FINAL

Groundwater Monitoring Report for Remedial Action Implementation Area of Concern R-6/7 and R-12 Year 10 (2008)

Naval Weapons Station Earle Waterfront Complex Colts Neck, New Jersey

March 2009

Prepared for:
Naval Facilities Mid-Atlantic
Environmental Business Line
9742 Maryland Avenue, Building A-81
Naval Station Norfolk
Norfolk, Virginia 23511-3095

Prepared By:
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for
Remedial Action Implementation
Area of Concern R-6/7 and R-12
Year 10 (2008)

Naval Weapons Station Earle Waterfront Complex
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Contract No. N62472-03-D-0802
Contract Task Order No. 0017

to

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1.0 INTRODUCTION

1.1 General Information

ECOR Solutions, Inc. (ECOR) prepared this Year 10 (2008) Groundwater Monitoring Report for the Remedial Action Implementation at former Buildings R-6/7 and R-12, for Naval Facilities Mid-Atlantic (NAVFAC) under Contract Number N62472-03-D-0802, Task Order (TO) No. 0017. The purpose of this report is to present and discuss the results of the Year 10 (2008) Annual Monitoring Program in connection with the remediation of dissolved-phase constituents of concern (COC) in groundwater in the vicinity of former Buildings R-6/7 and R-12, located at the Waterfront Complex of the Naval Weapons Station (NWS) Earle, Colts Neck, New Jersey (**Figure 1**).

1.2 Historic Overview

Former buildings R-6 and R-7 were the Waterfront Complex's vehicle refueling center (**Figure 2**). Between 1995 and 1998, the refueling center was closed, R-6 and R-7 were demolished, USTs were removed, and a parking lot was constructed at the same location. Dissolved-phase petroleum-related groundwater impact occurs in this area and extends down gradient to the north toward building R-16.

Building R-12, currently the Inshore Boat Unit (IBU) 24, is located south of the parking lot and the location of former Buildings R-6/7 (**Figure 2**). In 1995, a leaking, 2,000-gallon No. 2 fuel oil UST system was discovered at the northeastern corner of Building R-12. The UST was located within a few feet of the building foundation, so it was abandoned in-place. A limited area of light non-aqueous phase liquid (LNAPL) was encountered within the vicinity of the abandoned-in-place UST.

Between 1995 and 1999, the Navy completed various investigations to delineate the extent of the groundwater impact and evaluate appropriate remedial response actions at both areas. Due to the close proximity of the areas to each other, combined RAWP and CEA documents were established and simultaneous remedial investigations were conducted.

The selected remedial action at AOC R-6/7 and R-12 is monitored natural attenuation. The New Jersey Department of Environmental Protection (NJDEP) approved the Remedial Action Work Plan (RAWP) and Classification Exception Area (CEA) documents for the Site in 1998. The CEA encompasses groundwater impact from previously used underground storage tank (UST) systems containing gasoline, diesel fuel, and No. 2 fuel oil. The plume of impacted groundwater includes weathered LNAPL fuel oil, dissolved-phase benzene, toulene, ethylbenzene, xylenes (collectively BTEX) naphthalene, and methyl tert-butyl ether (MTBE).

The results of the first-year monitoring (1999) indicated that the plume of dissolved-phase petroleum-related groundwater contamination had not expanded, and no significant changes in groundwater quality were observed between 1998 and 1999. However,

groundwater levels suggested the presence of a groundwater discharge zone, within the vicinity of the northwestern area of the CEA. At the Navy's request, Tetra Tech NUS (TtNUS) reviewed available information and identified a groundwater sump in the basement of building R-1, which is located just outside of the northwestern boundary of the CEA. The estimated elevation of the sump is similar to the groundwater elevations observed in the monitoring wells within the CEA. TtNUS concluded that the sump in Building R-1 was intercepting groundwater within the area. The Navy subsequently included the R-1 sump in the periodic sampling program during Years 2 through 5. Sampling of the sump groundwater was discontinued in Year 6.

2.0 CEA SUMMARY

2.1 General Information

The CEA documents list the following general Area(s) of Concern (AOC) information for the R-6/7 Site and R-12 Site:

- **Site Name/Location:**
  AOC R-6/7 and AOC R-12, Naval Weapons Station Earle; Monmouth County, New Jersey.
- **Site Identification Number**:
  AOC R-6/7 Spill Case Number: 90-09-10-1044
  AOC R-12 Spill Case Number: 95-10-18-1453-54
- **NJDEP Case Manager**: Erica Bergman
- **Site Contact Person**: Eric Helms
- **Lead Program:** NJDEP - Bureau of Federal Case Management
- **Aquifer/Formation Impacted:** Englishtown/Englishtown
- **Aquifer Classification:**
  Groundwater for the Waterfront Complex of the NWS Earle facility is classified as Class II-A.
- **Contaminants Exceeding Applicable Ground Water Quality Standards (GWQS)**: Benzene, ethylbenzene, xylene, and MTBE.
- **Projected Longevity of the CEA**: 20 years

2.2 Site Location and CEA Description

The AOC are located at the Waterfront Complex of the NWS Earle facility (**Figure 1**). According to the Middletown Township Tax Office, the waterfront area is designated as Block 306, Lot 45. The affected AOC are located on a parcel containing approximately three acres. Historically, the R-6/7 AOC has been used as a fuel dispensing station. Currently, the AOC is overlain by an asphalt parking lot and associated roadways. The AOC is bounded to the west by Buildings R-1 and R-2 and to the east by Normandy Road. The area is bounded to the north and south by asphalt parking lots. The CEA boundaries and surface features are presented in **Figure 2**.

3.0 GROUNDWATER MONITORING PROGRAM

3.1 CEA Monitoring Program Overview

The monitoring program specified in the CEA consists of the following:

- Short-term monitoring at wells R6/7-MW-102, R6/7-MW-104, R6/7-MW-105, R6/7-MW-106, R6/7-MW-107, R6/7-MW-109, R6/7-MW-112, R6/7-MW-04, R12-RC-01, and MW6-01 throughout the implementation of the LNAPL recovery remedial program, followed by a minimum of four and a maximum of eight consecutive quarters after the LNAPL recovery remedial activities commenced.

- Long-term monitoring will be conducted after sufficient data are obtained through quarterly sampling. Long-term monitoring will consist of annual sampling of groundwater from select monitoring wells until the site attainsCOC concentrations below NJDEP GWQS. At that point, groundwater monitoring will occur on a quarterly basis until the results of two consecutive quarters show no COC above NJDEP GWQS.

- All groundwater samples will be analyzed for benzene, ethylbenzene, toluene, xylenes, and MTBE via USEPA Method 624 by a New Jersey certified laboratory.

- Field parameter analyses will be performed prior to sample acquisition. Dissolved oxygen (DO), pH, temperature, turbidity, Oxidation Reduction Potential (ORP), and conductivity will be measured using field instruments and recorded for all groundwater samples.

- A groundwater monitoring report will be submitted to NJDEP on an annual basis. The reports will include a tabulation of all sample results received during the reporting period pursuant to New Jersey Administrative Code (N.J.A.C.) 7:26E-3.13(c)3 and will provide a brief narrative summarizing the data and presenting conclusions. In the event a non-compliance with the RAWP is identified (e.g., hydrocarbons are detected in a down gradient compliance well), NJDEP will be notified as soon as possible after detection.

3.2 Modifications to the CEA Monitoring Program

Site conditions observed during Year 1 (1999) necessitated some minor CEA modifications to the monitoring program, as follows:

- Measurement of groundwater levels was expanded from 10 wells to 14 wells. The additional data were required to more accurately determine and evaluate the groundwater flow direction.

- Sampling activities at the R-12 recovery wells were impacted by the Navy's ongoing passive LNAPL recovery operations. One of the recovery wells (RC-01, RC-02, or RC-03) will be sampled and analyzed each quarter, depending on which recovery well is in operation.

- Sampling and analysis of groundwater from the sump in the basement of Building R-1 were added to the monitoring program.

There were no CEA modifications to the monitoring program as a result of Year 2 (2000) site conditions. However, site conditions observed during Year 3 (2001) necessitated additional modifications to the monitoring program, as follows:

- The sampling frequency of the short-term groundwater monitoring program was reduced to annual sampling with continued LNAPL recovery.

- Sentry wells MW6-01 and R6/7-MW-112 were removed from the monitoring program after approval from NJDEP. However NJDEP recommended that sentry well R6/7-MW-106 be retained as part of the ongoing monitoring program.

There were no CEA modifications to the monitoring program as a result of Year 4 (2002) site conditions. Observations during Year 5 (2003) necessitated some minor modifications to the monitoring program, as follows:

- Operation of Building R-12 area passive LNAPL recovery system was discontinued during the Year 5 sampling period due to diminished recoverable LNAPL. The Navy's summary report (Final Building R-12 Skimmer System Status Report, Foster Wheeler Environmental Corporation, April 17, 2003) was accepted by NJDEP.

- As approved by the NJDEP monitoring well R6/7-MW-105 was removed for construction of Naval Weapons Stattion security access improvements. The well was decommissioned by a New Jersey-licensed driller.

The Year 6 (2004) monitoring program included seven wells (R6/7-MW-04, R6/7-MW-102, R6/7-MW-104, R6/7-MW-106, R6/7-MW-107, R6/7-MW-109, and R12-RC-03). Minor modifications to the monitoring program, were as follows:

- Recovery well R12-RC-03 was sampled because both R12-RC-01 and R12-RC-02 were destroyed during construction activities for the new security building.

- As approved by the NJDEP, naphthalene analysis was discontinued for all monitoring wells.

CEA modifications were made to the Year 7 monitoring program as a result of site conditions. The Year 7 (2005) monitoring program included wells R6/7-MW-102, R6/7-MW-106, R6/7-MW-107, and R12-RC-03.

- Monitoring wells R6/7-MW-04, R6/7-MW-104 and R6/7-MW-109 were removed from the monitoring program as approved by the NJDEP. The wells were decommissioned by a New Jersey-licensed driller in November 2005.

The Year 8 (2006) monitoring program included four wells (R6/7-MW-102, R6/7-MW-106, R6/7-107 and R12-RC-03). R12-RC-03 was not sampled because LNAPL was detected during groundwater gauging. There were no CEA modifications as a result of Year 8 site conditions.

The Year 9 (2007) monitoring program included four wells (R6/7-MW-102, R6/7-MW-106, R6/7-107 and R12-RC-03). R12-RC-03 was not sampled because LNAPL was detected during groundwater gauging. There were no CEA modifications as a result of Year 9 site conditions.

4.0 DISCUSSION OF RESULTS

4.1 Technical Overview

The Year 10 (2008) Annual Groundwater Monitoring Program at AOC R-6/7 and R-12 was implemented in accordance with the CEA documents modified as discussed in Section 3.2. The groundwater samples were collected and sent to the laboratory on 5 November 2008. No CEA modifications were made to the Year 10 (2008) monitoring program. The Year 10 monitoring program included four wells R6/7-MW-102, R6/7-MW-106, R6/7-MW-107, and R12-RC-03. Well R12-RC-03 was not sampled as LNAPL was detected during the gauging event.

