

Demonstration Program Quarterly Progress Report #2

**Administrative Order #R9-4171-94-08
Olin Niagara Falls Plant
Niagara Falls, New York**

Prepared for:



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ABBREVIATIONS AND ACRONYMS

Acronym	Definition
GWTS	Groundwater Treatment System
ARGC	Alundum Road-Gill Creek
NYSDEC	New York State Department of Environmental Compliance
VOC	volatile organic compound

1.0 INTRODUCTION

Olin is performing a one year Demonstration Program to evaluate effectiveness of groundwater capture within the Alundum Road-Gill Creek (ARGC) area by the Solvent pumping wells (PWs), PW-3B and PW-4B, located on Olin property.

The Demonstration Program is being performed in accordance with the November 6, 2015 *Demonstration Program Work Plan* (Amec Foster Wheeler, 2015) and the comments provided by New York Department of Environmental Conservation (NYSDEC) in their March 2, 2016 conditional approval letter.

The Demonstration Program commenced March 11, 2016 following shut-down of the Olin groundwater treatment system (GWTS). The first *Demonstration Program Report* was submitted to NYSDEC on August 1, 2016 (Amec Foster Wheeler, 2016). This report is the second quarterly progress report for the Demonstration Program and covers the period from June 11, 2016 through September 11, 2016. The progress report presents activities completed and data collected during the period as well as an evaluation of the data.

The Demonstration Program's second quarter results support that the Olin GWTS is redundant and that the Solvent GWTS provides hydraulic capture of A and B-Zone groundwater from the ARGC area without the Olin GWTS operating. These results are consistent with the objectives of the Olin Consent Order and Remedial Plan.

2.0 SITE ACTIVITIES

Water quality samples were collected June 8-10, 2016 from the twelve wells listed in the *Demonstration Program Work Plan* plus the three additional wells requested by NYSDEC in their March 2, 2016 letter. Samples were collected using low flow sampling techniques. The samples were submitted to ALS Environmental Laboratory in Rochester, NY for chemical analysis. The samples were analyzed for volatile organic compound (VOCs), pesticides, and mercury in accordance with the monitoring requirements in the *Demonstration Work Plan* and the *Groundwater Treatment System Operation and Maintenance Plan* (AMEC, 2014).

Quarterly water level measurements were collected on June 28, 2016. Water levels measurements were collected from the quarterly monitoring locations listed in the *Demonstration Work Plan*.

3.0 MONITORING RESULTS

This section presents the potentiometric surface and water quality results from this reporting period.

3.1 A-Zone

Figure 3.1a shows the site-wide A-Zone potentiometric surface for June 28, 2016, and Figure 3.1b shows the A-Zone ARGC area in closer detail. A-Zone groundwater in the ARGC area is effectively captured and drained to the B-Zone by the Passive Relief (PR) wells due to the natural downward vertical gradient that exists between the A-Zone and the B-Zone. Since potentiometric heads in the B-zone are below Gill Creek, the passive relief wells are effective in preventing A-zone groundwater migration to Gill Creek.

The yellow highlighted areas represent areas that are estimated to be dewatered as defined by the bottom elevation of the A-zone. The dewatered areas also show that the A-zone is being effectively drained to the B-zone. In cases where the A zone was dewatered, the physical bottom of the fracture system was used in the interpreted potentiometric surface.

3.2 B-Zone

Figure 3.2a shows the B-Zone potentiometric surface map for June 28, 2016, and Figure 3.2b shows the B-Zone ARGC area in closer detail. At the time of this synoptic water level event, it does not appear that the Solvent pumping wells on the Olin property (PW-3A and PW-4B) have as much drawdown as indicated by prior Olin monitoring events and prior Solvent GWTS Annual Reports.

Over the last ten water level measuring events since October 2, 2014, the average water level elevation for PW-3B was 554.84 feet (ft) above mean sea level (MSL) with a range from 553.01 to 557.76 ft MSL (the highest water level recorded on June 28, 2016). Over the same period, the average water level elevation for PW-4B was 556.50 ft MSL with a range from 555.71 to 557.61 ft MSL (the highest water level also recorded on June 28, 2016). The water level dataset for June 2016 therefore represents the most conservative condition (lowest Solvent pumping stress) on the ARCG Area. Under this condition groundwater in the ARGC Area was hydraulically contained and captured by the Solvent pumping wells located on the Olin Property.

