

**CCR COMPLIANCE
GROUNDWATER MONITORING AND CORRECTIVE ACTION
ANNUAL REPORT
NORTH ASH POND AND ASH LANDFILL**

Prepared for:



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1.0 Introduction

Title 40 Code of Federal Regulations (CFR) §257.90 mandates that existing Coal Combustion Residuals (CCR) landfills and surface impoundments, also known as CCR units, be subject to groundwater monitoring and corrective action requirements as further detailed in §257.91 through §257.98. These requirements are part of the overall CCR Rule (or Rule) which was published in the Federal Register on April 17, 2015 and which became effective on October 19, 2015. Specific obligations for Owners and Operators of existing CCR units regarding the preparation of “Annual Groundwater Monitoring and Corrective Action Reports (Annual Report)” are outlined in §257.90(e)(1-5). The first of these Annual Reports was completed no later than January 31, 2018, and provided information to address the following aspects for the preceding calendar year:

- Document the status of the groundwater monitoring and corrective action program for the respective CCR units;
- Summarize key actions completed;
- Describe any problems encountered and actions taken to resolve the problems; and
- Offer a projection of key activities for the upcoming year.

At a minimum, the Annual Report must contain the following information to the extent applicable and available:

- A map, aerial image, or diagram showing the CCR unit and all background/upgradient and downgradient monitoring wells, to include the well identification numbers, that are part of the groundwater monitoring program;
- Identification of any monitoring wells that were installed or decommissioned during the preceding year, along with a narrative description of why those actions were taken;
- In addition to all the monitoring data obtained under §257.90 through §257.98, a summary including the number of groundwater samples that were collected for analysis for each background/upgradient and downgradient well, the dates the samples were collected, and whether the sample was required by the detection monitoring or assessment monitoring programs;
- A narrative discussion of any transition between monitoring programs (e.g., the date and circumstances for transitioning from detection monitoring to assessment monitoring in addition to identifying the constituent(s) detected at a statistically significant increase over background levels); and
- Any other information required to be included as specified in §257.90 through §257.98.

The New Castle Generating Station, owned by New Castle Power, LLC, a subsidiary of GenOn Holdings, Inc. (GenOn), is a coal-fired power plant located in West Pittsburg, Pennsylvania. The Rule applies to this facility due to the management/disposal of CCR materials that are generated from the combustion of coal. CCR units associated with station operations include the New Castle Plant Ash Landfill and the North Ash Pond; however, the management/placement of CCR materials in both units has been significantly curtailed since the transition from coal to natural gas firing was effected in mid-2016. Moreover, this transition resulted in the “closure by removal” of the North Ash Pond in June 2019 in accordance with §257.102(c) of the Rule. Each of these CCR units has a dedicated groundwater monitoring system that was originally installed to comply with Commonwealth of Pennsylvania Residual Waste Regulations, and was subsequently evaluated and modified (as needed) for use under the CCR program.

In summary, this third Annual Report has been prepared to comply with the requirements of §257.90(e), addressing each of the New Castle Station’s CCR Units with respect to the groundwater monitoring and corrective actions undertaken during Calendar Year 2019. This Annual Report and all subsequent reports thereto will be placed in the Station’s operating record per §257.105(h)(1), noticed to the State Director per §257.106(h)(1), and posted to the publicly accessible internet site per §257.107(h)(1).

2.0 *North Ash Pond*

2.1 *Groundwater Monitoring Network*

The CCR groundwater monitoring system for the North Ash Pond is comprised of four wells, including Well MP-20 (upgradient), and Wells MP-21, MP-22, and MP-23 (downgradient). All of the wells are screened within the unconsolidated materials, wherein the uppermost aquifer exists. The locations of the wells are shown on the attached Figure 1, along with depiction of the generalized groundwater flow direction in the area of the pond. Each of these wells was already existing, and no new wells were added nor were any existing wells abandoned/replaced during the 2019 reporting period.

2.2 *Alternate Source Demonstration*

During late-2018 and into early-January 2019, the results from the August 2018 Assessment Monitoring event were reviewed, with indications that each of the three downgradient wells were showing arsenic concentrations representing a statistically significant level (SSL) above the corresponding groundwater protection standard. Accordingly, and per the provisions of §257.94(e)(2), efforts were undertaken to conduct an Alternate Source Demonstration (ASD) in an attempt to identify a potential source other than the North Ash Pond which was responsible for the observed SSLs of arsenic. This ASD was completed in April 2019, and yielded findings to clearly demonstrate that an unlined historical ash impoundment was responsible for the elevated arsenic concentrations. A copy of the April 2019 ASD (as certified by APTIM's qualified professional engineer) is included in Appendix A. Based on the successful completion of the ASD and per §257.95(g)(3)(ii), the North Ash Pond continued in the Assessment Monitoring program relative to the 2019 CCR sampling activities.

2.3 *2019 Data Collection*

Following completion of the above-noted ASD, the North Ash Pond continued in the CCR Assessment Monitoring Program with the May 2019 sampling event encompassing Appendix III constituents and the full list of Appendix IV parameters. Results from this sampling event are summarized in Tables 1 and 2, covering Appendix III and Appendix IV, respectively. As shown in Table 2, only barium and arsenic were detected at concentrations above background. Arsenic values again represented SSLs in each of the downgradient wells although now recognized as being associated with the identified alternate source, the historic ash impoundment.

No further sampling was conducted in 2019, as the North Ash Pond was subjected to successful "closure by removal" [per §257.102(c)] as documented in the June 2019 Closure Certification Report prepared by APTIM's qualified professional engineer [per §257.102(f)(3)]. In accordance with §257.107(i)(8), a copy of this document was posted on GenOn's publicly accessible CCR

website. Commensurate with the closure and the findings from the April 2019 ASD, the former North Ash Pond is no longer a designated CCR Unit and the Rule requirements for groundwater monitoring are no longer applicable [per §257.102(c)].

2.4 2019 Monitoring Program Transitions

In 2019, the North Ash Pond remained in the Assessment Monitoring Program based on the findings from the ASD discussed above in Section 2.2. Only one round of sampling was performed during the 2019 reporting period, as a result of the mid-year closure of the North Ash Pond, effective June 2019.

2.5 2019 Corrective Actions

During 2019, there were no problems identified or corrective actions undertaken.

2.6 2020 Projected Activities

The former North Ash Pond is no longer designated as a CCR Unit. Per §257.102(c), groundwater monitoring requirements are no longer applicable and have been terminated.

3.0 Ash Landfill

3.1 Groundwater Monitoring Network

The CCR groundwater monitoring system for the Ash Landfill is comprised of six wells, including Wells MP-11 and P-6 (upgradient), and Wells MP-10R, MP-12, MP-15, and MP-18 (downgradient). All of the wells are screened within the unconsolidated materials, wherein the uppermost aquifer exists. The locations of the wells are shown on Figure 1 along with a depiction of the generalized groundwater flow direction. Each of these wells was already existing, and no new wells were added nor were any existing wells abandoned/replaced during the 2019 reporting period.

3.2 2019 Data Collection

Based on the April 2018 Alternate Source Demonstration (ASD), which successfully identified the historic ash impoundment as the source of SSIs for multiple Appendix III constituents (boron, calcium, sulfate, and total dissolved solids [TDS]), the Ash Landfill entered 2019 still under the provisions of the Detection Monitoring Program. Accordingly, during the 2019 reporting period, sampling events were performed in both May and August to comply with the semi-annual monitoring requirements per §257.94(b). The data from these events is summarized in Table 3. Considering the May 2019 and August 2019 Detection Monitoring events showed SSIs for the same general group of Appendix III constituents, and that flow in the Ash Landfill leachate detection zone remains absent, the findings from the April 2018 ASD stand as relevant and applicable. Moving into 2020, the Ash Landfill will continue in the CCR Detection Monitoring Program.

3.3 2019 Monitoring Program Transitions

During 2019, there were no transitions between monitoring programs. As a result of the successful ASD (April 2018) and its continued relevance and applicability, only activities in support of the Detection Monitoring Program were conducted.

3.4 2019 Corrective Actions

During 2019, there were no problems identified or corrective actions undertaken.

3.5 2020 Projected Activities

AS noted, it is anticipated that Detection Monitoring activities will continue for the Ash Landfill during 2020, with continued review of Appendix III constituent concentrations and comparison against the calculated background values.

Table 1
New Castle Generating Station
North Ash Pond--Groundwater Analytical Data
CCR Appendix III Constituents

Monitoring Well	Date Sampled	Groundwater Elevation (ft. MSL)	Total Boron (mg/L)	Total Calcium (mg/L)	Total Chloride (mg/L)	Total Fluoride (mg/L)	Total Dissolved Solids (mg/L)	Sulfate (mg/L)	pH (S.U.)
			Calculated Background						
			3.29	669	32	0.5	2764	1610	6.45-6.90
MP-20 (Upgradient)	29-Dec-15	766.13	1.81	506	30	< 0.5	2340	1390	6.72
	2-Mar-16	766.55	1.68	606	28	< 0.1	2260	1190	6.77
	2-Jun-16	766.13	1.38	452	28	< 0.1	2310	1100	6.62
	8-Sep-16	763.41	1.53	511	26	0.1	2230	1150	6.68
	1-Dec-16	764.11	1.73	500	25	< 0.1	2160	1050	6.79
	2-Mar-17	766.95	2.13	572	27	< 0.1	2320	1330	6.72
	31-May-17	768.15	2.23	570	27	< 0.2	2520	1270	6.57
	30-Aug-17	765.05	2.39	586	26	< 0.1	2530	1150	6.66
	9-Oct-17	764.22	2.39	583	22	< 0.1	2590	1080	6.69
	24-May-18	766.71	2.55	604	28	< 0.5	2470	1310	6.93
29-Aug-18	765.31	2.59	560	23	< 0.5	2430	1170	6.80	
23-May-19	769.56	3.10	537	25	< 0.1	2280	1280	7.23	
MP-21 (Downgradient)	29-Dec-15	765.68	1.66	473	34	< 0.5	2260	1260	6.68
	2-Mar-16	766.09	1.64	527	31	< 0.1	2160	1150	6.69
	2-Jun-16	765.63	1.52	456	30	< 0.1	2450	1210	6.53
	8-Sep-16	762.86	1.59	477	29	0.2	2300	1220	6.56
	1-Dec-16	763.54	1.77	529	27	< 0.1	2210	1060	6.66
	2-Mar-17	766.53	< 0.05	489	30	< 0.1	2210	1230	6.85
	1-Jun-17	767.65	1.67	525	32	< 0.2	2270	1220	6.52
	30-Aug-17	764.62	1.71	510	31	< 0.1	2310	1070	6.59
	9-Oct-17	763.81	1.72	467	27	< 0.1	2360	959	6.69
	24-May-18	766.14	1.76	448	33	< 0.5	2150	1090	6.91
29-Aug-18	764.70	1.52	475	31	< 0.5	2320	1140	6.77	
23-May-19	766.15	1.70	472	30	< 0.1	2210	1220	7.05	
MP-22 (Downgradient)	29-Dec-15	764.41	1.38	387	34	< 0.5	1650	761	6.76
	2-Mar-16	764.59	1.41	388	34	< 0.1	1620	816	6.72
	2-Jun-16	763.89	1.27	336	33	< 0.1	1700	801	6.54
	8-Sep-16	761.33	1.39	404	32	0.1	1750	845	6.57
	1-Dec-16	761.92	1.32	409	31	< 0.1	1710	798	6.62
	2-Mar-17	765.03	1.45	381	33	0.1	1710	868	6.63
	1-Jun-17	766.06	1.39	436	35	< 0.2	1790	915	6.47
	30-Aug-17	763.17	1.44	429	33	< 0.1	1860	832	6.66
	9-Oct-17	762.42	1.50	411	31	< 0.1	1990	840	6.55
	24-May-18	764.35	1.62	392	35	< 0.5	1950	861	6.70
29-Aug-18	763.22	1.16	424	33	< 0.5	1940	921	6.60	
23-May-19	763.99	1.39	394	34	< 0.1	1840	974	7.00	
MP-23 (Downgradient)	29-Dec-15	759.66	0.78	408	59	< 0.5	1740	1060	6.72
	2-Mar-16	754.89	0.81	436	50	< 0.1	1710	999	6.70
	2-Jun-16	754.80	0.73	357	47	0.1	1790	981	6.49
	8-Sep-16	750.96	0.82	397	48	0.5	1630	873	6.53
	1-Dec-16	753.21	0.74	371	52	0.1	1430	815	6.61
	2-Mar-17	761.40	0.80	334	48	0.2	1350	702	6.77
	1-Jun-17	762.92	0.77	361	55	< 0.2	1360	769	6.56
	30-Aug-17	760.38	0.72	297	54	< 0.1	1290	595	6.92
	9-Oct-17	760.36	0.68	278	52	0.1	1270	563	6.72
	24-May-18	762.00	0.83	338	58	< 0.5	1190	518	6.89
29-Aug-18	760.33	0.76	275	58	< 0.5	1090	556	6.73	
23-May-19	759.84	0.80	335	53	0.1	1300	714	7.06	

Notes:

1. Cells with "<" are represented as non-detects. Values shown correspond to the laboratory reporting limit.
2. Background values based on statistical evaluation of initial eight rounds (Dec. 2015 thru Aug. 2017) of groundwater sampling data for Well MP-20.

Table 2
New Castle Generating Station
North Ash Pond--Groundwater Analytical Data
CCR Appendix IV Constituents

Monitoring Well	Date Sampled	Total Antimony (mg/L)	Total Arsenic (mg/L)	Total Barium (mg/L)	Total Beryllium (mg/L)	Total Cadmium (mg/L)	Total Chromium (mg/L)	Total Cobalt (mg/L)	Total Fluoride (mg/L)	Total Lead (mg/L)	Total Lithium (mg/L)	Total Mercury (mg/L)	Total Molybdenum (mg/L)	Total Selenium (mg/L)	Total Thallium (mg/L)	Total Radium-226 and 228 (pCi/L)
		Calculated Background														
		0.001	0.02	0.09	0.001	0.002	0.01	0.005	0.5	0.001	0.40	0.0002	0.02	0.001	0.0002	4.19
		Groundwater Protection Standard														
		MCL	Background	MCL	MCL	MCL	MCL	RSL	MCL	RSL	Background	MCL	RSL	MCL	MCL	MCL
0.006	0.02	2	0.004	0.005	0.1	0.006	4.0	0.015	0.40	0.002	0.10	0.05	0.002	5		
MP-20 (Upgradient)	29-Dec-15	< 0.001	0.016	0.07	< 0.001	< 0.002	< 0.01	< 0.005	< 0.5	< 0.001	0.18	< 0.0002	< 0.02	< 0.001	< 0.0002	1.35
	2-Mar-16	< 0.001	0.018	0.06	< 0.001	< 0.002	< 0.01	< 0.005	< 0.1	< 0.001	0.16	< 0.0002	< 0.02	< 0.001	< 0.0002	1.29
	2-Jun-16	< 0.001	0.019	0.05	< 0.001	< 0.002	< 0.01	< 0.005	< 0.1	< 0.001	0.13	< 0.0002	< 0.02	< 0.001	< 0.0002	1.56
	8-Sep-16	< 0.001	0.020	0.06	< 0.001	< 0.002	< 0.01	< 0.005	0.1	< 0.001	0.14	< 0.0002	< 0.02	< 0.001	< 0.0002	2.77
	1-Dec-16	< 0.001	0.018	0.07	< 0.001	< 0.0002	< 0.01	< 0.005	< 0.1	< 0.001	0.15	< 0.0002	< 0.02	< 0.001	< 0.0002	1.20
	2-Mar-17	< 0.001	0.018	0.08	< 0.001	< 0.0002	< 0.01	< 0.005	< 0.1	< 0.001	0.23	< 0.0002	< 0.02	< 0.001	< 0.0002	0.08
	31-May-17	< 0.001	0.018	0.07	< 0.001	< 0.0002	< 0.01	< 0.005	< 0.2	< 0.001	0.24	< 0.0002	< 0.02	< 0.001	< 0.0002	2.18
	30-Aug-17	< 0.001	0.019	0.07	< 0.001	< 0.0002	< 0.01	< 0.005	< 0.1	< 0.001	0.25	< 0.0002	< 0.02	< 0.001	< 0.0002	2.39
	24-May-18	< 0.001	0.018	0.07	< 0.001	< 0.002	< 0.01	< 0.005	< 0.5	< 0.001	0.29	< 0.0002	< 0.02	< 0.001	< 0.0002	1.46
	29-Aug-18	Not Analyzed	0.018	0.07	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	< 0.5	Not Analyzed	0.26	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	1.35
23-May-19	< 0.001	0.017	0.07	< 0.001	< 0.002	< 0.01	< 0.005	< 0.1	< 0.001	0.28	< 0.0002	< 0.02	< 0.001	< 0.0002	1.99	
MP-21 (Downgradient)	29-Dec-15	< 0.001	0.079	0.12	< 0.001	< 0.002	< 0.01	< 0.005	< 0.5	< 0.001	0.08	< 0.0002	< 0.02	< 0.001	< 0.0002	1.12
	2-Mar-16	< 0.001	0.080	0.13	< 0.001	< 0.002	< 0.01	< 0.005	< 0.1	< 0.001	0.08	< 0.0002	< 0.02	< 0.001	< 0.0002	1.92
	2-Jun-16	< 0.001	0.091	0.12	< 0.001	< 0.002	< 0.01	< 0.005	< 0.1	< 0.001	0.08	< 0.0002	< 0.02	< 0.001	< 0.0002	2.27
	8-Sep-16	< 0.001	0.084	0.13	< 0.001	< 0.002	< 0.01	< 0.005	0.2	< 0.001	0.09	< 0.0002	< 0.02	< 0.001	< 0.0002	3.19
	1-Dec-16	< 0.001	0.085	0.13	< 0.001	< 0.002	< 0.01	< 0.005	< 0.1	< 0.001	0.09	< 0.0002	< 0.02	< 0.001	< 0.0002	1.15
	2-Mar-17	< 0.001	0.083	0.12	< 0.001	< 0.0002	< 0.01	< 0.005	0.1	< 0.001	0.09	< 0.0002	< 0.02	< 0.001	< 0.0002	1.10
	1-Jun-17	< 0.001	0.081	0.12	< 0.001	< 0.0002	< 0.01	< 0.005	< 0.2	< 0.001	0.09	< 0.0002	< 0.02	< 0.001	< 0.0002	1.88
	30-Aug-17	< 0.001	0.088	0.11	< 0.001	< 0.0002	< 0.01	< 0.005	< 0.1	< 0.001	0.09	< 0.0002	< 0.02	< 0.001	< 0.0002	3.11
	24-May-18	< 0.001	0.087	0.11	< 0.001	< 0.002	< 0.01	< 0.005	< 0.5	< 0.001	0.09	< 0.0002	< 0.02	< 0.001	< 0.0002	2.37
	29-Aug-18	Not Analyzed	0.071	0.11	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	< 0.5	Not Analyzed	0.09	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	1.49
23-May-19	< 0.001	0.082	0.12	< 0.001	< 0.002	< 0.01	< 0.005	< 0.1	< 0.001	0.10	< 0.0002	< 0.02	< 0.001	< 0.0002	1.03	
MP-22 (Downgradient)	29-Dec-15	< 0.001	0.045	0.07	< 0.001	< 0.002	< 0.01	< 0.005	< 0.5	< 0.001	0.04	< 0.0002	< 0.02	< 0.001	< 0.0002	0.64
	2-Mar-16	< 0.001	0.058	0.06	< 0.001	< 0.002	< 0.01	< 0.005	< 0.1	< 0.001	0.03	< 0.0002	< 0.02	< 0.001	< 0.0002	1.24
	2-Jun-16	< 0.001	0.074	0.05	< 0.001	< 0.002	< 0.01	< 0.005	< 0.1	< 0.001	0.03	< 0.0002	< 0.02	< 0.001	< 0.0002	1.66
	8-Sep-16	< 0.001	0.078	0.05	< 0.001	< 0.002	< 0.01	< 0.005	0.1	< 0.001	0.04	< 0.0002	< 0.02	< 0.001	< 0.0002	2.85
	1-Dec-16	< 0.001	0.086	0.05	< 0.001	< 0.0002	< 0.01	< 0.005	< 0.1	< 0.001	0.03	< 0.0002	< 0.02	< 0.001	< 0.0002	1.08
	2-Mar-17	< 0.001	0.079	0.05	< 0.001	< 0.0002	< 0.01	< 0.005	0.1	< 0.001	0.03	< 0.0002	< 0.02	< 0.001	< 0.0002	1.96
	1-Jun-17	< 0.001	0.082	0.05	< 0.001	< 0.0002	< 0.01	< 0.005	< 0.2	< 0.001	0.03	< 0.0002	< 0.02	< 0.001	< 0.0002	1.26
	30-Aug-17	< 0.001	0.088	0.04	< 0.001	< 0.0002	< 0.01	< 0.005	< 0.1	< 0.001	0.03	< 0.0002	< 0.02	< 0.001	< 0.0002	4.24
	24-May-18	< 0.001	0.091	0.04	< 0.001	< 0.002	< 0.01	< 0.005	< 0.5	< 0.001	0.04	< 0.0002	< 0.02	< 0.001	< 0.0002	0.57
	29-Aug-18	Not Analyzed	0.087	0.04	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	< 0.5	Not Analyzed	0.04	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	0.87
23-May-19	< 0.001	0.090	0.06	< 0.001	< 0.002	< 0.01	< 0.005	< 0.1	< 0.001	0.04	< 0.0002	< 0.02	< 0.001	< 0.0002	1.66	
MP-23 (Downgradient)	29-Dec-15	< 0.001	0.068	0.02	< 0.001	< 0.002	< 0.01	< 0.005	< 0.5	< 0.001	0.12	< 0.0002	< 0.02	< 0.001	< 0.0002	0.35
	2-Mar-16	< 0.001	0.069	0.02	< 0.001	< 0.002	< 0.01	< 0.005	< 0.1	< 0.001	0.12	< 0.0002	< 0.02	< 0.001	< 0.0002	2.72
	2-Jun-16	< 0.001	0.079	0.02	< 0.001	< 0.002	< 0.01	< 0.005	0.1	< 0.001	0.10	< 0.0002	< 0.02	< 0.001	< 0.0002	2.10
	8-Sep-16	< 0.001	0.069	0.02	< 0.001	< 0.002	< 0.01	< 0.005	0.5	< 0.001	0.11	< 0.0002	< 0.02	< 0.001	< 0.0002	3.20
	1-Dec-16	< 0.001	0.070	0.02	< 0.001	< 0.0002	< 0.01	< 0.005	0.1	< 0.001	0.10	< 0.0002	< 0.02	< 0.001	< 0.0002	0.98
	2-Mar-17	< 0.001	0.066	0.03	< 0.001	< 0.0002	< 0.01	< 0.005	0.2	< 0.001	0.10	< 0.0002	< 0.02	< 0.001	< 0.0002	0.36
	1-Jun-17	< 0.001	0.070	0.03	< 0.001	< 0.0002	< 0.01	< 0.005	< 0.2	< 0.001	0.10	< 0.0002	< 0.02	< 0.001	< 0.0002	1.75
	30-Aug-17	< 0.001	0.067	0.02	< 0.001	< 0.0002	< 0.01	< 0.005	< 0.1	< 0.001	0.09	< 0.0002	< 0.02	< 0.001	< 0.0002	2.43
	24-May-18	< 0.001	0.067	0.03	< 0.001	< 0.002	< 0.01	< 0.005	< 0.5	< 0.001	0.10	< 0.0002	< 0.02	< 0.001	< 0.0002	1.15
	29-Aug-18	Not Analyzed	0.078	0.03	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	< 0.5	Not Analyzed	0.09	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	1.86
23-May-19	< 0.001	0.074	0.04	< 0.001	< 0.002	< 0.01	< 0.005	0.1	< 0.001	0.11	< 0.0002	< 0.02	< 0.001	< 0.0002	1.42	

- Notes:**
- Cells with "<" are represented as non-detects. Values shown correspond to the laboratory reporting limit.
 - Background values based on statistical evaluation of initial eight rounds (Dec. 2015 thru Aug. 2017) of groundwater sampling data for Well MP-20.
 - As indicated, Groundwater Protection Standards are either published MCLs or risk-based Regional Screening Levels (RSLs). For constituents where calculated background exceeds either the MCL or RSL, the background value is used.