4.2 Groundwater Sampling and Analytical Methods

The groundwater sampling was completed by ECOR staff. Sampling activities were conducted in accordance with the methods described in the following NJDEP guidance documents:

- Field Sampling Procedures Manual (FSPM) August 2005
- Alternative Groundwater Sampling Techniques Guide (AGSTG) July 1994
- Field Analysis Manual (FAM) July 1994

The sampling field notes and logs (**Appendix C**) document sample dates and times, parameter analysis results, depth to groundwater measurements, and site-specific observations relevant to interpretation of the analytical results.

Quality assurance (QA) samples were collected during this sampling event. The QA samples included one trip blank (TB) per sample shipment cooler and one field blank (FB) per sampling day. One field duplicate sample (DUP) was collected during this event. Sample container requirements and sample holding times were maintained in accordance with NJDEP guidelines. QA sample results are presented in **Table 5**. No COC were detected in the trip blank. Other than a low level of MTBE (0.30 J), no other COC were detected in the field blank showing that decontamination procedures are satisfactory. For DUP samples, the precision between the original sample and its duplicate is evaluated by calculating the relative percent difference (RPD). ECOR has evaluated DUP samples using an acceptance criterion of 20 percent (20%) for detected primary COC. RPDs for the duplicate and original sample are presented in **Table 6**. All RPDs were below the 20 percent criterion showing very good correlation between the duplicate and original.

Annual monitoring at AOC R-6/7 and R-12 was performed concurrently with the quarterly monitoring program conducted for Buildings C-17/20/16/50. These areas have also been approved by NJDEP as CEAs with groundwater remediation monitoring programs. All groundwater samples were analyzed for BTEX and MTBE by USEPA Method 624. All samples for this sampling event (November 2008) were analyzed by Analytical Laboratory Services Inc., Middletown, Pennsylvania.

4.3 Analytical Results and Groundwater Flow Direction

Table 1 provides a summary of the current groundwater analytical results. **Table 2** provides the recorded field parameters prior to sampling. **Table 3** contains recorded groundwater elevations (past and present). **Table 4** provides a summary of the historic groundwater analytical results. **Figure 3** depicts the locations of the wells and the corresponding data for Year 10. **Figure 4** depicts groundwater contours and apparent groundwater flow direction for the annual monitoring event.

In general, the laboratory analytical results (**Table 1**) indicate the following:

- No target COC were detected in sentry well R-6/7-MW-102.
- MTBE was detected at a concentration of 0.30 J micrograms per liter (µg/L) in sentry well R-6/7-MW-106. No other target COC was detected in this well.
- Benzene (347 µg/L), ethylbenzene (979 µg/L) and xylenes (1860 µg/L) were detected in monitoring well R-6/7-MW-107 at concentrations above the NJDEP GWQS of 1 µg/L, 70 µg/L and 1,000 µg/L respectively. Toluene (198 µg/L) was detected but did not exceed the NJDEP GWQS of 1,000 µg/L. MTBE was not detected in well R-6/7-MW-107.
- Due to the presence of LNAPL in recovery well R-12-RC-03, a groundwater sample was not collected from this monitoring well during this sampling event. The LNAPL thickness was determined to be 0.01ft.

Consistent with historic data, Year 10 groundwater contours indicated a general groundwater flow from the south to the north within the AOC as shown on **Figure 4**.

Validated laboratory analytical data for all groundwater samples is included in **Appendix A**. The validation report is included in **Appendix B**. Sampling logs and field notes are included in **Appendix C**.

4.4 Data Validation

Third-party, independent data validation was performed on all of the analytical data for this event. The data validation was performed in accordance with USEPA Region 2 and NJDEP guidelines. Validated data is presented in **Appendix A** and the validation report in **Appendix B**.

No quality problems were identified that would impact the reliability of the data or the conclusions reached based on the data.

5.0 CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

Based on a review of sample analytical results and observations from this groundwater sampling event and review of historic analytical data from previous sampling events the following conclusions have been made:

Groundwater monitoring data through Year 10 indicate that the plume of dissolved-phase groundwater impact is not expanding or migrating beyond the extent of the CEA boundary. This is exemplified by sampling results for sentry well R-6/7-MW-102. No target COC have ever been detected above GWQS at well R-6/7-MW-102. In general, the Year 10 annual monitoring data indicate groundwater quality trends consistent with historic trends. COC levels continue to slowly decrease in well R-6/7-MW-107 and recovery well R-12-RC-03 continues to exhibit the presence of LNAPL. Like well R-6/7-MW-102, no target COC have ever been detected above GWQS at well R-6/7-MW-106.

The general direction of groundwater flow during this sampling event is from south-southwest to the north-northeast.

5.2 Recommendations

ECOR recommends continuation of annual groundwater sampling. It is also recommended that more wells are gauged prior to sampling in order to provide more groundwater elevation points to be included on potentiometric surface maps. Finally, it is recommended that a sorbent sock be installed in well R-12-RC-03.

TABLES

TABLE 1
SUMMARY OF GROUNDWATER ANALYTICAL RESULTS
NOVEMBER 2008
AOC R-6/7 AND R-12
NWS EARLE
COLTS NECK, NEW JERSEY

			Compounds			
	Benzene	**Ethylbenzene**	**Naphthalene**	**Toluene**	**Xylenes**	**MTBE**
Well ID						
R-12-RC-03	NAPL	NAPL	NA	NAPL	NAPL	NAPL
R-6/7-MW-102	ND	ND	NA	ND	ND	ND
R-6/7-MW-106	ND	ND	NA	ND	ND	0.30 B
R-6/7-MW-107	**347**	**979**	NA	198	**1860**	ND
DUP-1 (R-6/7-MW-107)	**368**	**963**	NA	210	**1830**	ND
GWQS	*1*	*700*	*300*	*1,000*	*1,000*	*70*

Notes:
GWQS = New Jersey Department of Environmental Protection (NJDEP) Groundwater Quality
results reported in micrograms per Liter (µg/L)
bold = result exceeds criteria
ND = Not Detected at the Reporting Dection Limit (RDL)
NA = Not Analyzed
NS = Not Sampled
NAPL = non-aqueous phase liquid
B = Compound/analyte was not detected substantially above the level of the associated method blank/preparation or field blank

TABLE 2

WATER QUALITY MEASUREMENTS
NOVEMBER 2008
AOC R-6/7 AND R-12
NWS EARLE
COLTS NECK, NEW JERSEY

WATER QUALITY MEASUREMENTS PRE-SAMPLING								
Sample ID	**Date Collected**	**Time Collected**	**pH (SU)**	**Conductivity (mS/cm)**	**Dissolved Oxygen (mg/L)**	**Turbidity (NTU)**	**ORP (mV)**	**Temperature (ºC)**
MW-102	5-Nov-08	1324	5.7	0.606	2.90	4.58	-35.1	18.73
MW-106	5-Nov-08	1426	5.79	8.56	0.45	11.4	-12.6	18.4
MW-107	5-Nov-08	1340	6.61	1.229	0.27	9.43	-103.9	19.87

TABLE 3

HISTORIC GROUNDWATER ELEVATION DATA

BUILDINGS R-6/7 AND R-12

NWS EARLE

COLTS NECK, NEW JERSEY

	Groundwater Levels			
	Elevation (feet AMSL)	Product Thickness (feet)	Depth to Water (feet BTOC)	Groundwater Elevation (feet AMSL)
R-12-RC-03				
May-00*	17.35	NA	8.4	8.95
Nov-02*	17.35	0.13	8.81	8.66
Nov-04*	17.35	NA	8.88	8.47
Dec-05*	17.35	NA	8.71	8.64
Nov-06	17.35	0.11	7.92	9.52
Nov-07	17.35	< 0.01	9.43	7.91
Nov-08	17.35	0.01	9.46	7.90
R-12-RC-02				
Feb-99	17.35	NA	---	---
May-99	17.35	NA	---	---
Aug-99	17.35	NA	---	---
Nov-99	17.35	0.14	9.46	8.01
Feb-00	17.35	NA	9.12	8.23
Aug-00	17.35	NA	8.65	8.7
Nov-00	17.35	NA	9.05	8.3
Nov-00-Dup	17.35	NA	9.05	8.3
Aug-01	17.35	NA	NM	---
Nov-03	17.35	NA	NM	---
R-12-RC-01				
Feb-99	17.08	0.98	9.64	8.27
May-99	17.08	2.08	10.58	8.27
Aug-99	17.08	2.40	12.05	7.07
Nov-99	17.08	NA	NM	---
Feb-00	17.08	NA	9.2	7.88
May-00	17.08	NA	NM	---
Aug-00	17.08	NA	NM	---
Nov-00	17.08	NA	NM	---
Feb-01	17.08	NA	3.11	13.97
May-01	17.08	NA	8.43	8.65
Nov-01	17.08	NA	11.6 a	5.48
Nov-03	17.08	NA	8.54	8.54
R-6/7-MW-102				
Feb-99	12.48	NA	6.82	5.66
May-99	12.48	NA	7.12	5.36
Aug-99	12.48	NA	7.58	4.90
Nov-99	12.48	NA	7.21	5.27
May-00	12.48	NA	7.79	4.69
Feb-00	12.48	NA	7.14	5.34
Aug-00	12.48	NA	6.68	5.8
Aug-00-Dup	12.48	NA	6.68	5.8
Nov-00	12.48	NA	7.08	5.4

TABLE 3
HISTORIC GROUNDWATER ELEVATION DATA
BUILDINGS R-6/7 AND R-12
NWS EARLE
COLTS NECK, NEW JERSEY

	Groundwater Levels			
	Elevation (feet AMSL)	Product Thickness (feet)	Depth to Water (feet BTOC)	Groundwater Elevation (feet AMSL)
Feb-01	12.48	NA	6.56	5.92
May-01	12.48	NA	6.83	5.65
May-01-Dup	12.48	NA	NM	---
Aug-01	12.48	NA	6.71	5.77
Nov-01	12.48	NA	7.68	4.8
Nov-02	12.48	NA	6.66	5.82
Nov-03	12.48	NA	7.70	4.78
Nov-04	12.48	NA	7.85	4.63
Dec-05	12.48	NA	7.48	5.00
Nov-06	12.48	NA	7.05	5.43
Nov-07	12.48	NA	7.90	4.58
Nov-08	12.48	NA	7.80	4.68
R-6/7-MW-104				
Feb-99	16.60	NA	8.30	8.30
May-99	16.60	NA	8.16	8.44
Aug-99	16.60	NA	9.33	7.27
Nov-99	16.60	NA	8.88	7.72
Feb-00	16.60	NA	8.52	8.08
May-00	16.60	NA	8	8.6
Aug-00	16.60	NA	3.13	13.47
Nov-00	16.60	NA	8.78	7.82
Feb-01	16.60	NA	7.87	8.73
May-01	16.60	NA	7.84	8.76
Aug-01	16.60	NA	8.69	7.91
Nov-01	16.60	NA	9.43	7.17
Nov-02	16.60	NA	8.19	8.41
Nov-03	16.60	NA	8.17	8.43
Nov-04	16.60	NA	8.20	8.40
R-6/7-MW-105				
Feb-99	20.06	NA	>10.12	---
Feb-99-Dup	20.06	NA	NM	---
May-99	20.06	NA	11.2	8.86
Aug-99	20.06	NA	12.5	7.56
Nov-99	20.06	NA	12.06	8.00
Feb-00	20.06	NA	11.59	8.47
May-00	20.06	NA	10.91	9.15
Aug-00	20.06	NA	>10.34	---
Nov-00	20.06	NA	11.97	8.09
Feb-01	20.06	NA	10.92	9.14
May-01	20.06	NA	NM	---
Aug-01	20.06	NA	11.75	8.31
Nov-01	20.06	NA	12.55	7.51