3.3 Water Quality Results

Tables 3.1 through 3.4 show the monitoring results for June 2016 for the following indicator parameters in the A and B-Zones for the wells required to be monitored:

- 1,2,4-Trichlorobenzene - Aromatic
- Trichloroethene – Aliphatic
- Gamma-BHC – Pesticide
- Total Mercury - Mercury

Results for June 2014 and June 2015 (before the Demonstration Program) are included on the tables for comparison. Figures 3.3a through 3.6b show the constituent distributions for the indicator parameters in the A and B-Zones. The tables and figures show that constituent concentrations and distribution are consistent with conditions prior to the Demonstration Program implementation.

4.0 CONCLUSIONS

The Demonstration Program's second quarter results support that the Olin GWTS is redundant and that the Solvent GWTS provides hydraulic capture of A and B-Zone groundwater from the ARGC area without the Olin GWTS operating. At the time of this synoptic water level event, the Solvent B-Zone pumping wells were experiencing less drawdown than historical data suggests, indicating the system is effective in capturing groundwater from the ARCG area under a conservative range of conditions. These results are consistent with the objectives of the Olin Consent Order and Remedial Plan.

5.0 REFERENCES

AMEC, 2014. *Groundwater Treatment System – Operations and Maintenance Plan*. Kennesaw, GA. AMEC Environment & Infrastructure, Inc. August 15, 2014.

Amec Foster Wheeler, 2015. *Demonstration Program Work Plan*. Kennesaw, GA. Amec Foster Wheeler Environment & Infrastructure, Inc. November 6, 2015.

Amec Foster Wheeler, 2016. *Demonstration Program Quarterly Progress Report #1*. Kennesaw, GA. Amec Foster Wheeler Environment & Infrastructure, Inc. August 1, 2016.

TABLES

Table 3.1: 1,2,4-Trichlorobenzene Results

1,2,4-Trichlorobenzene Concentration - ug/L					
Date	June 2014	June 2015	April 2016	June 2016	
A-Zone Wells					
OBA-4A	1.0 U	1.0 U	1.0 U	1.0 U	
OBA-24A	1.0 U	1.0 U	1.0 U	1.0 U	
OBA-25A	1.0 U	1.0 U	2.9	1.0 U	
OBA-26A	1.0 U	1.0 U	1.0 U	1.0 U	
PN-20A	1.0 U	1.0 U	11	1.0 U	
B-Zone Wells					
OBA-2B	180	170	230	37	
OBA-4B	1.0 U	1.0 U	1.5	1.6	
OBA-5B	8100	10000	8500	8000	
OBA-6B	100	200	150	230	
OBA-24B	520	840	280	310	
OBA-25B	1.0 U	1.0 U	4	1.0 U	
OBA-26B	1.0 U	3	5.0 U	10 U	
PN-5B	8300	8000	8300	9300	
PN-20B	210	55 J	130	70	
PN-24B	NA	NA	7.7	1.0 U	

Notes:

U- constituent not detected- reporting limit shown

ug/L - micrograms per liter

NA - not applicable

Prepared By: ESH 08/08/2016

Checked By: ADB 08/11/2016

Table 3.2: Trichloroethene Results

Trichloroethene Concentration - ug/L				
Date	June 2014	June 2015	April 2016	June 2016
A-Zone Wells				
OBA-4A	16	12	9.9	15.0
OBA-24A	26	20	15	20.0
OBA-25A	22	20	16	27
OBA-26A	1.0 U	1.0 U	1.0 U	1.0 U
PN-20A	11	16	7.3	14
B-Zone Wells				
OBA-2B	55	28	20	34
OBA-4B	1.2	1.9	1.4	2.3
OBA-5B	20000	20000	10000	13000
OBA-6B	22	27	23	17
OBA-24B	2000	7500	7400	6500
OBA-25B	1.0 U	1.0 U	1.0 U	1.0 U
OBA-26B	1.0 U	1.0 U	5.0 U	10 U
PN-5B	5600	8300	3400	7300
PN-20B	4900	1600	3800	1700
PN-24B	NA	NA	6.4	3.3

Notes:

U- constituent not detected- reporting limit shown

ug/L - micrograms per liter

NA - not applicable

Prepared By: ESH 08/08/2016

Checked By: ADB 08/11/2016

Table 3.3: Gamma-BHC Results

Gamma-BHC Concentration - ug/L					
Date	June 2014	June 2015	April 2016	June 2016	
A-Zone Wells					
OBA-4A	0.047	U	0.047	U	0.047
OBA-24A	0.047	U	0.047	U	0.0
OBA-25A	0.047	U	0.047	U	0.047
OBA-26A	0.047	U	0.047	U	0.047
PN-20A	0.047	U	0.047	U	0.068
B-Zone Wells					
OBA-2B	0.051		0.047	U	0.048
OBA-4B	0.047	U	0.047	U	0.047
OBA-5B	630		460		200
OBA-6B	0.047	U	0.047	U	0.047
OBA-24B	59		78		21
OBA-25B	0.047	U	0.047	U	0.047
OBA-26B	0.047	U	0.047	U	0.047
PN-5B	1100		1300		1000
PN-20B	0.27		0.23		0.34
PN-24B	NA		NA		0.31

Notes:

U- constituent not detected- reporting limit shown

ug/L - micrograms per liter

NA - not applicable

Prepared By: ESH 08/08/2016

Checked By: ADB 08/11/2016

Table 3.4: Total Mercury Results

Total Mercury Concentration - ug/L					
Date	June 2014	June 2015	April 2016	June 2016	
A-Zone Wells					
OBA-4A	0.2 U	0.2 U	0.2 U	0.33	
OBA-24A	0.2 U	0.2 U	0.2 U	0.2 U	
OBA-25A	0.2 U	5.01	4.87	2.02	
OBA-26A	0.2 U	0.2 U	0.2 U	0.2 U	
PN-20A	0.2 U	0.26	0.2 U	0.2 U	
B-Zone Wells					
OBA-2B	0.2 U	0.2 U	0.2 U	0.2 U	
OBA-4B	0.2 U	0.2 U	0.2 U	0.2 U	
OBA-5B	0.2 U	0.2 U	0.34	0.2 U	
OBA-6B	3.37	1.92	0.2 U	0.2 U	
OBA-24B	0.2 U	0 U	0.2 U	0.2 U	
OBA-25B	0.2 U	0.2 U	0.2 U	0.2 U	
OBA-26B	0.2 U	0.2 U	0.2 U	0.2 U	
PN-5B	0.2 U	1.62	0.2 U	1.83	
PN-20B	0.2 U	0.2 U	0.2 U	0.2 U	
PN-24B	NA	NA	0.2 U	0.22	

Notes:

U- constituent not detected- reporting limit shown

ug/L - micrograms per liter

NA - not applicable

Prepared By: ESH 08/08/2016

Checked By: ADB 08/11/2016

Table 3.5: June 2016 Site Groundwater Analytical Results

Well ID: Sample Date:	Sample OBA-1A 6/21/2016	Sample OBA-1B 6/21/2016	Sample OBA-2B 6/8/2016	Sample OBA-3A 6/20/2016	Sample OBA-4A 6/20/2016	Sample OBA-4B 6/20/2016
Volatile Organic Compound Concentrations - SW846 8260C µg/L						
Aliphatic Compounds						
1,1,1-Trichloroethane	1.0 U	1.0 U	1.0 U	2.2	1.0 U	1.0 U
1,1,2,2-Tetrachloroethane	1.0 U	1.0 U	3.8	74	1.0 U	1.0 U
1,1,2-Trichloroethane	1.0 U	1.0 U	1.0 U	3.7	1.0 U	1.0 U
1,1-Dichloroethene	1.0 U	1.0 U	1.0 U	4.0	1.0 U	1.0 U
Carbon tetrachloride	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Chloromethane (Methyl chloride)	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
cis-1,2-Dichloroethene	1.0 U	8.1	18	2000 D	1.7	12
Methylene chloride (Dichloromethane)	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Tetrachloroethene (PCE)	1.0 U	6.9	28	420 D	7.4	1.0 U
trans-1,2-Dichloroethene	1.0 U	1.1	1.0	18	1.0 U	1.0 U
Trichloroethene (TCE)	1.0 U	9.6	34	960 D	15	2.3
Vinyl Chloride	1.0 U	6.9	1.0 U	56	1.0 U	7.7
Aromatic Compounds						
1,2,4-Trichlorobenzene	1.0 U	1.0 U	37	10	1.0 U	1.6
1,2-Dichlorobenzene	1.0 U	1.0 U	1.0 U	7.9	1.0 U	1.0 U
1,3-Dichlorobenzene	1.0 U	1.0 U	1.9	27	1.0 U	2.4
1,4-Dichlorobenzene	1.0 U	1.0 U	1.0 U	29	1.0 U	2.1
Benzene	1.0 U	1.0 U	1.0 U	4.3	1.0 U	1.8
Chlorobenzene	1.0 U	1.0 U	1.0 U	23	1.0 U	10
Pesticide Concentrations - SW846 8081 ug/L						
alpha-BHC	0.47 U	0.047 U	0.25	0.56	0.050	0.31
beta-BHC	8.1	0.047 U	0.13	0.38	0.050 U	0.10
delta-BHC	0.48 U	0.048 U	0.048 U	0.28	0.050 U	0.048 U
gamma-BHC (Lindane)	0.47 U	0.047 U	0.047 U	0.31	0.10	0.22
Total Metal Concentrations - SW846 7470 ug/L						
Total Mercury	0.20 U	24.2	0.20 U	0.20 U	0.33	0.20 U