Table 3
New Castle Generating Station
Ash Landfill--Groundwater Analytical Data
CCR Appendix III Constituents

Monitoring Well	Date Sampled	Groundwater Elevation (ft. MSL)	Total Boron (mg/L)	Total Calcium (mg/L)	Total Chloride (mg/L)	Total Fluoride (mg/L)	Total Dissolved Solids (mg/L)	Sulfate (mg/L)	pH (S.U.)
			Calculated Background						
			0.30	217	50	0.1	980	454	6.04-7.96
MP-11 (Upgradient)	30-Dec-15	776.93	0.05	146	36	< 0.1	922	425	7.47
	1-Mar-16	778.21	0.09	173	31	< 0.1	842	410	7.39
	1-Jun-16	777.77	0.15	178	27	< 0.1	890	385	7.29
	7-Sep-16	776.00	0.07	169	33	< 0.1	980	380	7.33
	30-Nov-16	776.24	0.08	167	33	0.1	872	390	7.43
	1-Mar-17	778.54	0.34	187	26	< 0.1	880	371	7.35
	31-May-17	778.75	0.09	192	25	0.1	838	381	7.03
	29-Aug-17	778.66	0.08	178	48	0.1	916	408	7.11
	10-Oct-17	776.06	0.07	178	39	< 0.1	916	392	6.90
	23-May-18	779.13	0.08	187	27	0.1	806	365	7.07
	28-Nov-18	780.14	0.09	172	29	< 0.1	900	389	6.77
	22-May-19	778.35	0.08	179	24	0.2	794	400	7.18
27-Aug-19	778.16	0.08	171	23	0.2	806	395	7.29	
P-6 (Upgradient)	30-Dec-15	777.39	0.11	126	19	< 0.1	622	297	6.69
	1-Mar-16	777.65	0.13	146	26	< 0.1	602	322	6.65
	1-Jun-16	777.93	0.11	129	19	< 0.1	618	302	6.63
	7-Sep-16	776.38	0.12	136	21	< 0.1	620	306	6.58
	30-Nov-16	776.97	0.12	141	19	< 0.1	614	297	6.56
	1-Mar-17	778.64	0.12	135	20	< 0.1	614	305	6.60
	31-May-17	778.64	0.11	146	22	< 0.1	606	316	6.42
	29-Aug-17	777.17	0.12	138	22	< 0.1	644	327	6.52
	10-Oct-17	776.67	0.12	139	21	< 0.1	620	320	6.62
	23-May-18	779.25	0.12	154	20	< 0.1	614	301	6.46
	28-Nov-18	779.95	0.12	142	24	< 0.1	656	342	6.32
	22-May-19	779.44	0.12	147	25	< 0.1	606	353	6.80
27-Aug-19	778.99	0.11	139	25	0.1	602	356	6.82	
MP-10R (Downgradient)	30-Dec-15	768.89	9.62	294	24	< 0.1	1650	853	6.02
	1-Mar-16	769.63	9.55	330	26	< 0.1	1510	784	6.14
	1-Jun-16	768.79	7.95	226	20	< 0.1	1250	609	5.90
	7-Sep-16	764.97	10.9	352	31	< 0.1	1730	817	6.05
	30-Nov-16	766.49	12.7	330	34	< 0.1	1670	824	6.10
	1-Mar-17	769.79	12.1	285	37	< 0.1	1450	797	6.17
	31-May-17	770.70	5.47	212	23	< 0.1	1010	474	6.01
	29-Aug-17	766.48	10.1	254	27	< 0.1	1300	625	6.06
	10-Oct-17	765.37	12.5	296	31	< 0.1	1550	742	6.10
	23-May-18	771.74	3.06	156	8	< 0.1	592	212	6.00
	28-Nov-18	772.33	4.85	212	17	< 0.1	906	415	6.01
	22-May-19	770.86	1.60	118	4	< 0.1	410	134	6.43
27-Aug-19	769.17	1.56	118	2	< 0.1	462	191	6.52	
MP-12 (Downgradient)	30-Dec-15	772.05	4.96	573	14	< 0.5	4320	2560	6.61
	1-Mar-16	772.56	4.38	594	11	< 1.0	3640	1970	6.55
	1-Jun-16	772.38	3.63	482	11	< 1.0	3780	2140	6.54
	7-Sep-16	769.74	5.35	600	14	< 1	4420	2490	6.50
	30-Nov-16	770.29	4.32	600	12	< 0.5	4030	1950	6.53
	1-Mar-17	772.65	4.19	582	16	0.2	4040	2380	6.60
	31-May-17	773.85	2.59	569	14	< 0.2	3300	1780	6.18
	29-Aug-17	771.16	3.94	589	18	< 0.5	4600	2760	6.31
	10-Oct-17	770.36	4.43	585	14	< 0.1	4490	1920	6.38
	23-May-18	775.03	0.63	58	2	0.2	258	115	5.62
	28-Nov-18	775.26	1.26	175	5	0.2	1160	666	6.20
	22-May-19	773.88	0.76	96	2	0.2	554	328	5.74
27-Aug-19	773.12	1.72	248	5	1.2	1520	990	5.91	

Table 3
New Castle Generating Station
Ash Landfill--Groundwater Analytical Data
CCR Appendix III Constituents

Monitoring Well	Date Sampled	Groundwater Elevation (ft. MSL)	Total Boron (mg/L)	Total Calcium (mg/L)	Total Chloride (mg/L)	Total Fluoride (mg/L)	Total Dissolved Solids (mg/L)	Sulfate (mg/L)	pH (S.U.)
			Calculated Background						
			0.30	217	50	0.1	980	454	6.04-7.96
MP-15 (Downgradient)	30-Dec-15	773.86	1.13	638	7	< 0.1	2340	1150	6.68
	2-Mar-16	775.04	1.25	761	6	< 0.1	2310	1230	6.73
	2-Jun-16	773.54	1.22	645	6	< 0.1	2390	1180	6.62
	7-Sep-16	770.57	1.13	643	5	< 0.1	2320	1120	6.53
	30-Nov-16	772.62	1.06	585	6	< 0.1	2190	1060	6.61
	1-Mar-17	775.78	1.20	670	7	< 0.1	2290	1210	6.48
	31-May-17	775.86	1.30	669	8	< 0.2	2420	1120	6.49
	29-Aug-17	771.62	1.12	627	6	< 0.2	2280	1130	6.41
	9-Oct-17	771.11	1.09	620	5	< 0.1	2310	990	6.54
	23-May-18	777.07	1.10	699	4	< 0.1	2330	1060	6.30
	29-Nov-18	776.30	1.27	715	5	< 0.1	2570	1260	6.39
	22-May-19	779.54	1.07	681	3	< 0.1	2310	1300	6.81
	27-Aug-19	775.98	1.13	697	8	0.2	2400	1360	6.58
MP-18 (Downgradient)	30-Dec-15	769.18	1.03	124	10	0.2	536	98	6.75
	1-Mar-16	769.56	1.03	87	4	0.1	336	53	6.49
	1-Jun-16	768.74	0.99	137	10	< 0.2	580	91	6.82
	7-Sep-16	765.28	1.04	149	14	0.2	606	115	6.74
	30-Nov-16	767.26	1.18	134	15	0.2	512	80	6.55
	1-Mar-17	770.51	0.99	108	12	0.1	442	66	6.54
	31-May-17	770.28	0.80	66	5	0.1	252	33	5.93
	29-Aug-17	767.09	1.06	144	12	0.2	520	59	6.74
	10-Oct-17	766.96	1.15	136	9	0.1	518	68	6.69
	23-May-18	770.94	0.58	49	2	< 0.1	192	18	5.88
	28-Nov-18	771.42	0.85	71	3	0.1	294	37	5.99
	22-May-19	770.36	1.02	126	7	0.3	422	24	6.65
	27-Aug-19	769.05	1.11	132	6	0.4	472	43	6.98

Notes:

1. Cells with "<" are represented as non-detects. Values shown correspond to the laboratory reporting limit.
2. Background values based on statistical evaluation of initial eight rounds (Dec. 2015 thru Aug. 2017) of groundwater sampling data for Wells MP-11 and P-6.

Figures

File: O:\PROJECT\631003785-New Castle\631003785-B1.dwg
 Plot Date/Time: Jan 07, 2020 - 9:02am
 Plotted By: Greg Jones
 Xref: image
 OFFICE Pittsburgh, PA
 DATE 1/6/20
 DESIGNED BY
 DRAWN BY E. Schlegel
 CHECKED BY
 APPROVED BY
 DRAWING NUMBER 631003785-B1



LEGEND:

- CCR GROUNDWATER MONITORING WELL FOR NEW CASTLE PLANT ASH LANDFILL WITH GROUNDWATER ELEVATIONS MEASURED ON MAY 22, 2019.
- CCR GROUNDWATER MONITORING WELL FOR NORTH ASH POND WITH GROUNDWATER ELEVATIONS MEASURED ON MAY 23, 2019.
- GROUNDWATER FLOW DIRECTION



REFERENCES:

1. GOOGLE AERIAL PHOTOGRAPH, DATED 4/15/2016.

APTIM
 500 Penn Center Boulevard,
 Suite 1000
 Pittsburgh, Pennsylvania 15235



FIGURE 1
CCR COMPLIANCE GROUNDWATER MONITORING WELL LOCATION MAP
 PLANT ASH LANDFILL AND NORTH ASH POND
 NEW CASTLE GENERATING STATION
 NEW CASTLE, PENNSYLVANIA

Appendix A

North Ash Pond—Alternate Source Demonstration

**CCR COMPLIANCE
ALTERNATE SOURCE DEMONSTRATION
APPENDIX IV GROUNDWATER EXCEEDANCE
NEW CASTLE NORTH BOTTOM ASH POND**

Prepared for:



GenOn Power Midwest LP
New Castle Generating Station
West Pittsburg, Pennsylvania

Prepared by:



Aptim Environmental & Infrastructure, LLC
St. Charles, Illinois

April 2019

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1.0 Introduction

Title 40 Code of Federal Regulations (CFR) §257.90 mandates that existing Coal Combustion Residuals (CCR) impoundments, also known as CCR units, be subject to groundwater monitoring and corrective action requirements as further detailed in §257.91 through §257.98. These requirements are part of the overall CCR Rule (or Rule) which was published in the Federal Register on April 17, 2015 and became effective on October 19, 2015. Specific obligations for Owners and Operators of existing CCR units regarding the requirements for groundwater sampling as part of the CCR Detection and Assessment Monitoring Programs are outlined in §257.94 and §257.95, respectively.

The New Castle Generating Station, operated by GenOn Power Midwest LP, a subsidiary of GenOn Holdings, Inc. (GenOn), is a coal-fired power plant located in West Pittsburg, Pennsylvania. The Rule applies to this facility due to the management/disposal of CCR materials that are generated from the combustion of coal. Regulated CCR units associated with station operations include the North Bottom Ash Pond and the New Castle Plant Ash Landfill (not the subject of this current document). However, the management/placement of CCR materials in both units has been significantly curtailed since the transition from coal to natural gas firing was effected in mid-2016.

The North Bottom Ash Pond has a dedicated groundwater monitoring system that has been developed and operated to meet CCR Rule requirements. The groundwater monitoring system consists of one upgradient well (MP-20) and three downgradient wells (MP-21, MP-22, and MP-23). The locations of the wells are shown on Figure 1. Detection Monitoring for the North Bottom Ash Pond began in in December 2015 after implementation of the CCR Rule.

The North Bottom Ash Pond was transitioned into the CCR Assessment Monitoring Program in April 2018 due to elevated chloride levels that were observed in downgradient well MP-23. Upon entry into the Assessment Monitoring Program, an initial round of samples covering all Appendix III and Appendix IV constituents was collected in May 2018 (refer to attached Tables 1 and 2) per §257.95(b). Appendix IV constituents that were detected in May 2018 were analyzed again during the August 2018 Assessment Monitoring Event. Following receipt and evaluation of the data, a preliminary determination was made that arsenic was present in all downgradient wells at concentrations that represented a statistically significant level (SSL) above the corresponding groundwater protection standard.

With preliminary consideration of the results being representative of an SSL, a decision was made on January 15, 2019 to evaluate whether the North Bottom Ash Pond or an alternate source was the contributing source of the observed arsenic concentrations in the wells. The CCR Rule allows

for an Alternate Source Demonstration (ASD) in accordance with the provisions of §257.95(g)(3)(ii), which states:

“The owner or operator may demonstrate that a source other than the CCR unit caused the contamination, or that the statistically significant increase resulted from an error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality.”

As described in subsequent sections, an alternate source has been demonstrated to be the source of the arsenic that has been observed in the groundwater monitoring network. This ASD has been prepared to demonstrate conformance with the requirements of §257.95(g)(3)(ii), and which further stipulate that the ASD must be completed within 90 days of detecting a SSL(s) and be certified by a qualified professional engineer. When a successful ASD is completed, then sampling under the CCR Assessment Monitoring program may continue for the unit. The ASD must also be included in the Annual Groundwater Monitoring and Corrective Action Report [per §257.90(e)], which is to be prepared by January 31 of each year. If at the end of the 90-day period the ASD is proven unsuccessful, the owner or operator of the affected CCR unit must then initiate an Assessment of Corrective Measures per the requirements of §257.96.

2.0 Background

The North Bottom Ash Pond, which is situated north of the main generating station and south of the Plant Ash Landfill, is reported to have been originally constructed in 1955 and encompasses an area of approximately 2.3 acres, as measured around the crest of the pond. The pond is primarily incised in an area where fly ash and fill were previously placed. A 1 to 3 foot dike is present around the eastern side of the pond. The pond is approximately 450 feet long by 200 feet wide as measured from crest to crest at the widest sections, and has an average depth of 15 feet. Ground surface elevations around the top of the pond typically range between 778 to 781 feet above mean sea level (ft MSL), while the elevation of the bottom of the pond is at approximately 760 ft MSL.

From Figure 1, it is further observed that the pond is located immediately adjacent and hydraulically downgradient of an acknowledged unlined historic impoundment (approx. 120 acres in size) that was utilized for the management of coal ash. Specifically, this impoundment accepted sluiced fly ash and bottom ash from approximately 1939 to 1978, and then “dry” fly ash from approximately 1978 to 1984. The impoundment continued to be utilized up until the time that the Plant Ash Landfill was constructed in the northern portion of the impoundment footprint.

The historic impoundment is a feature recognized by the Pennsylvania Department of Environmental Protection (PADEP) to contribute to long-standing groundwater impacts, particularly arsenic, in the northern area of the Station. These impacts and the required monitoring/reporting actions are detailed in the Station’s Solid Waste Permit No. 300818 (issued February 23, 1999 and modified April 23, 2008), and further memorialized in the Consent Order and Agreement (dated August 3, 2006) between PADEP and Orion Power Midwest LP (predecessor to the current operating entity GenOn Power Midwest LP).

It is noted that the currently active Stage 4 section of the Plant Ash Landfill (deemed as the CCR unit) is wholly located on top of the historic ash impoundment. However, Stage 4 is separated from the underlying historic impoundment and the originally permitted Landfill Stages 1, 2, and 3A (which lie directly atop the historic impoundment and beneath Stage 4) by an engineered liner system that has been reviewed and approved by PADEP.

As previously noted, four wells were installed in 2015 to support the requirements for CCR groundwater monitoring of the North Bottom Ash Pond, including one upgradient well (MP-20) and three downgradient wells (MP-21, MP-22, and MP-23). Background sampling was performed over the course of eight quarterly events (4th QTR 2015 through 3rd QTR 2017) at all four groundwater monitoring wells. Data from upgradient well MP-20 was then utilized to calculate site-specific background levels for each of the Appendix III constituents (as shown on Table 1).

The results from the 3rd QTR 2017 Detection Monitoring event showed chloride concentrations in downgradient well MP-23 (52 mg/L) to be above the calculated acceptable background value (32 mg/L). Based on this exceedance and characterization as a statistically significant increase (SSI) above the established background concentration, a decision was made on January 15, 2018 to evaluate the potential existence of an alternate source for the observed chloride concentration in well MP-23. Accordingly, and per the provisions of §257.94(e)(2), efforts were undertaken to conduct an ASD in an attempt to determine whether a potential source other than the North Bottom Ash Pond was responsible for the observed SSI. This alternate source evaluation was ultimately inconclusive and did not yield sufficient information to indicate whether another potential source was contributing to the observed elevated chloride levels in Well MP-23.

Due to the fact that an alternative source was not conclusively determined to be responsible for the 3rd QTR 2017 chloride SSI, the North Bottom Ash Pond was transitioned into the CCR Assessment Monitoring Program in April 2018.

As noted in Section 1.0, an initial round of samples covering all Appendix III and Appendix IV constituents was collected in May 2018 (refer to attached Tables 1 and 2) per §257.95(b). From these results, detected Appendix IV constituents were carried forward and analyzed during the August 2018 Assessment Monitoring Event. Following receipt and evaluation of the data, a preliminary determination was made that arsenic was present in all downgradient wells at concentrations that represented a statistically significant level (SSL) above the corresponding groundwater protection standard.

As presented in the following sections of this document, evidence supports the conclusion that the arsenic concentrations in the downgradient wells are caused by an alternate source, namely the 120-acre historic unlined impoundment that is immediately adjacent (i.e., north and west) to the North Bottom Ash Pond.

3.0 *Geochemical Comparison*

Utilizing the data from the August 2018 Assessment Monitoring event, a geochemical “fingerprint” comparison was performed to determine whether the arsenic levels in monitoring wells MP-21, MP-22, and MP-23 likely originated from the North Bottom Ash Pond or from the another potential alternate upgradient source: the adjacent and immediately upgradient unlined historic ash impoundment.

Ternary diagrams are commonly used to evaluate the similarity of groundwater geochemistry at multiple observation points and to identify likely sources of groundwater impacts when multiple sources are present. Geochemistry ternary diagrams plot the proportion of three dependent chemical constituents in an equilateral triangle. Groundwater that flows through a medium leaching these constituents will generally exhibit clustered data points at downgradient observation points. These data points represent similar ratios of chemical constituent levels.

The following groundwater observation points were used to compare the similarity of chemical constituent ratios (calcium, chloride, and sulfate) at the New Castle facility using ternary diagram methods:

- All North Bottom Ash Pond CCR Groundwater Monitoring Network Wells (August 2018 groundwater data, see Table 1)
- North Bottom Ash Pond effluent reported at NPDES-permitted Outfall 004 (2017 groundwater data presented in New Castle NPDES Permit Renewal Application, see Appendix A)
- Nearby Monitoring Well MP-15 (see Figure 1). (August 2018 groundwater data, see Table 3)

These comparison points provide the opportunity to identify likely sources of the arsenic impact:

- The CCR Groundwater Monitoring Network Wells surround the North Bottom Ash Pond and provide a geochemical makeup of the groundwater that may be impacted by the North Bottom Ash Pond or an alternative upgradient source. For this pond, the unlined historic ash impoundment is immediately upgradient.
- The North Bottom Ash Pond effluent reported at NPDES-permitted Outfall 004 provides the geochemical makeup of the water stored within the Pond.

- Monitoring well MP-15 is downgradient from the unlined historic ash impoundment, but does not capture water that flows through the North Bottom Ash Pond. This well therefore provides a geochemical makeup of groundwater that has flowed through the historic ash impoundment only.

Review of the ternary diagram indicates the geochemical composition of downgradient monitoring wells MP-21, MP-22, and MP-23 is similar to that of upgradient monitoring well MP-20 and nearby well MP-15 but is dissimilar to the water actually contained in the pond (as represented by the Outfall 004 data). This strongly suggests that the unlined historic ash impoundment is the likely source of the elevated arsenic concentrations.

Another comparison to note is that of boron, which is a recognized component of coal ash and considered to be a very mobile indicator parameter as such. Groundwater impacted by coal ash generally contains significant levels of boron. Data from Outfall 004 (Appendix A) show levels of boron within the North Bottom Ash Pond ranging from 0.140 mg/L to 0.151 mg/L. Conversely, levels of boron within upgradient monitoring well MP-20 range from 1.38 mg/L to 2.59 mg/L (over an order of magnitude greater than the North Bottom Ash Pond). Further, levels of boron within each of the downgradient monitoring wells, as well as monitoring well MP-15, are all significantly higher than levels of boron within the North Bottom Ash Pond.

A final comparison to note is arsenic. Like boron, arsenic is also a recognized component of coal ash, and groundwater impacted by coal ash generally contains significant levels of arsenic. Data from Outfall 004 (Appendix A) show arsenic concentrations within the North Bottom Ash Pond ranging from 0.011 mg/L to 0.014 mg/L, with arsenic in the downgradient monitoring wells ranging from 0.045 mg/L to 0.091 mg/L. Again, a notable difference is observed in the concentrations from the potential source water within the pond as compared to the downgradient monitoring wells.

As one would expect, the source of impacted groundwater should contain higher levels of impacts than that of the impacted groundwater itself. Being that the CCR unit (the North Bottom Ash Pond) had lower levels of boron and arsenic than any of the monitoring wells (upgradient and downgradient), it is concluded that all of the monitoring wells are being impacted by an alternate source other than the North Bottom Ash Pond. Further discussion to support this conclusion is provided in Section 4.0.

4.0 *Alternate Source Identification and Conclusions*

Based on groundwater level data obtained during the August 2018 Assessment Monitoring Event, the localized groundwater flow direction in and around the area of the North Bottom Ash Pond is generally from the northeast to the southwest toward the Beaver River (refer to Figure 3). This groundwater flow direction results in a portion of the historic impoundment being situated directly upgradient of the North Bottom Ash Pond. Within this area, well MP-15 is located locally downgradient from the historic impoundment and up- and side-gradient from the North Bottom Ash Pond, and thus serves as an intermediate monitoring location between the two features. If the historic impoundment was the source of the impacts to the North Bottom Ash Pond monitoring locations, then monitoring well MP-15 would be predicted to have similar impacts as the North Bottom Ash Pond monitoring wells. This is, in fact, the case as is seen in the Ternary Diagram in Figure 2. Monitoring well MP-15 is chemically similar to the North Bottom Ash Pond monitoring locations, lying in cluster with them and away from the chemically dissimilar water contained in the North Bottom Ash Pond (represented by Outfall 004 data).

As generally accepted, groundwater impacts are expected to lessen with distance downgradient from the source of those impacts. Based on groundwater flow (refer to Figure 3), monitoring well MP-15 is closest to the historic impoundment, followed in increasing distance by monitoring wells MP-20, MP-21, MP-22, and MP-23, respectively (refer to Figure 4). When various Appendix III constituents from the 4th QTR 2018 Monitoring Events (see Tables 1 and 3) were compared along with monitoring well distance from the historic impoundment, the groundwater impacts did lessen as distance increased (refer to Figures 5, 6, 7, and 8) providing further support that the historic impoundment is the source of the groundwater impacts. It should be noted that the boron concentration in monitoring well MP-15 (refer to Figure 5) was slightly lower than that of well MP-20; however the greatest impact still remains upgradient of the North Bottom Ash Pond and does decrease with distance. Appendix IV constituent arsenic was also compared using the above mentioned monitoring wells along with monitoring well distance from the historic impoundment (refer to Figure 9), utilizing data from the most recent Monitoring Event when all of the monitoring wells were sampled for Appendix IV constituents (August 2017). As shown in Figure 9, the arsenic concentration, similar to the various Appendix III constituent concentrations, also generally lessened as distance from the historic impoundment increased.

As an additional point of reference, the findings detailed in the April 2018 ASD for the New Castle Plant Ash Landfill also identified the historic impoundment as the source of Appendix III groundwater exceedances in monitoring wells downgradient from the landfill, including monitoring well MP-15. From a larger perspective and as previously noted in Section 2.0, the historic impoundment is a feature recognized by PADEP as being the principal contributing source to long-standing groundwater impacts, particularly arsenic, in the northern area of the Station.

From the information above and that presented in previous sections of this ASD, the Appendix IV exceedances for arsenic reported at monitoring wells MP-21, MP-22, and MP-23 during the August 2018 Assessment Monitoring Event have resulted from a source other than the North Bottom Ash Pond. The source for the arsenic exceedances is the historic impoundment located just north of the North Bottom Ash Pond. Commensurate with this conclusion, the SSLs from the August 2018 Assessment Monitoring Event are deemed not to be in association with the New Castle North Bottom Ash Pond. Accordingly, and per §257.95(g)(3)(ii), Assessment Monitoring for the regulated unit will continue on the minimum semiannual frequency as outlined in §257.95(d)(1), until such time as the pond is closed.

5.0 Professional Engineer's Certification

In accordance with §257.95(g)(3)(ii) of the Rule, I hereby certify based on a review of the information contained herein, that the technical and investigatory methods utilized in this Alternate Source Demonstration Report are accurate and appropriate. These methods' application have provided the necessary evidence to conclude that the New Castle North Bottom Ash Pond is not the source of the arsenic SSLs observed during the August 2018 Assessment Monitoring Event.

Certified by: 

Richard Southorn, P.E., P.G.

