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VARIOUS TANK ACTIONS AND GROUNDWATER SAMPLING AT BUILDING 1279
(FEBRUARY 2010) CNC CHARLESTON SC
3/1/2010
ADVENT ENVIRONMENTAL INC

**VARIOUS TANK ACTIONS
GROUNDWATER SAMPLING AT BUILDING 1279
(FEBRUARY 2010)**

**FORMER CHARLESTON NAVAL COMPLEX
NORTH CHARLESTON, SOUTH CAROLINA**

Prepared for:



Naval Facilities Engineering Command – Southeast

and



BRAC Program Management Office – Southeast

**Contract Number
N62467-06-D-0125**

**Task Order
0048**

**ADVENT Project 09-500
March 2010**

**Various Tank Actions
Groundwater Sampling at Building 1279
(February 2010)**

Former Charleston Naval Complex
North Charleston, South Carolina

Contract N62467-06-D-0125
Task Order 0048
ADVENT Project 09-500
March 2010

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Prepared by:



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CERTIFICATION PAGE

REGISTERED SOUTH CAROLINA PROFESSIONAL GEOLOGIST CERTIFICATION

By affixing my seal to this report, I certify the data and interpretations stated in the *Various Tank Actions, Groundwater Sampling at Building 1279 (February 2010), Former Charleston Naval Complex (CNC), North Charleston, South Carolina* are true and accurate to the best of my knowledge. I further certify that I am registered to practice geology in the state of South Carolina and that it is within my professional expertise to verify the correctness of this information.

James W. Weeg

Date

Registration Number: 2494 (South Carolina)

LIST OF ACRONYMS AND ABBREVIATIONS

µg/kg	micro-grams per kilogram
µg/L	micro-grams per liter
AST	Aboveground Storage Tank
bgs	below ground surface
BRAC	Base Realignment and Closure Commission
BTEX	Benzene, Toluene, Ethylbenzene, Xylenes
CNC	Charleston Naval Complex
COC	Contaminants of Concern
CTF	Chicora Tank Farm
DPT	Direct Push Technology
DTW	Depth to Water
FFP	Free Floating Product
MCLs	Maximum Contaminant Levels (derived from US EPA's Region-3 Risk Assessment Table, September 2008)
MNA	Monitored Natural Attenuation
MSL	Mean Sea Level
NAVFAC	Naval Facilities Engineering Command – Southeast
ND	Not Detected
OVA	Organic Vapor Analyzer
PAH	Poly-nuclear Aromatic Hydrocarbons
PID	Photo-Ionization Device (a type of OVA)
ppm	Parts Per Million
PMO	Program Management Office
RBSL	Risk Base Screening Level (derived from <i>South Carolina Risk- Based Corrective Action for Petroleum Releases, May 15, 2001</i>)
RL	Reporting Limit (derived from <i>SCDHECs Underground Storage Tank Assessment Guidelines, February 14, 2006</i>)
SAS	Surficial Aquifer System
SB	Soil Boring
SCDHEC	South Carolina Department of Health and Environmental Control
TMW	Temporary Monitoring Wells
UST	Underground Storage Tank
VOCs	Volatile Organic Compounds

1.0 INTRODUCTION

ADVENT Environmental, Inc. (ADVENT) was retained by the Naval Facilities Engineering Command – Southeast (NAVFAC) and the Base Realignment and Closure (BRAC) Program Management Office (PMO) – Southeast to conduct groundwater sampling at Building 1279, as part of the task order to provide service for *Various Tank Actions at the Chicora Tank Farm (CTF), Buildings 236, and 1279, and the Reserve Training Center located at the former Charleston Naval Complex (CNC)*, in North Charleston, South Carolina. A Work Plan for *Various Tank Actions at the Chicora Tank Farm, Buildings 236, 1279, and the Reserve Training Center* was submitted to the BRAC Office and approved in January 2009. Building 1279 is located near the intersection of North Hobson Avenue and Reynolds Avenue at the former CNC in North Charleston, South Carolina. A site location map is presented as Figure 1.

1.1 LOCAL SITE DESCRIPTION

The former CNC is located in North Charleston, South Carolina. Building 1279 is a storage facility that was used by the CNC, and is currently used for the same purpose by commercial firms at the Port of Charleston.

Local site conditions were assessed by analyzing the topography, geology, hydrogeology, and the overall visual appearance of the property. The following section describes the local site conditions at Building 1279.

1.2 TOPOGRAPHY AND SITE CONDITIONS

Topographic relief at Building 1279 is moderate. Mean elevation at the site is approximately 7 feet above mean sea level (MSL), with a minimum elevation of approximately 5 feet (1279MW003) and a maximum elevation of approximately 9 feet (1279MW002).

At present, Building 1279 is a fenced storage facility that provides both covered and open storage of bulk products. The building was formerly utilized as an administration building, and is joined to an overhead, open, cover system for bulk storage that occupies the southern portion of the site.

Building 1279 is bordered to the north by the Building 25 (a former administration building), to the east by Detyens Shipyards, Inc., to the south by Reynolds Avenue, and to the west by Kephart Street. A site map is presented as Figure 2.

1.3 GEOLOGY AND HYDROGEOLOGY

Charleston County, South Carolina, is located within the Coastal Plain Physiographic Province. The Coastal Plain extends along the Atlantic seaboard from Florida to southern New Jersey. The Coastal Plain is characterized by sediments that overlay basement rocks, thickening from just a few feet near the Fall Line to approximately 3,800 feet at the southernmost corner of South Carolina (Hydrologic Investigations Atlas 730-G).

Charleston County overlies the Surficial Aquifer System (SAS) which extends from Southern Florida to North Carolina. The SAS consists mostly of unconsolidated sand and minor beds of shells and oolitic limestone. At depth these formations are generally confined above and below by impermeable clay layers. SAS sediments range in age from late Miocene to Holocene. The SAS is typically less than 50 feet thick; however the system thickens coastward.

Groundwater flow in the SAS is mostly unconfined. Locally, thin clay beds create semi-confined conditions within the system. Water that enters the SAS moves quickly along short flow paths and discharges as baseflow to streams. Generally, groundwater flows southeast towards the coast. The transmissivity of the SAS is extremely variable depending on location. Well yields in South Carolina average 50 gallons per minute (Hydrologic Investigations Atlas 730-G).

Site specific groundwater flow is generally from the both the north and south towards the topographic low in the center of the site. This area is a designed drainage easement that runs east-west across the site. The groundwater interface is generally encountered at approximately 4 feet below ground surface (bgs) (Figure 3).

1.4 HISTORICAL SUMMARY

Groundwater monitoring wells at Building 1279 were installed by ADVENT in November 2004 using a South Carolina Certified Well Driller, as part of a Tier-I investigation (Figure 2). The wells were developed and initially sampled on November 11, 2004 as part of a Tier-I investigation. Additional sampling took place on November 4, 2005 as part of the Monitored Natural Attenuation Program (MNA). Historical analytical data are presented in Table 1.

