FINAL

Year 8 Groundwater Monitoring Report for Remedial Action Implementation Area of Concern R-6/7 and R-12

Naval Weapons Station Earle Waterfront Complex Leonardo, NJ

July 2007

Prepared for:
Naval Facilities Mid-Atlantic
(NAVFAC)

Prepared By:
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for
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Naval Weapons Station Earle Waterfront Complex
Leonardo, NJ

Contract No. N62472-03-D-0802
Contract Task Order No. 0017

to

NAVFAC Mid-Atlantic
Environmental Business Line
9742 Maryland Ave., Bldg. A-81
Norfolk Naval Station
Norfolk, VA 23511-3095

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1.0 INTRODUCTION

1.1 General Information

ECOR Solutions, Inc. (ECOR) prepared this Year 8 Groundwater Monitoring Report for the Remedial Action Implementation at 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 8 Annual Monitoring Program in connection with the remediation of dissolved-phase benzene in groundwater in the vicinity of Buildings R-6/7 and R-12 (Site), located at the Waterfront Complex of the Naval Weapons Station (NWS) Earle (Figure 1).

1.2 Historical Overview

The selected remedial action at Buildings R-6/7/12 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 contamination from previously used underground storage tank (UST) systems containing gasoline, diesel fuel, and No. 2 fuel oil. The plume of contamination includes weathered free-phase fuel oil, dissolved-phase benzene, total xylenes, ethylbenzene and methyl tert-butyl ether (MTBE). The horizontal extent of the free-phase fuel oil encompasses an area of approximately 560 square feet.

Buildings R-6 and R-7 were the Waterfront Complex's vehicle refueling center. Between 1995 and 1998, the refueling center was closed, the buildings were demolished, USTs were removed, and a parking lot was constructed at the same location. Dissolved-phase petroleum-related groundwater contamination occurs within the area.

Building R-12, currently the Inshore Boat Unit (IBU) 24, is located south of the parking lot and the former location of Buildings R-6/7. 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 free phase product 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 contamination 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 actions are underway.

The results of the first year monitoring 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, 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 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**: Gary Lipsius
- **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 is 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 area is a parcel containing approximately three acres. Historically, the R-6/7 area has been used as a fuel dispensing station. Currently, the area

is overlain by an asphalt parking lot and associated roadways. The area 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. The approximate center of the CEA may be found at the intersection of latitude 40° 25' 09.13" and longitude 74° 04' 14.07".

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 free-product recovery remedial program, followed by a minimum of four and a maximum of eight consecutive quarters after the free-product 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 attains contaminant concentrations below NJDEP GWQS. At that point, groundwater monitoring will occur on a quarterly basis until the results of two consecutive quarters show no contamination above NJDEP GWQS.

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

- Field analyses will be performed during 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.

- Groundwater monitoring reports 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 necessitated some minor 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 R12 recovery wells were impacted by the Navy's ongoing passive free-product 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 modifications to the monitoring program as a result of Year 2 site conditions. However, site conditions observed during Year 3 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 product 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 (Appendix A).

There were no modifications to the monitoring program as a result of Year 4 site conditions.

Site conditions observed during Year 5 necessitated some minor modifications to the monitoring program, as follows:

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

- Monitoring well R6/7-MW-105 was removed for construction of Station security access improvements. The well was abandoned by a licensed New Jersey driller.

The Year 6 monitoring program included 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 rather than well R12-RC-01 or well R12-RC-02 since both have been destroyed during construction activities for the new security building.

- Napthalene analysis was discontinued for all monitoring wells.

Modifications were made to the Year 7 monitoring program as a result of site conditions. The Year 7 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. The wells were abandoned by a licensed New Jersey driller in November 2005.

4.0 DISCUSSION OF RESULTS

4.1 Technical Overview

The Year 8 Annual Groundwater Monitoring Program at Buildings R-6/7 and R-12 was implemented in accordance with the CEA documents modified as discussed in Section 3.2. The annual samples were collected 29-30 November 2006 and sent to the laboratory 30 November 2006. No modifications were made to the Year 8 monitoring program. The Year 8 monitoring program included wells R6/7-MW-102, R6/7-MW-106, R6/7-MW-107, and R12-RC-03.

4.1.1 Analytical Results and Groundwater Flow Direction

Table 1 provides a summary of the analytical results for all sampling rounds (Year 1 through Year 8). Figure 3 depicts the locations of the wells and the corresponding data for Year 8. Figure 4 depicts groundwater contours and apparent groundwater flow direction for the annual monitoring event.

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

- No target analytes were detected in either sentry well, R-6/7-MW-106 or R-6/7-MW-102, during the Year 8 sampling event.

- As in previous sampling events, benzene, ethylbenzene and xylenes were observed in well R-6/7-MW-107 at levels above the NJDEP GWQS during the Year 8 sampling event. Toluene was detected but did not exceed the NJDEP GWQS. MTBE was not detected.

- The presence of product in recovery well R-12-RC-03 prevented sampling from this well in Year 8. The product thickness was determined to be 0.11ft.

The groundwater elevations and contours from the Year 8 measurements changed only slightly from the Year 7 measurements. Consistent with previous data, Year 8 measurements indicated a general flow from the south to the north/northwest within the AOC as seen in Figure 4.

The laboratory analytical results for all samples are included in Appendix B. The validation reports are included in Appendix C. Sample logs and field notes are included in Appendix D.

4.2 Field Sampling and Analytical Methods

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

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

The sample logs (Appendix D) document sample dates and times, field analysis results, depth to groundwater measurements, purge volumes, and site-specific observations relevant to interpretation of the analytical results.

Quality assurance (QA) samples were included during each sampling round. The QA samples included one trip blank per sample shipment group, and one rinsate blank per sampling day. Sample container and sample holding times were maintained in accordance with NJDEP guidelines.

Annual monitoring at 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 samples obtained were analyzed for benzene, ethylbenzene, toluene, xylene, and MTBE by EPA Method 624. All samples for the Year 8 annual sampling round (November 2006) were analyzed by Severn Trent Laboratories in North Canton, Ohio.

4.3 Data Validation

Third-party, independent data validation was performed on all of the analytical results from the Year 8 annual groundwater monitoring program. The data validation was performed in accordance with U. S. Environmental Protection Agency (EPA) Region 2 and NJDEP guidelines. Validated data is presented in Appendix C.

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

5.0 CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

Review of sample results and Site observations from the Year 8 monitoring program and review of historical data from previous investigations at the Site yield the following conclusions:

The Year 1 through Year 8 monitoring data indicate that the plume of dissolved-phase groundwater contamination is not expanding. In general, the Year 8 annual monitoring data indicate very similar groundwater quality at the Site in comparison with the conditions observed during monitoring for Year 7 (with the exception of R-12-RC-03.)

The interpreted groundwater contours for Year 8 indicate that groundwater flow direction is similar to the interpreted groundwater flow direction observed during Year 7. The groundwater flow and groundwater quality data obtained during Years 1 through 8 supports the general conclusion that the contaminants are not migrating beyond the extent of the CEA boundary. Contamination migration beyond well R-6/7-MW-102, located at the northern down gradient boundary of the CEA, is not indicated, as all target analytes were not detected at this well. At well R-6/7-MW-107 analyte levels of benzene, ethylbenzene, toluene, and xylenes all slightly decreased during Year 8 and MTBE was not detected. All target analytes were not detected at well R-6/7-MW-106. Recovery well R-12-RC-03 was not sampled due to the presence of product in the well.

5.2 Recommendations

Based on Site conditions observed during Year 8, ECOR recommends continued annual sampling of recovery wells R-6/7-MW-102, R-6/7-MW-106, R-6/7-MW-107, and R-12-RC-03 for EPA Method 624. Sampling Method 624 will be utilized to monitor the following compounds; benzene, ethylbenezene, naphthalene, toluene, xylenes, and MTBE. Due to the apparent direction of groundwater flow, ECOR recommends continued

monitoring of both sentry wells R6/7-MW-106 and R6/7-MW-102 on an annual basis as there would be no way to determine if the contamination is migrating.