Professional Engineer Registration No. PE 085411

Aptim Environmental & Infrastructure, LLC

Date: 4/9/19

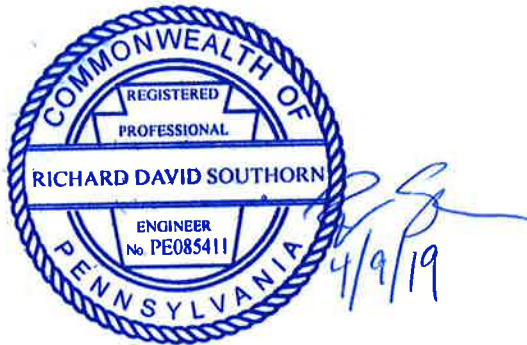


Table 1
New Castle Generating Station
North Ash Pond--Groundwater Analytical Data
CCR Appendix III Constituents

Monitoring Well	Date Sampled	Groundwater Elevation (ft. MSL)	Total Boron (mg/L)	Total Calcium (mg/L)	Total Chloride (mg/L)	Total Fluoride (mg/L)	Total Dissolved Solids (mg/L)	Sulfate (mg/L)	pH (S.U.)
			Calculated Background						
			3.29	669	32	0.5	2764	1610	6.45-6.90
MP-20 (Upgradient)	29-Dec-15	766.13	1.81	506	30	< 0.5	2340	1390	6.72
	2-Mar-16	766.55	1.68	606	28	< 0.1	2260	1190	6.77
	2-Jun-16	766.13	1.38	452	28	< 0.1	2310	1100	6.62
	8-Sep-16	763.41	1.53	511	26	0.1	2230	1150	6.68
	1-Dec-16	764.11	1.73	500	25	< 0.1	2160	1050	6.79
	2-Mar-17	766.95	2.13	572	27	< 0.1	2320	1330	6.72
	31-May-17	768.15	2.23	570	27	< 0.2	2520	1270	6.57
	30-Aug-17	765.05	2.39	586	26	< 0.1	2530	1150	6.66
	9-Oct-17	764.22	2.39	583	22	< 0.1	2590	1080	6.69
24-May-18	766.71	2.55	604	28	< 0.5	2470	1310	6.93	
29-Aug-18	765.31	2.59	560	23	< 0.5	2430	1170	6.80	
MP-21 (Downgradient)	29-Dec-15	765.68	1.66	473	34	< 0.5	2260	1260	6.68
	2-Mar-16	766.09	1.64	527	31	< 0.1	2160	1150	6.69
	2-Jun-16	765.63	1.52	456	30	< 0.1	2450	1210	6.53
	8-Sep-16	762.86	1.59	477	29	0.2	2300	1220	6.56
	1-Dec-16	763.54	1.77	529	27	< 0.1	2210	1060	6.66
	2-Mar-17	766.53	< 0.05	489	30	0.1	2210	1230	6.85
	1-Jun-17	767.65	1.67	525	32	< 0.2	2270	1220	6.52
	30-Aug-17	764.62	1.71	510	31	< 0.1	2310	1070	6.59
	9-Oct-17	763.81	1.72	467	27	< 0.1	2360	959	6.69
24-May-18	766.14	1.76	448	33	< 0.5	2150	1090	6.91	
29-Aug-18	764.70	1.52	475	31	< 0.5	2320	1140	6.77	
MP-22 (Downgradient)	29-Dec-15	764.41	1.38	387	34	< 0.5	1650	761	6.76
	2-Mar-16	764.59	1.41	388	34	< 0.1	1620	816	6.72
	2-Jun-16	763.89	1.27	336	33	< 0.1	1700	801	6.54
	8-Sep-16	761.33	1.39	404	32	0.1	1750	845	6.57
	1-Dec-16	761.92	1.32	409	31	< 0.1	1710	798	6.62
	2-Mar-17	765.03	1.45	381	33	0.1	1710	868	6.63
	1-Jun-17	766.06	1.39	436	35	< 0.2	1790	915	6.47
	30-Aug-17	763.17	1.44	429	33	< 0.1	1860	832	6.66
	9-Oct-17	762.42	1.50	411	31	< 0.1	1990	840	6.55
24-May-18	764.35	1.62	392	35	< 0.5	1950	861	6.70	
29-Aug-18	763.22	1.16	424	33	< 0.5	1940	921	6.60	
MP-23 (Downgradient)	29-Dec-15	759.66	0.78	408	59	< 0.5	1740	1060	6.72
	2-Mar-16	754.89	0.81	436	50	< 0.1	1710	999	6.70
	2-Jun-16	754.80	0.73	357	47	0.1	1790	981	6.49
	8-Sep-16	750.96	0.82	397	48	0.5	1630	873	6.53
	1-Dec-16	753.21	0.74	371	52	0.1	1430	815	6.61
	2-Mar-17	761.40	0.80	334	48	0.2	1350	702	6.77
	1-Jun-17	762.92	0.77	361	55	< 0.2	1360	769	6.56
	30-Aug-17	760.38	0.72	297	54	< 0.1	1290	595	6.92
	9-Oct-17	760.36	0.68	278	52	0.1	1270	563	6.72
24-May-18	762.00	0.83	338	58	< 0.5	1190	518	6.89	
29-Aug-18	760.33	0.76	275	58	< 0.5	1090	556	6.73	

Notes:

1. Cells with "<" are represented as non-detects. Values shown correspond to the laboratory reporting limit.
2. Background values based on statistical evaluation of initial eight rounds (Dec. 2015 thru Aug. 2017) of groundwater sampling data for Well MP-20.

Table 2
New Castle Generating Station
North Ash Pond--Groundwater Analytical Data
CCR Appendix IV Constituents

Monitoring Well	Date Sampled	Total Antimony (mg/L)	Total Arsenic (mg/L)	Total Barium (mg/L)	Total Beryllium (mg/L)	Total Cadmium (mg/L)	Total Chromium (mg/L)	Total Cobalt (mg/L)	Total Fluoride (mg/L)	Total Lead (mg/L)	Total Lithium (mg/L)	Total Mercury (mg/L)	Total Molybdenum (mg/L)	Total Selenium (mg/L)	Total Thallium (mg/L)	Total Radium-226 and 228 (pCi/L)
		Calculated Background														
		0.001	0.02	0.09	0.001	0.002	0.01	0.005	0.5	0.001	0.40	0.0002	0.02	0.001	0.0002	4.19
		Groundwater Protection Standard														
		MCL	Background	MCL	MCL	MCL	MCL	RSL	MCL	RSL	Background	MCL	RSL	MCL	MCL	MCL
		0.006	0.02	2	0.004	0.005	0.1	0.006	4.0	0.015	0.40	0.002	0.10	0.05	0.002	5
MP-20 (Upgradient)	29-Dec-15	< 0.001	0.016	0.07	< 0.001	< 0.002	< 0.01	< 0.005	< 0.5	< 0.001	0.18	< 0.0002	< 0.02	< 0.001	< 0.0002	1.35
	2-Mar-16	< 0.001	0.018	0.06	< 0.001	< 0.002	< 0.01	< 0.005	< 0.1	< 0.001	0.16	< 0.0002	< 0.02	< 0.001	< 0.0002	1.29
	2-Jun-16	< 0.001	0.019	0.05	< 0.001	< 0.002	< 0.01	< 0.005	< 0.1	< 0.001	0.13	< 0.0002	< 0.02	< 0.001	< 0.0002	1.56
	8-Sep-16	< 0.001	0.020	0.06	< 0.001	< 0.002	< 0.01	< 0.005	0.1	< 0.001	0.14	< 0.0002	< 0.02	< 0.001	< 0.0002	2.77
	1-Dec-16	< 0.001	0.018	0.07	< 0.001	< 0.0002	< 0.01	< 0.005	< 0.1	< 0.001	0.15	< 0.0002	< 0.02	< 0.001	< 0.0002	1.20
	2-Mar-17	< 0.001	0.018	0.08	< 0.001	< 0.0002	< 0.01	< 0.005	< 0.1	< 0.001	0.23	< 0.0002	< 0.02	< 0.001	< 0.0002	0.08
	31-May-17	< 0.001	0.018	0.07	< 0.001	< 0.0002	< 0.01	< 0.005	< 0.2	< 0.001	0.24	< 0.0002	< 0.02	< 0.001	< 0.0002	2.18
	30-Aug-17	< 0.001	0.019	0.07	< 0.001	< 0.0002	< 0.01	< 0.005	< 0.1	< 0.001	0.25	< 0.0002	< 0.02	< 0.001	< 0.0002	2.39
	24-May-18	< 0.001	0.018	0.07	< 0.001	< 0.002	< 0.01	< 0.005	< 0.5	< 0.001	0.29	< 0.0002	< 0.02	< 0.001	< 0.0002	1.46
29-Aug-18	Not Analyzed	0.018	0.07	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	0.26	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	1.35
MP-21 (Downgradient)	29-Dec-15	< 0.001	0.079	0.12	< 0.001	< 0.002	< 0.01	< 0.005	< 0.5	< 0.001	0.08	< 0.0002	< 0.02	< 0.001	< 0.0002	1.12
	2-Mar-16	< 0.001	0.080	0.13	< 0.001	< 0.002	< 0.01	< 0.005	< 0.1	< 0.001	0.08	< 0.0002	< 0.02	< 0.001	< 0.0002	1.92
	2-Jun-16	< 0.001	0.091	0.12	< 0.001	< 0.002	< 0.01	< 0.005	< 0.1	< 0.001	0.08	< 0.0002	< 0.02	< 0.001	< 0.0002	2.27
	8-Sep-16	< 0.001	0.084	0.13	< 0.001	< 0.002	< 0.01	< 0.005	0.2	< 0.001	0.09	< 0.0002	< 0.02	< 0.001	< 0.0002	3.19
	1-Dec-16	< 0.001	0.085	0.13	< 0.001	< 0.002	< 0.01	< 0.005	< 0.1	< 0.001	0.09	< 0.0002	< 0.02	< 0.001	< 0.0002	1.15
	2-Mar-17	< 0.001	0.083	0.12	< 0.001	< 0.0002	< 0.01	< 0.005	0.1	< 0.001	0.09	< 0.0002	< 0.02	< 0.001	< 0.0002	1.10
	1-Jun-17	< 0.001	0.081	0.12	< 0.001	< 0.0002	< 0.01	< 0.005	< 0.2	< 0.001	0.09	< 0.0002	< 0.02	< 0.001	< 0.0002	1.88
	30-Aug-17	< 0.001	0.088	0.11	< 0.001	< 0.0002	< 0.01	< 0.005	< 0.1	< 0.001	0.09	< 0.0002	< 0.02	< 0.001	< 0.0002	3.11
	24-May-18	< 0.001	0.087	0.11	< 0.001	< 0.002	< 0.01	< 0.005	< 0.5	< 0.001	0.09	< 0.0002	< 0.02	< 0.001	< 0.0002	2.37
29-Aug-18	Not Analyzed	0.071	0.11	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	0.09	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	1.49
MP-22 (Downgradient)	29-Dec-15	< 0.001	0.045	0.07	< 0.001	< 0.002	< 0.01	< 0.005	< 0.5	< 0.001	0.04	< 0.0002	< 0.02	< 0.001	< 0.0002	0.64
	2-Mar-16	< 0.001	0.058	0.06	< 0.001	< 0.002	< 0.01	< 0.005	< 0.1	< 0.001	0.03	< 0.0002	< 0.02	< 0.001	< 0.0002	1.24
	2-Jun-16	< 0.001	0.074	0.05	< 0.001	< 0.002	< 0.01	< 0.005	< 0.1	< 0.001	0.03	< 0.0002	< 0.02	< 0.001	< 0.0002	1.66
	8-Sep-16	< 0.001	0.078	0.05	< 0.001	< 0.002	< 0.01	< 0.005	0.1	< 0.001	0.04	< 0.0002	< 0.02	< 0.001	< 0.0002	2.85
	1-Dec-16	< 0.001	0.086	0.05	< 0.001	< 0.0002	< 0.01	< 0.005	< 0.1	< 0.001	0.03	< 0.0002	< 0.02	< 0.001	< 0.0002	1.08
	2-Mar-17	< 0.001	0.079	0.05	< 0.001	< 0.0002	< 0.01	< 0.005	0.1	< 0.001	0.03	< 0.0002	< 0.02	< 0.001	< 0.0002	1.96
	1-Jun-17	< 0.001	0.082	0.05	< 0.001	< 0.0002	< 0.01	< 0.005	< 0.2	< 0.001	0.03	< 0.0002	< 0.02	< 0.001	< 0.0002	1.26
	30-Aug-17	< 0.001	0.088	0.04	< 0.001	< 0.0002	< 0.01	< 0.005	< 0.1	< 0.001	0.03	< 0.0002	< 0.02	< 0.001	< 0.0002	4.24
	24-May-18	< 0.001	0.091	0.04	< 0.001	< 0.002	< 0.01	< 0.005	< 0.5	< 0.001	0.04	< 0.0002	< 0.02	< 0.001	< 0.0002	0.57
29-Aug-18	Not Analyzed	0.087	0.04	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	0.04	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	0.87
MP-23 (Downgradient)	29-Dec-15	< 0.001	0.068	0.02	< 0.001	< 0.002	< 0.01	< 0.005	< 0.5	< 0.001	0.12	< 0.0002	< 0.02	< 0.001	< 0.0002	0.35
	2-Mar-16	< 0.001	0.069	0.02	< 0.001	< 0.002	< 0.01	< 0.005	< 0.1	< 0.001	0.12	< 0.0002	< 0.02	< 0.001	< 0.0002	2.72
	2-Jun-16	< 0.001	0.079	0.02	< 0.001	< 0.002	< 0.01	< 0.005	0.1	< 0.001	0.10	< 0.0002	< 0.02	< 0.001	< 0.0002	2.10
	8-Sep-16	< 0.001	0.069	0.02	< 0.001	< 0.002	< 0.01	< 0.005	0.5	< 0.001	0.11	< 0.0002	< 0.02	< 0.001	< 0.0002	3.20
	1-Dec-16	< 0.001	0.070	0.02	< 0.001	< 0.0002	< 0.01	< 0.005	0.1	< 0.001	0.10	< 0.0002	< 0.02	< 0.001	< 0.0002	0.98
	2-Mar-17	< 0.001	0.066	0.03	< 0.001	< 0.0002	< 0.01	< 0.005	0.2	< 0.001	0.10	< 0.0002	< 0.02	< 0.001	< 0.0002	0.36
	1-Jun-17	< 0.001	0.070	0.03	< 0.001	< 0.0002	< 0.01	< 0.005	< 0.2	< 0.001	0.10	< 0.0002	< 0.02	< 0.001	< 0.0002	1.75
	30-Aug-17	< 0.001	0.067	0.02	< 0.001	< 0.0002	< 0.01	< 0.005	< 0.1	< 0.001	0.09	< 0.0002	< 0.02	< 0.001	< 0.0002	2.43
	24-May-18	< 0.001	0.067	0.03	< 0.001	< 0.002	< 0.01	< 0.005	< 0.5	< 0.001	0.10	< 0.0002	< 0.02	< 0.001	< 0.0002	1.15
29-Aug-18	Not Analyzed	0.078	0.03	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	0.09	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	1.86

- Notes:**
- Cells with "<" are represented as non-detects. Values shown correspond to the laboratory reporting limit.
 - Background values based on statistical evaluation of initial eight rounds (Dec. 2015 thru Aug. 2017) of groundwater sampling data for Well MP-20.
 - As indicated, Groundwater Protection Standards are either published MCLs or risk-based Regional Screening Levels (RSLs). For constituents where calculated background exceeds either the MCL or RSL, the background value is used.



Table 3
New Castle Generating Station
Ash Landfill--Groundwater Analytical Data
CCR Appendix III Constituents

Monitoring Well	Date Sampled	Groundwater Elevation (ft. MSL)	Total Boron (mg/L)	Total Calcium (mg/L)	Total Chloride (mg/L)	Total Fluoride (mg/L)	Total Dissolved Solids (mg/L)	Sulfate (mg/L)	pH (S.U.)
			Calculated Background						
			0.30	217	50	0.1	980	454	6.04-7.96
MP-11 (Upgradient)	30-Dec-15	776.93	0.05	146	36	< 0.1	922	425	7.47
	1-Mar-16	778.21	0.09	173	31	< 0.1	842	410	7.39
	1-Jun-16	777.77	0.15	178	27	< 0.1	890	385	7.29
	7-Sep-16	776.00	0.07	169	33	< 0.1	980	380	7.33
	30-Nov-16	776.24	0.08	167	33	< 0.1	872	390	7.43
	1-Mar-17	778.54	0.34	187	26	< 0.1	880	371	7.35
	31-May-17	778.75	0.09	192	25	< 0.1	838	381	7.03
	29-Aug-17	776.66	0.08	178	48	< 0.1	916	408	7.11
	10-Oct-17	776.06	0.07	178	39	< 0.1	916	392	6.90
	23-May-18	779.13	0.08	187	27	< 0.1	806	365	7.07
28-Nov-18	780.14	0.09	172	29	< 0.1	900	389	6.77	
P-6 (Upgradient)	30-Dec-15	777.39	0.11	126	19	< 0.1	622	297	6.69
	1-Mar-16	777.65	0.13	146	26	< 0.1	602	322	6.65
	1-Jun-16	777.93	0.11	129	19	< 0.1	618	302	6.63
	7-Sep-16	776.38	0.12	136	21	< 0.1	620	306	6.58
	30-Nov-16	776.97	0.12	141	19	< 0.1	614	297	6.56
	1-Mar-17	778.64	0.12	135	20	< 0.1	614	305	6.60
	31-May-17	778.64	0.11	146	22	< 0.1	606	316	6.42
	29-Aug-17	777.17	0.12	138	22	< 0.1	644	327	6.52
	10-Oct-17	776.67	0.12	139	21	< 0.1	620	320	6.62
	23-May-18	779.25	0.12	154	20	< 0.1	614	301	6.46
28-Nov-18	779.95	0.12	142	24	< 0.1	656	342	6.32	
MP-10R (Downgradient)	30-Dec-15	768.89	9.62	294	24	< 0.1	1650	853	6.02
	1-Mar-16	769.63	9.55	330	26	< 0.1	1510	784	6.14
	1-Jun-16	768.79	7.95	226	20	< 0.1	1250	609	5.90
	7-Sep-16	764.97	10.9	352	31	< 0.1	1730	817	6.05
	30-Nov-16	766.49	12.7	330	34	< 0.1	1670	824	6.10
	1-Mar-17	769.79	12.1	285	37	< 0.1	1450	797	6.17
	31-May-17	770.70	5.47	212	23	< 0.1	1010	474	6.01
	29-Aug-17	766.48	10.1	254	27	< 0.1	1300	625	6.06
	10-Oct-17	765.37	12.5	296	31	< 0.1	1550	742	6.10
	23-May-18	771.74	3.06	156	8	< 0.1	592	212	6.00
28-Nov-18	772.33	4.85	212	17	< 0.1	906	415	6.01	
MP-12 (Downgradient)	30-Dec-15	772.05	4.96	573	14	< 0.5	4320	2560	6.61
	1-Mar-16	772.56	4.38	594	11	< 1.0	3640	1970	6.55
	1-Jun-16	772.38	3.63	482	11	< 1.0	3780	2140	6.54
	7-Sep-16	769.74	5.35	600	14	< 1	4420	2490	6.50
	30-Nov-16	770.29	4.32	600	12	< 0.5	4030	1950	6.53
	1-Mar-17	772.65	4.19	582	16	< 0.2	4040	2380	6.60
	31-May-17	773.85	2.59	569	14	< 0.2	3300	1780	6.18
	29-Aug-17	771.16	3.94	589	18	< 0.5	4600	2760	6.31
	10-Oct-17	770.36	4.43	585	14	< 0.1	4490	1920	6.38
	23-May-18	775.03	0.63	58	2	< 0.2	258	115	5.62
28-Nov-18	775.26	1.26	175	5	< 0.2	1160	666	6.20	
MP-15 (Downgradient)	30-Dec-15	773.86	1.13	638	7	< 0.1	2340	1150	6.68
	2-Mar-16	775.04	1.25	761	6	< 0.1	2310	1230	6.73
	2-Jun-16	773.54	1.22	645	6	< 0.1	2390	1180	6.62
	7-Sep-16	770.57	1.13	643	5	< 0.1	2320	1120	6.53
	30-Nov-16	772.62	1.06	585	6	< 0.1	2190	1060	6.61
	1-Mar-17	775.78	1.20	670	7	< 0.1	2290	1210	6.48
	31-May-17	775.86	1.30	669	8	< 0.2	2420	1120	6.49
	29-Aug-17	771.62	1.12	627	6	< 0.2	2280	1130	6.41
	9-Oct-17	771.11	1.09	620	5	< 0.1	2310	990	6.54
	23-May-18	777.07	1.10	699	4	< 0.1	2330	1060	6.30
29-Nov-18	776.30	1.27	715	5	< 0.1	2570	1260	6.39	

Table 3
New Castle Generating Station
Ash Landfill--Groundwater Analytical Data
CCR Appendix III Constituents

Monitoring Well	Date Sampled	Groundwater Elevation (ft. MSL)	Total Boron (mg/L)	Total Calcium (mg/L)	Total Chloride (mg/L)	Total Fluoride (mg/L)	Total Dissolved Solids (mg/L)	Sulfate (mg/L)	pH (S.U.)
			Calculated Background						
			0.30	217	50	0.1	980	454	6.04-7.96
MP-18 (Downgradient)	30-Dec-15	769.18	1.03	124	10	0.2	536	98	6.75
	1-Mar-16	769.56	1.03	87	4	0.1	336	53	6.49
	1-Jun-16	768.74	0.99	137	10	< 0.2	580	91	6.82
	7-Sep-16	765.28	1.04	149	14	0.2	606	115	6.74
	30-Nov-16	767.26	1.18	134	15	0.2	512	80	6.55
	1-Mar-17	770.51	0.99	108	12	0.1	442	66	6.54
	31-May-17	770.28	0.80	66	5	0.1	252	33	5.93
	29-Aug-17	767.09	1.06	144	12	0.2	520	59	6.74
	10-Oct-17	766.96	1.15	136	9	0.1	518	68	6.69
	23-May-18	770.94	0.58	49	2	< 0.1	192	18	5.88
28-Nov-18	771.42	0.85	71	3	0.1	294	37	5.99	

Notes:

1. Cells with "<" are represented as non-detects. Values shown correspond to the laboratory reporting limit.
2. Background values based on statistical evaluation of initial eight rounds (Dec. 2015 thru Aug. 2017) of groundwater sampling data for Wells MP-11 and P-6.

Table 4
New Castle Generating Station
Ash Landfill--Groundwater Analytical Data
CCR Appendix IV Constituents