Notes:

U - constituent not detected - reporting limit shown.

ug/L - micrograms per liter

D - Concentration is a result of a dilution

Prepared By: ESH 08/10/2016

Checked By: ADB 08/11/2016

Table 3.5: June 2016 Site Groundwater Analytical Results

Well ID: Sample Date:	Sample OBA-5A 6/14/2016	Duplicate OBA-5A 6/14/2016	Sample OBA-5B 6/14/2016	Sample OBA-6A 6/21/2016	Sample OBA-6B 6/21/2016	Sample OBA-8B 6/14/2016
Volatile Organic Compound Concentrations - SW846 8260C µg/L						
Aliphatic Compounds						
1,1,1-Trichloroethane	50 U	50 U	100 U	1.0 U	1.0 U	25 U
1,1,2,2-Tetrachloroethane	50 U	50 U	180	1.0 U	1.0 U	25 U
1,1,2-Trichloroethane	50 U	50 U	100 U	1.0 U	1.0 U	25 U
1,1-Dichloroethene	50 U	50 U	100 U	1.0 U	1.0 U	25 U
Carbon tetrachloride	50 U	50 U	100 U	1.0 U	1.0 U	25 U
Chloromethane (Methyl chloride)	50 U	50 U	100 U	1.0 U	1.0 U	25 U
cis-1,2-Dichloroethene	470	490	5200	1.0 U	17	25 U
Methylene chloride (Dichloromethane)	50 U	50 U	100 U	1.0 U	1.0 U	25 U
Tetrachloroethene (PCE)	310	320	5200	1.1	48	25 U
trans-1,2-Dichloroethene	50 U	50 U	100 U	1.0 U	1.0 U	25 U
Trichloroethene (TCE)	93	160	13000	2.1	17	29
Vinyl Chloride	110	120	210	1.0 U	9.3	25 U
Aromatic Compounds						
1,2,4-Trichlorobenzene	5800	5700	8000	4.1	230 D	4800
1,2-Dichlorobenzene	270	280	810	1.0 U	48	130
1,3-Dichlorobenzene	1200	1200	890	1.0 U	20	270
1,4-Dichlorobenzene	860	850	1700	1.0 U	50	46
Benzene	1800	1800	3100	1.0 U	5.5	25 U
Chlorobenzene	1100	1100	3600	1.0 U	4.7	25 U
Pesticide Concentrations - SW846 8081 ug/L						
alpha-BHC	230	210	400	0.047 U	0.14	2.0
beta-BHC	57	55	49	0.054	0.23	1.0
delta-BHC	9.6 U	9.6 U	24 U	0.048 U	0.048 U	0.096 U
gamma-BHC (Lindane)	120	110	320	0.047 U	0.047 U	0.094 U
Total Metal Concentrations - SW846 7470 ug/L						
Total Mercury	0.52	0.47	0.20 U	0.20 U	0.20 U	0.20 U

Notes:

U - constituent not detected - reporting limit shown.