TABLE

TABLE 1
SAMPLE DATA SUMMARY
YEAR 1 THROUGH YEAR 8 GROUNDWATER MONITORING
BUILDINGS R-6/7 AND R-12
NWS EARLE, COLTS NECK, NEW JERSEY

Location	Compounds						Groundwater Levels		
	Benzene (ug/l)	Ethylbenzene (ug/l)	Naphthalene (ug/l)	Toluene (ug/l)	Xylenes (ug/l)	MTBE (ug/l)	Elevation Top of Casing (feet)	Depth to GW (1) (feet)	Adjusted Groundwater Elevation (feet)
NJDEP GWQS	**1**	**700**	**300**	**1,000**	***40 / 1,000**	**70**			
R-12-RC-02									
Nov-03	N.D.	5.6	10	N.D.	9.2	N.D.	17.35	N.M.	---
Aug-01	**23**	180	**450**	59	**237**	20	17.35	N.M.	---
Nov-00	N.D.	47.5	165	N.D.	**57.8**	N.D.	17.35	9.05	8.3
Nov-00-Dup	N.D.	47.9	171	N.D.	**57.9**	N.D.	17.35	9.05	8.3
Aug-00	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	17.35	8.65	8.7
R-12-RC-03**									
Nov-06	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	17.35	7.81/7.92 (1)	9.52 (2)
Dec-05*	N.D.	0.87 J	N.D.	0.21 J	3.4	ND	17.35	8.71	8.64
Nov-04*	N.D.	6.3	N.A.	N.D.	25.0	N.D.	17.35	8.88	8.47
Nov-02*	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	17.35	8.68/8.81 (1)	8.66 (2)
May-00*	**43***	59*	235*	13.1*	**179***	N.D.*	17.35	8.4	8.95
R-12-RC-02									
Feb-00	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	17.35	9.12	8.23
Nov-99	**6.2**	70.6	258	22	**258**	N.D.	17.35	9.32/9.46 (1)	8.01 (2)
Aug-99	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	17.35	---	---
May-99	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	17.35	---	---
Feb-99	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	17.35	---	---
R-12-RC-01									
Nov-03	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	17.08	8.54	8.54
Nov-01	**35.4**	75.7	183	5	**208**	N.D.	17.08	11.6 (3)	5.48
May-01	N.D.	24 J	56	N.D.	**146**	N.D.	17.08	8.43	8.65
Feb-01	N.D.	45	160	5.8	**47**	N.D.	17.08	3.11	13.97
Nov-00	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	17.08	N.M.	---
Aug-00	**10.8**	59	202	7.4	**183**	N.D.	17.08	N.M.	---
May-00	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	17.08	N.M.	---
Feb-00	**13.4**	56.9	193	N.D.	**134**	N.D.	17.08	9.2	7.88
Nov-99	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	17.08	N.M.	---
Aug-99	**26.1**	81.3	**399**	9	**306**	N.D.	17.08	9.65/12.05 (1)	7.07 (2)
May-99	**58**	102	N.A.	16.4	**291**	N.D.	17.08	8.5/10.58	8.27 (2)
Feb-99	**63.5**	83.2	N.A.	21.5	**295**	3.5	17.08	8.66/9.64 (1)	8.27 (2)
R-6/7-MW-102									
Nov-06	N.D.	N.D.	N.A.	N.D.	N.D.	N.D.	12.48	7.05	5.43
Dec-05	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	12.48	7.48	5.00
Nov-04	N.D.	N.D.	N.A.	N.D.	N.D.	N.D.	12.48	7.85	4.63
Nov-03	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	12.48	7.70	4.78
Nov-02	N.D.	N.D.	N.D.	N.D.	N.D.	0.6 J	12.48	6.66	5.82
Nov-01	N.D.	N.D.	N.D.	N.D.	N.D.	0.67 J	12.48	7.68	4.8
Aug-01	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	12.48	6.71	5.77
May-01	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	12.48	6.83	5.65
May-01-Dup	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	12.48	N.M.	---
Feb-01	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	12.48	6.56	5.92
Nov-00	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	12.48	7.08	5.4
Aug-00	N.D.	N.D.	N.D.	N.D.	N.D.	0.91	12.48	6.68	5.8
Aug-00-Dup	N.D.	N.D.	N.D.	N.D.	N.D.	0.86	12.48	6.68	5.8
May-00	N.D.	N.D.	N.D.	N.D.	N.D.	0.76	12.48	7.79	4.69
Feb-00	N.D.	N.D.	N.D.	N.D.	N.D.	1.7	12.48	7.14	5.34
Nov-99	N.D.	N.D.	N.D.	N.D.	N.D.	1.5	12.48	7.21	5.27
Aug-99	N.D.	N.D.	N.D.	N.D.	N.D.	1.3	12.48	7.58	4.90
May-99	N.D.	N.D.	N.A.	N.D.	N.D.	N.D.	12.48	7.12	5.36
Feb-99	N.D.	N.D.	N.A.	N.D.	N.D.	0.78	12.48	6.82	5.66

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NJDEP GWQS	**1**	**700**	**300**	**1,000**	***40 / 1,000**	**70**			
R-6/7-MW-104									
Nov-04	N.D.	N.D.	N.A.	N.D.	N.D.	0.70 J	16.60	8.20	8.40
Nov-03	N.D.	N.D.	N.D.	N.D.	N.D.	3.3	16.60	8.17	8.43
Nov-02	0.6 J	N.D.	N.D.	N.D.	N.D.	3.4	16.60	8.19	8.41
Nov-01	0.73 J	N.D.	N.D.	N.D.	N.D.	2.1	16.60	9.43	7.17
Aug-01	**1 J**	N.D.	2.6	N.D.	N.D.	N.D.	16.60	8.69	7.91
May-01	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	16.60	7.84	8.76
Feb-01	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	16.60	7.87	8.73
Nov-00	N.D.	N.D.	N.D.	N.D.	N.D.	2	16.60	8.78	7.82
Aug-00	**1.4**	N.D.	N.D.	N.D.	N.D.	1.8	16.60	3.13	13.47
May-00	**1.1**	N.D.	N.D.	N.D.	N.D.	1.5	16.60	8	8.6
Feb-00	**1**	N.D.	N.D.	N.D.	N.D.	1.6	16.60	8.52	8.08
Nov-99	**4.1**	N.D.	N.D.	N.D.	N.D.	2.2	16.60	8.88	7.72
Aug-99	**7.3**	N.D.	N.D.	N.D.	N.D.	2.5	16.60	9.33	7.27
May-99	**7.7**	N.D.	N.A.	N.D.	N.D.	N.D.	16.60	8.16	8.44
Feb-99	**6.1**	N.D.	N.A.	N.D.	N.D.	2.6	16.60	8.30	8.30
R-6/7-MW-105									
Nov-03	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	20.06	11.26	8.80
Nov-02	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	20.06	11.3	8.76
Nov-01	N.D.	N.D.	N.D.	N.D.	N.D.	0.71 J	20.06	12.55	7.51
Aug-01	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	20.06	11.75	8.31
May-01	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	20.06	N.M.	---
Feb-01	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	20.06	10.92	9.14
Nov-00	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	20.06	11.97	8.09
Aug-00	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	20.06	>10.34	---
May-00	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	20.06	10.91	9.15
Feb-00	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	20.06	11.59	8.47
Nov-99	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	20.06	12.06	8.00
Aug-99	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	20.06	12.5	7.56
May-99	N.D.	N.D.	N.A.	N.D.	N.D.	N.D.	20.06	11.2	8.86
Feb-99	N.D.	N.D.	N.A.	N.D.	N.D.	N.D.	20.06	>10.12	---
Feb-99-Dup	N.D.	N.D.	N.A.	N.D.	N.D.	N.D.	20.06	N.M.	---
R-6/7-MW-106									
Nov-06	N.D.	N.D.	N.A.	N.D.	N.D.	N.D.	16.62	10.39	6.23
Dec-05	N.D.	N.D.	N.D.	N.D.	N.D.	1.1	16.62	10.88	5.74
Nov-04	N.D.	N.D.	N.A.	N.D.	N.D.	0.83 J	16.62	10.81	5.81
Nov-03	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	16.62	11.43	5.19
Nov-02	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	16.62	10.64	5.98
Nov-01	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	16.62	11.66	4.96
Aug-01	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	16.62	11.26	5.36
May-01	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	16.62	10.68	5.94
Feb-01	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	16.62	10.4	6.22
Nov-00	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	16.62	11.02	5.6
Aug-00	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	16.62	10.53	6.09
May-00	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	16.62	10.63	5.99
Feb-00	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	16.62	10.98	5.64
Nov-99	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	16.62	11.14	5.48
Aug-99	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	16.62	11.53	5.09
May-99	N.D.	N.D.	N.A.	N.D.	N.D.	N.D.	16.62	11.00	5.62
May-99-Dup	N.D.	N.D.	N.A.	N.D.	N.D.	N.D.	16.62	11.00	5.62
Feb-99	N.D.	N.D.	N.A.	N.D.	N.D.	N.D.	16.62	10.59	6.03