Monitoring Well	Date Sampled	Total Antimony (mg/L)	Total Arsenic (mg/L)	Total Barium (mg/L)	Total Beryllium (mg/L)	Total Cadmium (mg/L)	Total Chromium (mg/L)	Total Cobalt (mg/L)	Total Fluoride (mg/L)	Total Lead (mg/L)	Total Lithium (mg/L)	Total Mercury (mg/L)	Total Molybdenum (mg/L)	Total Selenium (mg/L)	Total Thallium (mg/L)	Total Radium-226 and 228 (pCi/L)	
		Calculated Background															
		0.001	0.007	0.17	0.001	0.002	0.01	0.005	0.1	0.002	0.01	0.0002	0.04	0.002	0.0002	1.96	
		Groundwater Protection Standard															
		MCL	MCL	MCL	MCL	MCL	MCL	RSL	MCL	RSL	RSL	MCL	RSL	MCL	RSL	MCL	MCL
0.006	0.01	2	0.004	0.005	0.1	0.006	4.0	0.015	0.04	0.002	0.10	0.05	0.002	5			
MP-11 (Upgradient)	30-Dec-15	< 0.001	0.001	0.04	< 0.001	< 0.002	< 0.01	< 0.005	< 0.1	< 0.001	< 0.01	< 0.0002	< 0.02	0.002	< 0.0002	1.39	
	1-Mar-16	< 0.001	0.001	0.04	< 0.001	< 0.002	< 0.01	< 0.005	< 0.1	< 0.001	< 0.01	< 0.0002	< 0.02	0.002	< 0.0002	0.30	
	1-Jun-16	< 0.001	< 0.001	0.04	< 0.001	< 0.002	< 0.01	< 0.005	< 0.1	< 0.001	< 0.01	< 0.0002	< 0.02	0.002	< 0.0002	1.06	
	7-Sep-16	< 0.001	< 0.001	0.04	< 0.001	< 0.002	< 0.01	< 0.005	0.1	< 0.001	< 0.01	< 0.0002	< 0.02	0.001	< 0.0002	0.88	
	30-Nov-16	< 0.001	< 0.001	0.04	< 0.001	< 0.002	< 0.01	< 0.005	0.1	< 0.001	< 0.01	< 0.0002	< 0.02	0.002	< 0.0002	-0.13	
	1-Mar-17	< 0.001	0.001	0.04	< 0.001	< 0.0002	< 0.01	< 0.005	< 0.1	< 0.001	< 0.01	< 0.0002	0.04	0.002	< 0.0002	0.65	
	31-May-17	< 0.001	0.003	0.04	< 0.001	< 0.0002	< 0.01	< 0.005	0.1	< 0.001	< 0.01	< 0.0002	< 0.02	0.001	< 0.0002	0.47	
29-Aug-17	< 0.001	0.001	0.04	< 0.001	< 0.0002	< 0.01	< 0.005	0.1	< 0.001	< 0.01	< 0.0002	< 0.02	0.002	< 0.0002	1.21		
P-6 (Upgradient)	30-Dec-15	< 0.001	0.004	0.17	< 0.001	< 0.002	< 0.01	< 0.005	< 0.1	0.001	< 0.01	< 0.0002	< 0.02	< 0.001	< 0.0002	0.76	
	1-Mar-16	< 0.001	0.003	0.13	< 0.001	< 0.002	< 0.01	< 0.005	< 0.1	< 0.001	< 0.01	< 0.0002	< 0.02	< 0.001	< 0.0002	0.14	
	1-Jun-16	< 0.001	0.002	0.11	< 0.001	< 0.002	< 0.01	< 0.005	< 0.1	< 0.001	< 0.01	< 0.0002	< 0.02	< 0.001	< 0.0002	0.75	
	7-Sep-16	< 0.001	0.002	0.11	< 0.001	< 0.002	< 0.01	< 0.005	< 0.1	< 0.001	< 0.01	< 0.0002	< 0.02	< 0.001	< 0.0002	1.80	
	30-Nov-16	< 0.001	0.002	0.11	< 0.001	< 0.002	< 0.01	< 0.005	< 0.1	< 0.001	< 0.01	< 0.0002	< 0.02	< 0.001	< 0.0002	0.89	
	1-Mar-17	< 0.001	0.002	0.11	< 0.001	< 0.0002	< 0.01	< 0.005	< 0.1	< 0.001	< 0.01	< 0.0002	< 0.02	< 0.001	< 0.0002	0.42	
	31-May-17	< 0.001	0.007	0.14	< 0.001	< 0.0002	< 0.01	< 0.005	< 0.1	0.002	< 0.01	< 0.0002	< 0.02	< 0.001	< 0.0002	1.11	
29-Aug-17	< 0.001	0.003	0.10	< 0.001	< 0.0002	< 0.01	< 0.005	< 0.1	< 0.001	< 0.01	< 0.0002	< 0.02	< 0.001	< 0.0002	0.54		
MP-10R (Downgradient)	30-Dec-15	< 0.001	0.002	0.04	< 0.001	< 0.002	< 0.01	0.034	< 0.1	< 0.001	0.56	< 0.0002	< 0.02	< 0.001	< 0.0002	1.70	
	1-Mar-16	< 0.001	0.002	0.03	< 0.001	< 0.002	< 0.01	0.032	< 0.1	< 0.001	0.54	< 0.0002	< 0.02	< 0.001	< 0.0002	0.66	
	1-Jun-16	< 0.001	0.002	0.03	< 0.001	< 0.002	< 0.01	0.024	< 0.1	< 0.001	0.40	< 0.0002	< 0.02	< 0.001	< 0.0002	1.16	
	7-Sep-16	< 0.001	0.001	0.04	< 0.001	< 0.002	< 0.01	0.033	< 0.1	< 0.001	0.51	< 0.0002	< 0.02	< 0.001	< 0.0002	1.68	
	30-Nov-16	< 0.001	0.002	0.03	< 0.001	< 0.002	< 0.01	0.030	< 0.1	< 0.001	0.55	< 0.0002	< 0.02	< 0.001	< 0.0002	0.37	
	1-Mar-17	< 0.001	0.002	0.03	< 0.001	0.0005	< 0.01	0.028	< 0.1	< 0.001	0.40	< 0.0002	< 0.02	< 0.001	< 0.0002	1.22	
	31-May-17	< 0.001	0.001	0.02	< 0.001	0.0006	< 0.01	0.016	< 0.1	< 0.001	0.17	< 0.0002	< 0.02	< 0.001	< 0.0002	1.13	
29-Aug-17	< 0.001	0.002	0.03	< 0.001	0.0005	< 0.01	0.021	< 0.1	< 0.001	0.30	< 0.0002	< 0.02	< 0.001	< 0.0002	1.35		
MP-12 (Downgradient)	30-Dec-15	< 0.001	4.14	0.03	< 0.001	< 0.0002	< 0.01	< 0.005	< 0.5	< 0.001	2.54	< 0.0002	0.03	< 0.001	0.0009	0.56	
	1-Mar-16	< 0.001	3.60	0.02	< 0.001	< 0.0002	< 0.01	< 0.005	< 1.0	< 0.001	2.24	< 0.0002	0.02	< 0.001	0.0007	0.34	
	1-Jun-16	< 0.001	2.96	0.02	< 0.001	< 0.0002	< 0.01	< 0.005	< 1.0	< 0.001	1.82	< 0.0002	< 0.02	< 0.001	0.0009	0.00	
	7-Sep-16	< 0.001	4.91	0.02	< 0.001	< 0.0002	< 0.01	0.006	< 1.0	< 0.001	2.60	< 0.0002	0.03	< 0.001	0.0006	0.47	
	30-Nov-16	< 0.001	4.59	0.02	< 0.001	< 0.0002	< 0.01	0.008	< 0.5	< 0.001	2.43	< 0.0002	0.03	< 0.001	0.0004	0.39	
	1-Mar-17	< 0.001	3.98	0.02	< 0.001	< 0.0002	< 0.01	< 0.005	0.2	< 0.001	1.95	< 0.0002	0.03	< 0.001	0.0003	-0.03	
	31-May-17	< 0.001	1.54	0.03	< 0.001	0.0004	< 0.01	0.007	< 0.2	< 0.001	1.31	< 0.0002	< 0.02	0.005	0.0014	0.78	
29-Aug-17	< 0.001	4.07	0.02	< 0.002	< 0.0002	< 0.01	0.007	< 0.5	< 0.001	2.25	< 0.0002	< 0.02	0.001	0.0006	1.00		
MP-15 (Downgradient)	30-Dec-15	< 0.001	0.069	0.02	< 0.001	< 0.002	< 0.01	< 0.005	< 0.1	< 0.001	0.06	< 0.0002	0.04	< 0.001	0.0019	0.52	
	2-Mar-16	< 0.001	0.226	0.02	< 0.001	< 0.002	< 0.01	< 0.005	< 0.1	< 0.001	0.06	< 0.0002	< 0.02	< 0.001	0.0010	0.74	
	2-Jun-16	< 0.001	0.208	0.02	< 0.001	< 0.002	< 0.01	< 0.005	< 0.1	< 0.001	0.06	< 0.0002	0.02	< 0.001	0.0012	1.35	
	7-Sep-16	< 0.001	0.491	0.03	< 0.001	< 0.002	< 0.01	0.008	< 0.1	< 0.001	0.10	< 0.0002	0.12	< 0.001	0.0025	1.22	
	30-Nov-16	< 0.001	0.372	0.03	< 0.001	< 0.002	< 0.01	< 0.005	< 0.1	< 0.001	0.08	< 0.0002	0.09	< 0.001	0.0036	0.46	
	1-Mar-17	< 0.001	0.097	0.02	< 0.001	< 0.0002	< 0.01	0.005	< 0.1	< 0.001	0.06	< 0.0002	0.04	< 0.001	0.0017	0.53	
	31-May-17	< 0.001	0.136	0.02	< 0.001	< 0.0002	< 0.01	< 0.005	< 0.2	< 0.001	0.05	< 0.0002	0.02	< 0.001	0.0013	0.56	
29-Aug-17	< 0.001	0.307	0.02	< 0.001	< 0.0002	< 0.01	< 0.005	< 0.2	< 0.001	0.07	< 0.0002	0.05	< 0.001	0.0019	0.71		
MP-18 (Downgradient)	30-Dec-15	< 0.001	0.020	0.08	< 0.001	< 0.002	< 0.01	< 0.005	0.2	< 0.001	0.05	< 0.0002	< 0.02	0.025	0.0017	0.98	
	1-Mar-16	0.001	0.025	0.11	< 0.001	< 0.002	< 0.01	< 0.005	0.1	< 0.001	0.13	< 0.0002	0.04	0.079	0.0041	0.36	
	1-Jun-16	< 0.001	0.018	0.05	< 0.001	< 0.002	< 0.01	< 0.005	< 0.2	< 0.001	< 0.01	< 0.0002	< 0.02	0.002	0.0003	1.33	
	7-Sep-16	< 0.001	0.017	0.05	< 0.001	< 0.002	< 0.01	< 0.005	0.2	< 0.001	< 0.01	< 0.0002	< 0.02	0.001	0.0002	1.39	
	30-Nov-16	< 0.001	0.017	0.08	< 0.001	< 0.002	< 0.01	< 0.005	0.2	< 0.001	0.05	< 0.0002	< 0.02	0.009	0.0008	0.61	
	1-Mar-17	< 0.001	0.009	0.08	< 0.001	< 0.0002	< 0.01	< 0.005	0.1	< 0.001	0.06	< 0.0002	0.02	0.057	0.0017	1.19	
	31-May-17	0.004	0.003	0.11	< 0.001	< 0.0002	< 0.01	< 0.005	0.1	< 0.001	0.10	< 0.0002	0.05	0.037	0.0051	0.72	
29-Aug-17	< 0.001	0.008	0.07	< 0.001	< 0.0002	< 0.01	< 0.005	0.2	< 0.001	< 0.01	< 0.0002	< 0.02	0.001	0.0007	1.33		

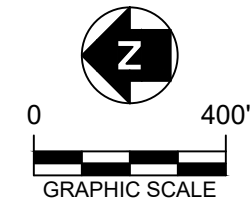
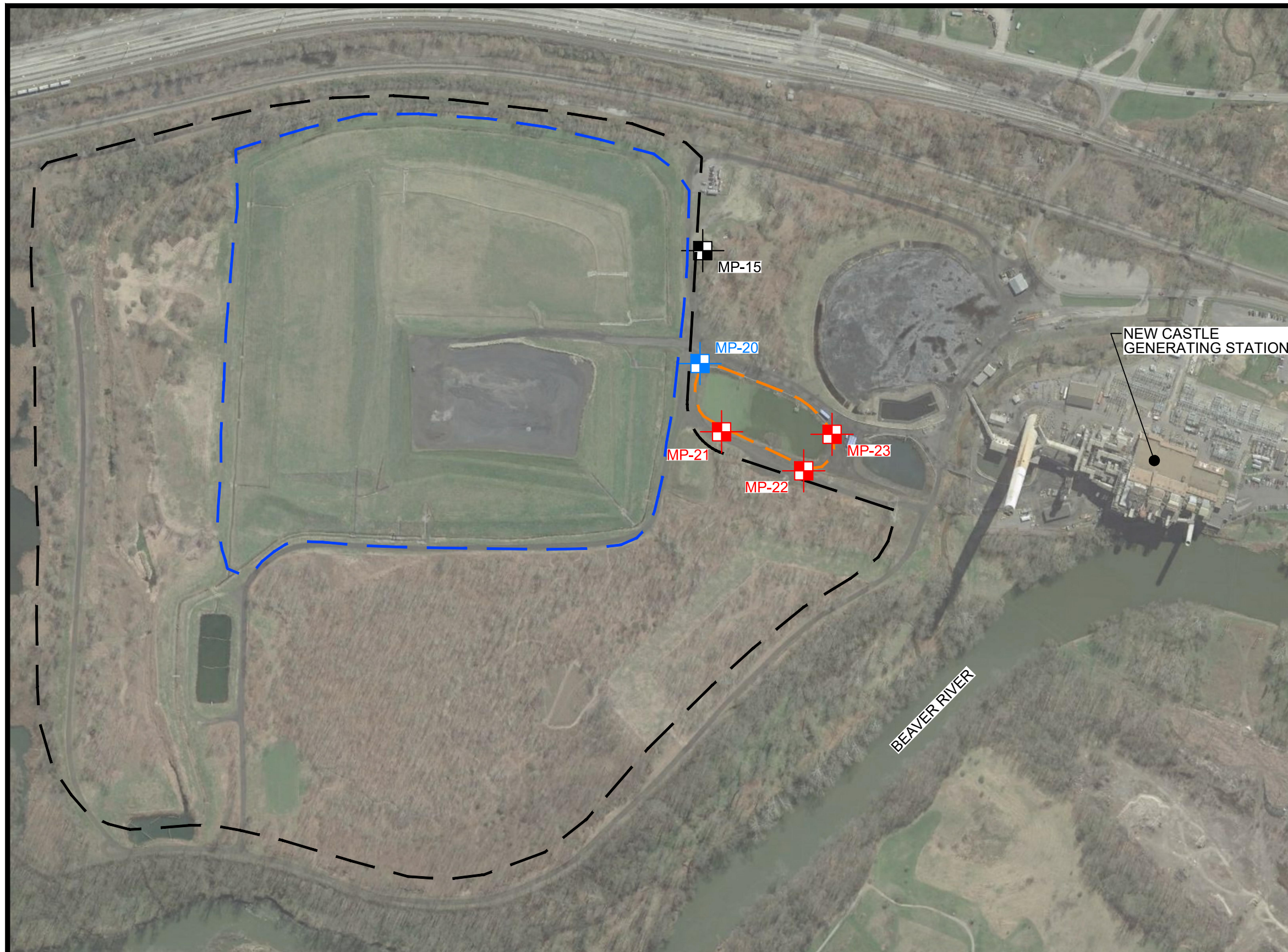
Notes:

- Cells with "<" are represented as non-detects. Values shown correspond to the laboratory reporting limit.
- Background values based on statistical evaluation of initial eight rounds (Dec. 2015 thru Aug. 2017) of groundwater sampling data for Wells MP-11 and P-6.
- As indicated, Groundwater Protection Standards are either published MCLs or risk-based Regional Screening Levels (RSLs). For constituents where calculated background exceeds either the MCL or RSL, the background value is used.









Figures

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LEGEND

-  APPROXIMATE NORTH BOTTOM ASH POND BOUNDARY
-  NEW CASTLE PLANT ASH LANDFILL
-  APPROXIMATE HISTORIC 120-ACRE ASH IMPOUNDMENT BOUNDARY
-  UPGRADIENT GROUNDWATER MONITORING WELL LOCATION (MP-20)
-  DOWNGRAIDENT GROUNDWATER MONITORING WELL LOCATION (MP-21, MP-22, MP-23)
-  ASH LANDFILL DOWNGRAIDENT GROUNDWATER MONITORING WELL LOCATION (MP-15)

NOTES

1. FOR CLARITY, NOT ALL SITE FEATURES MAY BE SHOWN.

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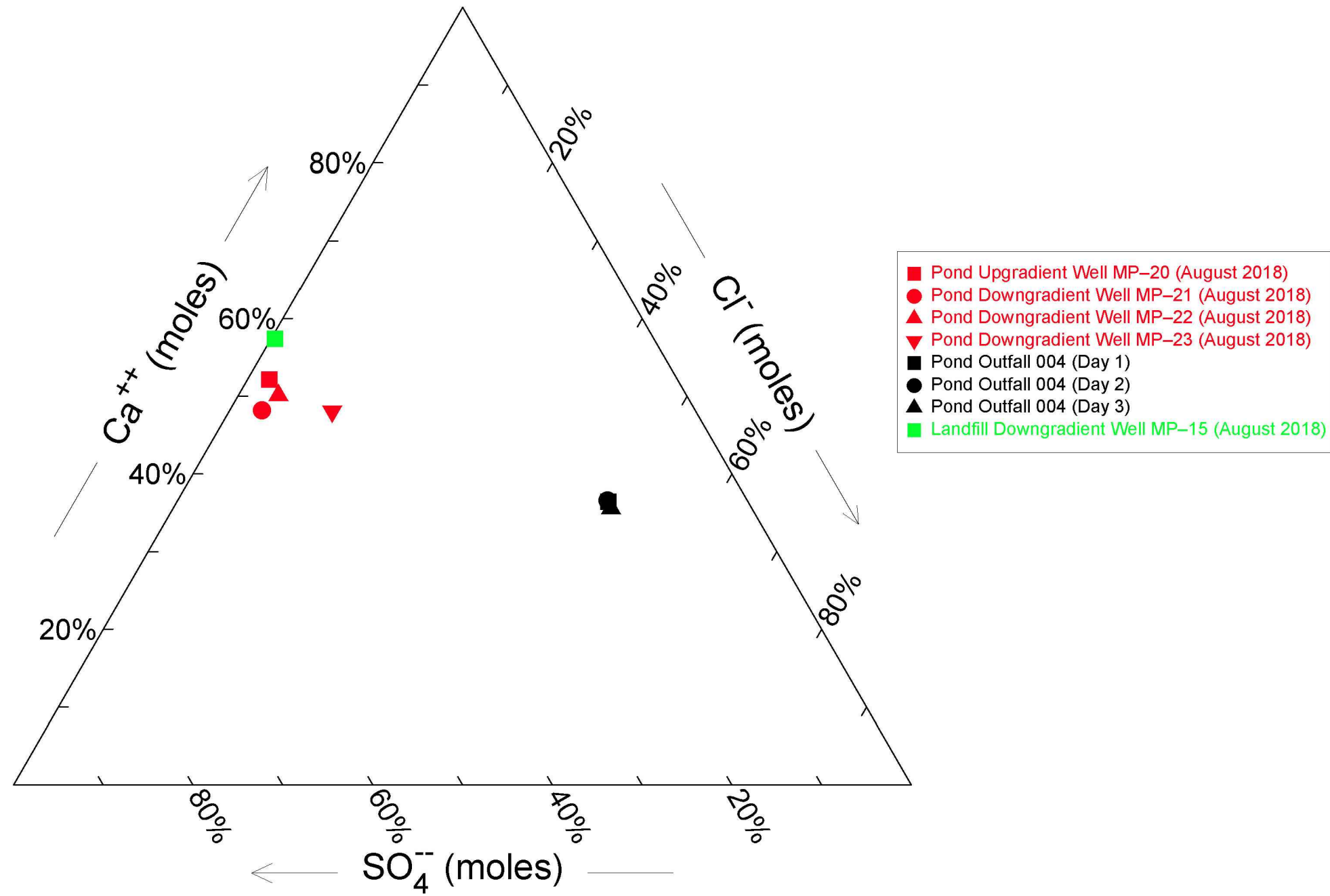
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**NEW CASTLE NORTH BOTTOM ASH POND
WEST PITTSBURG, PENNSYLVANIA**

**FIGURE 1
SITE LOCATION MAP**

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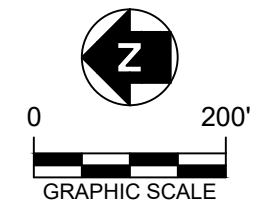
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**NEW CASTLE NORTH BOTTOM ASH POND
WEST PITTSBURG, PENNSYLVANIA**

**FIGURE 2
TERNARY DIAGRAM**

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LEGEND

- APPROXIMATE NORTH BOTTOM ASH POND BOUNDARY
- APPROXIMATE HISTORIC 120-ACRE ASH IMPOUNDMENT BOUNDARY
- UPGRADIENT GROUNDWATER MONITORING WELL LOCATION
- DOWNGRADIENT GROUNDWATER MONITORING WELL LOCATION
- ASH LANDFILL DOWNGRADIENT GROUNDWATER MONITORING WELL LOCATION
- APPROXIMATE GROUNDWATER ELEVATION CONTOUR
- ESTIMATED DIRECTION OF GROUNDWATER FLOW

NOTES

1. FOR CLARITY, NOT ALL SITE FEATURES MAY BE SHOWN.
2. GROUNDWATER LEVELS MEASURED ON AUGUST 29, 2018.

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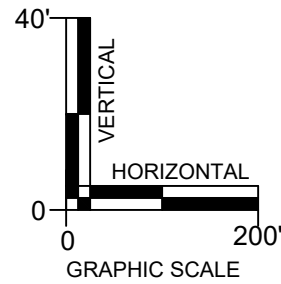
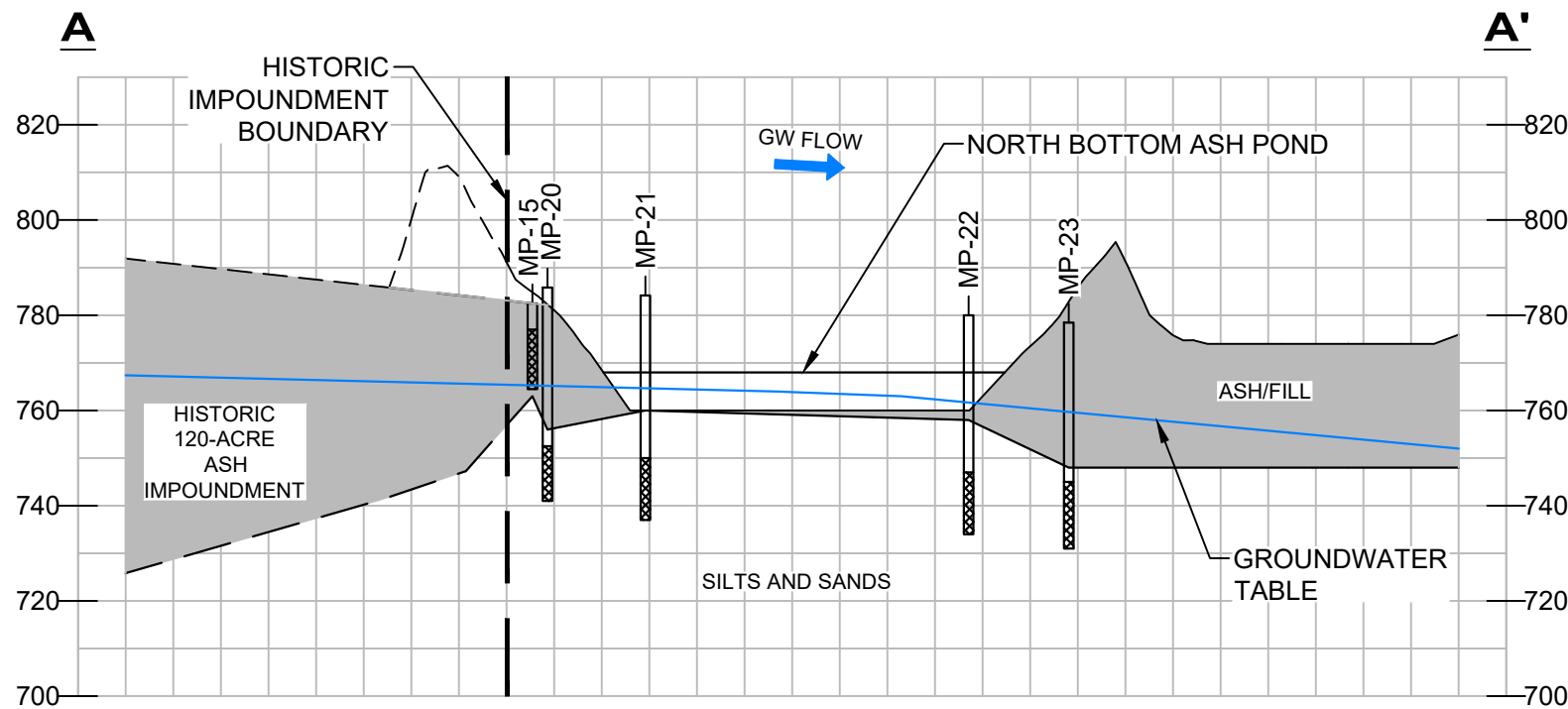
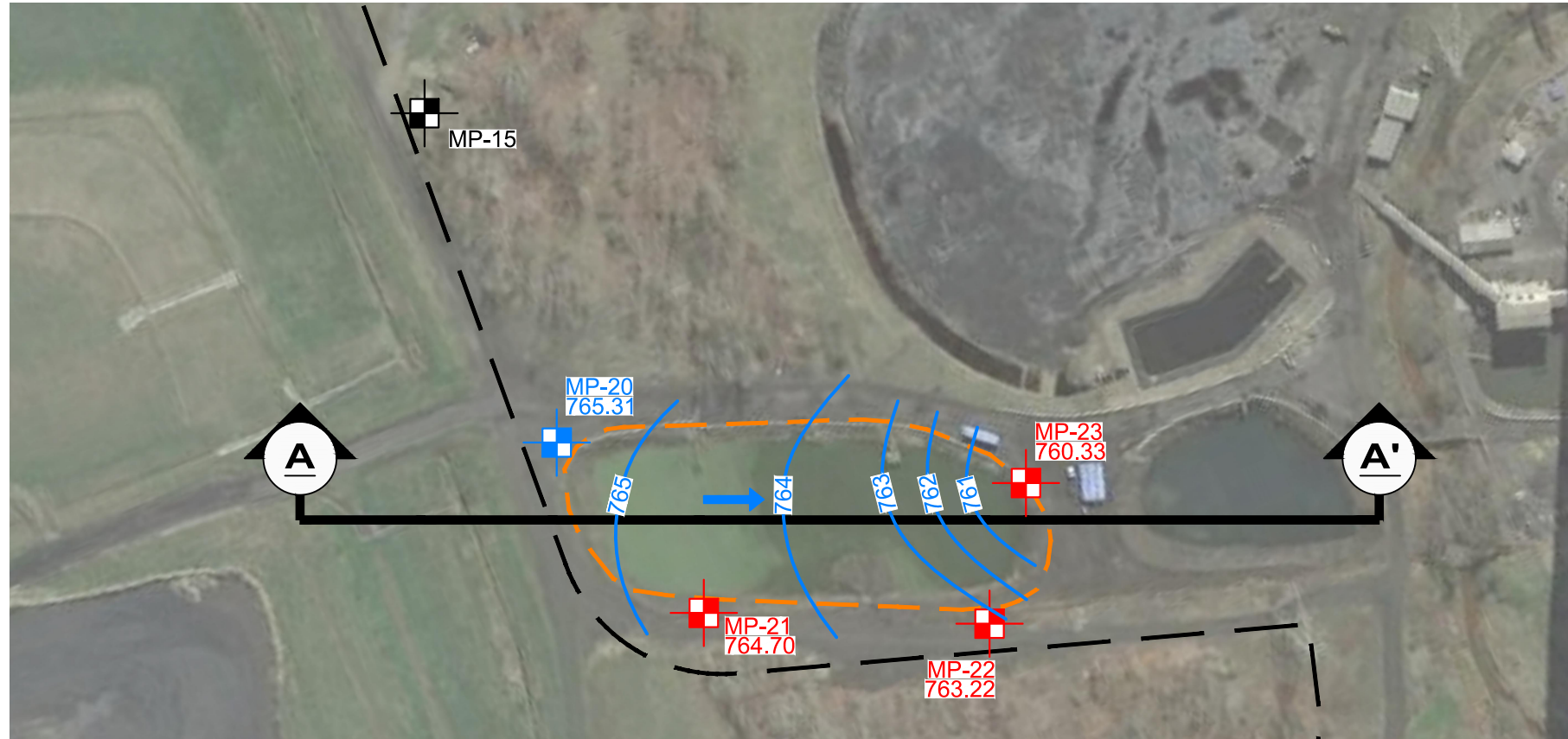
**NEW CASTLE NORTH BOTTOM ASH POND
WEST PITTSBURG, PENNSYLVANIA**

**FIGURE 3
GROUNDWATER ELEVATION CONTOUR MAP**

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NOTES

1. FOR CLARITY, NOT ALL SITE FEATURES MAY BE SHOWN.
2. GROUNDWATER LEVELS MEASURED ON AUGUST 29, 2018.
3. MONITORING WELLS SUPERIMPOSED ON CROSS SECTION LINE USING CORRESPONDING DOWNGRADIENT DISTANCES FROM THE HISTORIC 120-ACRE IMPOUNDMENT.