ug/L - micrograms per liter

D - Concentration is a result of a dilution

Prepared By: ESH 08/10/2016

Checked By: ADB 08/11/2016

Table 3.5: June 2016 Site Groundwater Analytical Results

Well ID: Sample Date:	Sample OBA-10A 6/20/2016	Sample OBA-11B 6/23/2016	Sample OBA-14A 6/17/2016	Sample OBA-14B 6/17/2016	Sample OBA-15A 6/20/2016	Sample OBA-16A 6/16/2016
Volatile Organic Compound Concentrations - SW846 8260C µg/L						
Aliphatic Compounds						
1,1,1-Trichloroethane	20 U	25 U	1.0 U	5.0	2.0 U	1.0 U
1,1,2,2-Tetrachloroethane	20 U	25 U	1.0 U	180	2.0 U	1.0 U
1,1,2-Trichloroethane	20 U	25 U	1.0 U	6.5	2.0 U	1.0 U
1,1-Dichloroethene	20 U	25 U	1.0 U	7.3	2.0 U	1.0 U
Carbon tetrachloride	20 U	25 U	1.0 U	1.8	2.0 U	1.0 U
Chloromethane (Methyl chloride)	20 U	25 U	1.0 U	1.0 U	2.0 U	1.0 U
cis-1,2-Dichloroethene	150	3600	1.0 U	1200 D	16	1.0 U
Methylene chloride (Dichloromethane)	20 U	25 U	1.0 U	1.0 U	2.0 U	1.0 U
Tetrachloroethene (PCE)	130	25 U	1.0 U	1100 D	2.2	2.7
trans-1,2-Dichloroethene	20 U	25 U	1.0 U	24	2.0 U	1.0 U
Trichloroethene (TCE)	450	25 U	1.0 U	2300 D	2.0 U	3.3
Vinyl Chloride	20 U	910	1.0 U	32	92	1.0 U
Aromatic Compounds						
1,2,4-Trichlorobenzene	13000 D	460	1.0 U	50	11	1.0 U
1,2-Dichlorobenzene	26000 D	28	1.0 U	19	91	1.0 U
1,3-Dichlorobenzene	3100	57	1.0 U	27	150	1.0 U
1,4-Dichlorobenzene	18000 D	25 U	1.0 U	36	240	1.0 U
Benzene	17000 D	25 U	1.0 U	7.5	40	1.0 U
Chlorobenzene	8700 D	25 U	1.0 U	26	250	1.0 U
Pesticide Concentrations - SW846 8081 ug/L						
alpha-BHC	5700	8.8	0.047 U	1.5	0.17	1.1
beta-BHC	190 U	1.4	0.047 U	1.3	0.066	9.6
delta-BHC	200 U	0.48 U	0.048 U	0.52	0.45	0.48 U
gamma-BHC (Lindane)	3900	0.47 U	0.047 U	0.93	0.39	0.47 U
Total Metal Concentrations - SW846 7470 ug/L						
Total Mercury	0.20 U	419				

Notes:

U - constituent not detected - reporting limit shown.

ug/L - micrograms per liter

D - Concentration is a result of a dilution

Prepared By: ESH 08/10/2016

Checked By: ADB 08/11/2016

Table 3.5: June 2016 Site Groundwater Analytical Results

Well ID: Sample Date:	Sample OBA-16B 6/16/2016	Sample OBA-23B 6/21/2016	Sample OBA-24A 6/14/2016	Sample OBA-24B 6/14/2016	Duplicate OBA-24B 6/14/2016	Sample OBA-25A 6/13/2016
Volatile Organic Compound Concentrations - SW846 8260C µg/L						
Aliphatic Compounds						
1,1,1-Trichloroethane	1.0 U	10 U	1.0 U	50 U	50 U	1.0 U
1,1,2,2-Tetrachloroethane	1.0 U	10 U	1.0 U	90	93	1.0 U
1,1,2-Trichloroethane	1.0 U	10 U	1.0 U	50 U	50 U	1.0 U
1,1-Dichloroethene	4.4	10 U	1.0 U	50 U	50 U	1.0 U
Carbon tetrachloride	1.0 U	10 U	1.0 U	50 U	50 U	1.0 U
Chloromethane (Methyl chloride)	1.0 U	10 U	1.0 U	50 U	50 U	1.0 U
cis-1,2-Dichloroethene	220 D	26	1.7	3500	3600	10
Methylene chloride (Dichloromethane)	1.0 U	10 U	1.0 U	50 U	50 U	1.0 U
Tetrachloroethene (PCE)	71	10 U	3.2	3200	3200	4.2
trans-1,2-Dichloroethene	3.9	10 U	1.0 U	50 U	50 U	1.0 U
Trichloroethene (TCE)	300 D	10 U	20	6500	6700	27
Vinyl Chloride	30	10 U	1.0 U	540	540	1.0 U
Aromatic Compounds						
1,2,4-Trichlorobenzene	240 D	780	1.0 U	310	190	1.0 U
1,2-Dichlorobenzene	16	30	1.0	110	120	1.0 U
1,3-Dichlorobenzene	41	920	6.5	50 U	50 U	1.0 U
1,4-Dichlorobenzene	16	750	30	99	120	1.0 U
Benzene	22	10 U	1.0 U	1000	1000	1.0 U
Chlorobenzene	15	88	75	170	190	1.0 U
Pesticide Concentrations - SW846 8081 ug/L						
alpha-BHC	0.98	1.5	0.047 U	16	17	0.047 U
beta-BHC	12	0.42	0.047 U	4.7 U	4.7 U	0.047 U
delta-BHC	0.48 U	0.048 U	0.048 U	4.8 U	4.8 U	0.048 U
gamma-BHC (Lindane)	0.47 U	0.047 U	0.047 U	18	18	0.047 U
Total Metal Concentrations - SW846 7470 ug/L						
Total Mercury	0.93	0.20 U	0.20 U	0.20 U	0.20 U	2.02