TABLE 1
SAMPLE DATA SUMMARY
YEAR 1 THROUGH YEAR 8 GROUNDWATER MONITORING
BUILDINGS R-6/7 AND R-12
NWS EARLE, COLTS NECK, NEW JERSEY

Location	Compounds						Groundwater Levels		
	Benzene (ug/l)	Ethylbenzene (ug/l)	Naphthalene (ug/l)	Toluene (ug/l)	Xylenes (ug/l)	MTBE (ug/l)	Elevation Top of Casing (feet)	Depth to GW (1) (feet)	Adjusted Groundwater Elevation (feet)
NJDEP GWQS	**1**	**700**	**300**	**1,000**	***40 / 1,000**	**70**			
R-6/7-MW-107									
Nov-06	**400**	**790**	N.A.	220	**1700**	N.D.	14.98	8.93	6.05
Dec-05	**480**	**930**	160	300	**1800**	N.D.	14.98	9.32	5.66
Dec-05-Dup	**480**	**900**	160	300	**1800**	21 J	14.98	9.32	5.66
Nov-04	**543**	**880**	N.A.	263	**1530**	40.7	14.98	9.47	5.51
Nov-03	**723**	**1000**	177	365	**2360**	67	14.98	9.93	5.05
Nov-02	**999**	**961**	212	374	**2040**	**153**	14.98	9.82	5.16
Nov-01	**1090**	**1010**	**305**	432	**1920**	**156**	14.98	9.97	5.01
Nov-01-Dup	**1130**	**1030**	**316**	440	**2030**	**174**	14.98	N.M.	---
Aug-01	**470**	570	250	330	**1880**	**130**	14.98	9.58	5.4
Aug-01-Dup	**1200**	**990**	**470**	**1500**	**3900**	**170**	14.98	N.M.	---
May-01	**2000**	**1600 J**	100	**1400 J**	**5300**	**100**	14.98	9.02	5.96
Feb-01	**1100**	**1200**	**400**	710	**3160**	**140**	14.98	8.73	6.25
Feb-01-Dup	**1200**	**1300**	**410**	780	**3430**	**190**	14.98	N.M.	---
Nov-00	**1240**	**856**	232	456	**2250**	**143**	14.98	9.29	5.69
Aug-00	**1190**	**1150**	**311**	622	**3210**	**129**	14.98	8.90	6.08
May-00	**1440J**	**1460J**	**344J**	918J	**3620**	**86.5J**	14.98	8.98	6
May-00-Dup	**1380J**	**1360J**	**346J**	851J	**3880J**	**87J**	14.98	8.98	6
Feb-00	**938**	**821**	196	441	**2320**	**73.8**	14.98	9.31	5.67
Feb-00-Dup	**956**	**830**	212	448	**2350**	**72.9**	14.98	9.31	5.67
Nov-99	**1550 J**	**1080**	254	630	**2720**	**186**	14.98	9.49	5.49
Nov-99-Dup	**1260**	**846**	201	475	**4060**	**193**	14.98	9.49	5.49
Aug-99	**1380**	**964**	242	524	**2530**	**213**	14.98	9.85	5.13
Aug-99-Dup	**1190**	**857**	N.D.	504	**2370**	**249**	14.98	9.85	5.13
May-99	**1870**	**1710**	N.A.	**1150**	**5040**	N.D.	14.98	9.25	5.73
Feb-99	**1400 J**	**1200 J**	N.A.	798 J	**3510 J**	**312 J**	14.98	8.95	6.03
R-6/7-MW-109									
Nov-04	N.D.	N.D.	N.A.	N.D.	N.D.	N.D.	21.89	16.35	5.54
Nov-03	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	21.89	16.42	5.47
Nov-02	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	21.89	15.79	6.10
Nov-01	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	21.89	16.82	5.07
Aug-01	N.D.	N.D.	N.D.	4.6	2.8 J	N.D.	21.89	16.30	5.59
May-01	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	21.89	15.85	6.04
Feb-01	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	21.89	17.74	4.15
Nov-00	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	21.89	16.17	5.72
Aug-00	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	21.89	15.77	6.12
May-00	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	21.89	15.91	5.98
Feb-00	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	21.89	16.18	5.71
Nov-99	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	21.89	16.35	5.54
Aug-99	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	21.89	16.67	5.22
May-99	N.D.	N.D.	N.A.	N.D.	N.D.	N.D.	21.89	16.46	5.43
Feb-99	N.D.	N.D.	N.A.	N.D.	N.D.	N.D.	21.89	>15.35	---
R-6/7-MW-112									
Nov-01	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	12.02	7.02	5.00
Aug-01	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	12.02	6.69	5.33
May-01	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	12.02	6.14	5.88
Feb-01	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	12.02	5.73	6.29
Nov-00	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	12.02	6.36	5.66
Aug-00	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	12.02	5.94	6.08
May-00	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	12.02	6.06	5.96
Feb-00	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	12.02	6.37	5.65
Nov-99	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	12.02	6.53	5.49
Aug-99	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	12.02	6.60	5.42
May-99	N.D.	N.D.	N.A.	N.D.	N.D.	N.D.	12.02	6.30	5.72
Feb-99	N.D.	N.D.	N.A.	N.D.	N.D.	N.D.	12.02	5.95	6.07

TABLE 1
SAMPLE DATA SUMMARY
YEAR 1 THROUGH YEAR 8 GROUNDWATER MONITORING
BUILDINGS R-6/7 AND R-12
NWS EARLE, COLTS NECK, NEW JERSEY