LEGEND

- APPROXIMATE NORTH BOTTOM ASH POND BOUNDARY
- APPROXIMATE HISTORIC 120-ACRE ASH IMPOUNDMENT BOUNDARY
- UPGRADIENT GROUNDWATER MONITORING WELL LOCATION
- DOWNGRADIENT GROUNDWATER MONITORING WELL LOCATION
- ASH LANDFILL DOWNGRADIENT GROUNDWATER MONITORING WELL LOCATION
- APPROXIMATE GROUNDWATER ELEVATION CONTOUR
- ESTIMATED DIRECTION OF GROUNDWATER FLOW



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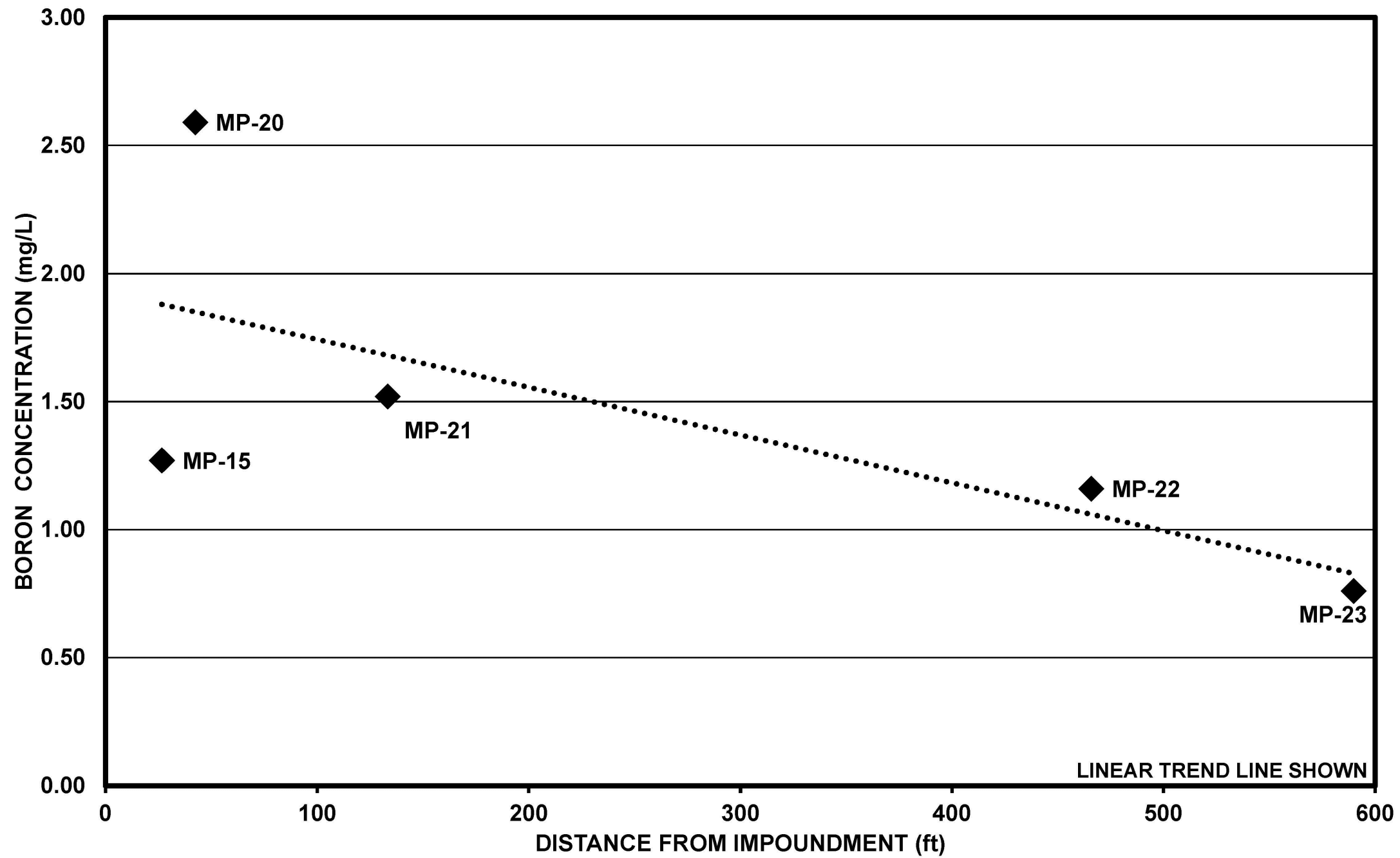
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**NEW CASTLE NORTH BOTTOM ASH POND
WEST PITTSBURG, PENNSYLVANIA**

**FIGURE 4
CROSS SECTION - HISTORIC IMPOUNDMENT
AND NORTH BOTTOM ASH POND**

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LINEAR TREND LINE SHOWN

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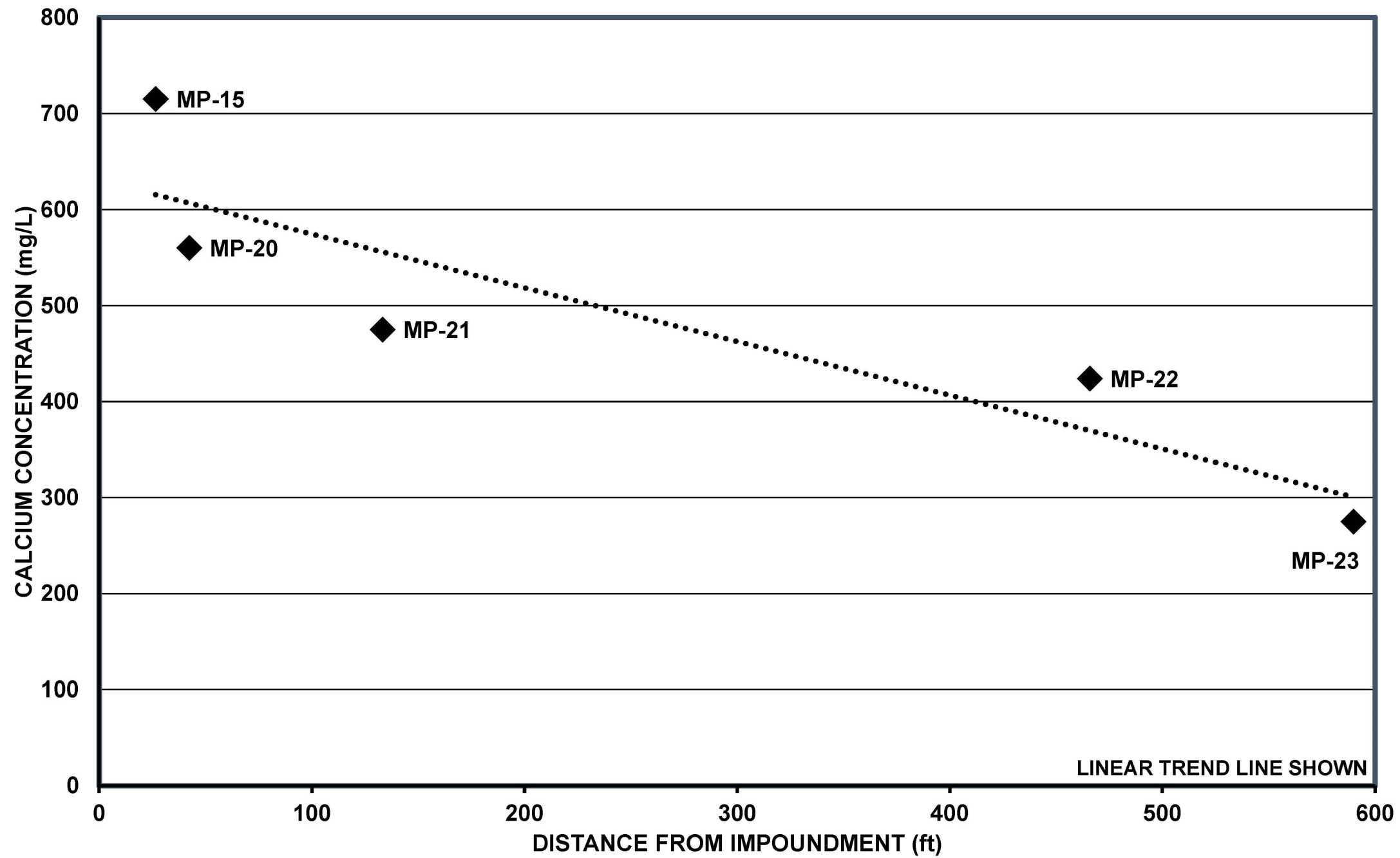
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**NEW CASTLE NORTH BOTTOM ASH POND
WEST PITTSBURG, PENNSYLVANIA**

**FIGURE 5
BORON CONCENTRATIONS VS.
DISTANCE FROM HISTORIC IMPOUNDMENT**

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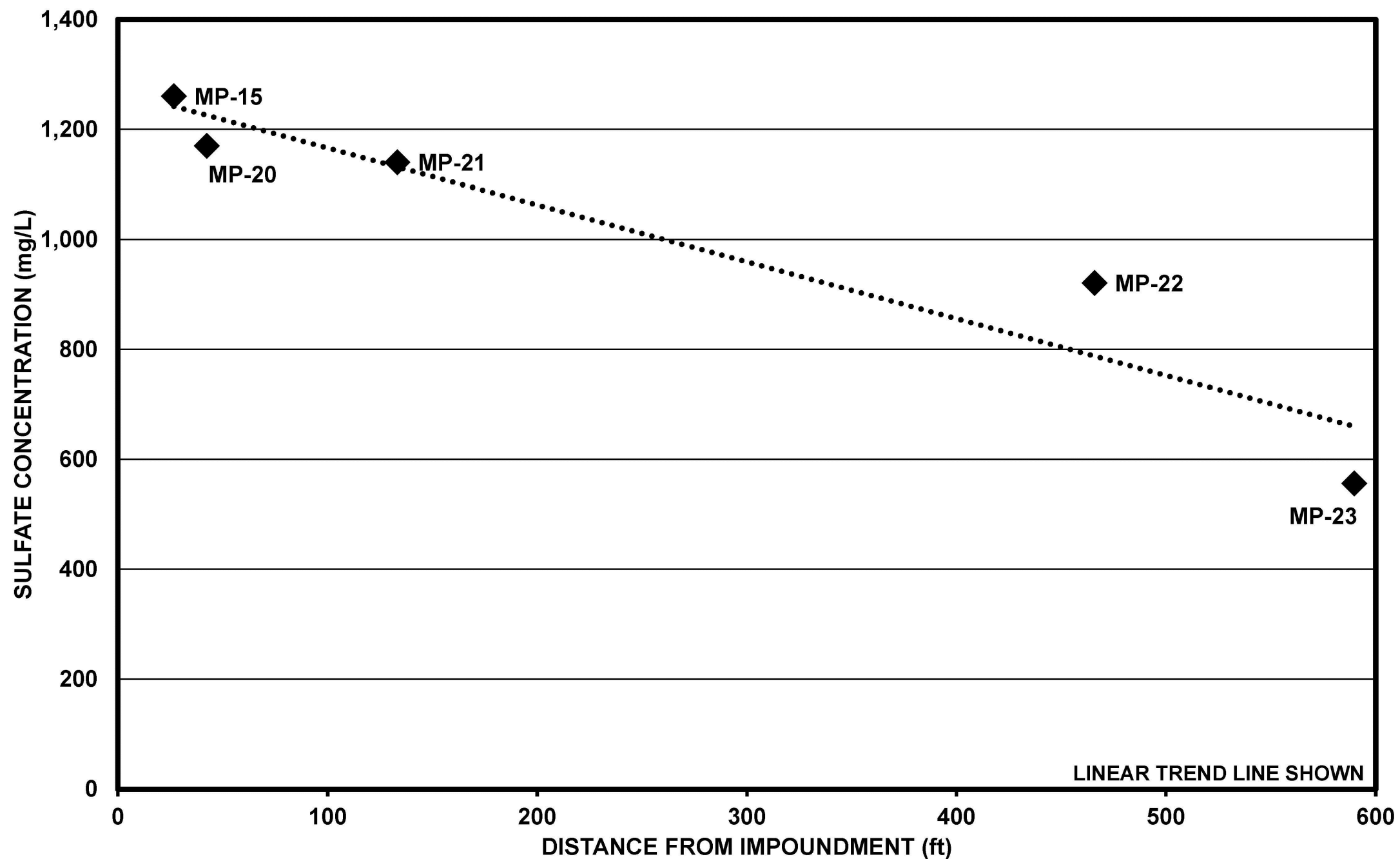
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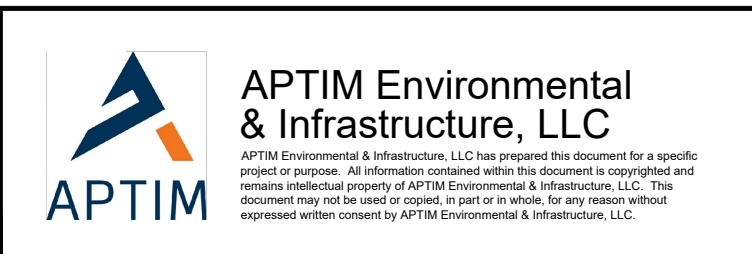
**FIGURE 6
CALCIUM CONCENTRATIONS VS.
DISTANCE FROM HISTORIC IMPOUNDMENT**

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LINEAR TREND LINE SHOWN

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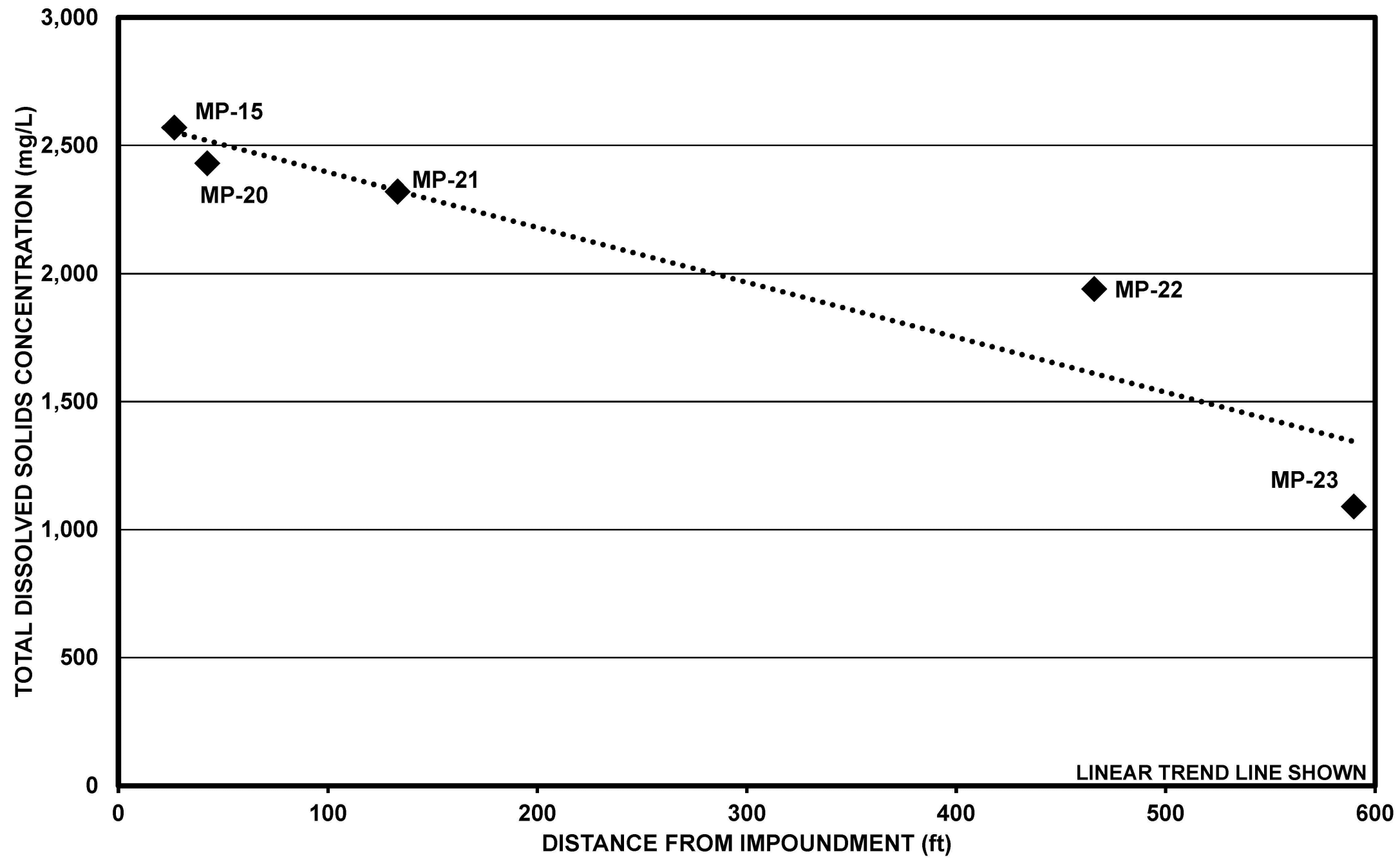


**NEW CASTLE NORTH BOTTOM ASH POND
WEST PITTSBURG, PENNSYLVANIA**

**FIGURE 7
SULFATE CONCENTRATIONS VS.
DISTANCE FROM HISTORIC IMPOUNDMENT**

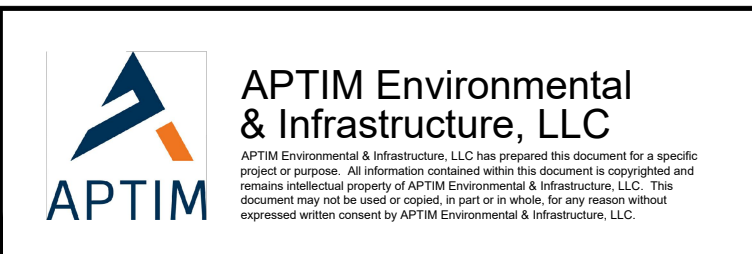
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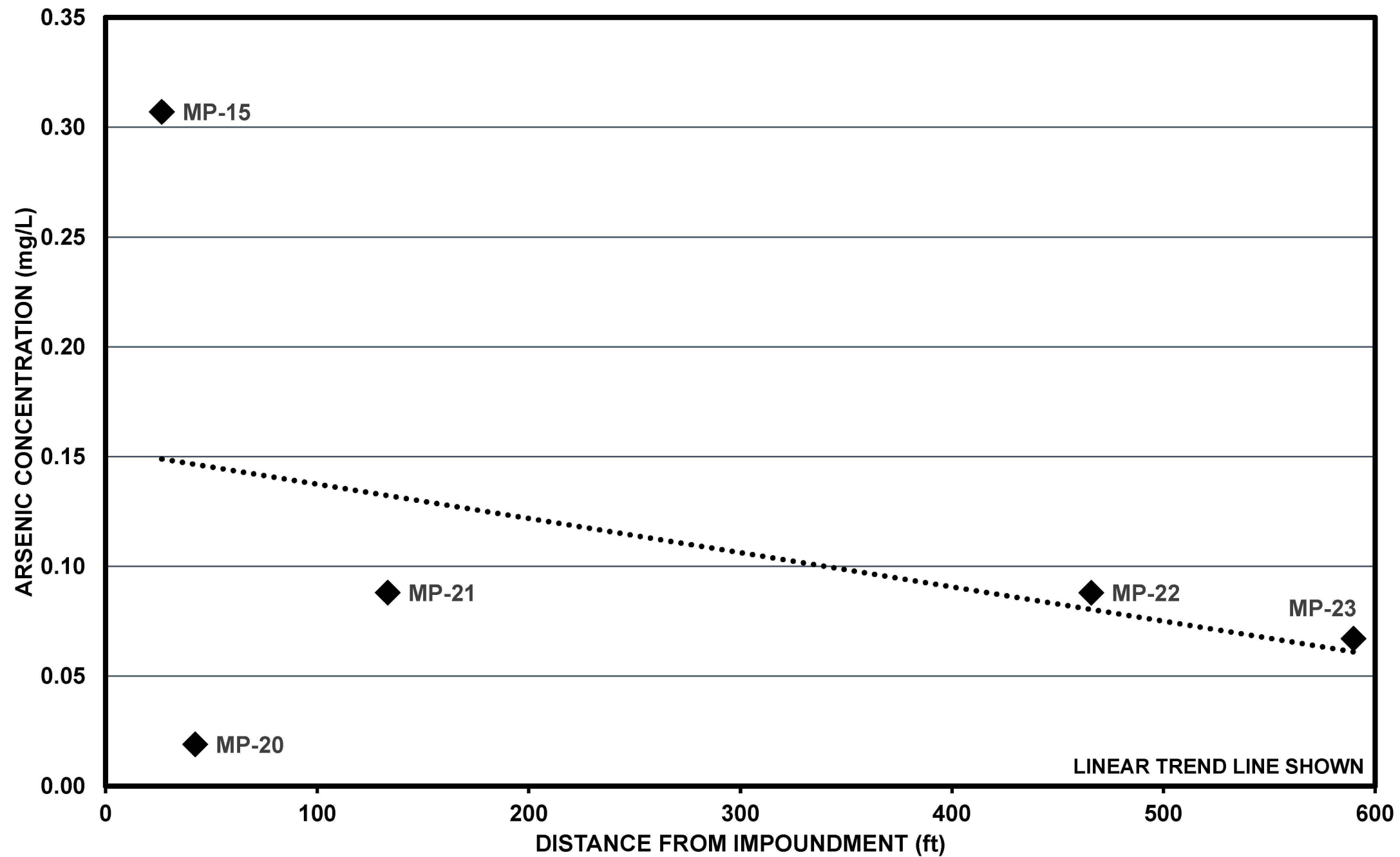


**NEW CASTLE NORTH BOTTOM ASH POND
WEST PITTSBURG, PENNSYLVANIA**

**FIGURE 8
TOTAL DISSOLVED SOLIDS CONCENTRATIONS VS.
DISTANCE FROM HISTORIC IMPOUNDMENT**

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**NEW CASTLE NORTH BOTTOM ASH POND
WEST PITTSBURG, PENNSYLVANIA**

**FIGURE 9
ARSENIC CONCENTRATIONS VS.
DISTANCE FROM HISTORIC IMPOUNDMENT**



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Appendix A

North Bottom Ash Pond Outfall 004 Analytical Data



**GEOCHEMICAL
TESTING**
Environmental and Energy Analysis

2005 N. Center Ave.
Somerset, PA 15501

814/443-1671
814/445-6666
FAX: 814/445-6729

Monday, September 11, 2017

Steven Brown
NRG - NEW CASTLE POWER PLANT
PO BOX 325
WEST PITTSBURGH, PA 16160

RE: New Castle NPDES Renewal

Order No.: G1708G93

Dear Steven Brown:

Geochemical Testing received 1 sample(s) on 8/29/2017 for the analyses presented in the following report.

There were no problems with the analyses and all QC data met NELAC, EPA, and laboratory specifications except where noted in the Case Narrative or Laboratory Results.

If you have any questions regarding these tests results, please feel free to call.

Sincerely,

Timothy W. Bergstresser
Director of Technical Services

Leslie A. Nemeth
Project Manager



Geochemical Testing

Date: 11-Sep-17

CLIENT: NRG - NEW CASTLE POWER PLANT
Project: New Castle NPDES Renewal
Lab Order: G1708G93

CASE NARRATIVE

No problems were encountered during analysis of this workorder, except if noted in this report.

SAMPLE RECEIPT CHECKLIST

	Response
COC is present	Yes
COC is filled out in ink and legible	Yes
COC relinquished, signature, date, and time	Yes
Samples arrived within hold time	Yes
Containers properly preserved for the requested testing	Yes
Sample containers have legible labels	Yes
Sample preservation verified	Yes
Appropriate sample containers are used	Yes
Sample container(s) received at proper temperature	Yes
Zero headspace where required	Yes
Sufficient volume for all requested analyses	Yes

Comments on the above checklist: None

Samples were not filtered in the field for dissolved metals by EPA 200.7; samples were lab filtered and then preserved to pH < 2. The field filtering requirements of 40 CFR Part 136 were not met. Consult with your regulatory agency for further guidance on the use of this data.