TABLE 3

HISTORIC GROUNDWATER ELEVATION DATA

BUILDINGS R-6/7 AND R-12

NWS EARLE

COLTS NECK, NEW JERSEY

	Groundwater Levels			
	Elevation (feet AMSL)	Product Thickness (feet)	Depth to Water (feet BTOC)	Groundwater Elevation (feet AMSL)
Nov-02	20.06	NA	11.3	8.76
Nov-03	20.06	NA	11.26	8.80
R-6/7-MW-106				
Feb-99	16.62	NA	10.59	6.03
May-99	16.62	NA	11.00	5.62
May-99-Dup	16.62	NA	11.00	5.62
Aug-99	16.62	NA	11.53	5.09
Nov-99	16.62	NA	11.14	5.48
Feb-00	16.62	NA	10.98	5.64
May-00	16.62	NA	10.63	5.99
Aug-00	16.62	NA	10.53	6.09
Nov-00	16.62	NA	11.02	5.6
Feb-01	16.62	NA	10.4	6.22
May-01	16.62	NA	10.68	5.94
Aug-01	16.62	NA	11.26	5.36
Nov-01	16.62	NA	11.66	4.96
Nov-02	16.62	NA	10.64	5.98
Nov-03	16.62	NA	11.43	5.19
Nov-04	16.62	NA	10.81	5.81
Dec-05	16.62	NA	10.88	5.74
Nov-06	16.62	NA	10.39	6.23
Nov-07	16.62	NA	12.45	4.17
Nov-07-(Dup-	16.62	NA	12.45	4.17
Nov-08	16.62	NA	13.25	3.37
R-6/7-MW-107				
Feb-99	14.98	NA	8.95	6.03
May-99	14.98	NA	9.25	5.73
Aug-99	14.98	NA	9.85	5.13
Aug-99-Dup	14.98	NA	9.85	5.13
Nov-99	14.98	NA	9.49	5.49
Nov-99-Dup	14.98	NA	9.49	5.49
Feb-00	14.98	NA	9.31	5.67
Feb-00-Dup	14.98	NA	9.31	5.67
May-00	14.98	NA	8.98	6
May-00-Dup	14.98	NA	8.98	6
Aug-00	14.98	NA	8.90	6.08
Nov-00	14.98	NA	9.29	5.69
Feb-01	14.98	NA	8.73	6.25
Feb-01-Dup	14.98	NA	NM	---
May-01	14.98	NA	9.02	5.96
Aug-01	14.98	NA	9.58	5.4
Aug-01-Dup	14.98	NA	NM	---

TABLE 3

HISTORIC GROUNDWATER ELEVATION DATA

BUILDINGS R-6/7 AND R-12

NWS EARLE

COLTS NECK, NEW JERSEY

	Groundwater Levels			
	Elevation (feet AMSL)	**Product Thickness (feet)**	**Depth to Water (feet BTOC)**	**Groundwater Elevation (feet AMSL)**
Nov-01	14.98	NA	9.97	5.01
Nov-01-Dup	14.98	NA	NM	---
Nov-02	14.98	NA	9.82	5.16
Nov-03	14.98	NA	9.93	5.05
Nov-04	14.98	NA	9.47	5.51
Dec-05	14.98	NA	9.32	5.66
Dec-05-Dup	14.98	NA	9.32	5.66
Nov-06	14.98	NA	8.93	6.05
Nov-07	14.98	NA	9.30	5.68
Nov-08	14.98	NA	9.70	5.28
Nov-08 Dup	14.98	NA	9.70	5.28
R-6/7-MW-109				
Feb-99	21.89	NA	>15.35	---
May-99	21.89	NA	16.46	5.43
Aug-99	21.89	NA	16.67	5.22
Nov-99	21.89	NA	16.35	5.54
Feb-00	21.89	NA	16.18	5.71
May-00	21.89	NA	15.91	5.98
Aug-00	21.89	NA	15.77	6.12
Nov-00	21.89	NA	16.17	5.72
Feb-01	21.89	NA	17.74	4.15
May-01	21.89	NA	15.85	6.04
Aug-01	21.89	NA	16.30	5.59
Nov-01	21.89	NA	16.82	5.07
Nov-02	21.89	NA	15.79	6.10
Nov-03	21.89	NA	16.42	5.47
Nov-04	21.89	NA	16.35	5.54
R-6/7-MW-112				
Feb-99	12.02	NA	5.95	6.07
May-99	12.02	NA	6.30	5.72
Aug-99	12.02	NA	6.60	5.42
Nov-99	12.02	NA	6.53	5.49
Feb-00	12.02	NA	6.37	5.65
May-00	12.02	NA	6.06	5.96
Aug-00	12.02	NA	5.94	6.08
Nov-00	12.02	NA	6.36	5.66
Feb-01	12.02	NA	5.73	6.29
May-01	12.02	NA	6.14	5.88
Aug-01	12.02	NA	6.69	5.33
Nov-01	12.02	NA	7.02	5.00

TABLE 3

HISTORIC GROUNDWATER ELEVATION DATA

BUILDINGS R-6/7 AND R-12

NWS EARLE

COLTS NECK, NEW JERSEY

	Groundwater Levels			
	Elevation (feet AMSL)	**Product Thickness (feet)**	**Depth to Water (feet BTOC)**	**Groundwater Elevation (feet AMSL)**
R-6/7-MW-04				
Feb-99	16.39	NA	7.32	9.07
May-99	16.39	NA	7.82	8.57
Aug-99	16.39	NA	9.35	7.04
Nov-99	16.39	NA	8.98	7.41
Feb-00	16.39	NA	8.53	7.86
May-00	16.39	NA	8.07	8.32
Aug-00	16.39	NA	>756	---
Nov-00	16.39	NA	8.95	7.44
Feb-01	16.39	NA	7.74	8.65
May-01	16.39	NA	7.93	8.46
Aug-01	16.39	NA	9.24	7.15
Nov-01	16.39	NA	9.51	6.88
Nov-02	16.39	NA	8.30	8.09
Nov-02-Dup	16.39	NA	NM	---
Nov-03	16.39	NA	8.23	8.16
Nov-03-Dup	16.39	NA	NM	---
Nov-04	16.39	NA	9.15	7.24
MW-6-01				
Feb-99	17.75	NA	11.96	5.79
May-99	17.75	NA	12.22	5.53
Aug-99	17.75	NA	12.01	5.74
Nov-99	17.75	NA	12.05	5.70
Feb-00	17.75	NA	12.42	5.33
May-00	17.75	NA	11.82	5.93
Aug-00	17.75	NA	11.76	5.99
Nov-00	17.75	NA	12.38	5.37
Feb-01	17.75	NA	11.72	6.03
May-01	17.75	NA	11.81	5.94
Aug-01	17.75	NA	12.47	5.28
Nov-01	17.75	NA	13.30	4.45
Nov-02	17.75	NA	11.84	5.91
Nov-03	17.75	NA	12.49	5.26

Notes:

NA = Not Applicable

NM = Not Measured

AMSL = Above Mean Sea Level

BTOC = Below Top of Casing

TABLE 4
HISTORIC GROUNDWATER ANALYTICAL RESULTS
BUILDINGS R-6/7 AND R-12
NWS EARLE
COLTS NECK, NEW JERSEY

Location	Compounds					
	Benzene	**Ethylbenzene**	**Naphthalene**	**Toluene**	**Xylenes**	**MTBE**
GWQS	***1***	***700***	***300***	***1,000***	***1,000***	***70***
R-12-RC-03						
May-00	**43**	59	235	13.1	179	ND
Nov-02	NS	NS	NS	NS	NS	NS
Nov-04	ND	6.3	NA	ND	25.0	ND
Dec-05	ND	0.87 J	ND	0.21 J	3.4	ND
Nov-06	NS	NS	NS	NS	NS	NS
Nov-07	NS	NS	NS	NS	NS	NS
Nov-08	NS	NS	NS	NS	NS	NS
R-12-RC-02	Destroyed - 2004					
Feb-99	NS	NS	NS	NS	NS	NS
May-99	NS	NS	NS	NS	NS	NS
Aug-99	NS	NS	NS	NS	NS	NS
Nov-99	**6.2**	70.6	258	22	258	ND
Feb-00	NS	NS	NS	NS	NS	NS
Aug-00	NS	NS	NS	NS	NS	NS
Nov-00	ND	47.5	165	ND	57.8	ND
Nov-00-Dup	ND	47.9	171	ND	57.9	ND
Aug-01	**23**	180	**450**	59	237	20
Nov-03	ND	5.6	10	ND	9.2	ND
R-12-RC-01	Destroyed - 2004					
Feb-99	**63.5**	83.2	NA	21.5	295	3.5
May-99	**58**	102	NA	16.4	291	ND
Aug-99	**26.1**	81.3	**399**	9	306	ND
Nov-99	NS	NS	NS	NS	NS	NS
Feb-00	**13.4**	56.9	193	ND	134	ND
May-00	NS	NS	NS	NS	NS	NS
Aug-00	**10.8**	59	202	7.4	183	ND
Nov-00	NS	NS	NS	NS	NS	NS
Feb-01	ND	45	160	5.8	47	ND
May-01	ND	24 J	56	ND	146	ND
Nov-01	**35.4**	75.7	183	5	208	ND
Nov-03	NS	NS	NA	NS	NS	NS
R-6/7-MW-102						
Feb-99	ND	ND	NA	ND	ND	0.78
May-99	ND	ND	NA	ND	ND	ND
Aug-99	ND	ND	ND	ND	ND	1.3
Nov-99	ND	ND	ND	ND	ND	1.5
Feb-00	ND	ND	ND	ND	ND	1.7
May-00	ND	ND	ND	ND	ND	0.76
Aug-00	ND	ND	ND	ND	ND	0.91

