micrograms per liter (µg/l)  
Empty cells indicate parameter not analyzed.  
Shaded cell indicates result equal to or greater than GCTL.