Notes:

U - constituent not detected - reporting limit shown.

ug/L - micrograms per liter

D - Concentration is a result of a dilution

Prepared By: ESH 08/10/2016

Checked By: ADB 08/11/2016

Table 3.5: June 2016 Site Groundwater Analytical Results

Well ID: Sample Date:	Sample OBA-25B 6/13/2016	Sample OBA-26A 6/13/2016	Sample OBA-26B 6/13/2016	Sample PN-4A 6/9/2016	Sample PN-4B 6/9/2016	Sample PN-5A 6/20/2016
Volatile Organic Compound Concentrations - SW846 8260C µg/L						
Aliphatic Compounds						
1,1,1-Trichloroethane	1.0 U	1.0 U	10.0 U	1.0 U	10 U	1.0 U
1,1,2,2-Tetrachloroethane	1.0 U	1.0 U	10.0 U	1.0 U	170	1.0 U
1,1,2-Trichloroethane	1.0 U	1.0 U	10.0 U	1.0 U	10 U	1.0 U
1,1-Dichloroethene	1.0 U	1.0 U	10.0 U	1.0 U	12	1.0 U
Carbon tetrachloride	1.0 U	1.0 U	10.0 U	1.0 U	10 U	1.0 U
Chloromethane (Methyl chloride)	1.0 U	1.0 U	10.0 U	1.0 U	10 U	1.0 U
cis-1,2-Dichloroethene	140	3.0	10.0 U	1.0 U	1900	1.0 U
Methylene chloride (Dichloromethane)	1.0 U	1.0 U	10.0 U	1.0 U	10 U	1.0 U
Tetrachloroethene (PCE)	1.0 U	1.0 U	10.0 U	1.4	3600	1.0 U
trans-1,2-Dichloroethene	3.2	1.0 U	10.0 U	1.0 U	30	1.0 U
Trichloroethene (TCE)	1.0 U	1.0 U	10.0 U	2.1	5000	1.0 U
Vinyl Chloride	130 D	1.0 U	10.0 U	1.0 U	120	1.0 U
Aromatic Compounds						
1,2,4-Trichlorobenzene	1.0 U	1.0 U	10 U	1.0 U	2900 D	1.0 U
1,2-Dichlorobenzene	18	1.0 U	360	1.0 U	130	1.0 U
1,3-Dichlorobenzene	16	1.0 U	470	1.0 U	470	1.4
1,4-Dichlorobenzene	39	1.0 U	890	1.0 U	380	1.0 U
Benzene	9.2	1.0 U	61	1.0 U	36	1.0 U
Chlorobenzene	100 D	1.0 U	3000 D	1.0 U	110	1.0 U
Pesticide Concentrations - SW846 8081 ug/L						
alpha-BHC	0.047 U	0.047 U	0.047 U	0.41	200	0.058
beta-BHC	0.047 U	0.047 U	0.047 U	0.28	24 U	1.0
delta-BHC	0.048 U	0.048 U	0.048 U	0.099	24 U	0.048 U
gamma-BHC (Lindane)	0.047 U	0.047 U	0.047 U	0.95	240	0.047 U
Total Metal Concentrations - SW846 7470 ug/L						
Total Mercury	0.20 U	0.20 U	0.20 U	0.20 U	0.47	0.20 U

Notes:

U - constituent not detected - reporting limit shown.