Location	Compounds						Groundwater Levels		
	Benzene (ug/l)	Ethylbenzene (ug/l)	Naphthalene (ug/l)	Toluene (ug/l)	Xylenes (ug/l)	MTBE (ug/l)	Elevation Top of Casing (feet)	Depth to GW (1) (feet)	Adjusted Groundwater Elevation (feet)
NJDEP GWQS	**1**	**700**	**300**	**1,000**	***40 / 1,000**	**70**			
R-6/7-MW-04									
Nov-04	0.32 J	N.D.	N.A.	N.D.	N.D.	0.26 J	16.39	9.15	7.24
Nov-03	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	16.39	8.23	8.16
Nov-03-Dup	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	16.39	N.M.	---
Nov-02	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	16.39	8.30	8.09
Nov-02-Dup	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	16.39	N.M.	---
Nov-01	**1.9**	N.D.	N.D.	0.84 J	N.D.	1.6 J	16.39	9.51	6.88
Aug-01	**1.9 J**	3.4	1.8	1.6	12.1	N.D.	16.39	9.24	7.15
May-01	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	16.39	7.93	8.46
Feb-01	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	16.39	7.74	8.65
Nov-00	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	16.39	8.95	7.44
Aug-00	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	16.39	>756	---
May-00	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	16.39	8.07	8.32
Feb-00	N.D.	N.D.	N.D.	N.D.	N.D.	0.54	16.39	8.53	7.86
Nov-99	N.D.	N.D.	0.88	N.D.	N.D.	N.D.	16.39	8.98	7.41
Aug-99	N.D.	N.D.	1.6	0.7	N.D.	N.D.	16.39	9.35	7.04
May-99	**4.1**	N.D.	N.A.	N.D.	N.D.	N.D.	16.39	7.82	8.57
Feb-99	N.D.	N.D.	N.A.	N.D.	N.D.	N.D.	16.39	7.32	9.07
MW-6-01									
Nov-03	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	17.75	12.49	5.26
Nov-02	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	17.75	11.84	5.91
Nov-01	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	17.75	13.30	4.45
Aug-01	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	17.75	12.47	5.28
May-01	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	17.75	11.81	5.94
Feb-01	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	17.75	11.72	6.03
Nov-00	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	17.75	12.38	5.37
Aug-00	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	17.75	11.76	5.99
May-00	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	17.75	11.82	5.93
Feb-00	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	17.75	12.42	5.33
Nov-99	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	17.75	12.05	5.70
Aug-99	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	17.75	12.01	5.74
May-99	N.D.	N.D.	N.A.	N.D.	N.D.	N.D.	17.75	12.22	5.53
Feb-99	N.D.	N.D.	N.A.	N.D.	N.D.	N.D.	17.75	11.96	5.79
SUMP R-1									
Nov-03	**2.4**	1.6 J	21 R	N.D.	1.3 J	6.2	---	---	---
Nov-02	N.D.	N.D.	N.D.	N.D.	N.D.	2.8	---	---	---
Nov-01	N.D.	N.D.	N.D.	N.D.	N.D.	2	---	---	---
Aug-01	N.D.	N.D.	2.7	N.D.	N.D.	N.D.	---	---	---
May-01	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	---	---	---
Feb-01	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	---	---	---
Nov-00	N.D.	N.D.	N.D.	N.D.	N.D.	1.4	---	---	---
Aug-00	N.D.	N.D.	N.D.	N.D.	N.D.	1.6	---	---	---
May-00	N.D.	N.D.	N.D.	N.D.	N.D.	1.8	---	---	---
Feb-00	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	---	---	---

Data previous to November 2004 was provided by TtNUS.

Groundwater Quality Criteria is from the New Jersey Department of Environmental Protection (NJDEP) Groundwater Quality Criteria for Class II-A Groundwater (N.J.A.C. 7:9-6). Unless otherwise noted, the criteria used are the Higher of the Practical Quantitation Levels (PQLs) and Groundwater Quality Criteria.

Analytes with concentrations greater than the NJDEP Groundwater Quality Criteris are highlighted in bold.

*Criterion for total xylenes is NJDEP Maximum Contaminant Level (MCL) of 1,000 ug/L as of 5 February 1997. Previous reports used a value of 40 ug/L, so the bold highlight was kept for historical reference.

(1): Depth to LNAPL/Depth to Water

(2): Groundwater elevation corrected for LNAPL thickness

(3): Water level measurement may not be accurate since pump was pulled and recovery may not have been complete.

* *Recovery well R12-RC-02 could not be accessed, so well R12-RC-03 was sampled.

N.D.: Not Detected

N.A.: Not Analyzed

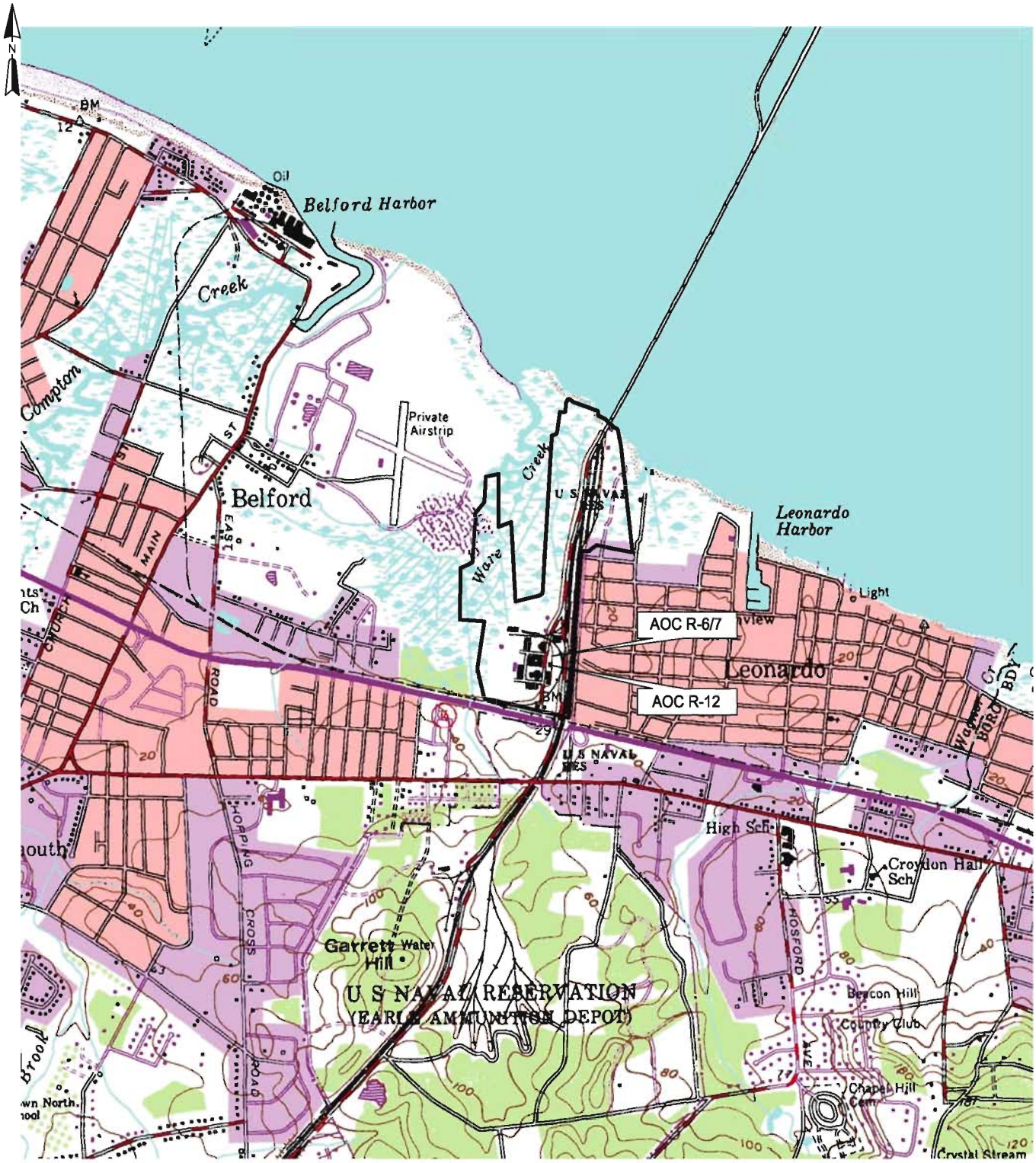
N.S.: Not Sampled

N.M.: Not Measured

J: Estimated as a result of a value below the CRQL or a technical non-compliance.

R: Surrogate recovery non-compliance.