Analytical results from the Tier-I investigation in 2004 detected Contaminants of Concern (COCs) above the Risk Based Screening Level (RBSL) established by the South Carolina Department of Health and Environmental Control (SCDHEC). Sample 1279MW002 exceeded the RBSL for naphthalene (25 µg/L) with a concentration of 57 µg/L. Sample 1279MW003 exceeded the RBSL for Benzene (5 µg/L) with a concentration of 10 µg/L. During the first round of MNA sampling, concentrations of benzene, toluene, ethylbenze, and xylenes (BTEX) and naphthalene were reported below detection level (BDL) or below the RBSL in the samples from all monitoring wells except 1279MW003. The sample collected from monitoring well 1279MW003 exceeded the RBSL for both Benzene (5 µg/L) with a concentration of 28 µg/L, and Naphthalene (25 µg/L) with a concentration of 100 µg/L.

As part of the MNA program, three (3) monitoring wells (1279MW001, 1279MW002, and 1279MW003) were sampled on August 4, 2008 at Building 1279.

Sample 1279MW002 exceeded the RBSL for benzene (5 µg/L) with a concentration of 6.5 µg/L. Additionally ethyl-benzene was detected in the sample from 1279MW002 and

naphthalene was detected in both 1279MW001 and 1279MW002. However, these detections were below the RBSL.

The three (3) monitoring wells (1279MW001, 1279MW002, and 1279MW003) were again sampled on February 19, 2009. Analytical results for the three monitoring wells did not exceed the RBSLs. However, benzene, ethyl-benzene, naphthalene, and o-xylenes were all detected in the sample from 1279MW003, but at levels below the RBSL. Table 1 presents a summary of the historical analytical results for each groundwater well.

As part of the MNA program, three (3) monitoring wells (1279MW001, 1279MW002, and 1279MW003) were sampled on August 13, 2009 at Building 1279. Analytical results for the three monitoring wells did not exceed RBSLs. However, naphthalene was detected in all three wells, but at levels below the RBSL. Additionally, benzene and ethylbenzene were detected in the sample from 1279MW003, but at levels below RBSL.

2.0 BUILDING 1279 GROUNDWATER SAMPLING

As part of the MNA program, three (3) monitoring wells (1279MW001, 1279MW002, and 1279MW003) were sampled on February 4, 2010 at Building 1279. Field activities were conducted in accordance with the approved workplan (January 2009). Well purge data and sample log sheets are included in Appendix A of this report.

2.1 SAMPLE COLLECTION

Groundwater monitoring wells were sampled in accordance with methods defined in the *EPA Ground Water Issue, Low-Flow (Minimal Drawdown) Ground-Water Sampling Procedures*, dated April 1996. Once purging was completed, samples were collected and analyzed by a South Carolina certified laboratory for VOCs via EPA Method 8260. Prior to sampling, water-level measurements were made at each well. Figure 3 shows the potentiometric surface for the August 2009 monitoring event. Groundwater samples were collected using a low-flow method, preserved on ice, and submitted to a South Carolina certified laboratory for analysis.

Groundwater samples were collected at three locations (1279MW001, 1279MW002, and 1279MW003) as indicated on Figure 2 and analyzed for BTEX and naphthalene using EPA Method 8260.

2.2 ANALYTICAL RESULTS

The sample from 1279MW003 exceeded the RBSL for benzene (5 µg/L) with a analyzed result of 7.9 µg/L. Additionally, ethylbenzene was detected in the sample from 1279MW003, but at levels below the RBSL. Analytical results for 1279MW001 and 1279MW002 did not detect any BTEX or Naphthalene. Analytical results for the February 4, 2010 groundwater sampling event are presented in Table 2 and included in Appendix B.

3.0 CONCLUSIONS AND RECOMMENDATIONS

Sampling has been conducted at Building 1279 since the installation of groundwater monitoring wells in 2005. Historical data shows that COCs have been present in all sampling events performed. However, each progressive sampling event has shown lower levels of contamination. This appears to indicate that monitored natural attenuation is occurring at Building 1279. However, this sampling event showed an increase and exceedance of the RBSL for benzene at 1279MW003. Considering that this site is an active trans-shipment site, it is difficult to determine at this time if this result is due to the pre-existing environmental issue, or is a contribution of ongoing surface activities. Therefore, ADVENT recommends that at least two more rounds of semi-annual sampling to monitor conditions at the site, with a long term goal for the site to be recommended for “no further action” (NFA) status to SCDHEC.

TABLES

Table 1
Historical Analytical Results
Bldg 1279, Former CNC
North Charleston, South Carolina
ADVENT Project No: 09-500

COC/Method	1279MW001					1279MW002					RBSL	
	Date	11/4/2004	11/4/2005	8/4/2008	2/19/2009	8/13/2009	11/4/2004	11/4/2005	8/4/2008	2/19/2009		8/13/2009
8260 MSV Low Level	µg/L											
Benzene	ND	ND	ND	ND	ND	ND	3.5	ND	6.4	ND	ND	5
Ethylbenzene	ND	ND	ND	ND	ND	ND	76	1.5	11.2	ND	ND	700
Naphthalene	ND	ND	1.6	ND	5.7	57	ND	5.1	ND	3.1	25	
Toluene	ND	1,000										
Total Xylenes	ND	10,000										

COC/Method	1279MW003					RBSL
	Date	11/4/2004	11/4/2005	8/4/2008	2/19/2009	
8260 MSV Low Level	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Benzene	10	28	ND	4.4	1.4	5
Ethylbenzene	16	11	ND	1.5	2.1	700
Naphthalene	22	100	ND	8.2	5.4	25
Toluene	ND	ND	ND	ND	ND	1,000
Total Xylenes	ND	ND	ND	0.24J	ND	10,000

Prepared By: JWW, 02/26/10

Checked By: ECS, 03/02/10

COC = Constituent of Concern

ug/L = micrograms per liter

ND = Not Detected

RBSL = Risk Based Screening Level (from Table-B1, South Carolina Risk-Based Corrective Action For Petroleum Releases, May 15, 2001)

Red = Value exceeds the RBSL

Bold = Constituent of Concern detected

J = Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

Table 2
Groundwater Analytical Results
Building 1279, Former CNC
North Charleston, South Carolina
ADVENT Project No: 09-500
February 4, 2010

COC/Method	1279MW001	1279MW002	1279MW003	RBSL
8260 MSV Low Level	µg/L	µg/L	µg/L	µg/L
Benzene	ND	ND	7.9	5
Ethylbenzene	ND	ND	5.6	700
Naphthalene	ND	ND	ND	25
Toluene	ND	ND	ND	1,000
m&p -xylene	ND	ND	ND	5,000
o-xylene	ND	ND	ND	5,000