Legend:	ND - Not Detected	S - Spike Recovery outside accepted recovery limits
	J - Indicates an estimated value.	R - RPD outside accepted recovery limits
	U - The analyte was not detected at or above the listed concentration, which is below the laboratory quantitation limit.	E - Value above quantitation range
	B - Analyte detected in the associated Method Blank	** - Value exceeds Action Limit
	Q - Qualifier	H - Method Hold Time Exceeded
	QL - Quantitation Limit	MCL - Contaminant Limit
	DF - Dilution Factor	



Laboratory Results

Geochemical Testing

Date: 11-Sep-17

CLIENT: NRG - NEW CASTLE POWER PLANT
Lab Order: G1708G93
Project: New Castle NPDES Renewal
Lab ID: G1708G93-001
Matrix: SURFACE WATER

Client Sample ID: 004 Day 1
Collection Date: 8/28/2017 12:36:00 PM
Sampled By: NRG
Date Received: 8/29/2017 9:57:08 AM

Analyses	Result	Q	MDL	PQL	Units	DF	Date Prepared	Date Analyzed
PHYSICAL TESTS			Analyst: KLS				SM 2540 D	SM 2540 D
Total suspended solids	2		1.0	1	mg/L	1	08/29/17 1:15 PM	08/29/17 1:22 PM
INORGANIC NON-METALS			Analyst: KLS				SM 2540C	SM 2540 C
Total dissolved solids	376		1.0	2	mg/L	1	08/29/17 1:15 PM	08/29/17 1:21 PM
INDICATOR ORGANIC PARAMETERS			Analyst: MMR				SM 5210 B	SM 5210 B
BOD 5-day	1	J	0.8	2	mg/L	1.5	08/29/17 2:50 PM	09/03/17 5:14 PM
INDICATOR ORGANIC PARAMETERS			Analyst: MMR				Hach 8000	HACH 8000
Chemical Oxygen Demand	18		5.0	10	mg/L	1	08/29/17 11:55 PM	08/30/17 1:55 AM
INORGANIC NON-METALS			Analyst: DMM				EPA 300.0	EPA 300.0
Bromide	0.10	U	0.10	0.2	mg/L	1	08/29/17 12:30 PM	08/29/17 12:43 PM
Chloride	66.1		0.20	1.0	mg/L	1	08/29/17 12:30 PM	08/29/17 12:43 PM
Fluoride	0.12		0.050	0.10	mg/L	1	08/29/17 12:30 PM	08/29/17 12:43 PM
Sulfate	58.1		0.50	2.0	mg/L	1	08/29/17 12:30 PM	08/29/17 12:43 PM
INORGANIC NON-METALS			Analyst: BEH					ASTM D7511-09
Cyanide, total	0.010	U	0.010	0.020	mg/L	1		08/30/17 10:50 AM
COLOR			Analyst: SLY					SM 2120 B
Color	30		5.0	5.0	Color Units	1		08/29/17 11:30 AM
INORGANIC METALS			Analyst: DMM				USGS I-1230-8	USGS I-1230-85
Hexavalent Chromium	0.0010	US	0.0010	0.0020	mg/L	1	08/29/17 10:45 AM	08/29/17 11:17 AM
NOTES: S - Matrix spike recovery was low, the method control sample recovery was acceptable.								
INORGANIC NON-METALS			Analyst: SLY				SM 5540 C	SM 5540 C
MBAS	0.04	J	0.020	0.050	mg/L as LAS	1	08/29/17 2:15 PM	08/29/17 3:40 PM
NOTES: The complete unit designation is "mg/L MBAS (calculated as LAS, molar weight 342.)"								
INORGANIC NON-METALS			Analyst: SMS					EPA 350.1
Ammonia Nitrogen	0.16		0.040	0.10	mg/L as N	1		08/30/17 11:46 AM
INORGANIC NON-METALS			Analyst: SMS				EPA 353.2	EPA 353.2
Nitrate - Nitrite	0.74		0.020	0.05	mg/L as N	1	08/31/17 8:51 AM	09/05/17 4:57 PM
INDICATOR ORGANIC PARAMETERS			Analyst: BEH					EPA 420.4
Phenolics	8.0	J	5.00	10.0	µg/L	1		08/31/17 10:16 AM



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Analyses	Result	Q	MDL	PQL	Units	DF	Date Prepared	Date Analyzed
INORGANIC NON METALS			Analyst: MMR				SM 4500-S2- B	SM 4500-S2- D
Sulfide	0.05	U	0.05	0.1	mg/L	1	08/30/17 4:40 AM	08/30/17 5:05 AM
INORGANIC NON-METALS			Analyst: SAG				EPA 351.2	EPA 351.2
Total Kjeldahl Nitrogen	1		0.5	1	mg/L as N	1	08/31/17 1:15 PM	08/31/17 6:20 PM
INORGANIC METALS			Analyst: LNG				SM 3112 B	SM 3112 B
Mercury	0.10	U	0.10	0.2	µg/L	1	08/30/17 8:45 AM	08/31/17 1:13 PM
INORGANIC METALS			Analyst: JEK				EPA 200.2	EPA 200.8
Aluminum	28.0		2.00	5.0	µg/L	1	08/30/17 10:53 AM	09/01/17 11:18 AM
Antimony	0.50	U	0.50	1.0	µg/L	1	08/30/17 10:53 AM	09/01/17 11:18 AM
Arsenic	13.6		0.50	1.0	µg/L	1	08/30/17 10:53 AM	09/01/17 11:18 AM
Barium	45.3		2.00	5.0	µg/L	1	08/30/17 10:53 AM	09/01/17 11:18 AM
Beryllium	0.50	U	0.50	1.0	µg/L	1	08/30/17 10:53 AM	09/06/17 12:00 PM
Cadmium	0.10	U	0.10	0.2	µg/L	1	08/30/17 10:53 AM	09/01/17 11:18 AM
Chromium	2.00	U	2.00	5.0	µg/L	1	08/30/17 10:53 AM	09/01/17 11:18 AM
Cobalt	0.6		0.20	0.5	µg/L	1	08/30/17 10:53 AM	09/01/17 11:18 AM
Copper	9.6		0.50	1.0	µg/L	1	08/30/17 10:53 AM	09/01/17 11:18 AM
Lead	0.8	J	0.20	1.0	µg/L	1	08/30/17 10:53 AM	09/01/17 11:18 AM
Manganese	225		2.50	5.0	µg/L	5	08/30/17 10:53 AM	09/06/17 10:09 AM
Molybdenum	7.6		0.50	1.0	µg/L	1	08/30/17 10:53 AM	09/01/17 11:18 AM
Nickel	3.8		0.20	0.5	µg/L	1	08/30/17 10:53 AM	09/01/17 11:18 AM
Selenium	0.6	J	0.50	1.0	µg/L	1	08/30/17 10:53 AM	09/01/17 11:18 AM
Silver	0.10	U	0.10	0.2	µg/L	1	08/30/17 10:53 AM	09/01/17 11:18 AM
Thallium	0.10	U	0.10	0.2	µg/L	1	08/30/17 10:53 AM	09/01/17 11:18 AM
Zinc	12.1		2.00	5.0	µg/L	1	08/30/17 10:53 AM	09/01/17 11:18 AM
INORGANIC METALS			Analyst: GXI				EPA 200.2	EPA 200.7
Iron, dissolved	293		20.0	50	µg/L	1	08/30/17 10:53 AM	08/31/17 4:31 PM
INORGANIC METALS			Analyst: GXI				EPA 200.2	EPA 200.7
Boron	151		10	50	µg/L	1	08/30/17 10:53 AM	09/01/17 2:20 PM
Calcium	56600		50.0	100	µg/L	1	08/30/17 10:53 AM	08/31/17 4:17 PM
Iron	476		20.0	50	µg/L	1	08/30/17 10:53 AM	08/31/17 4:17 PM
Magnesium	14400		50.0	100	µg/L	1	08/30/17 10:53 AM	08/31/17 4:17 PM
Phosphorus	278		5.00	10.0	µg/L	1	08/30/17 10:53 AM	08/31/17 4:17 PM
Hardness (SM 2340B)	201000		500	1000	µg/L	1	08/30/17 10:53 AM	08/31/17 4:17 PM
GCFID ANALYSIS			Analyst: TEW				EPA 8015	EPA 8015
Acrylamide	5.0	U*	5.0	10	mg/L	1	08/30/17 11:42 AM	08/30/17 5:16 PM
Surr: 1,2-butanediol	92.2		0	50-150	%REC	1	08/30/17 11:42 AM	08/30/17 5:16 PM



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GCFID ANALYSIS

Analyst: **TEW**

EPA 8015

EPA 8015

NOTES:

* - The laboratory is not certified by PADEP for this analyte.

SEMI-VOLATILE COMPOUNDS

Analyst: **NPT**

EPA 3535A

EPA 625

1,2,4-Trichlorobenzene	0.10	U	0.10	0.2	µg/L	1	08/30/17 11:37 AM	09/05/17 5:52 PM
1,2-Dichlorobenzene	0.10	U	0.10	0.2	µg/L	1	08/30/17 11:37 AM	09/05/17 5:52 PM
1,2-Diphenylhydrazine as Azobenzene	0.10	U	0.10	0.2	µg/L	1	08/30/17 11:37 AM	09/05/17 5:52 PM
1,3-Dichlorobenzene	0.10	U	0.10	0.2	µg/L	1	08/30/17 11:37 AM	09/05/17 5:52 PM
1,4-Dichlorobenzene	0.10	U	0.10	0.2	µg/L	1	08/30/17 11:37 AM	09/05/17 5:52 PM
1,4-Dioxane	1.0		0.10	0.2	µg/L	1	08/30/17 11:37 AM	09/05/17 5:52 PM
2,4,6-Trichlorophenol	0.20	U	0.20	0.5	µg/L	1	08/30/17 11:37 AM	09/05/17 5:52 PM
2,4-Dichlorophenol	0.20	U	0.20	0.5	µg/L	1	08/30/17 11:37 AM	09/05/17 5:52 PM
2,4-Dimethylphenol	0.20	U	0.20	0.5	µg/L	1	08/30/17 11:37 AM	09/05/17 5:52 PM
2,4-Dinitrophenol	1.00	U	1.00	2.0	µg/L	1	08/30/17 11:37 AM	09/05/17 5:52 PM
2,4-Dinitrotoluene	0.10	U	0.10	0.2	µg/L	1	08/30/17 11:37 AM	09/05/17 5:52 PM
2,6-Dinitrotoluene	0.10	U	0.10	0.2	µg/L	1	08/30/17 11:37 AM	09/05/17 5:52 PM
2-Chloro-Naphthalene	0.10	U	0.10	0.2	µg/L	1	08/30/17 11:37 AM	09/05/17 5:52 PM
2-Chlorophenol	0.20	U	0.20	0.5	µg/L	1	08/30/17 11:37 AM	09/05/17 5:52 PM
2-Methyl-4,6-dinitrophenol	0.20	U	0.20	0.5	µg/L	1	08/30/17 11:37 AM	09/05/17 5:52 PM
2-Nitrophenol	0.20	U	0.20	0.5	µg/L	1	08/30/17 11:37 AM	09/05/17 5:52 PM
3,3-Dichlorobenzidine	0.10	U	0.10	0.2	µg/L	1	08/30/17 11:37 AM	09/05/17 5:52 PM
4-Bromophenylphenylether	0.10	U	0.10	0.2	µg/L	1	08/30/17 11:37 AM	09/07/17 4:48 AM
4-Chlorophenylphenylether	0.10	U	0.10	0.2	µg/L	1	08/30/17 11:37 AM	09/05/17 5:52 PM
4-Nitrophenol	0.20	U	0.20	0.5	µg/L	1	08/30/17 11:37 AM	09/05/17 5:52 PM
Acenaphthene	0.10	U	0.10	0.2	µg/L	1	08/30/17 11:37 AM	09/05/17 5:52 PM
Acenaphthylene	0.10	U	0.10	0.2	µg/L	1	08/30/17 11:37 AM	09/05/17 5:52 PM
Anthracene	0.10	U	0.10	0.2	µg/L	1	08/30/17 11:37 AM	09/05/17 5:52 PM
Benzidine	0.10	U	0.10	0.2	µg/L	1	08/30/17 11:37 AM	09/05/17 5:52 PM
Benzo(a)anthracene	0.10	U	0.10	0.2	µg/L	1	08/30/17 11:37 AM	09/05/17 5:52 PM
Benzo(a)pyrene	0.05	U	0.05	0.1	µg/L	1	08/30/17 11:37 AM	09/05/17 5:52 PM
Benzo(b)fluoranthene	0.10	U	0.10	0.2	µg/L	1	08/30/17 11:37 AM	09/05/17 5:52 PM
Benzo(g,h,i)perylene	0.10	U	0.10	0.2	µg/L	1	08/30/17 11:37 AM	09/07/17 4:48 AM
Benzo(k)fluoranthene	0.10	U	0.10	0.2	µg/L	1	08/30/17 11:37 AM	09/05/17 5:52 PM
bis(2-Chloroethoxy)methane	0.10	U	0.10	0.2	µg/L	1	08/30/17 11:37 AM	09/05/17 5:52 PM
bis(2-Chloroethyl)ether	0.10	U	0.10	0.2	µg/L	1	08/30/17 11:37 AM	09/05/17 5:52 PM
bis(2-Chloroisopropyl)ether	0.10	U	0.10	0.2	µg/L	1	08/30/17 11:37 AM	09/05/17 5:52 PM
bis(2-Ethylhexyl)phthalate	1.00	U	1.00	3.0	µg/L	1	08/30/17 11:37 AM	09/07/17 4:48 AM
Butyl benzylphthalate	1.00	U	1.00	2.0	µg/L	1	08/30/17 11:37 AM	09/07/17 4:48 AM
Chrysene	0.10	U	0.10	0.2	µg/L	1	08/30/17 11:37 AM	09/05/17 5:52 PM
Dibenzo(a,h)anthracene	0.10	U	0.10	0.2	µg/L	1	08/30/17 11:37 AM	09/07/17 4:48 AM
Diethyl Phthalate	1.00	U	1.00	2.0	µg/L	1	08/30/17 11:37 AM	09/05/17 5:52 PM



I.D. 56-00306 PA DEP

Laboratory Results

Geochemical Testing

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Analyses	Result	Q	MDL	PQL	Units	DF	Date Prepared	Date Analyzed
SEMI-VOLATILE COMPOUNDS			Analyst: NPT				EPA 3535A	EPA 625
Dimethyl Phthalate	1.00	U	1.00	2.0	µg/L	1	08/30/17 11:37 AM	09/05/17 5:52 PM
Di-N-Butyl Phthalate	1.00	U	1.00	2.0	µg/L	1	08/30/17 11:37 AM	09/05/17 5:52 PM
Di-N-Octylphthalate	1.00	U	1.00	2.0	µg/L	1	08/30/17 11:37 AM	09/07/17 4:48 AM
Dioxin Scan	Not Detected		0.10	0.2	µg/L	1	08/30/17 11:37 AM	09/05/17 5:52 PM
Fluoranthene	0.10	U	0.10	0.2	µg/L	1	08/30/17 11:37 AM	09/05/17 5:52 PM
Fluorene	0.10	U	0.10	0.2	µg/L	1	08/30/17 11:37 AM	09/05/17 5:52 PM
Hexachlorobenzene	0.10	U	0.10	0.2	µg/L	1	08/30/17 11:37 AM	09/05/17 5:52 PM
Hexachlorobutadiene	0.10	U	0.10	0.2	µg/L	1	08/30/17 11:37 AM	09/05/17 5:52 PM
Hexachlorocyclopentadiene	0.10	U	0.10	0.2	µg/L	1	08/30/17 11:37 AM	09/05/17 5:52 PM
Hexachloroethane	0.10	U	0.10	0.2	µg/L	1	08/30/17 11:37 AM	09/05/17 5:52 PM
Indeno(1,2,3-cd)pyrene	0.10	U	0.10	0.2	µg/L	1	08/30/17 11:37 AM	09/07/17 4:48 AM
Isophorone	0.1	J	0.10	0.2	µg/L	1	08/30/17 11:37 AM	09/05/17 5:52 PM
Naphthalene	0.10	U	0.10	0.2	µg/L	1	08/30/17 11:37 AM	09/05/17 5:52 PM
Nitrobenzene	0.10	U	0.10	0.2	µg/L	1	08/30/17 11:37 AM	09/05/17 5:52 PM
n-Nitrosodimethylamine	0.10	U	0.10	0.2	µg/L	1	08/30/17 11:37 AM	09/05/17 5:52 PM
N-Nitroso-di-n-propylamine	0.10	U	0.10	0.2	µg/L	1	08/30/17 11:37 AM	09/05/17 5:52 PM
n-Nitrosodiphenylamine	0.10	U	0.10	0.2	µg/L	1	08/30/17 11:37 AM	09/05/17 5:52 PM
p-Chloro-m-cresol	0.10	U	0.10	0.2	µg/L	1	08/30/17 11:37 AM	09/05/17 5:52 PM
Pentachlorophenol	0.20	U	0.20	0.5	µg/L	1	08/30/17 11:37 AM	09/05/17 5:52 PM
Phenanthrene	0.10	U	0.10	0.2	µg/L	1	08/30/17 11:37 AM	09/05/17 5:52 PM
Phenol	0.20	U	0.20	0.5	µg/L	1	08/30/17 11:37 AM	09/05/17 5:52 PM
Pyrene	0.10	U	0.10	0.2	µg/L	1	08/30/17 11:37 AM	09/07/17 4:48 AM
Surr: 2,4,6-Tribromophenol	101		0	10-139 %REC		1	08/30/17 11:37 AM	09/05/17 5:52 PM
Surr: 2-Fluorophenol	77.5		0	16-134 %REC		1	08/30/17 11:37 AM	09/05/17 5:52 PM
Surr: 4,4-Dibromoctafluorobiphenyl	92.0		0	27-145 %REC		1	08/30/17 11:37 AM	09/05/17 5:52 PM
Surr: Benz(a)anthracene-d12	87.5		0	30-141 %REC		1	08/30/17 11:37 AM	09/05/17 5:52 PM
Surr: Phenol-d6	81.5		0	19-122 %REC		1	08/30/17 11:37 AM	09/05/17 5:52 PM
Surr: Tetrachloro-m-xylene	86.0		0	27-131 %REC		1	08/30/17 11:37 AM	09/05/17 5:52 PM
VOLATILE ORGANIC COMPOUNDS			Analyst: SJM				EPA 624	
1,1,1-Trichloroethane	0.20	U	0.20	0.5	µg/L	1	08/29/17 10:59 PM	
1,1,2,2-Tetrachloroethane	0.20	U	0.20	0.5	µg/L	1	08/29/17 10:59 PM	
1,1,2-Trichloroethane	0.50	U	0.50	1.0	µg/L	1	08/29/17 10:59 PM	
1,1-Dichloroethane	0.20	U	0.20	0.5	µg/L	1	08/29/17 10:59 PM	
1,1-Dichloroethene	0.20	U	0.20	0.5	µg/L	1	08/29/17 10:59 PM	
1,2-Dichloroethane	0.20	U	0.20	0.5	µg/L	1	08/29/17 10:59 PM	
1,2-Dichloropropane	0.20	U	0.20	0.5	µg/L	1	08/29/17 10:59 PM	
2-Chloroethylvinyl ether	0.50	U	0.50	1.0	µg/L	1	08/29/17 10:59 PM	
Benzene	0.20	U	0.20	0.5	µg/L	1	08/29/17 10:59 PM	
Bromoform	0.20	U	0.20	0.5	µg/L	1	08/29/17 10:59 PM	
Carbon Tetrachloride	0.20	U	0.20	0.5	µg/L	1	08/29/17 10:59 PM	



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Analyses	Result	Q	MDL	PQL	Units	DF	Date Prepared	Date Analyzed
VOLATILE ORGANIC COMPOUNDS			Analyst: SJM				EPA 624	
Chlorobenzene	0.20	U	0.20	0.5	µg/L	1		08/29/17 10:59 PM
Chlorodibromomethane	0.40	U	0.40	1.0	µg/L	1		08/29/17 10:59 PM
Chloroethane	0.20	U	0.20	0.5	µg/L	1		08/29/17 10:59 PM
Chloroform	1.0		0.20	0.5	µg/L	1		08/29/17 10:59 PM
Dichlorobromomethane	0.20	U	0.20	0.5	µg/L	1		08/29/17 10:59 PM
Ethylbenzene	0.20	U	0.20	0.5	µg/L	1		08/29/17 10:59 PM
Methyl Bromide	0.50	U	0.50	1.0	µg/L	1		08/29/17 10:59 PM
Methyl Chloride	0.20	U	0.20	0.5	µg/L	1		08/29/17 10:59 PM
Methylene Chloride	0.20	U	0.20	0.5	µg/L	1		08/29/17 10:59 PM
Tetrachloroethene	0.3	J	0.20	0.5	µg/L	1		08/29/17 10:59 PM
Toluene	0.20	U	0.20	0.5	µg/L	1		08/29/17 10:59 PM
trans-1,2-Dichloroethene	0.50	U	0.50	1.0	µg/L	1		08/29/17 10:59 PM
Trichloroethene	0.20	U	0.20	0.5	µg/L	1		08/29/17 10:59 PM
Vinyl Chloride	0.20	U	0.20	0.5	µg/L	1		08/29/17 10:59 PM
trans-1,3-Dichloropropene	0.20	U	0.20	0.5	µg/L	1		08/29/17 10:59 PM
cis-1,3-Dichloropropene	0.20	U	0.20	0.5	µg/L	1		08/29/17 10:59 PM
1,3-Dichloropropylene	0.20	U	0.20	0.5	µg/L	1		08/29/17 10:59 PM
Surr: 1,2-Dichloroethane-d4	97.9		0	80-120 %REC		1		08/29/17 10:59 PM
Surr: 4-Bromofluorobenzene	98.2		0	80-120 %REC		1		08/29/17 10:59 PM
Surr: Toluene-d8	99.0		0	80-120 %REC		1		08/29/17 10:59 PM
VOLATILE ORGANIC COMPOUNDS			Analyst: SJM				EPA 624	
Acrolein	1.00	U	1.00	2.00	µg/L	1		08/29/17 11:23 PM
Acrylonitrile	0.500	U	0.500	1.00	µg/L	1		08/29/17 11:23 PM
Surr: 1,2-Dichloroethane-d4	99.4		0	80-120 %REC		1		08/29/17 11:23 PM
Surr: 4-Bromofluorobenzene	99.0		0	80-120 %REC		1		08/29/17 11:23 PM
Surr: Toluene-d8	99.6		0	80-120 %REC		1		08/29/17 11:23 PM
INDICATOR ORGANIC PARAMETERS			Analyst: HBP				EPA 1664	EPA 1664
Oil & Grease	1.4	U	1.4	5	mg/L	1.01	08/30/17 1:59 PM	08/31/17 3:09 PM
INDICATOR ORGANIC PARAMETERS			Analyst: NEL					SM 5310 C
Total Organic Carbon	8.5		0.20	0.5	mg/L	1		08/30/17 8:08 PM



I.D. 56-00306 PA DEP

Friday, September 08, 2017

Steven Brown
NRG - NEW CASTLE POWER PLANT
PO BOX 325
WEST PITTSBURGH, PA 16160

RE: New Castle NPDES Renewal

Order No.: G1708H84

Dear Steven Brown:

Geochemical Testing received 1 sample(s) on 8/30/2017 for the analyses presented in the following report.

There were no problems with the analyses and all QC data met NELAC, EPA, and laboratory specifications except where noted in the Case Narrative or Laboratory Results.

If you have any questions regarding these tests results, please feel free to call.

Sincerely,



Timothy W. Bergstresser
Director of Technical Services

Leslie A. Nemeth
Project Manager

Geochemical Testing

Date: 08-Sep-17

CLIENT: NRG - NEW CASTLE POWER PLANT
Project: New Castle NPDES Renewal
Lab Order: G1708H84

CASE NARRATIVE

No problems were encountered during analysis of this workorder, except if noted in this report.

SAMPLE RECEIPT CHECKLIST

	Response
COC is present	Yes
COC is filled out in ink and legible	Yes
COC relinquished, signature, date, and time	Yes
Samples arrived within hold time	Yes
Containers properly preserved for the requested testing	Yes
Sample containers have legible labels	Yes
Sample preservation verified	Yes
Appropriate sample containers are used	Yes
Sample container(s) received at proper temperature	Yes
Zero headspace where required	Yes
Sufficient volume for all requested analyses	Yes

Comments on the above checklist: None

Samples were not filtered in the field for dissolved metals by EPA 200.7; samples were lab filtered and then preserved to pH < 2. The field filtering requirements of 40 CFR Part 136 were not met. Consult with your regulatory agency for further guidance on the use of this data.