ug/L - micrograms per liter

D - Concentration is a result of a dilution

Prepared By: ESH 08/10/2016

Checked By: ADB 08/11/2016

Table 3.5: June 2016 Site Groundwater Analytical Results

Well ID: Sample Date:	Sample PN-5B 6/20/2016	Duplicate PN-5B 6/20/2016	Sample PN-6A 6/9/2016	Sample PN-6B 6/9/2016	Sample PN-7B 6/22/2016	Sample PN-11B 6/22/2016
Volatile Organic Compound Concentrations - SW846 8260C µg/L						
Aliphatic Compounds						
1,1,1-Trichloroethane	5.0 U	50 U	1.0 U	50 U	20 U	250 U
1,1,2,2-Tetrachloroethane	5100 D	5200	1.0 U	50 U	130	830
1,1,2-Trichloroethane	8.5	50 U	1.0 U	50 U	20 U	250 U
1,1-Dichloroethene	30	50 U	1.0 U	50 U	20 U	250 U
Carbon tetrachloride	7.8	50 U	1.0 U	50 U	20 U	250 U
Chloromethane (Methyl chloride)	5.0 U	50 U	1.0 U	50 U	20 U	250 U
cis-1,2-Dichloroethene	1400 D	1400	1.0 U	65	390	1800
Methylene chloride (Dichloromethane)	5.0 U	50 U	1.0 U	50 U	20 U	250 U
Tetrachloroethene (PCE)	6500 D	6800	3.3	670	190	27000
trans-1,2-Dichloroethene	54	65	1.0 U	50 U	20 U	250 U
Trichloroethene (TCE)	7300 D	7300	3.9	550	2300	39000
Vinyl Chloride	61	69	1.0 U	50 U	37	490
Aromatic Compounds						
1,2,4-Trichlorobenzene	9300 D	9600	1.0	6700	14000 D	12000
1,2-Dichlorobenzene	730	910	1.0 U	400	620	5200
1,3-Dichlorobenzene	870	900	19	2400	820	1200
1,4-Dichlorobenzene	560	650	24	1700	1200	4900
Benzene	2000 D	2000	1.0 U	650	3200	870
Chlorobenzene	990	1100	16	630	620	1300
Pesticide Concentrations - SW846 8081 ug/L						
alpha-BHC	770	740	0.047 U	290	170	550
beta-BHC	47 U	47 U	0.28	25	4.7 U	35
delta-BHC	450	440	0.048 U	28	6.2	25
gamma-BHC (Lindane)	1700	1700	0.047 U	330	150	440
Total Metal Concentrations - SW846 7470 ug/L						
Total Mercury	1.83	2.85	0.59	0.25	0.72	0.42

Notes:

U - constituent not detected - reporting limit shown.

ug/L - micrograms per liter

D - Concentration is a result of a dilution

Prepared By: ESH 08/10/2016

Checked By: ADB 08/11/2016

Table 3.5: June 2016 Site Groundwater Analytical Results

Well ID: Sample Date:	Duplicate PN-11B 6/22/2016	Sample PN-12A 6/10/2016	Sample PN-12B 6/10/2016	Sample PN-14A 6/21/2016	Sample PN-14B 6/21/2016	Sample PN-15A 6/10/2016
Volatile Organic Compound Concentrations - SW846 8260C µg/L						
Aliphatic Compounds						
1,1,1-Trichloroethane	250 U	1.0 U	100 U	10 U	2.5 U	2.5 U
1,1,2,2-Tetrachloroethane	610	1.0 U	110	10 U	2.5 U	2.5 U
1,1,2-Trichloroethane	250 U	1.0 U	100 U	10 U	2.5 U	2.5 U
1,1-Dichloroethene	250 U	1.0 U	100 U	10 U	2.5 U	2.5 U
Carbon tetrachloride	250 U	1.0 U	100 U	10 U	2.5 U	2.5 U
Chloromethane (Methyl chloride)	250 U	1.0 U	100 U	10 U	2.5 U	2.5 U
cis-1,2-Dichloroethene	1600	1.2	3000	10 U	2.5 U	2.5 U
Methylene chloride (Dichloromethane)	250 U	2.3	360	10 U	2.5 U	2.5 U
Tetrachloroethene (PCE)	20000	2.0	10000	21	2.5 U	2.5 U
trans-1,2-Dichloroethene	250 U	1.0 U	100 U	10 U	2.5 U	2.5 U
Trichloroethene (TCE)	30000	2.7	19000	22	2.5 U	2.5 U
Vinyl Chloride	330	1.0 U	270	10 U	2.5 U	2.5 U
Aromatic Compounds						
1,2,4-Trichlorobenzene	11000	43	13000	150	320	2.5 U
1,2-Dichlorobenzene	4700	2.0	570	10 U	15	17
1,3-Dichlorobenzene	1100	10	1300	10 U	54	660 D
1,4-Dichlorobenzene	4400	7.2	570	10 U	82	1000 D
Benzene	640	8.5	550	10 U	13	8.2
Chlorobenzene	1000	2.8	510	10 U	7.9	1400 D
Pesticide Concentrations - SW846 8081 ug/L						
alpha-BHC	510	3.4	250	0.47 U	1.4	0.074
beta-BHC	31	1.8	45	10	1.3	0.092
delta-BHC	24 U	0.24 U	24 U	0.48 U	0.048 U	0.048 U
gamma-BHC (Lindane)	410	0.50	68	0.47 U	0.047 U	0.047 U
Total Metal Concentrations - SW846 7470 ug/L						
Total Mercury	0.44	0.20 U	3.08	4.15	0.72	0.20 U