Prepared By: JWW, 2/26/10

Checked By: ECS, 3/02/10

COC = Constituent of Concern

ug/L = micrograms per liter

ND = Not Detected

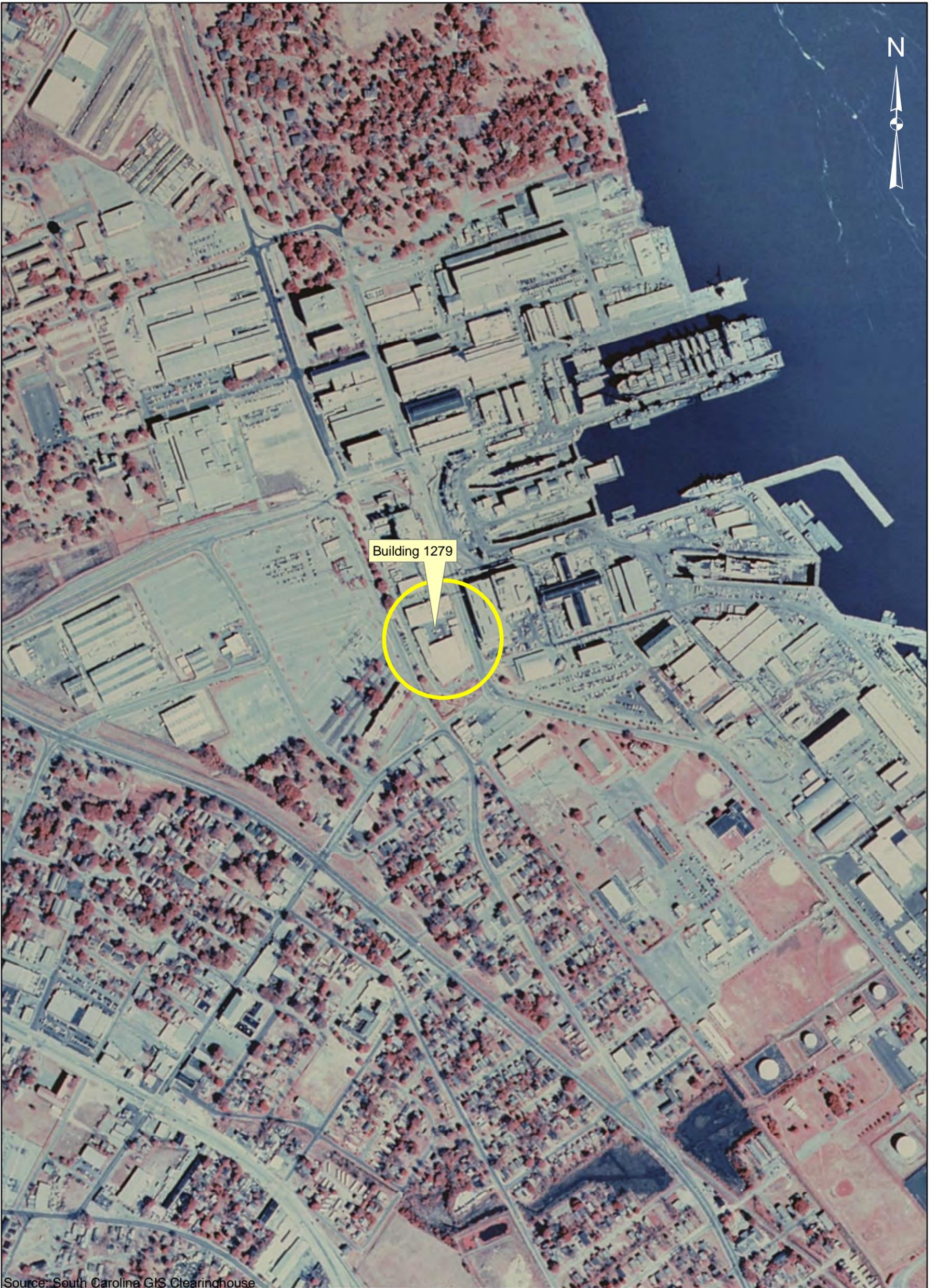
RBSL = Risk Based Screening Level (from Table-B1, South Carolina Risk-Based Corrective Action For Petroleum Releases, May 15, 2001)