Legend:	ND - Not Detected	S - Spike Recovery outside accepted recovery limits
	J - Indicates an estimated value.	R - RPD outside accepted recovery limits
	U - The analyte was not detected at or above the listed concentration, which is below the laboratory quantitation limit.	E - Value above quantitation range
	B - Analyte detected in the associated Method Blank	** - Value exceeds Action Limit
	Q - Qualifier	H - Method Hold Time Exceeded
	QL - Quantitation Limit	MCL - Contaminant Limit
	DF - Dilution Factor	



Laboratory Results

Geochemical Testing

Date: 08-Sep-17

CLIENT: NRG - NEW CASTLE POWER PLANT
Lab Order: G1708H84
Project: New Castle NPDES Renewal
Lab ID: G1708H84-001
Matrix: GROUNDWATER

Client Sample ID: 004 Day 2
Collection Date: 8/29/2017 12:39:00 PM
Sampled By: NRG
Date Received: 8/30/2017 9:57:29 AM

Analyses	Result	Q	MDL	PQL	Units	DF	Date Prepared	Date Analyzed
PHYSICAL TESTS			Analyst: KLS				SM 2540 D	SM 2540 D
Total suspended solids	2		1.0		1 mg/L	1	08/30/17 3:30 PM	08/30/17 3:44 PM
INORGANIC NON-METALS			Analyst: KLS				SM 2540C	SM 2540 C
Total dissolved solids	372		1.0		2 mg/L	1	08/30/17 3:30 PM	08/30/17 3:44 PM
INDICATOR ORGANIC PARAMETERS			Analyst: DMM				SM 5210 B	SM 5210 B
BOD 5-day	2	B	0.8		2 mg/L	1.5	08/30/17 1:00 PM	09/05/17 6:00 AM
INDICATOR ORGANIC PARAMETERS			Analyst: MMR				Hach 8000	HACH 8000
Chemical Oxygen Demand	21		5.0		10 mg/L	1	08/30/17 11:50 PM	08/31/17 1:50 AM
INORGANIC NON-METALS			Analyst: DMM				EPA 300.0	EPA 300.0
Bromide	0.1	J	0.10		0.2 mg/L	1	08/30/17 11:50 AM	08/30/17 1:30 PM
Chloride	68.9		0.20		1.0 mg/L	1	08/30/17 11:50 AM	08/30/17 1:30 PM
Fluoride	0.12		0.050		0.10 mg/L	1	08/30/17 11:50 AM	08/30/17 1:30 PM
Sulfate	60.9		0.50		2.0 mg/L	1	08/30/17 11:50 AM	08/30/17 1:30 PM
INORGANIC NON-METALS			Analyst: BEH					ASTM D7511-09
Cyanide, total	0.010	U	0.010		0.020 mg/L	1		09/01/17 11:46 AM
COLOR			Analyst: SAG					SM 2120 B
Color	30		5.0		5.0 Color Units	1		08/30/17 12:54 PM
INORGANIC METALS			Analyst: SLY				USGS I-1230-8	USGS I-1230-85
Hexavalent Chromium	0.0010	US	0.0010		0.0020 mg/L	1	08/30/17 10:40 AM	08/30/17 11:01 AM
NOTES: S - Matrix spike recovery was low, the method control sample recovery was acceptable.								
INORGANIC NON-METALS			Analyst: BEH				SM 5540 C	SM 5540 C
MBAS	0.020	U	0.020		0.050 mg/L as LAS	1	08/31/17 11:00 AM	08/31/17 12:00 PM
NOTES: The complete unit designation is "mg/L MBAS (calculated as LAS, molar weight 342.)"								
INORGANIC NON-METALS			Analyst: SMS					EPA 350.1
Ammonia Nitrogen	0.15		0.040		0.10 mg/L as N	1		08/31/17 1:26 PM
INORGANIC NON-METALS			Analyst: SMS				EPA 353.2	EPA 353.2
Nitrate - Nitrite	0.67		0.020		0.05 mg/L as N	1	09/05/17 8:30 AM	09/05/17 3:35 PM
INDICATOR ORGANIC PARAMETERS			Analyst: BEH					EPA 420.4
Phenolics	5.0	J	5.00		10.0 µg/L	1		08/31/17 6:28 PM



I.D. 56-00306 PA DEP

Laboratory Results

Geochemical Testing

Date: 08-Sep-17

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Lab Order: G1708H84
Project: New Castle NPDES Renewal
Lab ID: G1708H84-001
Matrix: GROUNDWATER

Client Sample ID: 004 Day 2
Collection Date: 8/29/2017 12:39:00 PM
Sampled By: NRG
Date Received: 8/30/2017 9:57:29 AM

Analyses	Result	Q	MDL	PQL	Units	DF	Date Prepared	Date Analyzed
INORGANIC NON METALS			Analyst: MMR				SM 4500-S2- B	SM 4500-S2- D
Sulfide	0.05	U	0.05	0.1	mg/L	1	08/31/17 3:50 AM	08/31/17 4:40 AM
INORGANIC NON-METALS			Analyst: SAG				EPA 351.2	EPA 351.2
Total Kjeldahl Nitrogen	2		0.5	1	mg/L as N	1	08/31/17 1:15 PM	08/31/17 6:23 PM
INORGANIC METALS			Analyst: LNG				SM 3112 B	SM 3112 B
Mercury	0.10	U	0.10	0.2	µg/L	1	08/31/17 8:35 AM	08/31/17 2:36 PM
INORGANIC METALS			Analyst: JEK				EPA 200.2	EPA 200.8
Aluminum	28.5		2.00	5.0	µg/L	1	08/31/17 9:10 AM	09/01/17 12:03 PM
Antimony	0.50	U	0.50	1.0	µg/L	1	08/31/17 9:10 AM	09/01/17 12:03 PM
Arsenic	13.0		0.50	1.0	µg/L	1	08/31/17 9:10 AM	09/01/17 12:03 PM
Barium	48.6		2.00	5.0	µg/L	1	08/31/17 9:10 AM	09/01/17 12:03 PM
Beryllium	0.50	U	0.50	1.0	µg/L	1	08/31/17 9:10 AM	09/01/17 12:03 PM
Cadmium	0.10	U	0.10	0.2	µg/L	1	08/31/17 9:10 AM	09/01/17 12:03 PM
Chromium	2.00	U	2.00	5.0	µg/L	1	08/31/17 9:10 AM	09/01/17 12:03 PM
Cobalt	0.6		0.20	0.5	µg/L	1	08/31/17 9:10 AM	09/01/17 12:03 PM
Copper	5.0		0.50	1.0	µg/L	1	08/31/17 9:10 AM	09/01/17 12:03 PM
Lead	0.8	J	0.20	1.0	µg/L	1	08/31/17 9:10 AM	09/01/17 12:03 PM
Manganese	212		2.50	5.0	µg/L	5	08/31/17 9:10 AM	09/06/17 11:42 AM
Molybdenum	7.4		0.50	1.0	µg/L	1	08/31/17 9:10 AM	09/01/17 12:03 PM
Nickel	3.8		0.20	0.5	µg/L	1	08/31/17 9:10 AM	09/01/17 12:03 PM
Selenium	0.7	J	0.50	1.0	µg/L	1	08/31/17 9:10 AM	09/01/17 12:03 PM
Silver	0.10	U	0.10	0.2	µg/L	1	08/31/17 9:10 AM	09/01/17 12:03 PM
Thallium	0.10	U	0.10	0.2	µg/L	1	08/31/17 9:10 AM	09/01/17 12:03 PM
Zinc	11.1		2.00	5.0	µg/L	1	08/31/17 9:10 AM	09/01/17 12:03 PM
INORGANIC METALS			Analyst: GXI				EPA 200.2	EPA 200.7
Iron, dissolved	269		20.0	50	µg/L	1	08/31/17 9:10 AM	09/01/17 8:23 PM
INORGANIC METALS			Analyst: GXI				EPA 200.2	EPA 200.7
Boron	141		10	50	µg/L	1	08/31/17 9:10 AM	09/05/17 1:13 PM
Calcium	59500		50.0	100	µg/L	1	08/31/17 9:10 AM	09/01/17 10:52 AM
Iron	464		20.0	50	µg/L	1	08/31/17 9:10 AM	09/01/17 10:52 AM
Magnesium	15400		50.0	100	µg/L	1	08/31/17 9:10 AM	09/01/17 10:52 AM
Phosphorus	269		5.00	10.0	µg/L	1	08/31/17 9:10 AM	09/01/17 10:52 AM
Hardness (SM 2340B)	212000		500	1000	µg/L	1	08/31/17 9:10 AM	09/01/17 10:52 AM
GCFID ANALYSIS			Analyst: TEW				EPA 8015	EPA 8015
Acrylamide	5.0	U*	5.0	10	mg/L	1	08/30/17 11:42 AM	08/30/17 5:45 PM
Surr: 1,2-butanediol	106		0	50-150	%REC	1	08/30/17 11:42 AM	08/30/17 5:45 PM



I.D. 56-00306 PA DEP

Laboratory Results

Geochemical Testing

Date: 08-Sep-17

CLIENT: NRG - NEW CASTLE POWER PLANT
Lab Order: G1708H84
Project: New Castle NPDES Renewal
Lab ID: G1708H84-001
Matrix: GROUNDWATER

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Date Received: 8/30/2017 9:57:29 AM

Analyses	Result	Q	MDL	PQL	Units	DF	Date Prepared	Date Analyzed
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GCFID ANALYSIS

Analyst: **TEW**

EPA 8015

EPA 8015

NOTES:

* - The laboratory is not certified by PADEP for this analyte.

SEMI-VOLATILE COMPOUNDS

Analyst: **NPT**

EPA 3535A

EPA 625

1,2,4-Trichlorobenzene	0.10	U	0.10	0.2	µg/L	1.01	08/30/17 11:37 AM	09/05/17 6:24 PM
1,2-Dichlorobenzene	0.10	U	0.10	0.2	µg/L	1.01	08/30/17 11:37 AM	09/05/17 6:24 PM
1,2-Diphenylhydrazine as Azobenzene	0.10	U	0.10	0.2	µg/L	1.01	08/30/17 11:37 AM	09/05/17 6:24 PM
1,3-Dichlorobenzene	0.10	U	0.10	0.2	µg/L	1.01	08/30/17 11:37 AM	09/05/17 6:24 PM
1,4-Dichlorobenzene	0.10	U	0.10	0.2	µg/L	1.01	08/30/17 11:37 AM	09/05/17 6:24 PM
1,4-Dioxane	1.0		0.10	0.2	µg/L	1.01	08/30/17 11:37 AM	09/05/17 6:24 PM
2,4,6-Trichlorophenol	0.20	U	0.20	0.5	µg/L	1.01	08/30/17 11:37 AM	09/05/17 6:24 PM
2,4-Dichlorophenol	0.20	U	0.20	0.5	µg/L	1.01	08/30/17 11:37 AM	09/05/17 6:24 PM
2,4-Dimethylphenol	0.20	U	0.20	0.5	µg/L	1.01	08/30/17 11:37 AM	09/05/17 6:24 PM
2,4-Dinitrophenol	1.01	U	1.01	2.0	µg/L	1.01	08/30/17 11:37 AM	09/05/17 6:24 PM
2,4-Dinitrotoluene	0.10	U	0.10	0.2	µg/L	1.01	08/30/17 11:37 AM	09/05/17 6:24 PM
2,6-Dinitrotoluene	0.10	U	0.10	0.2	µg/L	1.01	08/30/17 11:37 AM	09/05/17 6:24 PM
2-Chloro-Naphthalene	0.10	U	0.10	0.2	µg/L	1.01	08/30/17 11:37 AM	09/05/17 6:24 PM
2-Chlorophenol	0.20	U	0.20	0.5	µg/L	1.01	08/30/17 11:37 AM	09/05/17 6:24 PM
2-Methyl-4,6-dinitrophenol	0.20	U	0.20	0.5	µg/L	1.01	08/30/17 11:37 AM	09/05/17 6:24 PM
2-Nitrophenol	0.20	U	0.20	0.5	µg/L	1.01	08/30/17 11:37 AM	09/05/17 6:24 PM
3,3-Dichlorobenzidine	0.10	U	0.10	0.2	µg/L	1.01	08/30/17 11:37 AM	09/05/17 6:24 PM
4-Bromophenylphenylether	0.10	U	0.10	0.2	µg/L	1.01	08/30/17 11:37 AM	09/07/17 5:20 AM
4-Chlorophenylphenylether	0.10	U	0.10	0.2	µg/L	1.01	08/30/17 11:37 AM	09/05/17 6:24 PM
4-Nitrophenol	0.20	U	0.20	0.5	µg/L	1.01	08/30/17 11:37 AM	09/05/17 6:24 PM
Acenaphthene	0.10	U	0.10	0.2	µg/L	1.01	08/30/17 11:37 AM	09/05/17 6:24 PM
Acenaphthylene	0.10	U	0.10	0.2	µg/L	1.01	08/30/17 11:37 AM	09/05/17 6:24 PM
Anthracene	0.10	U	0.10	0.2	µg/L	1.01	08/30/17 11:37 AM	09/05/17 6:24 PM
Benzidine	0.10	U	0.10	0.2	µg/L	1.01	08/30/17 11:37 AM	09/05/17 6:24 PM
Benzo(a)anthracene	0.10	U	0.10	0.2	µg/L	1.01	08/30/17 11:37 AM	09/05/17 6:24 PM
Benzo(a)pyrene	0.05	U	0.05	0.1	µg/L	1.01	08/30/17 11:37 AM	09/05/17 6:24 PM
Benzo(b)fluoranthene	0.10	U	0.10	0.2	µg/L	1.01	08/30/17 11:37 AM	09/05/17 6:24 PM
Benzo(g,h,i)perylene	0.10	U	0.10	0.2	µg/L	1.01	08/30/17 11:37 AM	09/07/17 5:20 AM
Benzo(k)fluoranthene	0.10	U	0.10	0.2	µg/L	1.01	08/30/17 11:37 AM	09/05/17 6:24 PM
bis(2-Chloroethoxy)methane	0.10	U	0.10	0.2	µg/L	1.01	08/30/17 11:37 AM	09/05/17 6:24 PM
bis(2-Chloroethyl)ether	0.10	U	0.10	0.2	µg/L	1.01	08/30/17 11:37 AM	09/05/17 6:24 PM
bis(2-Chloroisopropyl)ether	0.10	U	0.10	0.2	µg/L	1.01	08/30/17 11:37 AM	09/05/17 6:24 PM
bis(2-Ethylhexyl)phthalate	1.01	U	1.01	3.0	µg/L	1.01	08/30/17 11:37 AM	09/07/17 5:20 AM
Butyl benzylphthalate	1.01	U	1.01	2.0	µg/L	1.01	08/30/17 11:37 AM	09/07/17 5:20 AM
Chrysene	0.10	U	0.10	0.2	µg/L	1.01	08/30/17 11:37 AM	09/05/17 6:24 PM
Dibenzo(a,h)anthracene	0.10	U	0.10	0.2	µg/L	1.01	08/30/17 11:37 AM	09/07/17 5:20 AM
Diethyl Phthalate	1.01	U	1.01	2.0	µg/L	1.01	08/30/17 11:37 AM	09/05/17 6:24 PM



I.D. 56-00306 PA DEP

Laboratory Results

Geochemical Testing

Date: 08-Sep-17

CLIENT: NRG - NEW CASTLE POWER PLANT
Lab Order: G1708H84
Project: New Castle NPDES Renewal
Lab ID: G1708H84-001
Matrix: GROUNDWATER

Client Sample ID: 004 Day 2
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Sampled By: NRG
Date Received: 8/30/2017 9:57:29 AM

Analyses	Result	Q	MDL	PQL	Units	DF	Date Prepared	Date Analyzed
SEMI-VOLATILE COMPOUNDS			Analyst: NPT			EPA 3535A		EPA 625
Dimethyl Phthalate	1.01	U	1.01	2.0	µg/L	1.01	08/30/17 11:37 AM	09/05/17 6:24 PM
Di-N-Butyl Phthalate	1.01	U	1.01	2.0	µg/L	1.01	08/30/17 11:37 AM	09/05/17 6:24 PM
Di-N-Octylphthalate	1.01	U	1.01	2.0	µg/L	1.01	08/30/17 11:37 AM	09/07/17 5:20 AM
Dioxin Scan	Not Detected		0.10	0.2	µg/L	1.01	08/30/17 11:37 AM	09/05/17 6:24 PM
Fluoranthene	0.10	U	0.10	0.2	µg/L	1.01	08/30/17 11:37 AM	09/05/17 6:24 PM
Fluorene	0.10	U	0.10	0.2	µg/L	1.01	08/30/17 11:37 AM	09/05/17 6:24 PM
Hexachlorobenzene	0.10	U	0.10	0.2	µg/L	1.01	08/30/17 11:37 AM	09/05/17 6:24 PM
Hexachlorobutadiene	0.10	U	0.10	0.2	µg/L	1.01	08/30/17 11:37 AM	09/05/17 6:24 PM
Hexachlorocyclopentadiene	0.10	U	0.10	0.2	µg/L	1.01	08/30/17 11:37 AM	09/05/17 6:24 PM
Hexachloroethane	0.10	U	0.10	0.2	µg/L	1.01	08/30/17 11:37 AM	09/05/17 6:24 PM
Indeno(1,2,3-cd)pyrene	0.10	U	0.10	0.2	µg/L	1.01	08/30/17 11:37 AM	09/07/17 5:20 AM
Isophorone	0.1	J	0.10	0.2	µg/L	1.01	08/30/17 11:37 AM	09/05/17 6:24 PM
Naphthalene	0.10	U	0.10	0.2	µg/L	1.01	08/30/17 11:37 AM	09/05/17 6:24 PM
Nitrobenzene	0.10	U	0.10	0.2	µg/L	1.01	08/30/17 11:37 AM	09/05/17 6:24 PM
n-Nitrosodimethylamine	0.10	U	0.10	0.2	µg/L	1.01	08/30/17 11:37 AM	09/05/17 6:24 PM
N-Nitroso-di-n-propylamine	0.10	U	0.10	0.2	µg/L	1.01	08/30/17 11:37 AM	09/05/17 6:24 PM
n-Nitrosodiphenylamine	0.10	U	0.10	0.2	µg/L	1.01	08/30/17 11:37 AM	09/05/17 6:24 PM
p-Chloro-m-cresol	0.10	U	0.10	0.2	µg/L	1.01	08/30/17 11:37 AM	09/05/17 6:24 PM
Pentachlorophenol	0.20	U	0.20	0.5	µg/L	1.01	08/30/17 11:37 AM	09/05/17 6:24 PM
Phenanthrene	0.10	U	0.10	0.2	µg/L	1.01	08/30/17 11:37 AM	09/05/17 6:24 PM
Phenol	0.20	U	0.20	0.5	µg/L	1.01	08/30/17 11:37 AM	09/05/17 6:24 PM
Pyrene	0.10	U	0.10	0.2	µg/L	1.01	08/30/17 11:37 AM	09/07/17 5:20 AM
Surr: 2,4,6-Tribromophenol	106		0	10-139 %REC		1.01	08/30/17 11:37 AM	09/05/17 6:24 PM
Surr: 2-Fluorophenol	81.0		0	16-134 %REC		1.01	08/30/17 11:37 AM	09/05/17 6:24 PM
Surr: 4,4-Dibromoctafluorobiphenyl	96.5		0	27-145 %REC		1.01	08/30/17 11:37 AM	09/05/17 6:24 PM
Surr: Benz(a)anthracene-d12	88.0		0	30-141 %REC		1.01	08/30/17 11:37 AM	09/05/17 6:24 PM
Surr: Phenol-d6	85.5		0	19-122 %REC		1.01	08/30/17 11:37 AM	09/05/17 6:24 PM
Surr: Tetrachloro-m-xylene	92.0		0	27-131 %REC		1.01	08/30/17 11:37 AM	09/05/17 6:24 PM
VOLATILE ORGANIC COMPOUNDS			Analyst: SJM			EPA 624		
1,1,1-Trichloroethane	0.20	U	0.20	0.5	µg/L	1	08/30/17 11:38 PM	
1,1,2,2-Tetrachloroethane	0.20	U	0.20	0.5	µg/L	1	08/30/17 11:38 PM	
1,1,2-Trichloroethane	0.50	U	0.50	1.0	µg/L	1	08/30/17 11:38 PM	
1,1-Dichloroethane	0.20	U	0.20	0.5	µg/L	1	08/30/17 11:38 PM	
1,1-Dichloroethene	0.20	U	0.20	0.5	µg/L	1	08/30/17 11:38 PM	
1,2-Dichloroethane	0.20	U	0.20	0.5	µg/L	1	08/30/17 11:38 PM	
1,2-Dichloropropane	0.20	U	0.20	0.5	µg/L	1	08/30/17 11:38 PM	
2-Chloroethylvinyl ether	0.50	U	0.50	1.0	µg/L	1	08/30/17 11:38 PM	
Benzene	0.20	U	0.20	0.5	µg/L	1	08/30/17 11:38 PM	
Bromoform	0.20	U	0.20	0.5	µg/L	1	08/30/17 11:38 PM	
Carbon Tetrachloride	0.20	U	0.20	0.5	µg/L	1	08/30/17 11:38 PM	



I.D. 56-00306 PA DEP

Laboratory Results

Geochemical Testing

Date: 08-Sep-17

CLIENT: NRG - NEW CASTLE POWER PLANT
Lab Order: G1708H84
Project: New Castle NPDES Renewal
Lab ID: G1708H84-001
Matrix: GROUNDWATER

Client Sample ID: 004 Day 2
Collection Date: 8/29/2017 12:39:00 PM
Sampled By: NRG
Date Received: 8/30/2017 9:57:29 AM

Analyses	Result	Q	MDL	PQL	Units	DF	Date Prepared	Date Analyzed
VOLATILE ORGANIC COMPOUNDS			Analyst: SJM				EPA 624	
Chlorobenzene	0.20	U	0.20	0.5	µg/L	1		08/30/17 11:38 PM
Chlorodibromomethane	0.40	U	0.40	1.0	µg/L	1		08/30/17 11:38 PM
Chloroethane	0.20	U	0.20	0.5	µg/L	1		08/30/17 11:38 PM
Chloroform	0.9		0.20	0.5	µg/L	1		08/30/17 11:38 PM
Dichlorobromomethane	0.20	U	0.20	0.5	µg/L	1		08/30/17 11:38 PM
Ethylbenzene	0.20	U	0.20	0.5	µg/L	1		08/30/17 11:38 PM
Methyl Bromide	0.50	U	0.50	1.0	µg/L	1		08/30/17 11:38 PM
Methyl Chloride	0.20	U	0.20	0.5	µg/L	1		08/30/17 11:38 PM
Methylene Chloride	0.20	U	0.20	0.5	µg/L	1		08/30/17 11:38 PM
Tetrachloroethene	0.20	U	0.20	0.5	µg/L	1		08/30/17 11:38 PM
Toluene	0.20	U	0.20	0.5	µg/L	1		08/30/17 11:38 PM
trans-1,2-Dichloroethene	0.50	U	0.50	1.0	µg/L	1		08/30/17 11:38 PM
Trichloroethene	0.20	U	0.20	0.5	µg/L	1		08/30/17 11:38 PM
Vinyl Chloride	0.20	U	0.20	0.5	µg/L	1		08/30/17 11:38 PM
trans-1,3-Dichloropropene	0.20	U	0.20	0.5	µg/L	1		08/30/17 11:38 PM
cis-1,3-Dichloropropene	0.20	U	0.20	0.5	µg/L	1		08/30/17 11:38 PM
1,3-Dichloropropylene	0.20	U	0.20	0.5	µg/L	1		08/30/17 11:38 PM
Surr: 1,2-Dichloroethane-d4	99.7		0	80-120 %REC		1		08/30/17 11:38 PM
Surr: 4-Bromofluorobenzene	98.2		0	80-120 %REC		1		08/30/17 11:38 PM
Surr: Toluene-d8	97.8		0	80-120 %REC		1		08/30/17 11:38 PM
VOLATILE ORGANIC COMPOUNDS			Analyst: SJM				EPA 624	
Acrolein	1.00	U	1.00	2.00	µg/L	1		08/30/17 11:14 PM
Acrylonitrile	0.500	U	0.500	1.00	µg/L	1		08/30/17 11:14 PM
Surr: 1,2-Dichloroethane-d4	102		0	80-120 %REC		1		08/30/17 11:14 PM
Surr: 4-Bromofluorobenzene	98.0		0	80-120 %REC		1		08/30/17 11:14 PM
Surr: Toluene-d8	97.6		0	80-120 %REC		1		08/30/17 11:14 PM
INDICATOR ORGANIC PARAMETERS			Analyst: HBP				EPA 1664	EPA 1664
Oil & Grease	1.4	U	1.4	5	mg/L	1.01	09/05/17 7:46 AM	09/05/17 3:43 PM
INDICATOR ORGANIC PARAMETERS			Analyst: NEL					SM 5310 C
Total Organic Carbon	9.7		0.20	0.5	mg/L	1		09/02/17 6:22 AM



I.D. 56-00306 PA DEP



**GEOCHEMICAL
TESTING**
Environmental and Energy Analysis

2005 N. Center Ave.
Somerset, PA 15501

814/443-1671
814/445-6666
FAX: 814/445-6729

Wednesday, September 13, 2017

Steven Brown
NRG - NEW CASTLE POWER PLANT
PO BOX 325
WEST PITTSBURGH, PA 16160

RE: New Castle NPDES Renewal

Order No.: G1708I89

Dear Steven Brown:

Geochemical Testing received 1 sample(s) on 8/31/2017 for the analyses presented in the following report.

There were no problems with the analyses and all QC data met NELAC, EPA, and laboratory specifications except where noted in the Case Narrative or Laboratory Results.

If you have any questions regarding these tests results, please feel free to call.

Sincerely,

Timothy W. Bergstresser
Director of Technical Services

Leslie A. Nemeth
Project Manager



Geochemical Testing

Date: 13-Sep-17

CLIENT: NRG - NEW CASTLE POWER PLANT
Project: New Castle NPDES Renewal
Lab Order: G1708I89

CASE NARRATIVE

No problems were encountered during analysis of this workorder, except if noted in this report.