TABLE 4
HISTORIC GROUNDWATER ANALYTICAL RESULTS
BUILDINGS R-6/7 AND R-12
NWS EARLE
COLTS NECK, NEW JERSEY

Location	Compounds					
	Benzene	**Ethylbenzene**	**Naphthalene**	**Toluene**	**Xylenes**	**MTBE**
GWQS	***1***	***700***	***300***	***1,000***	***1,000***	***70***
Aug-00-Dup	ND	ND	ND	ND	ND	0.86
Nov-00	ND	ND	ND	ND	ND	ND
Feb-01	ND	ND	ND	ND	ND	ND
May-01	ND	ND	ND	ND	ND	ND
May-01-Dup	ND	ND	ND	ND	ND	ND
Aug-01	ND	ND	ND	ND	ND	ND
Nov-01	ND	ND	ND	ND	ND	0.67 J
Nov-02	ND	ND	ND	ND	ND	0.6 J
Nov-03	ND	ND	ND	ND	ND	ND
Nov-04	ND	ND	NA	ND	ND	ND
Dec-05	ND	ND	ND	ND	ND	ND
Nov-06	ND	ND	NA	ND	ND	ND
Nov-07	ND	ND	NA	ND	ND	ND
Nov-08	ND	ND	NA	ND	ND	ND
R-6/7-MW-104	Sampling discontinued - 2005					
Feb-99	**6.1**	ND	NA	ND	ND	2.6
May-99	**7.7**	ND	NA	ND	ND	ND
Aug-99	**7.3**	ND	ND	ND	ND	2.5
Nov-99	**4.1**	ND	ND	ND	ND	2.2
Feb-00	**1**	ND	ND	ND	ND	1.6
May-00	**1.1**	ND	ND	ND	ND	1.5
Aug-00	**1.4**	ND	ND	ND	ND	1.8
Nov-00	ND	ND	ND	ND	ND	2
Feb-01	ND	ND	ND	ND	ND	ND
May-01	ND	ND	ND	ND	ND	ND
Aug-01	**1 J**	ND	2.6	ND	ND	ND
Nov-01	0.73 J	ND	ND	ND	ND	2.1
Nov-02	0.6 J	ND	ND	ND	ND	3.4
Nov-03	ND	ND	ND	ND	ND	3.3
Nov-04	ND	ND	NA	ND	ND	0.70 J
R-6/7-MW-105	Sampling discontinued - 2003					
Feb-99	ND	ND	NA	ND	ND	ND
Feb-99-Dup	ND	ND	NA	ND	ND	ND
May-99	ND	ND	NA	ND	ND	ND
Aug-99	ND	ND	ND	ND	ND	ND
Nov-99	ND	ND	ND	ND	ND	ND
Feb-00	ND	ND	ND	ND	ND	ND
May-00	ND	ND	ND	ND	ND	ND
Aug-00	ND	ND	ND	ND	ND	ND
Nov-00	ND	ND	ND	ND	ND	ND

TABLE 4
HISTORIC GROUNDWATER ANALYTICAL RESULTS
BUILDINGS R-6/7 AND R-12
NWS EARLE
COLTS NECK, NEW JERSEY

Location	Compounds					
	Benzene	Ethylbenzene	Naphthalene	Toluene	Xylenes	MTBE
GWQS	***1***	***700***	***300***	***1,000***	***1,000***	***70***
Feb-01	ND	ND	ND	ND	ND	ND
May-01	ND	ND	ND	ND	ND	ND
Aug-01	ND	ND	ND	ND	ND	ND
Nov-01	ND	ND	ND	ND	ND	0.71 J
Nov-02	ND	ND	ND	ND	ND	ND
Nov-03	ND	ND	ND	ND	ND	ND
R-6/7-MW-106						
Feb-99	ND	ND	NA	ND	ND	ND
May-99	ND	ND	NA	ND	ND	ND
May-99-Dup	ND	ND	NA	ND	ND	ND
Aug-99	ND	ND	ND	ND	ND	ND
Nov-99	ND	ND	ND	ND	ND	ND
Feb-00	ND	ND	ND	ND	ND	ND
May-00	ND	ND	ND	ND	ND	ND
Aug-00	ND	ND	ND	ND	ND	ND
Nov-00	ND	ND	ND	ND	ND	ND
Feb-01	ND	ND	ND	ND	ND	ND
May-01	ND	ND	ND	ND	ND	ND
Aug-01	ND	ND	ND	ND	ND	ND
Nov-01	ND	ND	ND	ND	ND	ND
Nov-02	NS	NS	NS	NS	NS	NS
Nov-03	ND	ND	ND	ND	ND	ND
Nov-04	ND	ND	NA	ND	ND	0.83 J
Dec-05	ND	ND	ND	ND	ND	1.1
Nov-06	ND	ND	NA	ND	ND	ND
Nov-07	ND	ND	NA	ND	ND	0.58 J
Nov-07-(Dup-2)	ND	ND	NA	ND	ND	0.52 J
Nov-08	ND	ND	NA	ND	ND	0.30 B
R-6/7-MW-107						
Feb-99	**1400 J**	**1200 J**	NA	798 J	**3510 J**	**312 J**
May-99	**1870**	**1710**	NA	**1150**	**5040**	ND
Aug-99	**1380**	**964**	242	524	**2530**	**213**
Aug-99-Dup	**1190**	**857**	ND	504	**2370**	**249**
Nov-99	**1550 J**	**1080**	254	630	**2720**	**186**
Nov-99-Dup	**1260**	**846**	201	475	**4060**	**193**
Feb-00	**938**	**821**	196	441	**2320**	**73.8**
Feb-00-Dup	**956**	**830**	212	448	**2350**	**72.9**
May-00	**1440J**	**1460J**	**344J**	918J	**3620**	**86.5J**
May-00-Dup	**1380J**	**1360J**	**346J**	851J	**3880J**	**87J**
Aug-00	**1190**	**1150**	**311**	622	**3210**	**129**

TABLE 4
HISTORIC GROUNDWATER ANALYTICAL RESULTS
BUILDINGS R-6/7 AND R-12
NWS EARLE
COLTS NECK, NEW JERSEY

Location	Compounds					
	Benzene	**Ethylbenzene**	**Naphthalene**	**Toluene**	**Xylenes**	**MTBE**
GWQS	***1***	***700***	***300***	***1,000***	***1,000***	***70***
Nov-00	**1240**	**856**	232	456	**2250**	**143**
Feb-01	**1100**	**1200**	**400**	710	**3160**	**140**
Feb-01-Dup	**1200**	**1300**	**410**	780	**3430**	**190**
May-01	**2000**	**1600 J**	100	**1400 J**	**5300**	**100**
Aug-01	**470**	570	250	330	**1880**	**130**
Aug-01-Dup	**1200**	**990**	**470**	**1500**	**3900**	**170**
Nov-01	**1090**	**1010**	**305**	432	**1920**	**156**
Nov-01-Dup	**1130**	**1030**	**316**	440	**2030**	**174**
Nov-02	**999**	**961**	212	374	**2040**	**153**
Nov-03	**723**	**1000**	177	365	**2360**	67
Nov-04	**543**	**880**	NA	263	**1530**	40.7
Dec-05	**480**	**930**	160	300	**1800**	ND
Dec-05-Dup	**480**	**900**	160	300	**1800**	21 J
Nov-06	**400**	**790**	NA	220	**1700**	ND
Nov-07	**449**	**1010**	NA	207	**1880**	29.1
Nov-08	**347**	**979**	NA	198	**1860**	ND
Nov-08 Dup	**368**	**963**	NA	210	**1830**	ND
R-6/7-MW-109	Sampling discontinued - 2005					
Feb-99	ND	ND	NA	ND	ND	ND
May-99	ND	ND	NA	ND	ND	ND
Aug-99	ND	ND	ND	ND	ND	ND
Nov-99	ND	ND	ND	ND	ND	ND
Feb-00	ND	ND	ND	ND	ND	ND
May-00	ND	ND	ND	ND	ND	ND
Aug-00	ND	ND	ND	ND	ND	ND
Nov-00	ND	ND	ND	ND	ND	ND
Feb-01	ND	ND	ND	ND	ND	ND
May-01	ND	ND	ND	ND	ND	ND
Aug-01	ND	ND	ND	4.6	2.8 J	ND
Nov-01	ND	ND	ND	ND	ND	ND
Nov-02	ND	ND	ND	ND	ND	ND
Nov-03	ND	ND	ND	ND	ND	ND
Nov-04	ND	ND	NA	ND	ND	ND
R-6/7-MW-112	Sampling discontinued - 2001					
Feb-99	ND	ND	NA	ND	ND	ND
May-99	ND	ND	NA	ND	ND	ND
Aug-99	ND	ND	ND	ND	ND	ND
Nov-99	ND	ND	ND	ND	ND	ND
Feb-00	ND	ND	ND	ND	ND	ND

TABLE 4
HISTORIC GROUNDWATER ANALYTICAL RESULTS
BUILDINGS R-6/7 AND R-12
NWS EARLE
COLTS NECK, NEW JERSEY

Location	Compounds					
	Benzene	**Ethylbenzene**	**Naphthalene**	**Toluene**	**Xylenes**	**MTBE**
GWQS	***1***	***700***	***300***	***1,000***	***1,000***	***70***
May-00	ND	ND	ND	ND	ND	ND
Aug-00	ND	ND	ND	ND	ND	ND
Nov-00	ND	ND	ND	ND	ND	ND
Feb-01	ND	ND	ND	ND	ND	ND
May-01	ND	ND	ND	ND	ND	ND
Aug-01	ND	ND	ND	ND	ND	ND
Nov-01	ND	ND	ND	ND	ND	ND
R-6/7-MW-04	Sampling discontinued - 2005					
Feb-99	ND	ND	NA	ND	ND	ND
May-99	**4.1**	ND	NA	ND	ND	ND
Aug-99	ND	ND	1.6	0.7	ND	ND
Nov-99	ND	ND	0.88	ND	ND	ND
Feb-00	ND	ND	ND	ND	ND	0.54
May-00	ND	ND	ND	ND	ND	ND
Aug-00	ND	ND	ND	ND	ND	ND
Nov-00	ND	ND	ND	ND	ND	ND
Feb-01	ND	ND	ND	ND	ND	ND
May-01	ND	ND	ND	ND	ND	ND
Aug-01	**1.9 J**	3.4	1.8	1.6	12.1	ND
Nov-01	**1.9**	ND	ND	0.84 J	ND	1.6 J
Nov-02	ND	ND	ND	ND	ND	ND
Nov-02-Dup	ND	ND	ND	ND	ND	ND
Nov-03	ND	ND	ND	ND	ND	ND
Nov-03-Dup	ND	ND	ND	ND	ND	ND
Nov-04	0.32 J	ND	NA	ND	ND	0.26 J
MW-6-01	Sampling discontinued - 2001					
Feb-99	ND	ND	NA	ND	ND	ND
May-99	ND	ND	NA	ND	ND	ND
Aug-99	ND	ND	ND	ND	ND	ND
Nov-99	ND	ND	ND	ND	ND	ND
Feb-00	ND	ND	ND	ND	ND	ND
May-00	ND	ND	ND	ND	ND	ND
Aug-00	ND	ND	ND	ND	ND	ND
Nov-00	ND	ND	ND	ND	ND	ND
Feb-01	ND	ND	ND	ND	ND	ND
May-01	ND	ND	ND	ND	ND	ND
Aug-01	ND	ND	ND	ND	ND	ND
Nov-01	ND	ND	ND	ND	ND	ND
Nov-02	NS	NS	NS	NS	NS	NS
Nov-03	NS	NS	NS	NS	NS	NS