Red = Value exceeds the RBSL

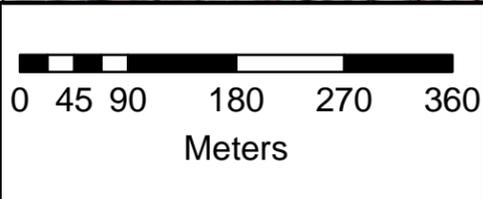
Bold = Constituent of Concern detected

J = Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

FIGURES



Source: South Carolina GIS Clearinghouse



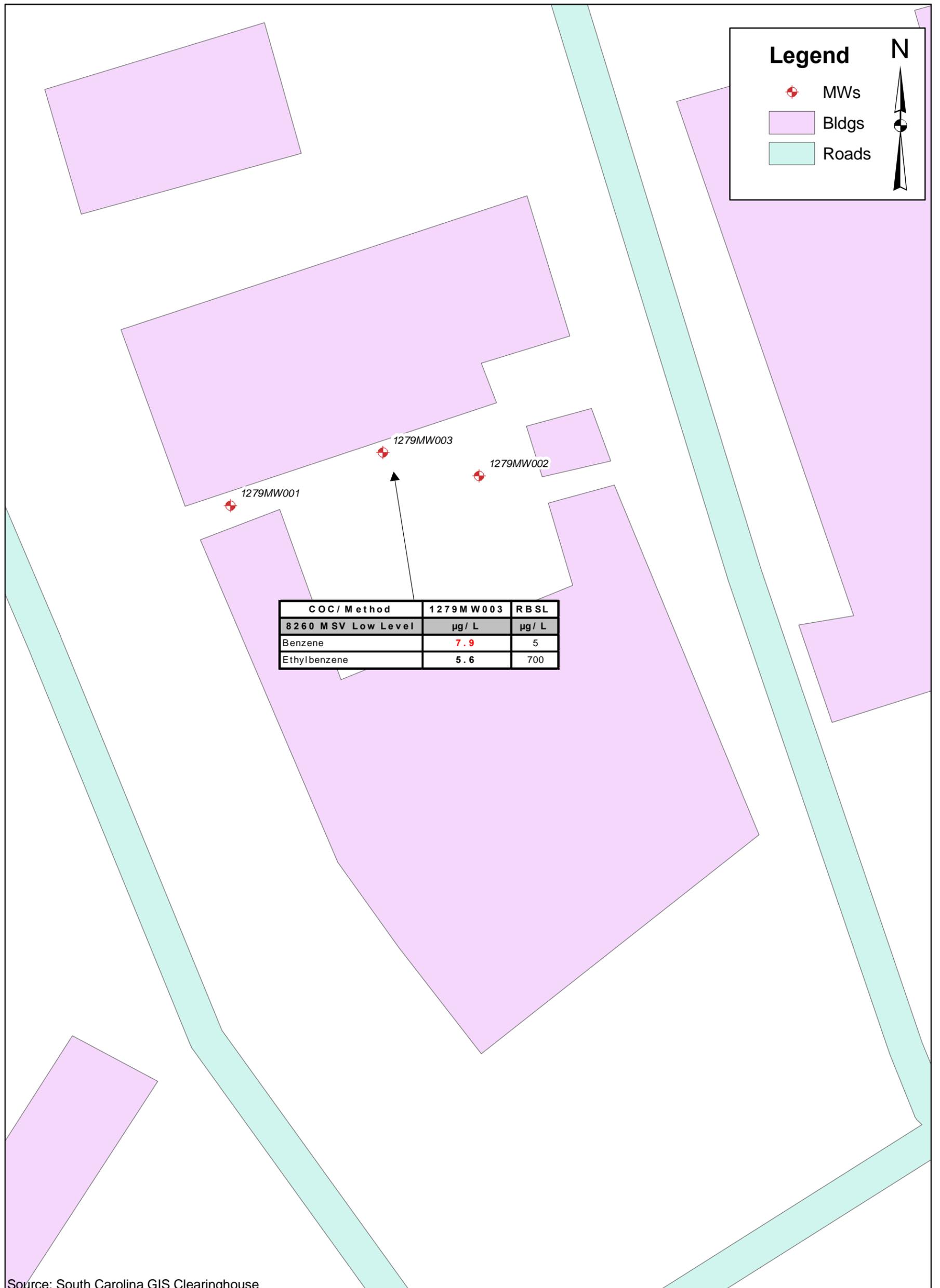
Created for

North Charleston, SC

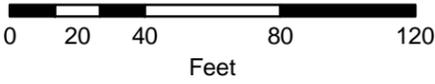
Title	Site Location Map			
Project	Groundwater Sampling at Bldg 1279			
Facility	Former Charleston Naval Complex			
Location	North Charleston, South Carolina			
Contract No.	N62467-06-D-0125	Task Order	0048	
Created by	 Mt. Pleasant, SC		Project No.	09-500
			Date	02/26/10
			Sheet I.D.	Figure 1

Figure 1	Scale	1:6500	
	File Name	fig_1_Site_location_map	
	Created by	J Weeg	02/26/10
	Checked by	K Borg	03/02/10

Revision:

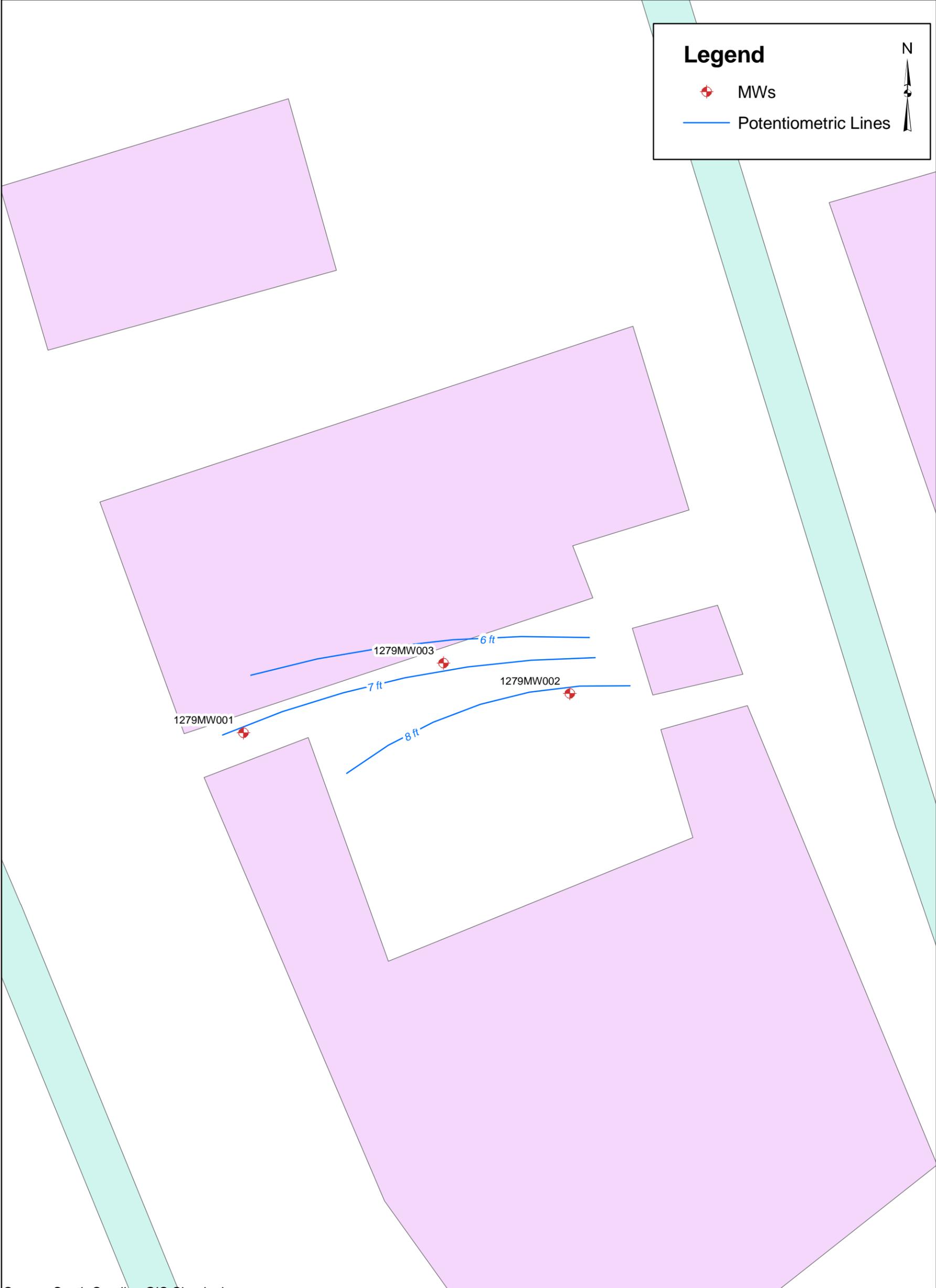


Source: South Carolina GIS Clearinghouse

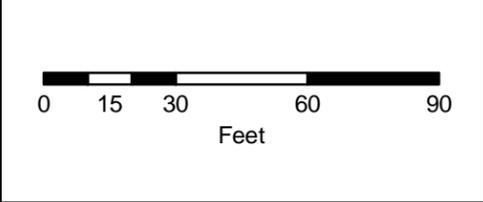
		Created for		Title		Site/Concentration Map				
		 North Charleston, SC		Project		Groundwater Sampling at Bldg 1279				
Revision:				Facility		Former Charleston Naval Complex				
		Contract No.		N62467-06-D-0125		Task Order		0048		
Figure 2 Sheet I.D.	Scale		1:650		Created by		Project No.		09-500	
	File Name		fig_2_site_conc_map		 Mt. Pleasant, SC		Date		02/26/10	
	Created by		J Weeg 02/26/10				Sheet I.D.		Figure 2	
Checked by		K Borg 03/02/10								