Notes:

U - constituent not detected - reporting limit shown.

ug/L - micrograms per liter

D - Concentration is a result of a dilution

Prepared By: ESH 08/10/2016

Checked By: ADB 08/11/2016

Table 3.5: June 2016 Site Groundwater Analytical Results

Well ID: Sample Date:	Sample PN-15B 6/10/2016	Sample PN-17A 6/8/2016	Sample PN-17B 6/8/2016	Sample PN-20A 6/09/2016	Sample PN-20B 6/9/2016	Sample PN-24B 6/23/2016
Volatile Organic Compound Concentrations - SW846 8260C µg/L						
Aliphatic Compounds						
1,1,1-Trichloroethane	100 U	1.0 U	100 U	1.0 U	25 U	1.0 U
1,1,2,2-Tetrachloroethane	100 U	1.0 U	100 U	1.0 U	340	1.0 U
1,1,2-Trichloroethane	100 U	1.0 U	100 U	1.0 U	25 U	1.0 U
1,1-Dichloroethene	100 U	1.0 U	100 U	1.0 U	25 U	1.0 U
Carbon tetrachloride	100 U	1.0 U	100 U	1.0 U	25 U	1.0 U
Chloromethane (Methyl chloride)	100 U	1.0 U	100 U	1.0 U	25 U	1.0 U
cis-1,2-Dichloroethene	100 U	1.0 U	100 U	1.0 U	280	8.1
Methylene chloride (Dichloromethane)	100 U	1.0 U	100 U	1.0 U	25 U	1.0 U
Tetrachloroethene (PCE)	100 U	1.0 U	100 U	8.4	3700	6.2
trans-1,2-Dichloroethene	100 U	1.0 U	100 U	1.0 U	25 U	1.0 U
Trichloroethene (TCE)	100 U	1.0 U	100 U	14	1700	3.3
Vinyl Chloride	100 U	1.0 U	100 U	1.0 U	51	2.6
Aromatic Compounds						
1,2,4-Trichlorobenzene	14000	1.0 U	10000	1.0 U	70	1.0 U
1,2-Dichlorobenzene	610	2.4	1300	1.0 U	83	1.7
1,3-Dichlorobenzene	2300	88	1700	1.0 U	94	3.9
1,4-Dichlorobenzene	380	24	1600	1.0 U	160	6.8
Benzene	100 U	6.0	100 U	1.0 U	25 U	1.0 U
Chlorobenzene	100 U	19	1100	1.0 U	36	7.3
Pesticide Concentrations - SW846 8081 ug/L						
alpha-BHC	150	0.047 U	11	0.047 U	0.80	0.092
beta-BHC	27	0.047 U	15	0.26	0.26	0.088
delta-BHC	4.8 U	0.048 U	0.48 U	0.048 U	0.16	0.085
gamma-BHC (Lindane)	4.7 U	0.047 U	0.47 U	0.068	0.31	0.047 U
Total Metal Concentrations - SW846 7470 ug/L						
Total Mercury	2.01	33.2	1.89	0.20 U	0.20 U	0.22

Notes:

U - constituent not detected - reporting limit shown.

ug/L - micrograms per liter

D - Concentration is a result of a dilution

Prepared By: ESH 08/10/2016

Checked By: ADB 08/11/2016

FIGURES