TABLE 4
HISTORIC GROUNDWATER ANALYTICAL RESULTS
BUILDINGS R-6/7 AND R-12
NWS EARLE
COLTS NECK, NEW JERSEY

Location	Compounds					
	Benzene	**Ethylbenzene**	**Naphthalene**	**Toluene**	**Xylenes**	**MTBE**
GWQS	***1***	***700***	***300***	***1,000***	***1,000***	***70***
SUMP R-1	Sampling discontinued - 2006					
Feb-00	NS	NS	NS	NS	NS	NS
May-00	ND	ND	ND	ND	ND	1.8
Aug-00	ND	ND	ND	ND	ND	1.6
Nov-00	ND	ND	ND	ND	ND	1.4
Feb-01	ND	ND	ND	ND	ND	ND
May-01	ND	ND	ND	ND	ND	ND
Aug-01	ND	ND	2.7	ND	ND	ND
Nov-01	ND	ND	ND	ND	ND	2
Nov-02	ND	ND	ND	ND	ND	2.8
Nov-03	**2.4**	1.6 J	21 R	ND	1.3 J	6.2

Notes:
GWQS = New Jersey Department of Environmental Protection (NJDEP) Groundwater Quality Standards for Class II-A Groundwater (N.J.A.C. 7:9-6
data previous to November 2004 was provided by TtNUS.
bold = result exceeds GWQS
* *Recovery well R12-RC-02 was destroyed, so well R12-RC-03 was sampled.

a: Water level measurement may not be accurate since pump was pulled and recovery may not have been complete.
ND = Not Detected
NA = Not Analyzed
NS = Not Sampled
J = Estimated as a result of a value below the CRQL or a technical non-compliance.
B = Compound/analyte was not detected substantially above the level of the associated method blank/preparation or field blank
R = Surrogate recovery non-compliance.

TABLE 5
QA/QC SUMMARY RESULTS
NOVEMBER 2008
AOC R-6/7 AND R-12
NWS EARLE
COLTS NECK, NEW JERSEY

	Compounds					
	Benzene	**Ethylbenzene**	**Naphthalene**	**Toluene**	**Xylenes**	**MTBE**
Well ID						
FB-1	ND	ND	ND	ND	ND	0.33 J
TB-1	ND	ND	ND	ND	ND	ND
GWQS	*1*	*700*	*300*	*1,000*	*1,000*	*70*

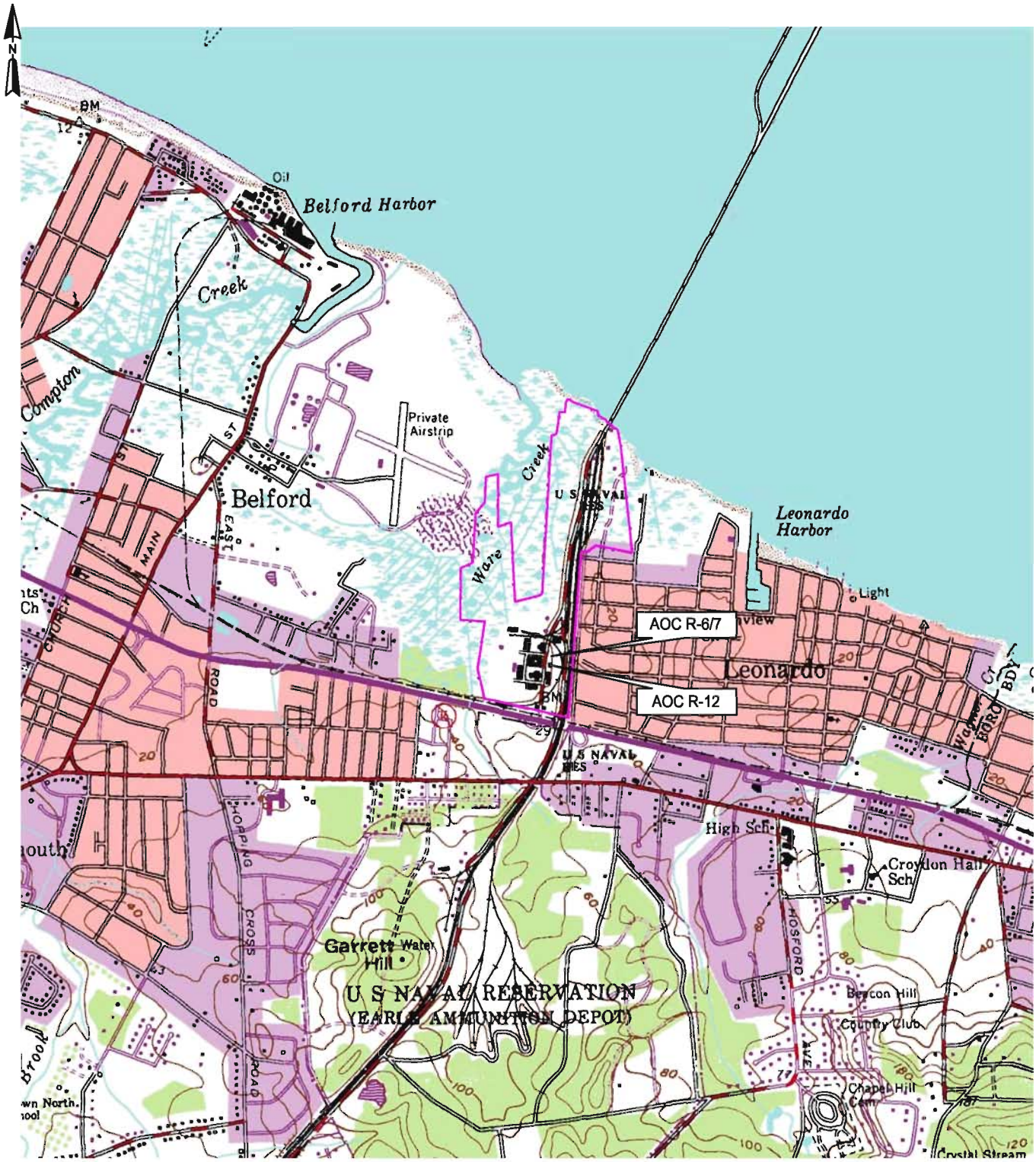
Notes:
GWQS = New Jersey Department of Environmental Protection (NJDEP) Groundwater Quality Standards for Class II-A Groundwater (N.J.A.C. 7:9-6
results reported in micrograms per Liter (µg/L)
ND = Not Detected at the Reporting Dection Limit (RDL)
J = indicates an estimated value between the Method Detection Limit (MDL) and the Practical Quantitaion Limit (PQL)

TABLE 6
RPD CALCULATIONS
NOVEMBER 2008
AOC R-6/7 AND R-12
NWS EARLE
COLTS NECK, NEW JERSEY

Benzene			Ethylbenzene			Toluene			Xylenes			MTBE		
Sample	**Duplicate**	**RPD**	**Sample**	**Duplicate**	**RPD**	**Sample**	**Duplicate**	**RPD**	**Sample**	**Duplicate**	**RPD**	**Sample**	**Duplicate**	**RPD**
347	368	6.0%	979	963.0	2.0%	198	210	6.0%	1860	1830	2.0%	ND	ND	NA

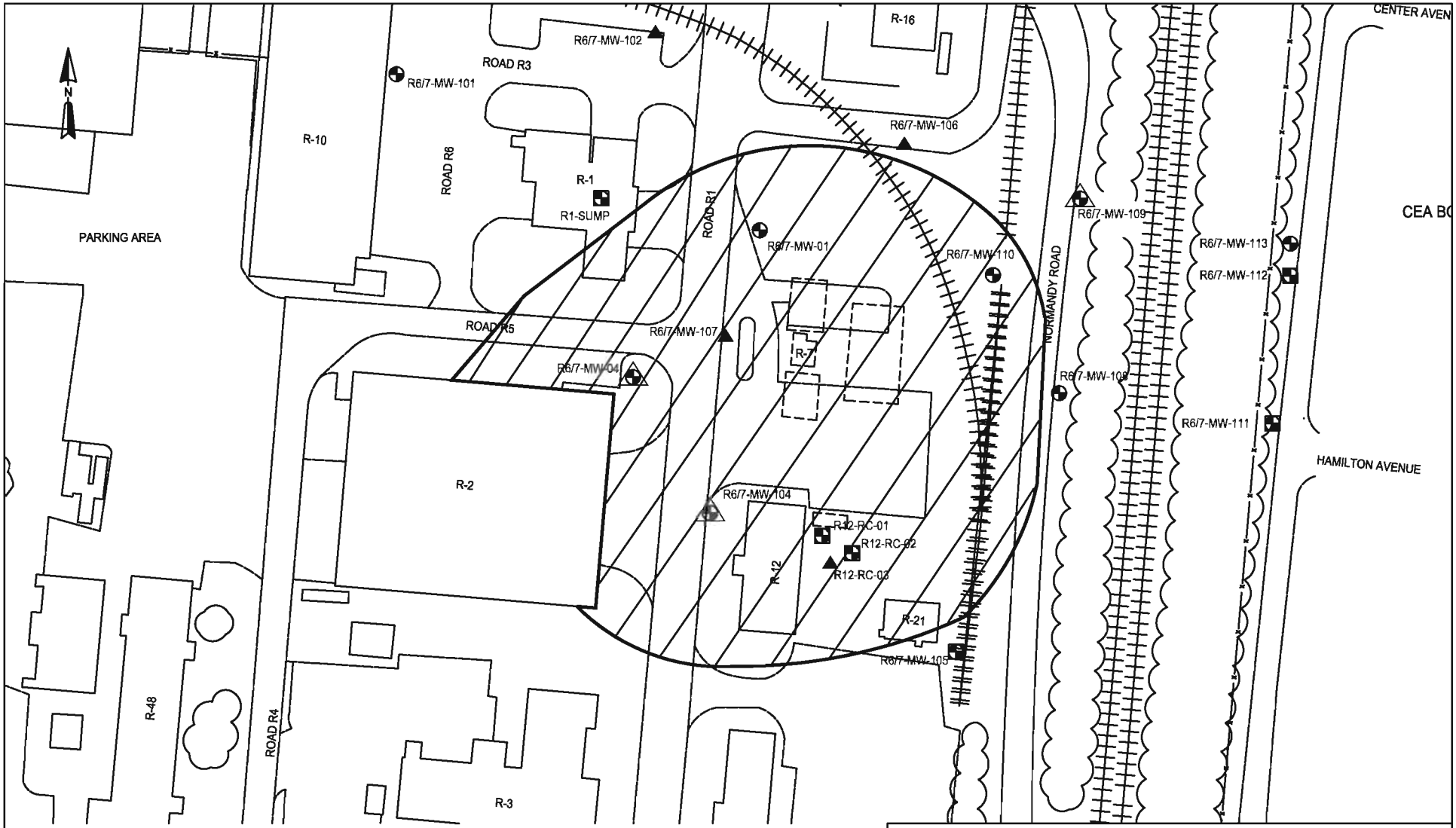
Notes:
Sample = R6/7-MW-107
Duplicate = DUP-1
results reported in micrograms per Liter (µg/L)
ND = Not Detected at the Reporting Dection Limit (RDL)
NA = Not Applicable