FIGURES



SITE LOCATION MAP		
BUILDINGS R-6/7 AND R-12 U.S. NAVY NWS- EARLE LEONDARDO, NJ		
ECOR Solutions 1075 Andrew Drive, Suite I, West Chester, PA 19380		
SCALE IN FEET 0 2000	DATE 01/31/06	FIGURE 1

SOURCE: USGS SANDY HOOK, NJ

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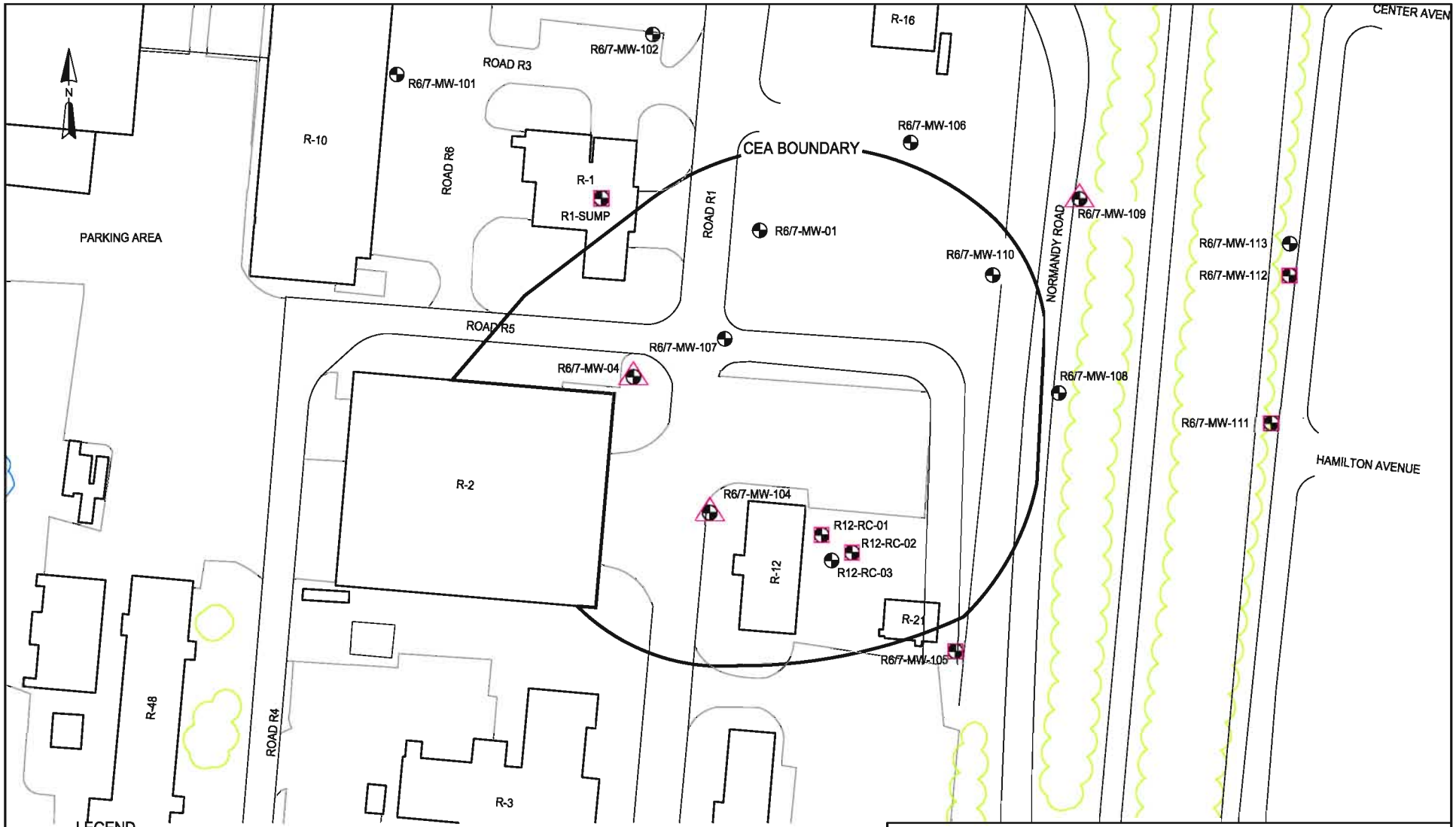


LEGEND

- FENCE
- TREELINE
- RAILROAD
- MONITORING WELL
- DESTROYED MONITORING WELL
- ABANDONED MONITORING WELL

SOURCE: TETRATECH NUS

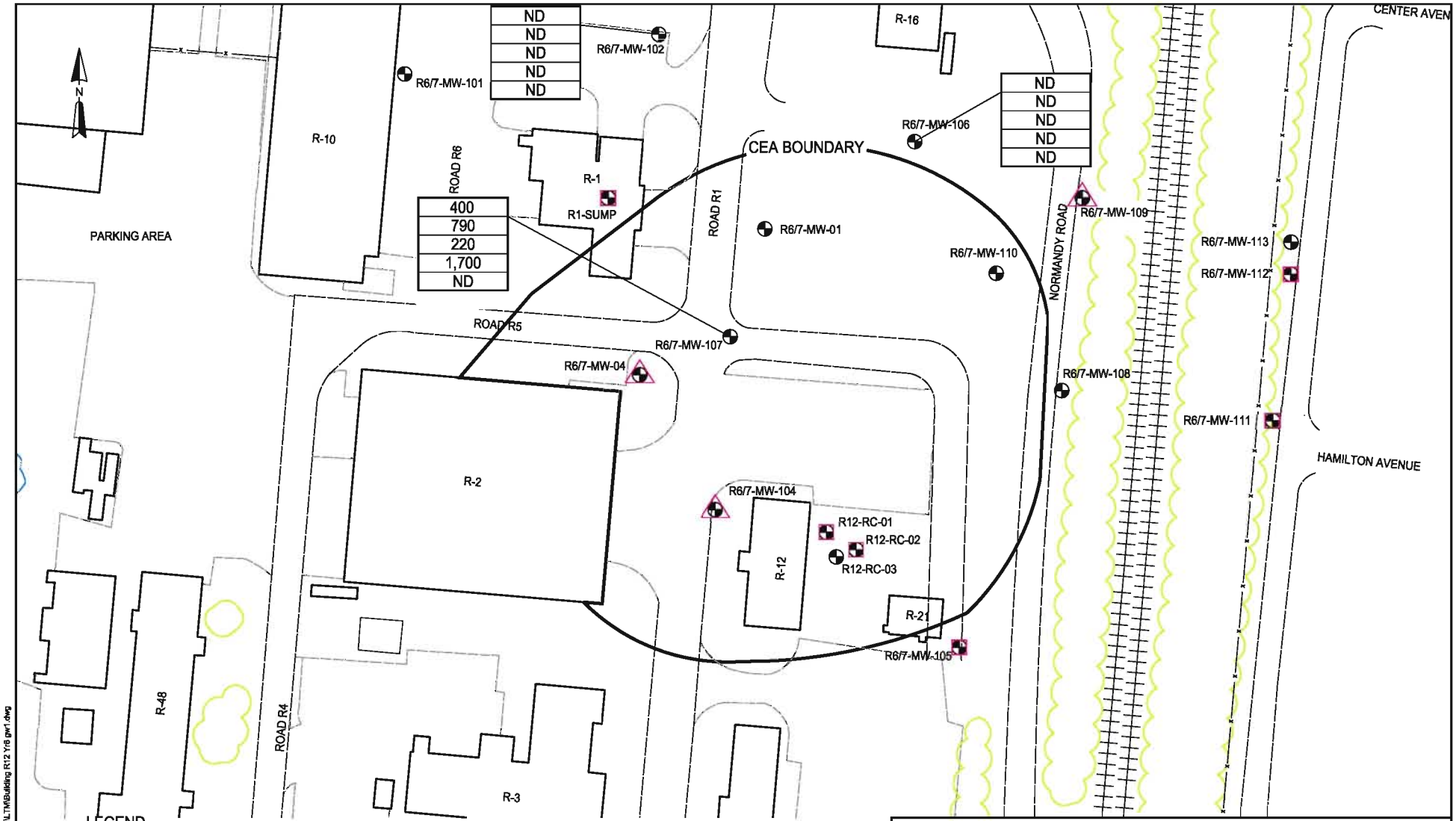
SITE MAP

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

FENCE

TREELINE

RAILROAD

MONITORING WELL

DESTROYED MONITORING WELL

ABANDONED MONITORING WELL

400	BENZENE CONCENTRATION (ug/L)
790	ETHYLBENZENE CONCENTRATION (ug/L)
220	TOLUENE CONCENTRATION (ug/L)
1,700	XYLENE CONCENTRATION (ug/L)
ND	MTBE CONCENTRATION (ug/L)

ND	NOT DETECTED
NA	NOT ANALYZED
J	ESTIMATED VALUE

SOURCE: TETRATECH NUS

YEAR 8 GROUNDWATER MONITORING SAMPLE RESULTS

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	03-04-07	3

ECOR Solutions, Inc.