Legend

-  MWs
-  Potentiometric Lines

Source: South Carolina GIS Clearinghouse



Created for



North Charleston, SC

Title	Potentiometric Map (February 2010)			
Project	Groundwater Sampling at Bldg 1279			
Facility	Former Charleston Naval Complex			
Location	North Charleston, South Carolina			
Contract No.	N62467-06-D-0125	Task Order	0048	
Created by	 ADVENT Mt. Pleasant, SC		Project No.	09-500
			Date	02/26/10

Figure 3	Scale	1:650	
	File Name	fig_3_potmap	
	Created by	J Weeg	02/26/10
	Checked by	K Borg	03/02/10

Revision:

Sheet I.D.
Figure 3

APPENDIX A

Date 2/11/10
 Location Bldg 1274
 Weather Cloudy 55°F
 TDT 1300
 Personnel JWW & ELS

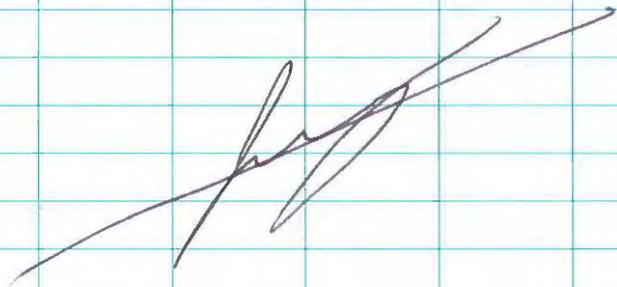
1300 - Onsite

1328 - ELS Setup at 1274 MW002
 DTW 3.62 DTB 15.00

1330 - JWW Setup at 1274 MW001
 DTW 3.05 DTB 15.00

1410 - ELS Setup at 1274 MW003
 DTW 3.24 DTB 15

1630 - Offsite, enroute to FedEx





LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: Bldg 1279
 PROJECT NUMBER: 09-500
 Depth to Water: 3.05

WELL ID: 1279 RW 001
 DATE: 2/4/10
 DTB: 15.60

Well Volume: (DTB - DTW) x 0.17 = Well Volume: (15.6 - 3.05) x 0.17 = 2.13 gal.

Time (Hrs)	Water Level (Ft below TOC)	Volume (gal)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celcius)	ORP (mV)	Comments
1343	3.85	0.50	6.87	0.095	142.0	1.60	14.98	24	
1346	3.85	0.75	6.91	0.094	138.0	1.33	15.20	22	
1349	3.85	0.00	6.92	0.094	136.0	1.23	15.37	22	
1352	3.85	1.25	6.94	0.094	134.0	1.01	15.42	22	
1355	3.85	1.50	6.95	0.093	133.0	0.78	15.46	23	
1358	3.85	1.75	6.96	0.094	132.0	0.62	15.55	23	
1401	3.85	2.00	6.98	0.094	132.0	0.48	15.38	24	
1404	3.85	2.25	6.98	0.094	132.0	0.53	15.45	24	

Sample Time: 1415

Total Vol. Purged: 2.25

Fe²⁺: 0.0
 H₂S: 0.0
 Diss. CO₂:

Stabilization Factors
 pH ± 0.1 DO ± 10%
 Conductivity ± 3% Turbidity ± 10%
 ORP ± 10Mv

Collected Dup-1



LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: Bldg 1279
 PROJECT NUMBER: 09-500
 Depth to Water: 3.62

WELL ID: 1279-MW002
 DATE: 2/4/10
 DTB: ~15

Well Volume: (DTB - DTW) x 0.17 = Well Volume: ~2

Time (Hrs)	Water Level (Ft below TOC)	Volume (gal)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celcius)	ORP (mV)	Comments
1328	3.62	0							
1340	3.75	2	5.45	295	75.5	0.0	19.51	145	
1343	3.75	2.5	5.45	290	134.0	0.0	19.59	149	
1346	3.75	3.0	5.45	284	121.0	0.0	19.57	153	
1349	3.74	3.5	5.44	279	118.0	0.0	19.59	157	
1352	3.74	4.0	5.44	275	2.4	0.0	19.53	160	
1355	3.74	4.5	5.45	276	16.2	0.0	19.51	161	
1358	3.74	5.0	5.46	272	29.9	0.0	19.48	162	

Sample Time: 1404

Total Vol. Purged: 5.0 gal.

Fe²⁺: 0.0
 H₂S: 0.0
 Diss. CO₂:

Stabilization Factors
 pH ± 0.1 DO ± 10%
 Conductivity ± 3% Turbidity ± 10%
 ORP ± 10Mv



LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: Bldg 1279
 PROJECT NUMBER: 09-500
 Depth to Water: 3.24

WELL ID: MW 003
 DATE: 2/4/10
 DTB: ~15

Well Volume: (DTB - DTW) x 0.17 = Well Volume: 1.88

Time (Hrs)	Water Level (Ft below TOC)	Volume (gal)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celcius)	ORP (mV)	Comments
1410	3.24	0							had to bail water
1431	3.33	2	6.09	0.298	4.7	0.01	19.03	34	out of casing.
1434	3.34	2.7	6.14	0.310	16.3	0.0	18.86	15	The water had no
1437	3.34	3.3	6.17	0.318	21.2	0.0	18.85	4	sheen or odor, but
1440	3.33	3.95	6.19	0.324	16.6	0.0	18.90	-6	once I removed the
1443	3.33	4.55	6.23	0.331	7.3	0.0	18.82	-16	cap the water in
1448	3.33	5.29	6.25	0.334	6.7	0.0	18.76	-23	the casing had a
1451	3.33	5.65	6.28	0.339	4.1	0.0	18.76	-30	definite sheen & fuel
1454	3.33	6.0	6.29	0.343	4.3	0.0	18.77	-34	odor. The cap seems
									to be coated on the
									interior portion.
									*Fuel odor observed

Sample Time: 1500

Total Vol. Purged: 6.0 gal

Fe²⁺: 0.0
 H₂S: 0.0
 Diss CO₂:

Stabilization Factors
 pH ± 0.1
 Conductivity ± 3%
 ORP ± 10Mv
 DO ± 10%
 Turbidity ± 10%
in purge water, no sheen

FIELD SAMPLING REPORT		ADVENT 498 Wando Park Blvd Suite 500 Mt. Pleasant, SC 29464 (843) 388-1851	JOB NUMBER <u>09-500</u> JOB NAME <u>Bldg 1279 Sampling</u> SAMPLING POINT (LOCATION) <u>Bldg 1279</u> DATE <u>2/4/10</u> TIME <u>1415</u>
------------------------------	---	--	--