FIGURES



SOURCE: USGS SANDY HOOK, NJ

SITE LOCATION MAP		
BUILDINGS R-6/7 AND R-12 U.S. NAVY NWS- EARLE COLTS NECK, NJ		
ECOR Solutions 508 Brandywine Parkway, West Chester, PA 19380		
SCALE IN FEET 0 2000	DATE 02-28-05	FIGURE 1



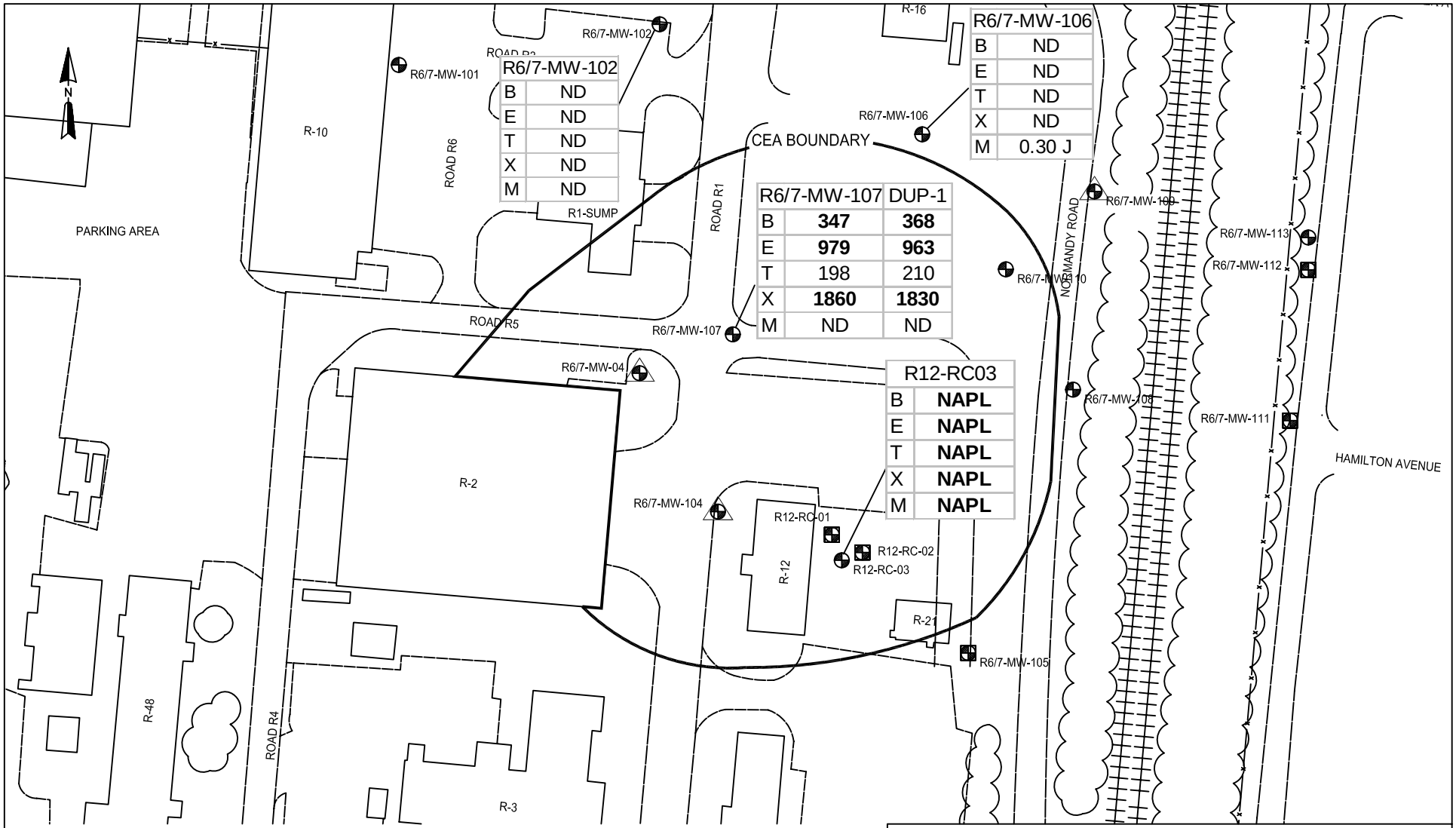
CURRENT SITE LAYOUT MAP

BUILDINGS R-6/7 AND R-12
U.S. NAVY NWS- EARLE
COLTS NECK, NJ

ECOR Solutions
1075 Andrew Drive, Suite I, West Chester, PA 19380

SCALE IN FEET	DATE	FIGURE
0 100	01-31-06	2

ECOR Solutions, Inc.



LEGEND

⊕	MONITORING WELL
ND	NOT DETECTED
NAPL	NON-AQUEOUS PHASE LIQUID
J	ESTIMATED VALUE

B	BENZENE CONCENTRATION (µg/L)
E	ETHYLBENZENE CONCENTRATION (µg/L)
T	TOULENE CONCENTRATION (µg/L)
X	XYLENE CONCENTRATION (µg/L)
M	MTBE CONCENTRATION (µg/L)

All concentrations in micrograms per liter (µg/L)

SOURCE: TETRATECH NUS

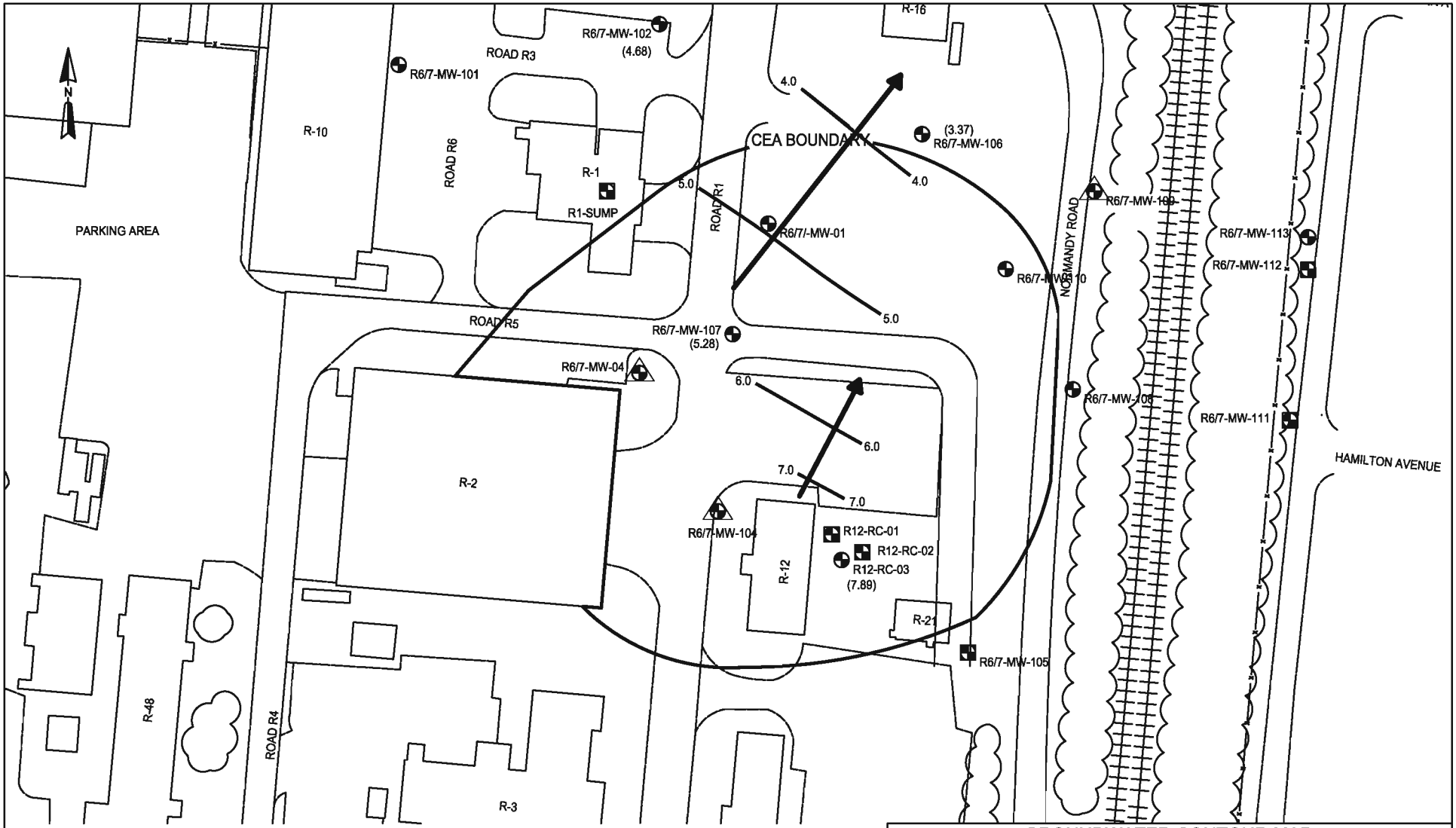
GROUNDWATER ANALTYICAL RESULTS MAP
NOVEMBER 2008

BUILDINGS R-6/7 AND R-12
U.S. NAVY NWS- EARLE
COLTS NECK, NJ

ECOR Solutions
1075 Andrew Drive, Suite I, West Chester, PA 19380

SCALE IN FEET	DATE	FIGURE
0 100	12-09-08	3

ECOR Solutions, Inc.



LEGEND

GROUNDWATER CONTOUR

(4.68) GROUNDWATER ELEVATION (FEET ABOVE MEAN SEA LEVEL)

GROUNDWATER FLOW

MONITORING WELL

SOURCE: TETRATECH NUS

GROUNDWATER CONTOUR MAP
NOVEMBER 2008

BUILDINGS R-6/7 AND R-12
U.S. NAVY NWS- EARLE
COLTS NECK, NJ

ECOR Solutions
1075 Andrew Drive, Suite I, West Chester, PA 19380

SCALE IN FEET	DATE	FIGURE
0 100	12-09-08	4

ECOR Solutions, Inc.

APPENDICES

APPENDIX A
GROUNDWATER LABORATORY ANALYTICAL DATA PACKAGE

FORM 1 ECOR Solutions SAMPLE NO.