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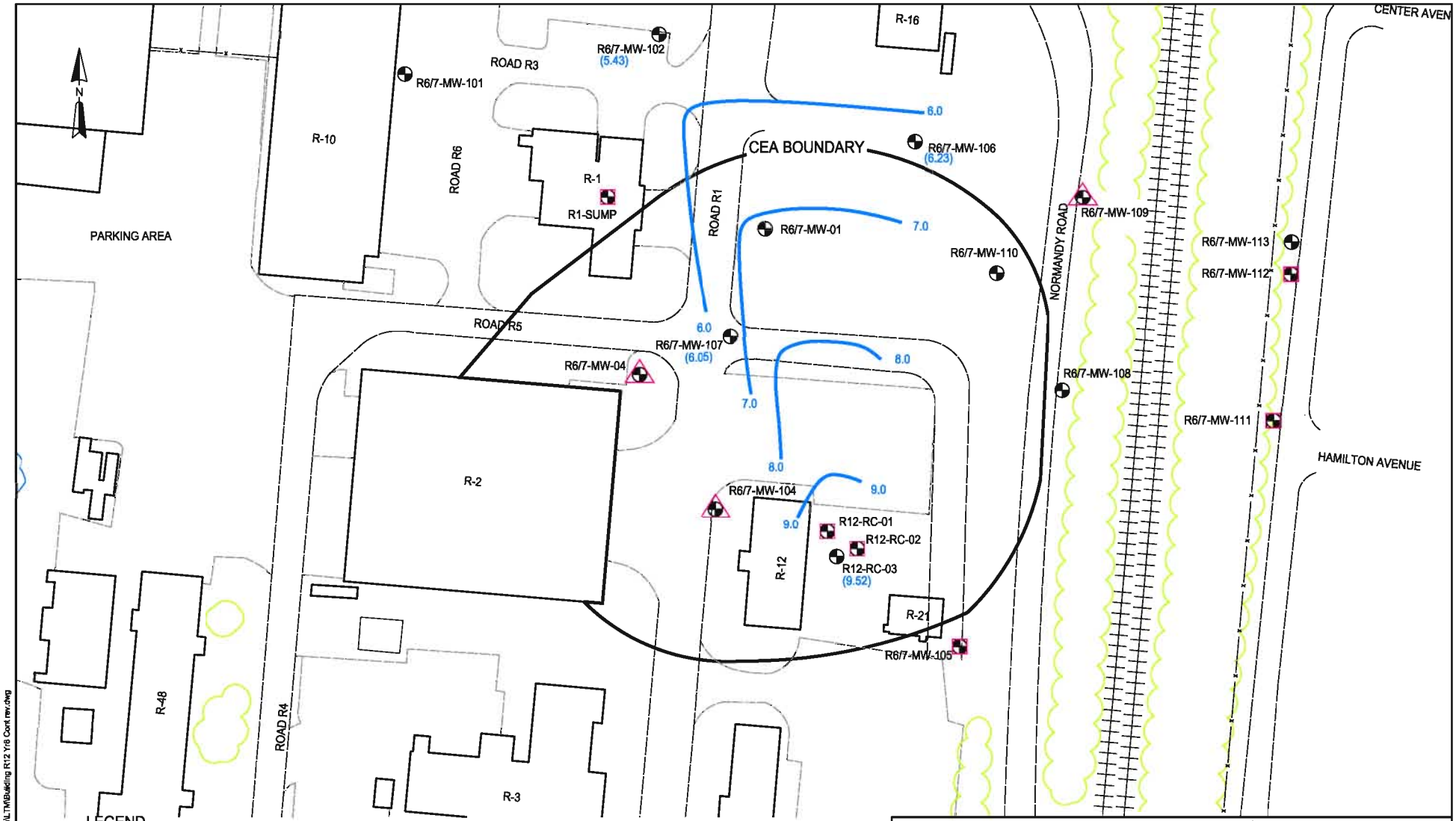

LEGEND

- FENCE
- TREELINE
- RAILROAD
- MONITORING WELL
- DESTROYED MONITORING WELL
- ABANDONED MONITORING WELL
- GROUNDWATER CONTOUR
- (9.43) GROUNDWATER ELEVATION

SOURCE: TETRATECH NUS

GROUNDWATER CONTOURS
NOVEMBER 2006

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	03-04-07	4

ECOR Solutions, Inc.

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APPENDIX A
CORRESPONDENCE, NJDEP TO NAVY, FOR AOC R-6/7-12

State of New Jersey

James E. McGreevey
Governor

Department of Environmental Protection

Bradley M. Campbell
Commissioner

Brian Helland
Naval Facilities Engineering Command
10 Industrial Highway
Code 1821, Mail Stop 82
Lester, PA 19113-2090

APR 22 2005

Dear Mr. Helland:

Re: Year 6 Groundwater Monitoring Report - Buildings R-6/7 and R-12
Naval Weapons Station Earle
Colts Neck Twp., Monmouth Co.

The New Jersey Department of Environmental Protection (NJDEP) has reviewed the above referenced report prepared by ECOR Solutions, Inc., (ECOR) on behalf of the Navy, dated March 2005. The document is approved in its present form; no further modification is necessary.

The Department is in agreement with ECOR's recommendations to remove sampling wells R6/7-MW-109, R6/7-MW-104 and R6/7-MW-04 due to the fact that all contaminants in these wells have been below the Ground Water Quality Standards for the last four years of sampling.

Be advised that all wells shall be closed by a New Jersey Licensed well driller in accordance with N.J.A.C 7:9D.

If you have any questions, please call me at (609)-633-7237.

Sincerely,

Bob Marcolina

Bob Marcolina, Case Manager
Bureau of Federal Case Management

c: Alicia Hartmann, NWS Earle

APPENDIX B

LABORATORY ANALYTICAL RESULTS

ECOR Solutions Inc

Client Sample ID: MW-102

GC/MS Volatiles

Lot-Sample #...:	A6L010320-017	**Work Order #...:**	JKNN41AA	**Matrix.....:**	WG
Date Sampled...:	11/30/06 10:19	**Date Received..:**	12/01/06		
Prep Date.....:	12/05/06	**Analysis Date..:**	12/05/06		
Prep Batch #...:	6338465				
Dilution Factor:	1	**Initial Wgt/Vol:**	5 mL	**Final Wgt/Vol..:**	5 mL
		Method.....:	CFR136A 624		

PARAMETER	RESULT	REPORTING LIMIT	UNITS
Benzene	ND	1.0	ug/L
Ethylbenzene	ND	5.0	ug/L
Methyl tert-butyl ether	ND	20	ug/L
Toluene	ND	5.0	ug/L
Xylenes (total)	ND	5.0	ug/L

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
1,2-Dichloroethane-d4	107	(90 - 117)
Toluene-d8	103	(90 - 110)
Bromofluorobenzene	99	(85 - 111)

ECOR Solutions Inc

Client Sample ID: MW-106

GC/MS Volatiles

Lot-Sample #...:	A6L010320-016	**Work Order #...:**	JKNN31AA	**Matrix.....:**	WG
Date Sampled...:	11/30/06 09:26	**Date Received..:**	12/01/06		
Prep Date.....:	12/05/06	**Analysis Date..:**	12/05/06		
Prep Batch #...:	6338465				
Dilution Factor:	1	**Initial Wgt/Vol:**	5 mL	**Final Wgt/Vol..:**	5 mL
		Method.....:	CFR136A 624		

PARAMETER	RESULT	REPORTING LIMIT	UNITS
Benzene	ND	1.0	ug/L
Ethylbenzene	ND	5.0	ug/L
Methyl tert-butyl ether	ND	20	ug/L
Toluene	ND	5.0	ug/L
Xylenes (total)	ND	5.0	ug/L

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
1,2-Dichloroethane-d4	109	(90 - 117)
Toluene-d8	102	(90 - 110)
Bromofluorobenzene	95	(85 - 111)