SAMPLE RECEIPT CHECKLIST

	Response
COC is present	Yes
COC is filled out in ink and legible	Yes
COC relinquished, signature, date, and time	Yes
Samples arrived within hold time	Yes
Containers properly preserved for the requested testing	Yes
Sample containers have legible labels	Yes
Sample preservation verified	Yes
Appropriate sample containers are used	Yes
Sample container(s) received at proper temperature	Yes
Zero headspace where required	Yes
Sufficient volume for all requested analyses	Yes

Comments on the above checklist: None

Samples were not filtered in the field for dissolved metals by EPA 200.7; samples were lab filtered and then preserved to pH < 2. The field filtering requirements of 40 CFR Part 136 were not met. Consult with your regulatory agency for further guidance on the use of this data.

Legend:	ND - Not Detected	S - Spike Recovery outside accepted recovery limits
	J - Indicates an estimated value.	R - RPD outside accepted recovery limits
	U - The analyte was not detected at or above the listed concentration, which is below the laboratory quantitation limit.	E - Value above quantitation range
	B - Analyte detected in the associated Method Blank	** - Value exceeds Action Limit
	Q - Qualifier	H - Method Hold Time Exceeded
	QL - Quantitation Limit	MCL - Contaminant Limit
	DF - Dilution Factor	



Laboratory Results

Geochemical Testing

Date: 13-Sep-17

CLIENT: NRG - NEW CASTLE POWER PLANT
Lab Order: G1708I89
Project: New Castle NPDES Renewal
Lab ID: G1708I89-001
Matrix: SURFACE WATER

Client Sample ID: 004 Day 3
Collection Date: 8/30/2017 12:40:00 PM
Sampled By: NRG
Date Received: 8/31/2017 10:14:13 AM

Analyses	Result	Q	MDL	PQL	Units	DF	Date Prepared	Date Analyzed
PHYSICAL TESTS			Analyst: KLS				SM 2540 D	SM 2540 D
Total suspended solids	2		1.0	1	mg/L	1	09/01/17 1:15 PM	09/01/17 1:34 PM
INORGANIC NON-METALS			Analyst: KLS				SM 2540C	SM 2540 C
Total dissolved solids	374		1.0	2	mg/L	1	09/01/17 1:15 PM	09/01/17 1:35 PM
INDICATOR ORGANIC PARAMETERS			Analyst: DMM				SM 5210 B	SM 5210 B
BOD 5-day	3		0.8	2	mg/L	1.5	08/31/17 1:20 PM	09/05/17 12:15 PM
INDICATOR ORGANIC PARAMETERS			Analyst: MMR				Hach 8000	HACH 8000
Chemical Oxygen Demand	22		5.0	10	mg/L	1	08/31/17 11:15 PM	09/01/17 1:15 AM
INORGANIC NON-METALS			Analyst: DMM				EPA 300.0	EPA 300.0
Bromide	0.1	J	0.10	0.2	mg/L	1	08/31/17 1:00 PM	08/31/17 2:06 PM
Chloride	71		0.2	1	mg/L	1	08/31/17 1:00 PM	08/31/17 2:06 PM
Fluoride	0.1		0.05	0.1	mg/L	1	08/31/17 1:00 PM	08/31/17 2:06 PM
Sulfate	62		0.5	2	mg/L	1	08/31/17 1:00 PM	08/31/17 2:06 PM
INORGANIC NON-METALS			Analyst: BEH					ASTM D7511-09
Cyanide, total	0.010	U	0.010	0.020	mg/L	1		09/01/17 12:04 PM
COLOR			Analyst: SAG					SM 2120 B
Color	30		5.0	5.0	Color Units	1		08/31/17 11:04 AM
INORGANIC METALS			Analyst: SAG				USGS I-1230-8	USGS I-1230-85
Hexavalent Chromium	0.0010	U	0.0010	0.0020	mg/L	1	08/31/17 10:45 AM	08/31/17 11:07 AM
INORGANIC NON-METALS			Analyst: BEH				SM 5540 C	SM 5540 C
MBAS	0.03	J	0.020	0.050	mg/L as LAS	1	08/31/17 4:30 PM	08/31/17 5:50 PM
NOTES: The complete unit designation is "mg/L MBAS (calculated as LAS, molar weight 342.)"								
INORGANIC NON-METALS			Analyst: SMS					EPA 350.1
Ammonia Nitrogen	0.28		0.040	0.10	mg/L as N	1		09/01/17 12:42 PM
INORGANIC NON-METALS			Analyst: SMS				EPA 353.2	EPA 353.2
Nitrate - Nitrite	0.72		0.020	0.05	mg/L as N	1	09/05/17 8:30 AM	09/08/17 2:08 PM
INDICATOR ORGANIC PARAMETERS			Analyst: BEH					EPA 420.4
Phenolics	5.00	U	5.00	10.0	µg/L	1		09/06/17 3:02 PM
INORGANIC NON METALS			Analyst: MMR				SM 4500-S2- B	SM 4500-S2- D



I.D. 56-00306 PA DEP

Laboratory Results

Geochemical Testing

Date: 13-Sep-17

CLIENT: NRG - NEW CASTLE POWER PLANT
Lab Order: G1708I89
Project: New Castle NPDES Renewal
Lab ID: G1708I89-001
Matrix: SURFACE WATER

Client Sample ID: 004 Day 3
Collection Date: 8/30/2017 12:40:00 PM
Sampled By: NRG
Date Received: 8/31/2017 10:14:13 AM

Analyses	Result	Q	MDL	PQL	Units	DF	Date Prepared	Date Analyzed
INORGANIC NON METALS			Analyst: MMR				SM 4500-S2- B	SM 4500-S2- D
Sulfide	0.05	U	0.05	0.1	mg/L	1	09/01/17 3:20 AM	09/01/17 3:40 AM
INORGANIC NON-METALS			Analyst: SAG				EPA 351.2	EPA 351.2
Total Kjeldahl Nitrogen	0.5	U	0.5	1	mg/L as N	1	09/05/17 3:20 PM	09/06/17 5:22 PM
INORGANIC METALS			Analyst: LNG				SM 3112 B	SM 3112 B
Mercury	0.100	U	0.100	0.20	µg/L	1	09/06/17 9:05 AM	09/08/17 9:09 AM
INORGANIC METALS			Analyst: JEK				EPA 200.2	EPA 200.8
Aluminum	31.9		2.00	5.0	µg/L	1	09/05/17 10:32 AM	09/05/17 5:14 PM
Antimony	0.50	U	0.50	1.0	µg/L	1	09/05/17 10:32 AM	09/05/17 5:14 PM
Arsenic	10.9		0.50	1.0	µg/L	1	09/05/17 10:32 AM	09/05/17 5:14 PM
Barium	38.5		2.00	5.0	µg/L	1	09/05/17 10:32 AM	09/05/17 5:14 PM
Beryllium	0.50	U	0.50	1.0	µg/L	1	09/05/17 10:32 AM	09/05/17 5:14 PM
Cadmium	0.10	U	0.10	0.2	µg/L	1	09/05/17 10:32 AM	09/05/17 5:14 PM
Chromium	2.00	U	2.00	5.0	µg/L	1	09/05/17 10:32 AM	09/05/17 5:14 PM
Cobalt	0.5	J	0.20	0.5	µg/L	1	09/05/17 10:32 AM	09/05/17 5:14 PM
Copper	3.5		0.50	1.0	µg/L	1	09/05/17 10:32 AM	09/05/17 5:14 PM
Lead	0.7	J	0.20	1.0	µg/L	1	09/05/17 10:32 AM	09/05/17 5:14 PM
Manganese	188		2.50	5.0	µg/L	5	09/05/17 10:32 AM	09/07/17 2:13 PM
Molybdenum	6.3		0.50	1.0	µg/L	1	09/05/17 10:32 AM	09/05/17 5:14 PM
Nickel	3.2		0.20	0.5	µg/L	1	09/05/17 10:32 AM	09/05/17 5:14 PM
Selenium	0.50	U	0.50	1.0	µg/L	1	09/05/17 10:32 AM	09/05/17 5:14 PM
Silver	0.10	U	0.10	0.2	µg/L	1	09/05/17 10:32 AM	09/05/17 5:14 PM
Thallium	0.10	U	0.10	0.2	µg/L	1	09/05/17 10:32 AM	09/05/17 5:14 PM
Zinc	9.3		2.00	5.0	µg/L	1	09/05/17 10:32 AM	09/05/17 5:14 PM
INORGANIC METALS			Analyst: GXI				EPA 200.2	EPA 200.7
Iron, dissolved	241		20.0	50	µg/L	1	09/05/17 10:32 AM	09/06/17 7:24 PM
INORGANIC METALS			Analyst: GXI				EPA 200.2	EPA 200.7
Boron	140		10	50	µg/L	1	09/05/17 10:32 AM	09/06/17 3:40 PM
Calcium	58600		50.0	100	µg/L	1	09/05/17 10:32 AM	09/06/17 3:40 PM
Iron	438		20.0	50	µg/L	1	09/05/17 10:32 AM	09/06/17 7:20 PM
Magnesium	14800		50.0	100	µg/L	1	09/05/17 10:32 AM	09/06/17 3:40 PM
Phosphorus	281		5.00	10.0	µg/L	1	09/05/17 10:32 AM	09/06/17 3:40 PM
Hardness (SM 2340B)	207000		500	1000	µg/L	1	09/05/17 10:32 AM	09/06/17 3:40 PM
GCFID ANALYSIS			Analyst: TEW				EPA 8015	EPA 8015
Acrylamide	5.0	U	5.0	10	mg/L	1	09/05/17 10:07 AM	09/06/17 7:37 PM
Surr: 1,2-butanediol	85.9		0	50-150	%REC	1	09/05/17 10:07 AM	09/06/17 7:37 PM



I.D. 56-00306 PA DEP

Laboratory Results

Geochemical Testing

Date: 13-Sep-17

CLIENT: NRG - NEW CASTLE POWER PLANT
Lab Order: G1708I89
Project: New Castle NPDES Renewal
Lab ID: G1708I89-001
Matrix: SURFACE WATER

Client Sample ID: 004 Day 3
Collection Date: 8/30/2017 12:40:00 PM
Sampled By: NRG
Date Received: 8/31/2017 10:14:13 AM

Analyses	Result	Q	MDL	PQL	Units	DF	Date Prepared	Date Analyzed
GCFID ANALYSIS			Analyst: TEW				EPA 8015	EPA 8015
SEMI-VOLATILE COMPOUNDS			Analyst: NPT				EPA 3535A	EPA 625
1,2,4-Trichlorobenzene	0.10	U	0.10		0.2 µg/L	1	09/05/17 2:42 PM	09/08/17 6:36 PM
1,2-Dichlorobenzene	0.10	U	0.10		0.2 µg/L	1	09/05/17 2:42 PM	09/08/17 6:36 PM
1,2-Diphenylhydrazine as Azobenzene	0.10	U	0.10		0.2 µg/L	1	09/05/17 2:42 PM	09/08/17 6:36 PM
1,3-Dichlorobenzene	0.10	U	0.10		0.2 µg/L	1	09/05/17 2:42 PM	09/08/17 6:36 PM
1,4-Dichlorobenzene	0.10	U	0.10		0.2 µg/L	1	09/05/17 2:42 PM	09/08/17 6:36 PM
1,4-Dioxane	1.2		0.10		0.2 µg/L	1	09/05/17 2:42 PM	09/08/17 6:36 PM
2,4,6-Trichlorophenol	0.20	U	0.20		0.5 µg/L	1	09/05/17 2:42 PM	09/08/17 6:36 PM
2,4-Dichlorophenol	0.20	U	0.20		0.5 µg/L	1	09/05/17 2:42 PM	09/08/17 6:36 PM
2,4-Dimethylphenol	0.20	U	0.20		0.5 µg/L	1	09/05/17 2:42 PM	09/08/17 6:36 PM
2,4-Dinitrophenol	1.00	U	1.00		2.0 µg/L	1	09/05/17 2:42 PM	09/08/17 6:36 PM
2,4-Dinitrotoluene	0.10	U	0.10		0.2 µg/L	1	09/05/17 2:42 PM	09/08/17 6:36 PM
2,6-Dinitrotoluene	0.10	U	0.10		0.2 µg/L	1	09/05/17 2:42 PM	09/08/17 6:36 PM
2-Chloro-Naphthalene	0.10	U	0.10		0.2 µg/L	1	09/05/17 2:42 PM	09/08/17 6:36 PM
2-Chlorophenol	0.20	U	0.20		0.5 µg/L	1	09/05/17 2:42 PM	09/08/17 6:36 PM
2-Methyl-4,6-dinitrophenol	0.20	U	0.20		0.5 µg/L	1	09/05/17 2:42 PM	09/08/17 6:36 PM
2-Nitrophenol	0.20	U	0.20		0.5 µg/L	1	09/05/17 2:42 PM	09/08/17 6:36 PM
3,3-Dichlorobenzidine	0.10	U	0.10		0.2 µg/L	1	09/05/17 2:42 PM	09/08/17 6:36 PM
4-Bromophenylphenylether	0.10	U	0.10		0.2 µg/L	1	09/05/17 2:42 PM	09/08/17 6:36 PM
4-Chlorophenylphenylether	0.10	U	0.10		0.2 µg/L	1	09/05/17 2:42 PM	09/08/17 6:36 PM
4-Nitrophenol	0.20	U	0.20		0.5 µg/L	1	09/05/17 2:42 PM	09/08/17 6:36 PM
Acenaphthene	0.10	U	0.10		0.2 µg/L	1	09/05/17 2:42 PM	09/08/17 6:36 PM
Acenaphthylene	0.10	U	0.10		0.2 µg/L	1	09/05/17 2:42 PM	09/08/17 6:36 PM
Anthracene	0.10	U	0.10		0.2 µg/L	1	09/05/17 2:42 PM	09/08/17 6:36 PM
Benzidine	0.10	U	0.10		0.2 µg/L	1	09/05/17 2:42 PM	09/12/17 1:58 AM
Benzo(a)anthracene	0.10	U	0.10		0.2 µg/L	1	09/05/17 2:42 PM	09/08/17 6:36 PM
Benzo(a)pyrene	0.05	U	0.05		0.1 µg/L	1	09/05/17 2:42 PM	09/08/17 6:36 PM
Benzo(b)fluoranthene	0.10	U	0.10		0.2 µg/L	1	09/05/17 2:42 PM	09/08/17 6:36 PM
Benzo(g,h,i)perylene	0.10	U	0.10		0.2 µg/L	1	09/05/17 2:42 PM	09/08/17 6:36 PM
Benzo(k)fluoranthene	0.10	U	0.10		0.2 µg/L	1	09/05/17 2:42 PM	09/08/17 6:36 PM
bis(2-Chloroethoxy)methane	0.10	U	0.10		0.2 µg/L	1	09/05/17 2:42 PM	09/08/17 6:36 PM
bis(2-Chloroethyl)ether	0.10	U	0.10		0.2 µg/L	1	09/05/17 2:42 PM	09/08/17 6:36 PM
bis(2-Chloroisopropyl)ether	0.10	U	0.10		0.2 µg/L	1	09/05/17 2:42 PM	09/08/17 6:36 PM
bis(2-Ethylhexyl)phthalate	1.00	U	1.00		3.0 µg/L	1	09/05/17 2:42 PM	09/08/17 6:36 PM
Butyl benzylphthalate	1.00	U	1.00		2.0 µg/L	1	09/05/17 2:42 PM	09/08/17 6:36 PM
Chrysene	0.10	U	0.10		0.2 µg/L	1	09/05/17 2:42 PM	09/08/17 6:36 PM
Dibenzo(a,h)anthracene	0.10	U	0.10		0.2 µg/L	1	09/05/17 2:42 PM	09/08/17 6:36 PM
Diethyl Phthalate	1.00	U	1.00		2.0 µg/L	1	09/05/17 2:42 PM	09/08/17 6:36 PM
Dimethyl Phthalate	1.00	U	1.00		2.0 µg/L	1	09/05/17 2:42 PM	09/08/17 6:36 PM



I.D. 56-00306 PA DEP

Laboratory Results

Geochemical Testing

Date: 13-Sep-17

CLIENT: NRG - NEW CASTLE POWER PLANT
Lab Order: G1708I89
Project: New Castle NPDES Renewal
Lab ID: G1708I89-001
Matrix: SURFACE WATER

Client Sample ID: 004 Day 3
Collection Date: 8/30/2017 12:40:00 PM
Sampled By: NRG
Date Received: 8/31/2017 10:14:13 AM

Analyses	Result	Q	MDL	PQL	Units	DF	Date Prepared	Date Analyzed
SEMI-VOLATILE COMPOUNDS			Analyst: NPT				EPA 3535A	EPA 625
Di-N-Butyl Phthalate	1.00	U	1.00	2.0	µg/L	1	09/05/17 2:42 PM	09/08/17 6:36 PM
Di-N-Octylphthalate	1.00	U	1.00	2.0	µg/L	1	09/05/17 2:42 PM	09/08/17 6:36 PM
Dioxin Scan	None Detected		0.10	0.2	µg/L	1	09/05/17 2:42 PM	09/08/17 6:36 PM
Fluoranthene	0.10	U	0.10	0.2	µg/L	1	09/05/17 2:42 PM	09/08/17 6:36 PM
Fluorene	0.10	U	0.10	0.2	µg/L	1	09/05/17 2:42 PM	09/08/17 6:36 PM
Hexachlorobenzene	0.10	U	0.10	0.2	µg/L	1	09/05/17 2:42 PM	09/08/17 6:36 PM
Hexachlorobutadiene	0.10	U	0.10	0.2	µg/L	1	09/05/17 2:42 PM	09/08/17 6:36 PM
Hexachlorocyclopentadiene	0.10	U	0.10	0.2	µg/L	1	09/05/17 2:42 PM	09/08/17 6:36 PM
Hexachloroethane	0.10	U	0.10	0.2	µg/L	1	09/05/17 2:42 PM	09/08/17 6:36 PM
Indeno(1,2,3-cd)pyrene	0.10	U	0.10	0.2	µg/L	1	09/05/17 2:42 PM	09/08/17 6:36 PM
Isophorone	0.1	J	0.10	0.2	µg/L	1	09/05/17 2:42 PM	09/08/17 6:36 PM
Naphthalene	0.10	U	0.10	0.2	µg/L	1	09/05/17 2:42 PM	09/08/17 6:36 PM
Nitrobenzene	0.10	U	0.10	0.2	µg/L	1	09/05/17 2:42 PM	09/08/17 6:36 PM
n-Nitrosodimethylamine	0.10	U	0.10	0.2	µg/L	1	09/05/17 2:42 PM	09/08/17 6:36 PM
N-Nitroso-di-n-propylamine	0.10	U	0.10	0.2	µg/L	1	09/05/17 2:42 PM	09/08/17 6:36 PM
n-Nitrosodiphenylamine	0.10	U	0.10	0.2	µg/L	1	09/05/17 2:42 PM	09/08/17 6:36 PM
p-Chloro-m-cresol	0.10	U	0.10	0.2	µg/L	1	09/05/17 2:42 PM	09/08/17 6:36 PM
Pentachlorophenol	0.20	U	0.20	0.5	µg/L	1	09/05/17 2:42 PM	09/08/17 6:36 PM
Phenanthrene	0.10	U	0.10	0.2	µg/L	1	09/05/17 2:42 PM	09/08/17 6:36 PM
Phenol	0.20	U	0.20	0.5	µg/L	1	09/05/17 2:42 PM	09/08/17 6:36 PM
Pyrene	0.10	U	0.10	0.2	µg/L	1	09/05/17 2:42 PM	09/08/17 6:36 PM
Surr: 2,4,6-Tribromophenol	91.0		0	10-139 %REC		1	09/05/17 2:42 PM	09/08/17 6:36 PM
Surr: 2-Fluorophenol	84.5		0	16-134 %REC		1	09/05/17 2:42 PM	09/08/17 6:36 PM
Surr: 4,4-Dibromoctafluorobiphenyl	87.5		0	27-145 %REC		1	09/05/17 2:42 PM	09/08/17 6:36 PM
Surr: Benz(a)anthracene-d12	71.5		0	30-141 %REC		1	09/05/17 2:42 PM	09/08/17 6:36 PM
Surr: Phenol-d6	74.5		0	19-122 %REC		1	09/05/17 2:42 PM	09/08/17 6:36 PM
Surr: Tetrachloro-m-xylene	80.0		0	27-131 %REC		1	09/05/17 2:42 PM	09/08/17 6:36 PM
VOLATILE ORGANIC COMPOUNDS			Analyst: SJM					EPA 624
1,1,1-Trichloroethane	0.20	U	0.20	0.5	µg/L	1		08/31/17 10:42 PM
1,1,2,2-Tetrachloroethane	0.20	U	0.20	0.5	µg/L	1		08/31/17 10:42 PM
1,1,2-Trichloroethane	0.50	U	0.50	1.0	µg/L	1		08/31/17 10:42 PM
1,1-Dichloroethane	0.20	U	0.20	0.5	µg/L	1		08/31/17 10:42 PM
1,1-Dichloroethene	0.20	U	0.20	0.5	µg/L	1		08/31/17 10:42 PM
1,2-Dichloroethane	0.20	U	0.20	0.5	µg/L	1		08/31/17 10:42 PM
1,2-Dichloropropane	0.20	U	0.20	0.5	µg/L	1		08/31/17 10:42 PM
2-Chloroethylvinyl ether	0.50	U	0.50	1.0	µg/L	1		08/31/17 10:42 PM
Benzene	0.20	U	0.20	0.5	µg/L	1		08/31/17 10:42 PM
Bromoform	0.20	U	0.20	0.5	µg/L	1		08/31/17 10:42 PM
Carbon Tetrachloride	0.20	U	0.20	0.5	µg/L	1		08/31/17 10:42 PM
Chlorobenzene	0.20	U	0.20	0.5	µg/L	1		08/31/17 10:42 PM



I.D. 56-00306 PA DEP

Laboratory Results

Geochemical Testing

Date: 13-Sep-17

CLIENT: NRG - NEW CASTLE POWER PLANT
Lab Order: G1708I89
Project: New Castle NPDES Renewal
Lab ID: G1708I89-001
Matrix: SURFACE WATER

Client Sample ID: 004 Day 3
Collection Date: 8/30/2017 12:40:00 PM
Sampled By: NRG
Date Received: 8/31/2017 10:14:13 AM

Analyses	Result	Q	MDL	PQL	Units	DF	Date Prepared	Date Analyzed
VOLATILE ORGANIC COMPOUNDS			Analyst: SJM				EPA 624	
Chlorodibromomethane	0.40	U	0.40	1.0	µg/L	1		08/31/17 10:42 PM
Chloroethane	0.20	U	0.20	0.5	µg/L	1		08/31/17 10:42 PM
Chloroform	1.2		0.20	0.5	µg/L	1		08/31/17 10:42 PM
Dichlorobromomethane	0.20	U	0.20	0.5	µg/L	1		08/31/17 10:42 PM
Ethylbenzene	0.20	U	0.20	0.5	µg/L	1		08/31/17 10:42 PM
Methyl Bromide	0.50	U	0.50	1.0	µg/L	1		08/31/17 10:42 PM
Methyl Chloride	0.20	U	0.20	0.5	µg/L	1		08/31/17 10:42 PM
Methylene Chloride	0.20	U	0.20	0.5	µg/L	1		08/31/17 10:42 PM
Tetrachloroethene	0.4	J	0.20	0.5	µg/L	1		08/31/17 10:42 PM
Toluene	0.20	U	0.20	0.5	µg/L	1		08/31/17 10:42 PM
trans-1,2-Dichloroethene	0.50	U	0.50	1.0	µg/L	1		08/31/17 10:42 PM
Trichloroethene	0.20	U	0.20	0.5	µg/L	1		08/31/17 10:42 PM
Vinyl Chloride	0.20	U	0.20	0.5	µg/L	1		08/31/17 10:42 PM
trans-1,3-Dichloropropene	0.20	U	0.20	0.5	µg/L	1		08/31/17 10:42 PM
cis-1,3-Dichloropropene	0.20	U	0.20	0.5	µg/L	1		08/31/17 10:42 PM
1,3-Dichloropropylene	0.20	U	0.20	0.5	µg/L	1		08/31/17 10:42 PM
Surr: 1,2-Dichloroethane-d4	100		0	80-120 %REC		1		08/31/17 10:42 PM
Surr: 4-Bromofluorobenzene	99.8		0	80-120 %REC		1		08/31/17 10:42 PM
Surr: Toluene-d8	98.8		0	80-120 %REC		1		08/31/17 10:42 PM
VOLATILE ORGANIC COMPOUNDS			Analyst: SJM				EPA 624	
Acrolein	1.00	U	1.00	2.00	µg/L	1		08/31/17 11:06 PM
Acrylonitrile	0.500	U	0.500	1.00	µg/L	1		08/31/17 11:06 PM
Surr: 1,2-Dichloroethane-d4	100		0	80-120 %REC		1		08/31/17 11:06 PM
Surr: 4-Bromofluorobenzene	100		0	80-120 %REC		1		08/31/17 11:06 PM
Surr: Toluene-d8	98.7		0	80-120 %REC		1		08/31/17 11:06 PM
INDICATOR ORGANIC PARAMETERS			Analyst: HBP				EPA 1664	EPA 1664
Oil & Grease	1.4	U	1.4	5	mg/L	1.02	09/05/17 12:56 PM	09/06/17 4:32 PM
INDICATOR ORGANIC PARAMETERS			Analyst: NEL				SM 5310 C	
Total Organic Carbon	9.2		0.20	0.5	mg/L	1		09/12/17 12:49 AM



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