VOLATILE ORGANICS ANALYSIS DATA SHEET

FB-1

Lab Name: Contract:

Lab Code: Case No.: SAS No.: SDG No.: EWN020

Matrix: (soil/water) WATER Lab Sample ID: 9762562005

Sample wt/vol: 5.000 (g/ml) ML Lab File ID: 3111025

Level: (low/med) LOW Date Received: 11/07/08

% Moisture: not dec. _____ Date Analyzed: 11/11/08

GC Column: RTX-VRX ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
71-43-2	Benzene	1.0	U
100-41-4	Ethylbenzene	1.0	U
108-88-3	Toluene	1.0	U
95-47-6	o-Xylene	1.0	U
108383/106423	mp-Xylene	2.0	U
1330-20-7	Total Xylenes	3.0	U
1634-04-4	Methyl t-Butyl Ether	0.33	J

FORM I VOA

FORM 1 ECOR Solutions SAMPLE NO.

VOLATILE ORGANICS ANALYSIS DATA SHEET

MW-102

Lab Name: Contract:

Lab Code: Case No.: SAS No.: SDG No.: EWN020

Matrix: (soil/water) WATER Lab Sample ID: 9762562001

Sample wt/vol: 5.000 (g/ml) ML Lab File ID: 3111026

Level: (low/med) LOW Date Received: 11/07/08

% Moisture: not dec. _____ Date Analyzed: 11/11/08

GC Column: RTX-VRX ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
71-43-2	Benzene	1.0	U
100-41-4	Ethylbenzene	1.0	U
108-88-3	Toluene	1.0	U
95-47-6	o-Xylene	1.0	U
108383/106423	mp-Xylene	2.0	U
1330-20-7	Total Xylenes	3.0	U
1634-04-4	Methyl t-Butyl Ether	1.0	U

FORM I VOA

0035

SMM 5/19/2009

FORM 1 ECOR Solutions SAMPLE NO.

VOLATILE ORGANICS ANALYSIS DATA SHEET

MW-106

Lab Name: Contract:

Lab Code: Case No.: SAS No.: SDG No.: EWN020

Matrix: (soil/water) WATER Lab Sample ID: 9762562002

Sample wt/vol: 5.000 (g/ml) ML Lab File ID: 3111027

Level: (low/med) LOW Date Received: 11/07/08

% Moisture: not dec. _____ Date Analyzed: 11/11/08

GC Column: RTX-VRX ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
71-43-2	Benzene	1.0	U
100-41-4	Ethylbenzene	1.0	U
108-88-3	Toluene	1.0	U
95-47-6	o-Xylene	1.0	U
108383/106423	mp-Xylene	2.0	U
1330-20-7	Total Xylenes	3.0	U
1634-04-4	Methyl t-Butyl Ether	0.30	J B

BL

FORM I VOA

SMM 3/19/2009

FORM 1 ECOR Solutions SAMPLE NO.

VOLATILE ORGANICS ANALYSIS DATA SHEET

TB-1

Lab Name: Contract:

Lab Code: Case No.: SAS No.: SDG No.: EWN020

Matrix: (soil/water) WATER Lab Sample ID: 9762562006

Sample wt/vol: 5.000 (g/ml) ML Lab File ID: 3111106

Level: (low/med) LOW Date Received: 11/07/08

% Moisture: not dec. _____ Date Analyzed: 11/11/08

GC Column: RTX-VRX ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
71-43-2	Benzene	1.0	U
100-41-4	Ethylbenzene	1.0	U
108-88-3	Toluene	1.0	U
95-47-6	o-Xylene	1.0	U
108383/106423	mp-Xylene	2.0	U
1330-20-7	Total Xylenes	3.0	U
1634-04-4	Methyl t-Butyl Ether	1.0	U

SMM 5/9/2009

FORM 1 ECOR Solutions SAMPLE NO.

VOLATILE ORGANICS ANALYSIS DATA SHEET

MW-107

Lab Name: Contract:

Lab Code: Case No.: SAS No.: SDG No.: EWN020

Matrix: (soil/water) WATER Lab Sample ID: 9762562003

Sample wt/vol: 5.000 (g/ml) ML Lab File ID: 3111114

Level: (low/med) LOW Date Received: 11/07/08

% Moisture: not dec. _____ Date Analyzed: 11/11/08

GC Column: RTX-VRX ID: 0.25 (mm) Dilution Factor: 5.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
71-43-2	Benzene	347	
100-41-4	Ethylbenzene	979	
108-88-3	Toluene	198	
95-47-6	o-Xylene	90.9	
108383/106423	mp-Xylene	1770	
1330-20-7	Total Xylenes	1860	
1634-04-4	Methyl t-Butyl Ether	5.0	U

FORM 1 ECOR Solutions SAMPLE NO.

VOLATILE ORGANICS ANALYSIS DATA SHEET

DUP-1

Lab Name: Contract:

Lab Code: Case No.: SAS No.: SDG No.: EWN020

Matrix: (soil/water) WATER Lab Sample ID: 9762562004

Sample wt/vol: 5.000 (g/ml) ML Lab File ID: 3111028

Level: (low/med) LOW Date Received: 11/07/08

% Moisture: not dec. _____ Date Analyzed: 11/11/08

GC Column: RTX-VRX ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q	
71-43-2	Benzene	~~346~~	~~E~~	A
100-41-4	Ethylbenzene	~~847~~	~~E~~	A
108-88-3	Toluene	~~216~~	~~E~~	A
95-47-6	o-Xylene	101		
108383/106423	mp-Xylene	~~1030~~	~~E~~	A
1330-20-7	Total Xylenes	~~1130~~	~~E~~	A
1634-04-4	Methyl t-Butyl Ether	1.0	U	

A Repeat from dilution

FORM I VOA

SMM 5/9/2009

FORM 1 ECOR Solutions SAMPLE NO.

VOLATILE ORGANICS ANALYSIS DATA SHEET

DUP-1

Lab Name: Contract:

Lab Code: Case No.: SAS No.: SDG No.: EWN020

Matrix: (soil/water) WATER Lab Sample ID: 9762562004

Sample wt/vol: 5.000 (g/ml) ML Lab File ID: 3111129

Level: (low/med) LOW Date Received: 11/07/08

% Moisture: not dec. _____ Date Analyzed: 11/12/08

GC Column: RTX-VRX ID: 0.25 (mm) Dilution Factor: 20.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
71-43-2	Benzene	368	☆
100-41-4	Ethylbenzene	963	☆
108-88-3	Toluene	210	☆
95-47-6	o-Xylene	95.1	
108383/106423	mp-Xylene	1730	☆
1330-20-7	Total Xylenes	1830	☆
1634-04-4	Methyl t-Butyl Ether	20.0	U

☆Report

FORM I VOA

APPENDIX B
DATA VALIDATION REPORT

Project: Earle Long Term Monitoring
Laboratory: Analytical Laboratory Services, Inc.
Sample Delivery Group: EWN020
Fraction: Organic
Matrix: Aqueous
Report Date: 2/11/2009

This analytical quality assurance report is based upon a review of analytical data generated for groundwater samples. The sample locations, laboratory identification numbers, sample collection dates, sample matrix, and analyses performed are presented in Table 1.

The samples were analyzed for volatile organic compounds: benzene toluene, ethylbenzene, xylene, and methyl-tert-butyl ether. The sample analyses were performed in accordance with the procedures outlined in "40 CFR Part 136".

All sample analyses have undergone an analytical quality assurance review to ensure adherence to the required protocols. Results have been validated or qualified according to general guidance provided in the Region III modifications to "Laboratory Data Validation Functional Guidelines for Validating Organic Analyses", USEPA 9/94. This document specifies procedures for validating data generated for CLP analyses. Therefore, the quality control requirements specified in the methods and associated acceptance criteria were also used to evaluate the non-CLP data. The parameters presented on the following page were evaluated.

X	•	Data Completeness
X	•	Chain of Custody Documentation
X	•	Holding Times
X	•	Instrument Performance
X	•	Initial and Continuing Calibration Summaries
X	•	Laboratory and Field Blank Analysis Results
X	•	Surrogate Compound Recoveries
X	•	Matrix Spike/Matrix Spike Duplicate Recoveries and Reproducibility
X	•	Field Duplicate Analysis Results
X	•	Laboratory Control Sample Results
X	•	Internal Standard Performance
X	•	Qualitative Identification
X	•	Quantitation/Reporting Limits

X - Denotes parameter evaluated.

It is recommended that the data only be used according to the qualifiers presented, and discussed in this report. All other data should be considered qualitatively and quantitatively valid as reported by the laboratory, based on the items evaluated.

Report Approved By:

Shawne M. Rodgers
President

2/11/2009

Date

1.0 DATA COMPLETENESS

The data package was complete.

2.0 CHAIN OF CUSTODY DOCUMENTATION

The chain of custody documentation was complete.

3.0 HOLDING TIMES

All criteria were met. No qualifiers were applied.

4.0 INSTRUMENT PERFORMANCE

All criteria were met. No qualifiers were applied.

5.0 INITIAL AND CONTINUING CALIBRATIONS

All criteria were met. No qualifiers were applied.

6.0 LABORATORY AND FIELD BLANK ANALYSIS RESULTS

The positive result methyl tert-butyl ether for sample MW-106 is qualitatively invalid due to the presence of this compound in associated field blank. USEPA Region III protocol requires positive results for uncommon contaminants, such as methyl tert-butyl ether, that are less than or equal to ten times the associated blank contamination level, to be considered qualitatively invalid. Placing a "B" qualifier next to this quantitative result has indicated this.

7.0 *SURROGATE COMPOUNDS*

All criteria were met. No qualifiers were applied.

8.0 *MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERIES AND REPRODUCIBILITY*

All criteria were met. No qualifiers were applied.

9.0 *FIELD DUPLICATE RESULTS*

Duplicate samples MW-107 and DUP-1 were submitted to the laboratory to evaluate sampling and analytical precision for those organic compounds determined to be present. Results for the duplicate samples are presented in Table 2. Precision is evaluated by calculating the relative percent difference (%RPD) between duplicate pair results. There are no USEPA-established acceptance criteria for field duplicate samples. EDQ uses internal acceptance criteria of twenty percent for volatile detected compounds (and 25 percent for extractable compounds) to evaluate field duplicate samples.

10.0 *LABORATORY CONTROL SAMPLE RESULTS*

All criteria were met. No qualifiers were applied.

11.0 *INTERNAL STANDARD PERFORMANCE*

All criteria were met. No qualifiers were applied.

12.0 *QUALITATIVE IDENTIFICATION*

The following samples dilutions for volatile organic compounds. The dilution analysis was performed because of suspected high concentrations

of target compounds and/or interferences. Quantitation limits elevated by the dilution factor have resulted for those compounds that were not detected. This should be noted when assessing the data.

Sample	Dilution Factor
MW-107	5.0

The samples presented below were re-analyzed at dilutions for volatile organic compounds. The samples were re-analyzed because the responses for compounds exceeded the linear range of the GC/ MS instrument. The results for these compounds have been reported from the dilution analyses. All other results are reported from the initial analyses.