SMK 12/8/2006

ECOR Solutions Inc

Client Sample ID: MW-107

GC/MS Volatiles

Lot-Sample #...:	A6L010320-018	**Work Order #...:**	JKNN51AA	**Matrix.....:**	WG
Date Sampled...:	11/30/06 11:40	**Date Received..:**	12/01/06		
Prep Date.....:	12/06/06	**Analysis Date..:**	12/06/06		
Prep Batch #...:	6340343				
Dilution Factor:	12.5	**Initial Wgt/Vol:**	5 mL	**Final Wgt/Vol..:**	5 mL
		Method.....:	CFR136A 624		

PARAMETER	RESULT	REPORTING LIMIT	UNITS
Benzene	**400**	**12**	**ug/L**
Ethylbenzene	**790**	**62**	**ug/L**
Methyl tert-butyl ether	ND	250	ug/L
Toluene	**220**	**62**	**ug/L**
Xylenes (total)	**1700**	**62**	**ug/L**

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
1,2-Dichloroethane-d4	104	(90 - 117)
Toluene-d8	107	(90 - 110)
Bromofluorobenzene	110	(85 - 111)

ECOR Solutions Inc

Client Sample ID: FB-3

GC/MS Volatiles

Lot-Sample #...:	A6L010320-019	**Work Order #...:**	JKNN81AA	**Matrix.....:**	WQ
Date Sampled...:	11/30/06 11:50	**Date Received..:**	12/01/06		
Prep Date.....:	12/05/06	**Analysis Date..:**	12/05/06		
Prep Batch #...:	6340343				
Dilution Factor:	1	**Initial Wgt/Vol:**	5 mL	**Final Wgt/Vol..:**	5 mL
		Method.....:	CFR136A 624		

PARAMETER	RESULT	REPORTING LIMIT	UNITS
Benzene	ND	1.0	ug/L
Ethylbenzene	ND	5.0	ug/L
Methyl tert-butyl ether	ND	20	ug/L
Toluene	ND	5.0	ug/L
Xylenes (total)	ND	5.0	ug/L

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
1,2-Dichloroethane-d4	108	(90 - 117)
Toluene-d8	102	(90 - 110)
Bromofluorobenzene	97	(85 - 111)

ECOR Solutions Inc

Client Sample ID: TB-2

GC/MS Volatiles

Lot-Sample #...: A6L010320-015	Work Order #...: JKNN01AA	Matrix.....: WQ
Date Sampled...: 11/29/06	Date Received..: 12/01/06	
Prep Date.....: 12/05/06	Analysis Date..: 12/05/06	
Prep Batch #...: 6338465		
Dilution Factor: 1	Initial Wgt/Vol: 5 mL	Final Wgt/Vol..: 5 mL
	Method.....: CFR136A 624	

PARAMETER	RESULT	REPORTING LIMIT	UNITS
Benzene	ND	1.0	ug/L
Ethylbenzene	ND	5.0	ug/L
Methyl tert-butyl ether	ND	20	ug/L
Toluene	ND	5.0	ug/L
Xylenes (total)	ND	5.0	ug/L

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
1,2-Dichloroethane-d4	107	(90 - 117)
Toluene-d8	103	(90 - 110)
Bromofluorobenzene	96	(85 - 111)

SML 12/20/2007

APPENDIX C

VALIDATION REPORTS

Project: Earle Long Term Monitoring
Laboratory: Severn Trent Laboratories
Sample Delivery Group: A6L010320
Fraction: Organic
Matrix: Aqueous
Report Date: 2/20/2007

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 and semivolatile organic compound, naphthalene. 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

2/28/2007
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

All criteria were met. No qualifiers were applied.

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 18-MW-01 and DUP-1, and 16-MW-08 and DUP-2 were submitted to the laboratory to evaluate sampling and analytical precision for those organic compounds determined to be present. There were no positive results for samples 18-MW-01 and DUP-1. Results for duplicate samples 16-MW-08 and DUP-2 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*

All criteria were met. No qualifiers were applied.

13.0 *QUANTITATION/REPORTING LIMITS*

The following samples were analyzed at dilutions for volatile organic compounds. The dilution analyses were 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	12.5

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
Semivolatile Organic Compounds	Method 625, "40 CFR Part 136

Table 1 Samples For Data Validation Review
NWS Earle Long Term Monitoring
Groundwater Samples Collected November 2006
Severn Trent Laboratories Sample Delivery Group A6L010320

Sample Location	Laboratory ID		Date Collected	Matrix	Analyses Performed VOC	SVOC
16-MW-15	A6L010320	001	11/28/2006	Groundwater	X	
16-MW-25	A6L010320	002	11/28/2006	Groundwater	X	
16-SW-01	A6L010320	003	11/28/2006	Groundwater	X	
16-SW-02	A6L010320	004	11/28/2006	Groundwater	X	
16-MW-24	A6L010320	005	11/28/2006	Groundwater	X	
FB-1	A6L010320	006	11/28/2006	Field Blank	X	
TB-1	A6L010320	007	11/28/2006	Trip Blank	X	
18-MW-01	A6L010320	008	11/29/2006	Groundwater	X	X
16-MW-10	A6L010320	009	11/29/2006	Groundwater	X	X
16-MW-11	A6L010320	010	11/29/2006	Groundwater	X	X
DUP-1	A6L010320	011	11/29/2006	Groundwater	X	X
16-MW-08	A6L010320	012	11/29/2006	Groundwater	X	X
DUP-2	A6L010320	013	11/29/2006	Groundwater	X	X
FB-2	A6L010320	014	11/29/2006	Field Blank	X	X
TB-2	A6L010320	015	11/29/2006	Trip Blank	X	
MW-106	A6L010320	016	11/30/2006	Groundwater	X	
MW-102	A6L010320	017	11/30/2006	Groundwater	X	
MW-107	A6L010320	018	11/30/2006	Groundwater	X	
FB-3	A6L010320	019	11/30/2006	Field Blank	X	

VOC Methyl tert-butyl ether, Benzene, Toluene, Ethylbenzene, total Xylenes
SVOC Naphthalene

Table 2 Field Duplicate Sample Results for Organic Analyses
Duplicate Samples 16-MW-08 and DUP-2

	16-MW-08 (µg/L)	DUP-2 (µg/L)	RPD	Comments
Benzene	1.4	1.3	7.4	

Data Validation Qualifier Code Glossary

B - The compound/analyte was not detected substantially above the level of the associated method blank/preparation or field blank.

J - The positive result reported for this analyte is a quantitative estimate.

U - This compound/analyte was not detected in the sample. The numeric value represents the sample quantitation/detection limit.

UJ - This compound/analyte was not detected in the sample. The quantitation/detection should be considered estimated and may be inaccurate or imprecise.

R The result for this compound/analyte is unusable. The analyte may or may not be present.

K - The positive result reported for this analyte is a biased high quantitative estimate. The actual result may be lower than reported.

L - The positive result for this analyte is a biased low quantitative estimate. The actual result may be higher than reported.

UL - This compound/analyte was not detected in the sample. The actual quantitation/detection may be higher than reported.

X - This analyte coelutes with another target compound on the two chromatographic columns used for analysis.

Other Codes:

ND - There were no positive results for this analytical fraction.

NA - This parameter is not applicable to this sample.

NR - This analysis parameter was not required for this sample.