SAMPLING INFORMATION	SAMPLE I.D. NUMBER: <u>1279 MW001</u>		HAZARDOUS?: <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO <input type="checkbox"/> UNKNOWN
SOIL SAMPLING DATA:			
SAMPLING DATE: <u>NA</u>	SAMPLER TYPE & MATERIAL	<u>NA</u>	
TIME: <u>NA</u>	SAMPLING DEPTH	<u>NA</u>	
	SAMPLE DESCRIPTION	<u>NA</u>	
WELL SAMPLING DATA:			
SAMPLING DATE: <u>2/4/10</u>	PURGE METHOD & MATERIALS: <u>Low Flow/Low Stress Peristaltic Pump with Teflon Lined Tubing</u>		
TIME: <u>1415</u>	WELL VOLUME [(DTB - DTW) x Constant = Well Volume]: <u>(15.6 - 3.05) x 0.17 = 2.13 gal.</u>		
	VOLUME OF WATER PURGED: <u>2.25 gal</u>		
	PURGE DATE: <u>2/4/10</u>	START TIME: <u>1330</u>	END TIME: <u>1415</u>
	SAMPLER TYPE & MATERIAL: <u>Geopump-II using flex tubing and teflon lined tubing</u>		
	SAMPLE DESCRIPTION: <u>CLR</u>		
	DEPTH TO GROUND WATER (ft): <u>3.05</u>	TOTAL WELL DEPTH (ft): <u>15.60</u>	

CONTAINER		PRESERVATIVE/ANALYSIS METHOD	NUMBER	FILTERING	COC
TYPE	VOLUME				
Glass	40ml Amber	HCl / EPA SW-846 Method 8260B	3	No	BTEX, Naphthalene

FIELD MEASUREMENTS		
PARAMETER	FINAL MEASUREMENT	COMMENTS
pH (STO UNITS)	<u>6.98</u>	
SPEC. COND (um/sm)	<u>0.094</u>	
Turbidity (NTU)	<u>132.0</u>	
Dissolved Oxygen (mg/L)	<u>0.53</u>	
Temperature ©	<u>15.45</u>	
ORP (mV)	<u>24</u>	

GENERAL INFORMATION		WEATHER <u>CLR Y</u>	AIR TEMP. <u>55° F</u>
SAMPLES COLLECTED BY: <u>J. W. Weg</u>			
PARAMETERS MEASURED WITH (EQUIPMENT TYPE & SER. NUM): <u>Hansa U-22: 7043009</u>			
MODE OF SHIPMENT: <input type="checkbox"/> CAR/TRUCK <input type="checkbox"/> BUS <input type="checkbox"/> PLANE <input checked="" type="checkbox"/> COMMER VEH.			
COMMENTS (FIELD MODIFICATIONS, INSTRUMENT PROBLEMS, SAMPLE DUPLICATE, ETC.): <u>ETA Collected Dup-1</u>			

FIELD SAMPLING REPORT



ADVENT

498 Wando Park Blvd Suite 500
Mt. Pleasant, SC 29464
(843) 388-1851

JOB NUMBER 09-500
JOB NAME Bldg 1279 Sampling
SAMPLING POINT
(LOCATION) Bldg 1279
DATE 2/4/10 TIME 1404

SAMPLING INFORMATION

SAMPLE I.D. NUMBER: 1279-MW002 HAZARDOUS?: _____ YES _____ NO UNKNOWN

SOIL SAMPLING DATA:

SAMPLING DATE: NA SAMPLER TYPE & MATERIAL NA
TIME: NA SAMPLING DEPTH NA
SAMPLE DESCRIPTION NA

WELL SAMPLING DATA:

SAMPLING DATE: 2/4/10 PURGE METHOD & MATERIALS: Low Flow/Low Stress Peristaltic Pump with Teflon Lined Tubing
TIME: 1404 WELL VOLUME ((DTB - DTW) x Constant = Well Volume): N2
VOLUME OF WATER PURGED: 5.0 gal.
PURGE DATE: 2/4/10 START TIME: 1328 END TIME: 1404
SAMPLER TYPE & MATERIAL: Geopump-II using flex tubing and teflon lined tubing
SAMPLE DESCRIPTION: clear, odorless
DEPTH TO GROUND WATER (ft): 3.62 TOTAL WELL DEPTH (ft): N15

CONTAINER		PRESERVATIVE/ANALYSIS METHOD	NUMBER	FILTERING	COC
TYPE	VOLUME				
Glass	40ml Amber	HCl / EPA SW-846 Method 8260B	3	No	BTEX, Naphthalene

FIELD MEASUREMENTS

PARAMETER	FINAL MEASUREMENT	COMMENTS
pH (STO UNITS)	<u>5.46</u>	
SPEC. COND (um/sm)	<u>0.276</u>	
Turbidity (NTU)	<u>29.9</u>	
Dissolved Oxygen (mg/L)	<u>0.0</u>	
Temperature @	<u>19.48</u>	
ORP (mV)	<u>162</u>	

GENERAL INFORMATION

WEATHER cloudy AIR TEMP. 50-55
 SAMPLES COLLECTED BY: ES
 PARAMETERS MEASURED WITH (EQUIPMENT TYPE & SER. NUM): Horiba U-22 (70601a)
 MODE OF SHIPMENT: _____ CAR/TRUCK _____ BUS _____ PLANE _____ COMMER VEH.
 COMMENTS (FIELD MODIFICATIONS, INSTRUMENT PROBLEMS, SAMPLE DUPLICATE, ETC.): _____

FIELD SAMPLING REPORT



ADVENT

498 Wando Park Blvd Suite 500
Mt. Pleasant, SC 29464
(843) 388-1851

JOB NUMBER 09-500
JOB NAME Bldg 1279 Sampling
SAMPLING POINT
(LOCATION) Bldg 1279
DATE 2/4/10 TIME 1:00

SAMPLING INFORMATION

SAMPLE I.D. NUMBER: MW003 HAZARDOUS?: YES NO UNKNOWN

SOIL SAMPLING DATA:

SAMPLING DATE: NA SAMPLER TYPE & MATERIAL NA
TIME: NA SAMPLING DEPTH NA
SAMPLE DESCRIPTION NA

WELL SAMPLING DATA:

SAMPLING DATE: 2/4/10 PURGE METHOD & MATERIALS: Low Flow/Low Stress Peristaltic Pump with Teflon Lined Tubing
TIME: 1500 WELL VOLUME [(DTB - DTW) x Constant = Well Volume]: 1.88
VOLUME OF WATER PURGED: 6.0 gal.
PURGE DATE: 2/4/10 START TIME: 1410 END TIME: 1500
SAMPLER TYPE & MATERIAL: Geopump-II using flex tubing and teflon lined tubing
SAMPLE DESCRIPTION: clear, fuel odor, no sheen
DEPTH TO GROUND WATER (ft): 3.24 TOTAL WELL DEPTH (ft): 15.00

CONTAINER

TYPE	VOLUME	PRESERVATIVE/ANALYSIS METHOD	NUMBER	FILTERING	COC
Glass	40ml Amber	HCl / EPA SW-846 Method 8260B	3	No	BTEX, Naphthalene

FIELD MEASUREMENTS

PARAMETER	FINAL MEASUREMENT	COMMENTS
pH (STO UNITS)	<u>6.29</u>	
SPEC. COND (um/sm)	<u>0.343</u>	
Turbidity (NTU)	<u>4.3</u>	
Dissolved Oxygen (mg/L)	<u>0.0</u>	
Temperature @	<u>18.77</u>	
ORP (mV)	<u>-34</u>	

GENERAL INFORMATION

WEATHER overcast AIR TEMP. 50°
SAMPLES COLLECTED BY: ECS
PARAMETERS MEASURED WITH (EQUIPMENT TYPE & SER. NUM): Horiba U-22 (706017)
MODE OF SHIPMENT: CAR/TRUCK BUS PLANE X COMMER VEH.