Sample	Dilution Factor	Results Exceeding the Linear Range
DUP-1	20	Benzene, Ethylbenzene, Toluene, o-Xylene, m/p-Xylene,

13.0 QUANTITATION/REPORTING LIMITS

As required by USEPA protocol, all compounds, which were qualitatively identified at concentrations below their respective Quantitation Limits (QLs), have been marked with "J" qualifiers to indicate that they are quantitative estimates.

METHODOLOGY REFERENCES

Analysis	Reference
Volatile Organic Compounds	Method 624, "40 CFR Part 136

Table 1 Samples For Data Validation Review
Earle Landfill Monitoring
Groundwater and Surface Water Samples Collected November 2008
Analytical Laboratory Services, Inc. Sample Delivery Group EWN 020

Sample Location	Laboratory ID		Date Collected	Matrix	Analyses Performed
					VOC
MW-102	9762562	1	11/6/2008	Groundwater	X
MW-106	9762562	2	11/6/2008	Groundwater	X
MW-107	9762562	3	11/6/2008	Groundwater	X
DUP-1	9762562	4	11/6/2008	Groundwater	X
FB-1	9762562	5	11/6/2008	Field Blank	X
TB-1	9762562	6	11/6/2008	Trip Blank	X

VOC Methyl tert-butyl Ether, Benzene, Toluene, Ethylbenzene, total Xylenes

Table 2 **Field Duplicate Sample Results for Organic Analyses**
Duplicate Samples MW-107 and DUP-1

	MW-107 (µg/L)	DUP-1 (µg/L)	RPD	Comments
Benzene	347	368	6	
Ethylbenzene	979	963	2	
Toluene	198	210	6	
Total Xylenes	1860	1830	2	

APPENDIX C
SAMPLING LOGS AND FIELD NOTES

GROUNDWATER LEVEL MEASUREMENT SHEET

Project Name:	NWS Earle Annual LTM	Project No.:	N0150.502
Location:	Colts Neck, NJ	Personnel:	JG
Weather Conditions:	overcast, breezy, ~55°F	Measuring Device:	Solinst Interface Probe
Tidally Influenced:	Yes ___ No ___	Remarks:	———

Monitoring Well ID	Date	Time	Total Well Depth (feet)*	Depth to Water (feet)*	Depth to Free Product (feet)*	PID (ppm)	Comments
MW-102	11/5/08	1240	14.60	9.80	———	0.0	
MW-106	↓	1235	19.55	13.25	———	0.0	
MW-107	↓	1245	15.85	9.70	———	0.0	
R12-RC-03	↓	1250	19.07	9.46	9.45	0.0	⇒ Not sampled due to product in well

*All measurements to the nearest 0.01 foot

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NWS Earle Annual LTM
Project No.: N0150.502

Sample ID No.: MW-102
Sample Location: park. 2 lot N of R-1
Sampled By: MM

SAMPLING DATA:	FINAL VALUES:						
Date:	Color (Visual)	Ph (Standard)	S.C. (mS/cm)	Turbidity (NTU)	DO ~~(mg/L)~~ (%)	Temp (°C)	ORP (MV)
Time: 1324							
Purge Method: Low Flow	Clear	5.70	0.606	4.58	2.9	18.73	-35.1

PURGE DATA:

Date: 11/5/08
Purge Method: Low Flow - bladder pump
PID Reading (ppm): 0.0
Well Casing Diameter & Material: 2" PVC
Total Well Depth (TD): 14.60
Static Water Level (DTW): 7.80
Static Product Level (DTP): ---
One Casing Volume (gal): ---
Start Purge (hrs): 1254
End Purge (hrs): 1326
Total Purge Time (min): 30
Total Vol. Purged (gal/L): ~6 gal

Purge Calculations:

1": 0.04080	6": 1.46869
2": 0.16319	8": 2.61101
3": 0.36717	10": 4.07970
4": 0.65275	12": 5.87477

Purge Vol = 3 × PF × (DTW - TD)

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
BTEX + MTBE (Method 624)	HCl	40 mL CG	2

OBSERVATIONS/NOTES:

Circle if Applicable:

MS/MSD | Duplicate ID No.:

Signature(s):

ECOR Solutions Inc.

PURGE DATA SHEET

Date: 11/5/08

Sample ID No.: MW-12

Time	Water Level	Flow	pH	Cond.	Turb.	DO	Temp.	ORP	Comments
(hrs)	(ft. below TOC)	(mL/min)	(SU)	(mS/cm)	(NTU)	~~(mg/L)~~ %	(Celsius)	(mV)	
	Target drawdown ≤0.3'	*≤500*	*±0.1 unit*	*±3%*	*±10%*	*± ±10%*	*±3%*	*±10 mV*	*Stability reached when 3 consecutive readings are within this range*
1258	7.95	840	~~5.65~~	~~0.665~~	8.70	12.6	18.74	-24.0	
1304	7.9	"	5.65	0.645	16.6	7.8	18.74	-27.8	
1309	7.95		5.70	0.618	10.69	3.3	18.73	-30.9	
1314	8.0		5.70	0.622	7.61	3.2	18.72	-33.0	
1319	7.9		5.70	0.611	7.03	3.0	18.72	-34.5	
1324	7.95		5.70	0.606	4.58	2.9	18.73	-35.1	

Signature(s):

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NWS Earle Annual LTM
Project No.: N0150.502

Sample ID No.: MW-126
Sample Location: parking lot south of R-16
Sampled By: RG

SAMPLING DATA:	FINAL VALUES:						
Date: 11/5/08	Color (Visual)	Ph (Standard)	S.C. (mS/cm)	Turbidity (NTU)	DO (mg/L)	Temp (°C)	ORP (MV)
Time: 1426							
Purge Method: Low Flow	Clear	5.71	8.560	11.4	0.45	18.40	-12.6

PURGE DATA:

Date: 11/5/08
Purge Method: Low Flow - bladder pump
PID Reading (ppm): 0.0
Well Casing Diameter & Material: 2" PVC
Total Well Depth (TD): 19.55
Static Water Level (DTW): 13.25
Static Product Level (DTP) ———
One Casing Volume (gal): ———
Start Purge (hrs): 1331
End Purge (hrs): 1426
Total Purge Time (min): 55
Total Vol. Purged (gal/L): 2.4 gal

Purge Calculations:

1": 0.04080	6": 1.46869
2": 0.16319	8": 2.61101
3": 0.36717	10": 4.07970
4": 0.65275	12": 5.87477

Purge Vol = 3 × PF × (DTW - TD)

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
BTEX + MTBE (Method 624)	HCl	40 mL CG	2

OBSERVATIONS/NOTES:

Circle if Applicable:

MS/MSD | Duplicate ID No.:

Signature(s):

ECOR Solutions Inc.

PURGE DATA SHEET

Date: 11/5/08

Sample ID No.: MW-106

Time	Water Level	Flow	pH	Cond.	Turb.	DO	Temp.	ORP	Comments
(hrs)	(ft. below TOC)	(mL/min)	(SU)	(mS/cm)	(NTU)	(mg/L)	(Celsius)	(mV)	
	Target drawdown ≤0.3'	*≤500*	*±0.1 unit*	*±3%*	*±10%*	*±10%*	*±3%*	*±10 mV*	*Stability reached when 3 consecutive readings are within this range*
1336	>11.25	280	5.83	1.696	111	3.31	19.20	110.9	
1341			5.79	1.779	117	1.82	19.20	98.2	
1346			5.71	2.433	63.1	0.52	18.90	59.2	
1351			5.70	2.899	49.6	0.46	18.78	45.9	
1356			5.70	4.555	37.5	0.38	18.66	25.3	
1401			5.72	6.590	25.3	0.34	18.59	8.6	
1406			5.75	7.949	14.2	0.37	18.54	-7.8	
1411			5.78	8.396	13.2	0.37	18.53	-9.7	
1416			5.78	8.428	11.7	0.40	18.49	-11.3	
1421			5.79	8.453	11.6	0.43	18.46	-12.3	
1426			5.79	8.560	11.4	0.45	18.40	-12.6	

Signature(s):

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NWS Earle Annual LTM
Project No.: N0150.502
Sample ID No.: MW-107
Sample Location: in intersection
Sampled By: JG

SAMPLING DATA:

Date: 11/5/08
Time: 1340
Purge Method: Low Flow

FINAL VALUES:

Color (Visual)	Ph (Standard)	S.C. (mS/cm)	Turbidity (NTU)	DO (mg/L)	Temp (°C)	ORP (MV)
Clear	6.61	1.229	9.43	0.27	19.87	-103.9

PURGE DATA:

Date: 11/5/08
Purge Method: Low Flow - bladder pump
PID Reading (ppm): 0.0
Well Casing Diameter & Material: 2" PVC
Total Well Depth (TD): 15.85
Static Water Level (DTW): 9.70
Static Product Level (DTP): ---
One Casing Volume (gal): ---
Start Purge (hrs): 1255
End Purge (hrs): 1340
Total Purge Time (min): 45
Total Vol. Purged (gal/L): ~7 1/2 gl

Purge Calculations:

1": 0.04080	6": 1.46869
2": 0.16319	8": 2.61101
3": 0.36717	10": 4.07970
4": 0.65275	12": 5.87477

Purge Vol = 3 × PF × (DTW - TD)

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
BTEX + MTBE (Method 624)	HCl	40 mL CG	2 x 4 = 8

OBSERVATIONS/NOTES:

Pump setting 2 cycles/min (25:5) = 650 mL/min
Collect field Blank (FB-1) @ 1400

Circle if Applicable:
MS/MSD
Duplicate ID No.: DUP-1

Signature(s):

ECOR Solutions Inc.

PURGE DATA SHEET

Date: 11/5/08

Sample ID No.: MW-107

Time	Water Level	Flow	pH	Cond.	Turb.	DO	Temp.	ORP	Comments
(hrs)	(ft. below TOC)	(mL/min)	(SU)	(mS/cm)	(NTU)	(mg/L)	(Celsius)	(mV)	
	Target drawdown ≤0.3'	*≤500*	*±0.1 unit*	*±3%*	*±10%*	*±10%*	*±3%*	*±10 mV*	*Stability reached when 3 consecutive readings are within this range*
1300	9.78	1050	6.53	0.974	263	0.66	19.89	-52.5	
1305			6.59	1.069	118	0.57	19.90	-70.6	
1310	9.78		6.63	1.187	23.5	0.49	19.91	-89.7	
1315			6.64	1.219	18.5	0.41	19.91	-96.4	
1320			6.64	1.225	16.2	0.35	19.90	-99.9	
1325			6.63	1.230	14.0	0.31	19.90	-101.8	
1330	9.78		6.63	1.226	10.49	0.29	19.89	-103.4	
1335			6.61	1.229	10.00	0.27	19.87	-103.8	
1340			6.61	1.229	9.43	0.27	19.87	-103.9	
~~1345~~									

Signature(s):