APPENDIX D

SAMPLE LOGS AND FIELD NOTES

GROUNDWATER LEVEL MEASUREMENT SHEET

Project Name:	NWS Earle LTM	Project No.:	N0102.170
Location:	R-6/7/12	Personnel:	AB, JG
Weather Conditions:	cloudy	Measuring Device:	Solinst Interface
Tidally Influenced:	Yes X No ___	Remarks:	

Monitoring Well ID	Date	Time	Elevation of Reference Point (feet)*	Total Well Depth (feet)*	Depth to Water (feet)*	~~Depth to Thickness~~ of Free Product (feet)*	Groundwater Elevation (feet)*	Comments
MW-102	11/30/06	0749		14.57	7.05			
MW-106	↓	0745		14.58	10.39			
MW-107	↓	0736		16.40	8.93			
R12-RC03	↓	0755			7.92	7.81		

*All measurements to the nearest 0.01 foot

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NWS Earle
Project No.: N0160.170

Sample ID No.: MW-102
Sample Location: Colts Neck, NJ
Sampled By: AB, JG

SAMPLING DATA:

Date: 11/30/06
Time: 1019
Purge Method: QED Microprge

FINAL VALUES:

Color (Visual)	Ph (Standard)	S.C. (mS/cm)	Temp (°C)	Turbidity (NTU)	DO (mg/l)	ORP (MV)
clear	5.41	0.650	17.69	6.77	0.4	14.3

PURGE DATA:

Date: 11/30/06
Purge Method: QED Microprge
PID Reading (ppm): —
Well Casing Diameter & Material: 2" PVC
Total Well Depth (TD): 14.57
Static Water Level (DTW): 7.05
Static Product Level (DTP) ———
One Casing Volume (gal): 7.5 x .16 = 1.2 x 3 = 3.6
Start Purge (hrs): 0948
End Purge (hrs): 1019
Total Purge Time (min): 31
Total Vol. Purged (gal/L):

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
Method 624 + MTBE	HCl	VOA	3

OBSERVATIONS/NOTES:

Circle If Applicable:

MS/MSD | Duplicate ID No.:

Signature(s):

PURGE DATA SHEET

Date: 11/30/06

Sample ID No.: MW-102

Time (hrs)	Water Level (ft. below TOC)	Flow (mL/min)	pH (SU)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	ORP (mV)	Comments
0949	7.31	1700	5.20	0.818	39.6	1.92	17.56	42.8	
0954	7.40		5.49	0.704	11.6	0.78	17.65	15.6	
0959	7.55		5.47	0.686	10.00	0.56	17.66	14.6	
1004	7.40		5.44	0.665	7.55	0.47	17.68	14.3	
1009	7.40		5.42	0.659	7.16	0.45	17.68	14.4	
1014	7.40		5.42	0.652	6.94	0.43	17.69	14.4	
1019	7.40		5.41	0.650	6.77	0.41	17.69	14.3	

Signature(s):

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NWS Earle LTM
Project No.: N0100.172

Sample ID No.: MW-106
Sample Location: Colts Neck, NJ
Sampled By: AB, JB

SAMPLING DATA:	FINAL VALUES:						
Date: 11/30/06	Color (Visual)	Ph (Standard)	S.C. (mS/cm)	Temp (°C)	Turbidity (NTU)	DO (mg/l)	ORP (MV)
Time: 0926							
Purge Method: QED Microp urge	Clear	5.65	5.086	17.97	6.83	0.48	-40.0

PURGE DATA:

Date: 11/30/06
Purge Method: QED Microp urge
PID Reading (ppm): —
Well Casing Diameter & Material: 2" PVC
Total Well Depth (TD): 19.58
Static Water Level (DTW): 10.39
Static Product Level (DTP) —
One Casing Volume (gal): 9.2 x .16 ≈ 1.4713 x 4.4
Start Purge (hrs): 0815
End Purge (hrs): 0926
Total Purge Time (min): 71
Total Vol. Purged (gal/L):

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
Method 624 + MTBE	HCl	VOA	3

OBSERVATIONS/NOTES:

Top of pump @ 11.42 ft - water level dropped below top of pump, so DTW greater than 11.42

Circle if Applicable:

MS/MSD | Duplicate ID No.:

Signature(s):

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NWS Earle
Project No.: N0100.170
Sample ID No.: MW-107
Sample Location: Colts Neck, NJ
Sampled By: AB, JG

SAMPLING DATA:	FINAL VALUES:						
Date: 11/30/06	Color (Visual)	Ph (Standard)	S.C. (mS/cm)	Temp (°C)	Turbidity (NTU)	DO (mg/l)	ORP (MV)
Time: 1140							
Purge Method: QED Microp urge	Clear	6.48	1.623	18.90	12.5	0.30	-121.9

PURGE DATA:

Date: 11/30/06
Purge Method: QED Micropurge
PID Reading (ppm): —
Well Casing Diameter & Material: 2" PVC
Total Well Depth (TD): 16.40
Static Water Level (DTW): 8.93
Static Product Level (DTP) —
One Casing Volume (gal): 7.5 x .16 ≈ 1.2 x 3 ≈ 3.6
Start Purge (hrs): 1039
End Purge (hrs): 1140
Total Purge Time (min): 61
Total Vol. Purged (gal/L):

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
Method 624 + MTBE	HCl	VOA	3

OBSERVATIONS/NOTES:

Circle if Applicable:

MS/MSD | Duplicate ID No.:

Signature(s):

PURGE DATA SHEET

Date: 11/30/06

Sample ID No.: MW-107

Time (hrs)	Water Level (ft. below TOC)	Flow (mL/min)	pH (SU)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	ORP (mV)	Comments
1040	9.10	1360	5.88	1.528	124	1.71	18.49	10.3	
1045	9.21		6.42	1.802	30.3	0.70	18.82	-93.4	
1050	9.28		6.51	1.884	24.8	0.50	18.86	-113.5	
1055			6.54	1.868	14.5	0.43	18.88	-119.2	
1100			6.56	1.802	17.7	0.38	18.87	-123.5	
1105	9.28		6.56	1.766	14.5	0.34	18.87	-124.4	
1110			6.57	1.713	17.4	0.33	18.91	-125.8	
1115			6.56	1.698	14.0	0.31	18.90	-126.1	
1120			6.55	1.670	11.8	0.32	18.90	-125.8	
1125			6.54	1.654	10.22	0.31	18.90	-125.1	
1130			6.52	1.639	12.0	0.30	18.90	-124.1	
1135			6.50	1.628	11.4	0.31	18.89	-122.7	
1140			6.48	1.623	12.5	0.30	18.90	-121.9	

Signature(s):

Chain of Custody Record

SEVERN TRENT STL®
Severn Trent Laboratories, Inc.

STL-4124 (0901)

Client: ECOK Solutions, Inc	Project Manager: [illegible] Schauble	Date: 11/29/06	Chain of Custody Number: 273840
Address: 1275 Andrew Dr., Suite I	Telephone Number (Area Code)/Fax Number: [illegible]-431-8731	Lab Number:	Page 2 of 2
City: West Chester; State: PA; Zip Code: 19380	Site Contact: [illegible] Bell; Lab Contact:		
Project Name and Location (State): NWS Earle, NJ	Carrier/Waybill Number:		
Contract/Purchase Order/Quote No.: N0130.170			

Sample I.D. No. and Description (Containers for each sample may be combined on one line)	Date	Time	Matrix: Air	Aqueous	Sed.	Soil		Containers & Preservatives: Unpres.	H2SO4	HNO3	HCl	NaOH	ZnAc/NaOH		Analysis: VOA - 8260 w/ MTBE	[illegible]	Special Instructions/ Conditions of Receipt
DUP-2	11/29/06	[illegible]		X				X			X				3	2	
FB-2	↓	1555		X				X			X				3	2	
TB-2	↓			X							X				2		
MW-106	[illegible]	0920		X							X				3		
MW-102	↓	1019		X							X				3		
MW-107	↓	1140		X							X				3		
FB-3	↓	1150		X							X				3		

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☒ Unknown

Sample Disposal
☐ Return To Client ☒ Disposal By Lab ☐ Archive For ____ Months (A fee may be assessed if samples are retained longer than 1 month)

Turn Around Time Required
☐ 24 Hours ☐ 48 Hours ☐ 7 Days ☒ 14 Days ☐ 21 Days ☐ Other____

QC Requirements (Specify)

1. Relinquished By: [illegible signature]	Date: 11/30/06	Time: 1600	1. Received By: [illegible signature]	Date: 11/30/06	Time: [illegible]
2. Relinquished By	Date	Time	2. Received By	Date	Time
3. Relinquished By	Date	Time	3. Received By	Date	Time

Comments

DISTRIBUTION: WHITE - Returned to Client with Report; CANARY - Stays with the Sample; PINK - Field Copy