COMMENTS (FIELD MODIFICATIONS, INSTRUMENT PROBLEMS, SAMPLE DUPLICATE, ETC.):

see purge form

APPENDIX B

Report of Analysis

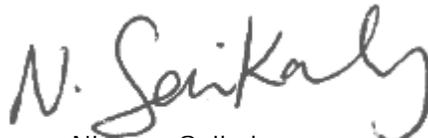
ADVENT
498 Wando Park Blvd.
Suite 500
Mount Pleasant, SC 29464
Attention: James Weeg

Project Name: CNC Varoius Tank Actions (Bldg 1279)

Project Number: 09-500

Lot Number: LB26034

Date Completed: 03/26/2010



Nisreen Saikaly
Project Manager



This report shall not be reproduced, except in its entirety, without the written approval of Shealy Environmental Services, Inc.

The following non-paginated documents are considered part of this report: Chain of Custody Record and Sample Receipt Checklist.

* LB26034 *

SHEALY ENVIRONMENTAL SERVICES, INC.

SC DHEC No: 32010

NELAC No: E87653

NC DEHNR No: 329

Case Narrative

ADVENT

Lot Number: LB26034

This Report of Analysis contains the analytical result(s) for the sample(s) listed on the Sample Summary following this Case Narrative. The sample receiving date is documented in the header information associated with each sample.

Sample receipt, sample analysis, and data review have been performed in accordance with the most current approved NELAC standards, the Shealy Environmental Services, Inc. ("Shealy") Quality Assurance Management Plan (QAMP), standard operating procedures (SOPs), and Shealy policies. Any exceptions to the NELAC standards, the QAMP, SOPs or policies are qualified on the results page or discussed below.

If you have any questions regarding this report please contact the Shealy Project Manager listed on the cover page.

SHEALY ENVIRONMENTAL SERVICES, INC.

Sample Summary

ADVENT

Lot Number: LB26034

Sample Number	Sample ID	Matrix	Date Sampled	Date Received
001	1279 MW001	Aqueous	02/04/2010 1415	02/05/2010
002	1279 MW002	Aqueous	02/04/2010 1404	02/05/2010
003	1279 MW003	Aqueous	02/04/2010 1500	02/05/2010
004	Dup 1	Aqueous	02/04/2010 1415	02/05/2010

(4 samples)

SHEALY ENVIRONMENTAL SERVICES, INC.

Executive Summary

ADVENT

Lot Number: LB26034

Sample	Sample ID	Matrix	Parameter	Method	Result	Q	Units	Page
003	1279 MW003	Aqueous	Benzene	8260B	7.9		ug/L	7
003	1279 MW003	Aqueous	Ethylbenzene	8260B	5.6		ug/L	7

(2 detections)

Volatile Organic Compounds by GC/MS

Client: ADVENT	Laboratory ID: LB26034-001
Description: 1279 MW001	Matrix: Aqueous
Date Sampled: 02/04/2010 1415	
Date Received: 02/05/2010	

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	5030B	8260B	1	02/12/2010 1515	MZ		28351

Parameter	CAS Number	Analytical Method	Result	Q	PQL	MDL	Units	Run
Benzene	71-43-2	8260B	ND		5.0	0.20	ug/L	1
Ethylbenzene	100-41-4	8260B	ND		5.0	1.7	ug/L	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	8260B	ND		5.0	0.40	ug/L	1
Toluene	108-88-3	8260B	ND		5.0	1.7	ug/L	1
Xylenes (total)	1330-20-7	8260B	ND		5.0	1.7	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1,2-Dichloroethane-d4		115	70-130
Bromofluorobenzene		115	70-130
Toluene-d8		111	70-130

PQL = Practical quantitation limit

B = Detected in the method blank

E = Quantitation of compound exceeded the calibration range

ND = Not detected at or above the MDL

J = Estimated result < PQL and ≥ MDL

P = The RPD between two GC columns exceeds 40%

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

N = Recovery is out of criteria

H = Out of holding time

Volatile Organic Compounds by GC/MS

Client: ADVENT	Laboratory ID: LB26034-002
Description: 1279 MW002	Matrix: Aqueous
Date Sampled: 02/04/2010 1404	
Date Received: 02/05/2010	

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	5030B	8260B	1	02/12/2010 1536	MZ		28351

Parameter	CAS Number	Analytical Method	Result	Q	PQL	MDL	Units	Run
Benzene	71-43-2	8260B	ND		5.0	0.20	ug/L	1
Ethylbenzene	100-41-4	8260B	ND		5.0	1.7	ug/L	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	8260B	ND		5.0	0.40	ug/L	1
Toluene	108-88-3	8260B	ND		5.0	1.7	ug/L	1
Xylenes (total)	1330-20-7	8260B	ND		5.0	1.7	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1,2-Dichloroethane-d4		116	70-130
Bromofluorobenzene		115	70-130
Toluene-d8		112	70-130

PQL = Practical quantitation limit B = Detected in the method blank E = Quantitation of compound exceeded the calibration range
 ND = Not detected at or above the MDL J = Estimated result < PQL and ≥ MDL P = The RPD between two GC columns exceeds 40%
 Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W" N = Recovery is out of criteria H = Out of holding time

Volatile Organic Compounds by GC/MS

Client: ADVENT	Laboratory ID: LB26034-003
Description: 1279 MW003	Matrix: Aqueous
Date Sampled: 02/04/2010 1500	
Date Received: 02/05/2010	

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	5030B	8260B	1	02/12/2010 1558	MZ		28351

Parameter	CAS Number	Analytical Method	Result	Q	PQL	MDL	Units	Run
Benzene	71-43-2	8260B	7.9		5.0	0.20	ug/L	1
Ethylbenzene	100-41-4	8260B	5.6		5.0	1.7	ug/L	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	8260B	ND		5.0	0.40	ug/L	1
Toluene	108-88-3	8260B	ND		5.0	1.7	ug/L	1
Xylenes (total)	1330-20-7	8260B	ND		5.0	1.7	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1,2-Dichloroethane-d4		118	70-130
Bromofluorobenzene		118	70-130
Toluene-d8		113	70-130

PQL = Practical quantitation limit B = Detected in the method blank E = Quantitation of compound exceeded the calibration range
 ND = Not detected at or above the MDL J = Estimated result < PQL and ≥ MDL P = The RPD between two GC columns exceeds 40%
 Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W" N = Recovery is out of criteria H = Out of holding time

Volatile Organic Compounds by GC/MS

Client: ADVENT	Laboratory ID: LB26034-004
Description: Dup 1	Matrix: Aqueous
Date Sampled: 02/04/2010 1415	
Date Received: 02/05/2010	

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	5030B	8260B	1	02/12/2010 1619	MZ		28351

Parameter	CAS Number	Analytical Method	Result	Q	PQL	MDL	Units	Run
Benzene	71-43-2	8260B	ND		5.0	0.20	ug/L	1
Ethylbenzene	100-41-4	8260B	ND		5.0	1.7	ug/L	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	8260B	ND		5.0	0.40	ug/L	1
Toluene	108-88-3	8260B	ND		5.0	1.7	ug/L	1
Xylenes (total)	1330-20-7	8260B	ND		5.0	1.7	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1,2-Dichloroethane-d4		115	70-130
Bromofluorobenzene		115	70-130
Toluene-d8		112	70-130

PQL = Practical quantitation limit B = Detected in the method blank E = Quantitation of compound exceeded the calibration range
 ND = Not detected at or above the MDL J = Estimated result < PQL and ≥ MDL P = The RPD between two GC columns exceeds 40%
 Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W" N = Recovery is out of criteria H = Out of holding time

QC Summary

Volatile Organic Compounds by GC/MS - MB

Sample ID: LQ28351-001

Matrix: Aqueous

Batch: 28351

Prep Method: 5030B

Analytical Method: 8260B

Parameter	Result	Q	Dil	PQL	MDL	Units	Analysis Date
Benzene	ND		1	5.0	0.20	ug/L	02/12/2010 1409
Ethylbenzene	ND		1	5.0	1.7	ug/L	02/12/2010 1409
Methyl tertiary butyl ether (MTBE)	ND		1	5.0	0.40	ug/L	02/12/2010 1409
Toluene	ND		1	5.0	1.7	ug/L	02/12/2010 1409
Xylenes (total)	ND		1	5.0	1.7	ug/L	02/12/2010 1409
Surrogate	Q	% Rec	Acceptance Limit				
Bromofluorobenzene		115	70-130				
1,2-Dichloroethane-d4		115	70-130				
Toluene-d8		112	70-130				

PQL = Practical quantitation limit

P = The RPD between two GC columns exceeds 40%

N - Recovery is out of criteria

ND = Not detected at or above the MDL

J = Estimated result < PQL and \geq MDL

+ - RPD is out of criteria

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Volatile Organic Compounds by GC/MS - LCS

Sample ID: LQ28351-002

Matrix: Aqueous

Batch: 28351

Prep Method: 5030B

Analytical Method: 8260B

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Benzene	50	55		1	110	72-127	02/12/2010 1243
Ethylbenzene	50	48		1	96	79-132	02/12/2010 1243
Methyl tertiary butyl ether (MTBE)	50	55		1	110	70-130	02/12/2010 1243
Toluene	50	45		1	90	75-125	02/12/2010 1243
Xylenes (total)	100	110		1	106	70-130	02/12/2010 1243
Surrogate	Q	% Rec	Acceptance Limit				
Bromofluorobenzene		115	70-130				
1,2-Dichloroethane-d4		111	70-130				
Toluene-d8		111	70-130				

PQL = Practical quantitation limit

P = The RPD between two GC columns exceeds 40%

N = Recovery is out of criteria

ND = Not detected at or above the MDL

J = Estimated result < PQL and \geq MDL

+ - RPD is out of criteria

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Volatile Organic Compounds by GC/MS - LCSD

Sample ID: LQ28351-003

Matrix: Aqueous

Batch: 28351

Prep Method: 5030B

Analytical Method: 8260B

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
Benzene	50	57		1	115	4.4	72-127	20	02/12/2010 1304
Ethylbenzene	50	51		1	101	4.8	79-132	20	02/12/2010 1304
Methyl tertiary butyl ether (MTBE)	50	55		1	110	0.21	70-130	20	02/12/2010 1304
Toluene	50	49		1	98	8.0	75-125	20	02/12/2010 1304
Xylenes (total)	100	110		1	110	4.0	70-130	20	02/12/2010 1304
Surrogate	Q	% Rec	Acceptance Limit						
Bromofluorobenzene		116	70-130						
1,2-Dichloroethane-d4		111	70-130						
Toluene-d8		113	70-130						

PQL = Practical quantitation limit

P = The RPD between two GC columns exceeds 40%

N = Recovery is out of criteria

ND = Not detected at or above the MDL

J = Estimated result < PQL and \geq MDL

+ - RPD is out of criteria

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W"

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

1 From Please print and press hard.
 Date 2/4/10 Sender's FedEx Account Number 27878588-2
 Sender's Name James Weeg Phone (843) 388-1851
 Company Advent Env., Inc.
 Address 498 Wando Park Blvd 500
Dept./Floor/Suite/Room
 City Mt. Pleasant State SC ZIP 29464

2 Your Internal Billing Reference
First 24 characters will appear on invoice. 09-500

3 To
 Recipient's Name Shealy Env. Services, Inc. Phone (803) 791-9700
 Company Shealy Env. Services, Inc.
 Recipient's Address 106 Wantage Pt. Rd.
We cannot deliver to P.O. boxes or P.O. ZIP codes. Dept./Floor/Suite/Room
 Address West Columbia State SC ZIP 29172
To request a package be held at a specific FedEx location, print FedEx address here.

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FedEx Envelope rate not available. Minimum charge: One-pound rate

4b Express Freight Service Packages over 150 lbs. ** To most locations

FedEx 1Day Freight* Next business day** FedEx 2Day Freight Second business day** FedEx 3Day Freight Third business day**

* Call for Confirmation

5 Packaging * Declared value limit \$500

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6 Special Handling Includes FedEx address in Section 3

SATURDAY Delivery Available ONLY for FedEx Priority Overnight, FedEx 2Day, FedEx 1Day Freight, and FedEx 2Day Freight to select ZIP codes HOLD Weekday at FedEx Location NOT Available for FedEx First Overnight HOLD Saturday at FedEx Location Available ONLY for FedEx Priority Overnight and FedEx 2Day to select locations

Does this shipment contain dangerous goods?
One box must be checked.
 No Yes As per attached Shipper's Declaration Yes Shipper's Declaration not required Dry Ice Dry Ice, 9, UN 1845 x _____ kg _____ lb
 Dangerous goods (including Dry Ice) cannot be shipped in FedEx packaging Cargo Aircraft Only

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Sender Acct. No. in Section 1 will be billed. Recipient Third Party Credit Card Cash/Check

FedEx Acct. No. / Credit Card No.	Exp. Date	Total Packages	Total Weight	Total Declared Value†	FedEx Use Only
		3	110	\$.00	

†Our liability is limited to \$100 unless you declare a higher value. See back for details.

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By signing you authorize us to deliver this shipment without obtaining a signature and agree to indemnify and hold us harmless from any resulting claims.

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